Municipal Employees' Retirement System of Michigan

Annual Actuarial Valuation Report
December 31, 2019 - Charlotte, City of (2301)

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Spring, 2020

Charlotte, City of

In care of:
Municipal Employees' Retirement System of Michigan
1134 Municipal Way
Lansing, Michigan 48917

This report presents the results of the Annual Actuarial Valuation, prepared for Charlotte, City of (2301) as of December 31, 2019. The report includes the determination of liabilities and contribution rates resulting from the participation in the Municipal Employees' Retirement System of Michigan ("MERS"). This report contains the minimum actuarially determined contribution requirement, in alignment with the MERS Plan Document, Actuarial Policy, and the Michigan Constitution and governing statutes. Charlotte, City of is responsible for the employer contributions needed to provide MERS benefits for its employees and former employees.

The purposes of this valuation are to:

- Measure funding progress as of December 31, 2019,
- Establish contribution requirements for the fiscal year beginning July 1, 2021,
- Provide information regarding the identification and assessment of risk,
- Provide actuarial information in connection with applicable Governmental Accounting Standards Board (GASB) statements, and
- Provide information to assist the local unit of government with state reporting requirements.

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

The findings in this report are based on data and other information through December 31, 2019. The valuation was based upon information furnished by MERS 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 MERS.

The Municipal Employees' Retirement Act, PA 427 of 1984 and the MERS' Plan Document Article VI sec. 71 (1)(d), provides the MERS Board with the authority to set actuarial assumptions and methods after consultation with the actuary. As the fiduciary of the plan, MERS Retirement Board sets certain assumptions for funding and GASB purposes. These assumptions are checked regularly through a comprehensive study, called an Experience Study. A study was completed in 2015, as prepared by the prior actuary, and is the basis of the demographic assumptions and methods currently in place. At the February 28, 2019 board meeting, the MERS Retirement Board adopted new economic assumptions effective with the December 31, 2019 annual actuarial valuation, which will impact contributions beginning in 2021. **At the February 27, 2020 board meeting, the MERS Retirement Board adopted demographic assumptions effective with the December 31, 2020 annual actuarial valuation, which will impact contributions beginning in 2022.** An illustration of the potential impact is found in this report.

The Michigan Department of Treasury provides required assumptions to be used for purposes of Public Act 202 reporting. These assumptions are for reporting purposes only and do not impact required contributions. Please refer to the State Reporting page found at the end of this report for information for this filing.

For a full list of all the assumptions used, please refer to the division-specific assumptions described in table(s) in this report, and to the Appendix on the MERS website at: http://www.mersofmich.com/Portals/0/Assets/Resources/AAV-Appendix/MERS-2019AnnualActuarialValuation-Appendix.pdf

The actuarial assumptions used for this valuation are reasonable for purposes of the measurement.

This report does not reflect the recent and still developing impact of COVID-19, which is likely to influence demographic and economic experience, at least in the short-term. We will continue to monitor these developments and their impact on the MERS Defined Benefit and Hybrid plans. Actual experience will be reflected in each subsequent annual valuation, as experience emerges.

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

David T. Kausch, Rebecca L. Stouffer, and Mark Buis are members of the American Academy of Actuaries. These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein. The signing actuaries are independent of the plan sponsor. GRS maintains independent consulting agreements with certain local units of government for services unrelated to the actuarial consulting services provided in this report.

The Retirement Board of the Municipal Employees' Retirement System of Michigan confirms that the System provides for payment of the required employer contribution as described in Section 20m of Act No. 314 of 1965 (MCL 38.1140m).

This information is purely actuarial in nature. It is not intended to serve as a substitute for legal, accounting or investment advice.

This report was prepared at the request of the MERS Retirement Board and may be provided only in its entirety by the municipality to other interested parties (MERS customarily provides the full report on request to associated third parties such as the auditor for the municipality). GRS is not responsible for the consequences of any unauthorized use. 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.

If you have reason to believe that the plan provisions are incorrectly described, that important plan provisions relevant to this valuation are not described, that conditions have changed since the calculations were made, that the information provided in this report is inaccurate or is in anyway incomplete, or if you need further information in order to make an informed decision on the subject matter in this report, please contact your Regional Manager at 1.800.767.MERS (6377).

Sincerely,

David T Kausch

David T. Kausch, FSA, FCA, EA, MAAA

Rebecca L. Stouffer

Rebecca L. Stouffer, ASA, FCA, MAAA

Mark Buis

Mark Buis, FSA, FCA, EA, MAAA

Table of Contents

Executive Summary

Funded Ratio

The funded ratio of a plan is the percentage of the dollar value of the actuarial accrued liability that is covered by the actuarial value of assets. While funding ratio may be a useful plan measurement, understanding a plan's funding trend may be more important than a particular point in time. Refer to Table 7 to find a history of this information.

	12/31/2019	12/31/2018
Funded Ratio*	53%	56%

* Reflects assets from Surplus divisions, if any.

Throughout this report are references to valuation results generated prior to the 2018 valuation date. Results prior to 2018 were received directly from the prior actuary or extracted from the previous valuation system by MERS's technology service provider.

Required Employer Contributions:

Your required employer contributions are shown in the following table. Employee contributions, if any, are in addition to the employer contributions. Changes to the actuarial assumptions and methods based on the 2015 Experience Study are fully phased-in with this valuation.

Effective this valuation, the MERS Retirement Board has adopted a reduction in the investment rate of return assumption from 7.75% to 7.35% and a reduction in the rate of wage inflation from 3.75% to 3.00%. Changes to these assumptions are effective for contributions beginning in 2021 and may be phased-in. This valuation reflects the first year of phase-in.

By default, MERS will invoice you based on the amount in the “No Phase-in” columns. This amount will be considered the minimum required contribution unless you request to be billed the “Phase-in” rates. If you wish to be billed using the phased-in rates, please contact MERS, at which point the alternate minimum required contribution will be the amount in the “Phase-in” columns. Please note that this approach is different than in years past.

	Percentage of Payroll				Monthly $ Based on Projected Payroll			
	Phase-in	No Phase-in	Phase-in	No Phase-in	Phase-in	No Phase-in	Phase-in	No Phase-in
Valuation Date:	12/31/2019	12/31/2019	12/31/2018	12/31/2018	12/31/2019	12/31/2019	12/31/2018	12/31/2018
Fiscal Year Beginning:	July 1, 2021	July 1, 2021	July 1, 2020	July 1, 2020	July 1, 2021	July 1, 2021	July 1, 2020	July 1, 2020
Division								
01 - SEIU,DPW,WWTP	-	-	-	-	$ 18,126	$ 19,062	$ 14,874	$ 15,179
02 - Police NSU	-	-	-	-	16,329	17,310	12,975	13,209
05 - Fire	-	-	-	-	9,462	10,086	0	0
10 - Non Union	-	-	-	-	24,253	25,870	30,133	30,763
12 - SEIU Clrcl	-	-	-	-	627	756	561	627
21 - FOP Sprvsn	-	-	-	-	12,559	13,432	12,613	12,826
HA - Police Union After 7/1/2012	0.00%	0.00%	0.02%	0.02%	0	0	6	6
HB - SEIU Union DPW/Cler aft 7/1/12	0.00%	0.00%	1.69%	1.69%	39	0	912	912
HC - Fire & Pol Non-Un aft 4/1/13	4.45%	4.29%	4.50%	4.50%	1,226	1,181	770	770
HD - Envir Srv	5.60%	5.54%	5.45%	5.45%	276	273	239	239
Municipality Total					**$ 82,897**	**$ 87,970**	**$ 73,083**	**$ 74,531**

Employee contribution rates:

	Employee Contribution Rate	
Valuation Date:	12/31/2019	12/31/2018
Division		
01 - SEIU,DPW,WWTP	2.25%	2.25%
02 - Police NSU	10.00%	10.00%
05 - Fire	7.20%	0.00%
10 - Non Union	7.20%	7.20%
12 - SEIU Clrcl	2.25%	2.25%
21 - FOP Sprvsn	13.00%	13.00%
HA - Police Union After 7/1/2012	0.00%	0.00%
HB - SEIU Union DPW/Cler aft 7/1/12	0.00%	0.00%
HC - Fire & Pol Non-Un aft 4/1/13	0.00%	0.00%
HD - Envir Srv	0.00%	0.00%

The employer may contribute more than the minimum required contributions, as these additional contributions will earn investment income and may result in lower future contribution requirements. Employers making contributions in excess of the minimum requirements may elect to apply the excess contribution immediately to a particular division, or segregate the excess into one or more of what MERS calls “Surplus” divisions. An election in the first case would immediately reduce any unfunded accrued liability and lower the amortization payments throughout the remaining amortization period. An election to set up Surplus divisions would not immediately lower future contributions, however the assets from the Surplus division could be transferred to an unfunded division in the future to reduce the unfunded liability in future years, or to be used to pay all or a portion of the minimum required contribution in a future year. For purposes of this report, the assets in any Surplus division have been included in the municipality's total assets, unfunded accrued liability and funded status, however, these assets are not used in calculating the minimum required contribution.

MERS strongly encourages employers to contribute more than the minimum contribution shown above.

Assuming that experience of the plan meets actuarial assumptions:
• To accelerate to a 100% funding ratio in 10 years, estimated monthly employer contributions for the fiscal year beginning in 2021 for the entire employer would be $136,137, instead of $87,970.

How and Why Do These Numbers Change?

In a defined benefit plan contributions vary from one annual actuarial valuation to the next as a result of the following:

- Changes in benefit provisions (see Table 2)
- Changes in actuarial assumptions and methods (see the Appendix)
- Experience of the plan (investment experience and demographic experience); this is the difference between actual experience of the plan and the actuarial assumptions.

Comments on Investment Rate of Return Assumption

A defined benefit plan is funded by employer contributions, participant contributions, and investment earnings. Investment earnings have historically provided a significant portion of the funding. The larger the share of benefits being provided from investment returns, the smaller the required contributions, and vice versa. Determining the contributions required to prefund the promised retirement benefits requires an assumption of what investment earnings are expected to add to the fund over a long period of time. This is called the **Investment Return Assumption**.

The MERS Investment Return Assumption is **7.35%** per year. This, along with all of our other actuarial assumptions, is reviewed at least every five years in an Experience Study that compares the assumptions used against actual experience and recommends adjustments if necessary. If your municipality would like to explore contributions at lower assumed investment return assumptions, please review the "what if" projection scenarios later in this report.

Assumption Change in 2019

At the February 28, 2019 board meeting, the MERS Retirement Board adjusted key economic assumptions. These assumptions, in particular the investment return assumption, have a significant effect on a plan's required contribution and funding level. Historically low interest rates, along with high equity market valuations, have led to reductions in projected returns for most asset classes. This has resulted in a Board adopted reduction in the investment rate of return assumption from 7.75% to 7.35%, effective with the December 31, 2019 valuation, first impacting 2021 contributions. The Board also changed the assumed rate of wage inflation from 3.75% to 3.00%, with the same effective date.

Assumption Change in 2020

A 5-year experience study analyzing historical experience from 2013 through 2018 was completed in February 2020. In addition to changes to the economic assumptions which will take effect with the Fiscal year 2021 contribution rates, the experience study recommends updated demographic assumptions, including adjustments to the following actuarial assumptions: mortality, retirement, disability, and termination rates. A complete description of the proposed assumptions may be found in the Appendix to the valuation. Changes to the demographic assumptions resulting from the experience study have been approved by the MERS Retirement Board and are to be effective beginning with the December 31, 2020 actuarial valuation first impacting 2022 contributions. This report includes a "What If" scenario of the approved 2020 assumption changes in an effort to show employers the anticipated impact on contribution rates.

Comments on Asset Smoothing

To avoid dramatic spikes and dips in annual contribution requirements due to short term fluctuations in asset markets, MERS applies a technique called **asset smoothing**. This spreads out each year's investment gains or losses over the prior year and the following four years. This smoothing method is used to determine your actuarial value of assets (valuation assets), which is then used to determine both your funded ratio and your required contributions. The (smoothed) **actuarial rate of return for 2019 was 4.77%, while the actual market rate of return was 13.41%.** To see historical details of the market rate of return, compared to the smoothed actuarial rate of return, refer to this report's Appendix, or view the "How Smoothing Works" video on the Defined Benefit resource page of the MERS website.

As of December 31, 2019, the actuarial value of assets is 101% of market value due to asset smoothing. This means that meeting the actuarial assumption in the next few years will require average annual market returns that exceed the 7.35% investment return assumption, or contribution requirements will continue to increase.

If the December 31, 2019 valuation results were based on market value instead of actuarial value:

- The funded percent of your entire municipality would be 52% (instead of 53%); and
- Your total employer contribution requirement for the fiscal year starting July 1, 2021 would be $1,068,708 (instead of $1,055,640).

Alternate Scenarios to Estimate the Potential Volatility of Results ("What If Scenarios")

The calculations in this report are based on assumptions about long-term economic and demographic behavior. These assumptions will never materialize in a given year, except by coincidence. Therefore the results will vary from one year to the next. The volatility of the results depends upon the characteristics of the plan. For example:

- Open divisions that have substantial assets compared to their active employee payroll will have more volatile employer contribution rates due to investment return fluctuations.
- Open divisions that have substantial accrued liability compared to their active employee payroll will have more volatile employer contribution rates due to demographic experience fluctuations.
- Small divisions will have more volatile contribution patterns than larger divisions because statistical fluctuations are relatively larger among small populations.
- Shorter amortization periods result in more volatile contribution patterns.

Many assumptions are important in determining the required employer contributions. In the following table, we show the impact of varying the Investment Return assumption and the demographic assumptions. Lower investment returns would result in higher required employer contributions, and vice-versa. Alternate demographic assumptions may result in higher or lower employer contributions depending on the demographic characteristics of the plan participants.

The relative impact of the economic and demographic scenarios below will vary from year to year, as the participant demographics change. The impact of each scenario should be analyzed for a given year, not from year to year. The results in the table are based on the December 31, 2019 valuation, and are for the municipality in total, not by division. These results do not reflect a phase in of the impact of the new actuarial assumptions.

It is important to note that calculations in this report are mathematical estimates based upon assumptions regarding future events, which may or may not materialize. Actuarial calculations can and do vary from one valuation to the next, sometimes significantly depending on the group's size. Projections are not predictions. Future valuations will be based on actual future experience.

In addition to economic assumption changes effective with Fiscal Year 2021 contributions, the Retirement Board has also adopted a change to certain demographic and other assumptions effective for the December 31, 2020 valuation which will impact the Fiscal Year 2022 contributions. Please see the section labeled "Assumption Change in 2020" for more information. The scenario shown using these assumptions as of December 31, 2019 is illustrative only. The actual impact of this change when reflected in the 2020 Annual Actuarial Valuation report will be different.

	Assumed Future Annual Smoothed Rate of Investment Return		
12/31/2019 Valuation Results	**Lower Future Annual Returns[3]**	**2020 Adopted Demographic Assumptions**	**Valuation Assumptions**
Investment Return Assumption	**5.35%**	**7.35%**	**7.35%**
Wage Increase Assumption	**3.00%**	**3.00%**	**3.00%**
Accrued Liability	$ 29,884,985	$ 24,629,340	$ 24,025,327
Valuation Assets[1]	$ 12,746,492	$ 12,746,492	$ 12,746,492
Unfunded Accrued Liability	$ 17,138,493	$ 11,882,848	$ 11,278,835
Funded Ratio	43%	52%	53%
Monthly Normal Cost	$ 31,093	$ 15,626	$ 16,067
Monthly Amortization Payment	$ 93,962	$ 75,906	$ 71,544
Total Employer Contribution[2]	$ 125,055	$ 92,334	$ 87,970

[1] The Valuation Assets include assets from Surplus divisions, if any.

[2] If assets exceed accrued liabilities for a division, the division may have an overfunding credit to reduce the division's employer contribution requirement. If the overfunding credit is larger than the normal cost, the division's full credit is included in the municipality's amortization payment above but the division's total contribution requirement is zero. This can cause the displayed normal cost and amortization payment to not add up to the displayed total employer contribution.

[3] Based on current demographic assumptions.

Projection Scenarios

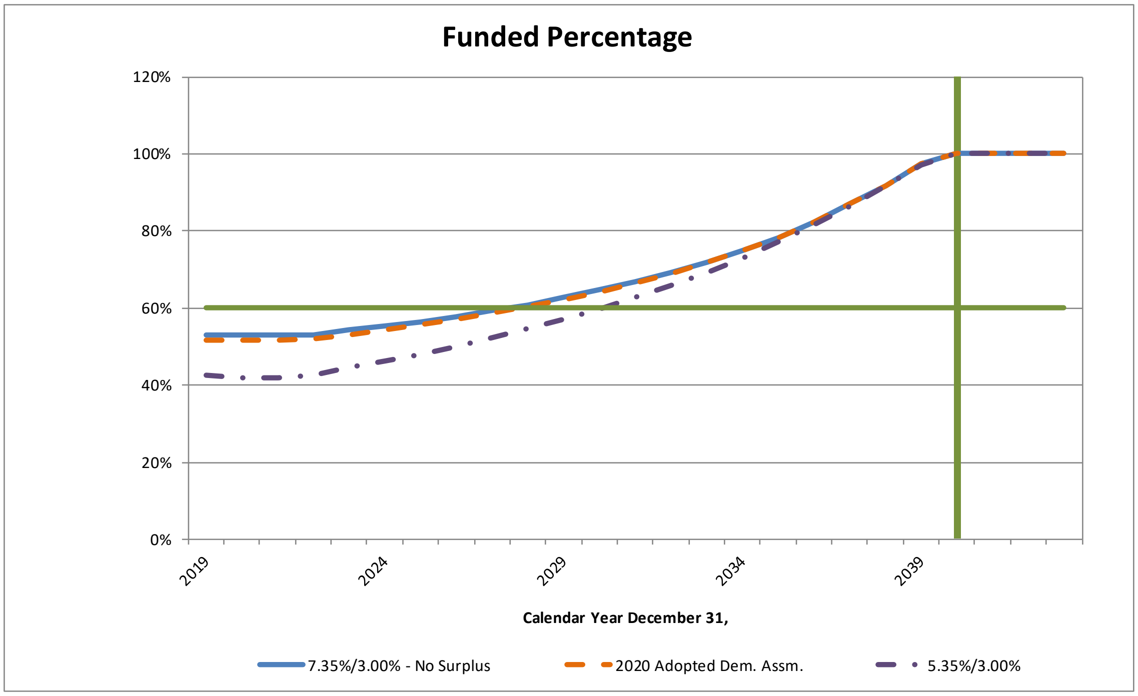
The next two pages show projections of the plan's funded ratio and computed employer contributions under the actuarial assumptions used in the valuation and alternate economic and demographic assumption scenarios. All three projections take into account the past investment losses that will continue to affect the actuarial rate of return in the short term.

The 7.35%/3.00% scenario provides an estimate of computed employer contributions based on current actuarial assumptions, and a projected 7.35% market return. The other two scenarios may be useful if the municipality chooses to budget more conservatively, and make contributions in addition to the minimum requirements. The 2020 adopted demographic assumption and 5.35%/3.00% projection scenarios provide an indication of the potential required employer contribution if these assumptions were met over the long-term.

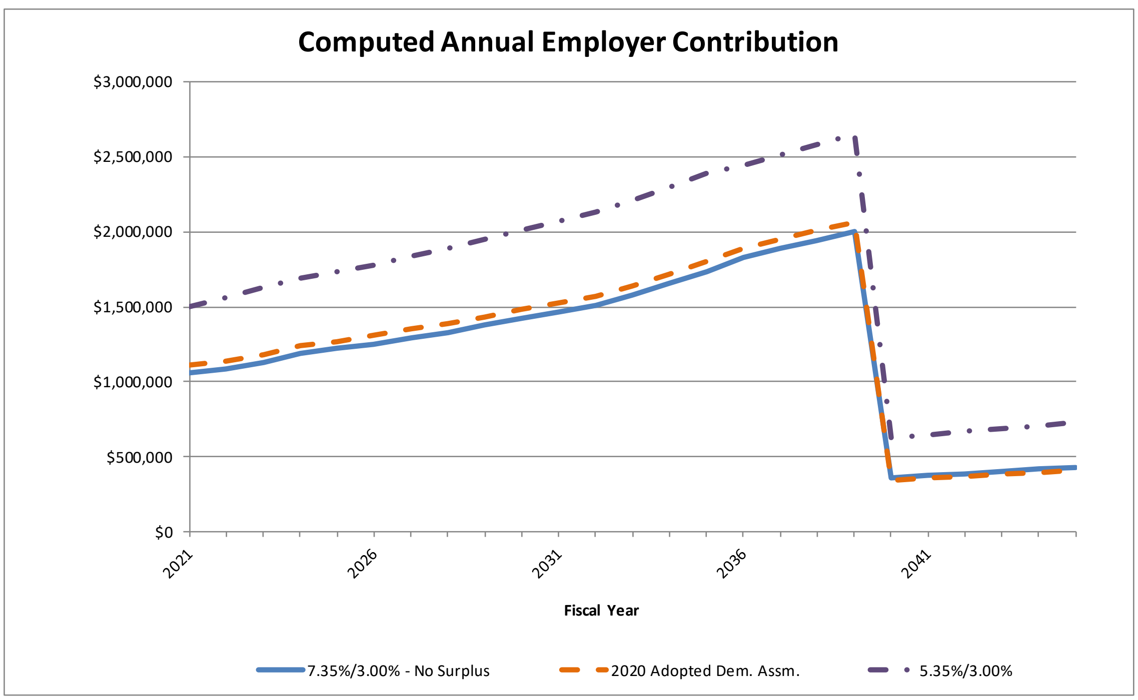
Valuation Year Ending 12/31	Fiscal Year Beginning 7/1	Actuarial Accrued Liability	Valuation Assets[2]	Funded Percentage	Computed Annual Employer Contribution
7.35%[1]/3.00% - Current Demographic Assumptions					
NO 5-YEAR PHASE-IN					
2019	2021	$ 24,025,327	$ 12,746,492	53%	$ 1,055,640
2020	2022	$ 24,300,000	$ 12,800,000	53%	$ 1,090,000
2021	2023	$ 24,500,000	$ 13,000,000	53%	$ 1,130,000
2022	2024	$ 24,800,000	$ 13,200,000	53%	$ 1,190,000
2023	2025	$ 25,100,000	$ 13,600,000	54%	$ 1,220,000
2024	2026	$ 25,300,000	$ 14,000,000	55%	$ 1,250,000
7.35%[1]/3.00% - Adopted 2020 Demographic Assumptions					
NO 5-YEAR PHASE-IN					
2019	2021	$ 24,629,340	$ 12,746,492	52%	$ 1,108,008
2020	2022	$ 24,900,000	$ 12,800,000	52%	$ 1,140,000
2021	2023	$ 25,200,000	$ 13,000,000	52%	$ 1,180,000
2022	2024	$ 25,600,000	$ 13,300,000	52%	$ 1,240,000
2023	2025	$ 25,900,000	$ 13,700,000	53%	$ 1,270,000
2024	2026	$ 26,200,000	$ 14,200,000	54%	$ 1,310,000
5.35%[1]/3.00% - Current Demographic Assumptions					
NO 5-YEAR PHASE-IN					
2019	2021	$ 29,884,985	$ 12,746,492	43%	$ 1,500,660
2020	2022	$ 30,200,000	$ 12,600,000	42%	$ 1,560,000
2021	2023	$ 30,500,000	$ 12,800,000	42%	$ 1,630,000
2022	2024	$ 30,800,000	$ 13,100,000	43%	$ 1,690,000
2023	2025	$ 31,100,000	$ 13,800,000	44%	$ 1,730,000
2024	2026	$ 31,400,000	$ 14,500,000	46%	$ 1,780,000

[1] Represents both the interest rate for discounting liabilities and the future investment return assumption on the Market Value of assets.

[2] Valuation Assets do not include assets from Surplus divisions, if any.



Notes:
All projected funded percentages are shown with no phase-in.
The green indicator lines have been added at 60% funded and 21 years following the valuation date for PA 202 purposes.



Notes:
All projected contributions are shown with no phase-in.

Table 1: Employer Contribution Details For the Fiscal Year Beginning July 1, 2021

Division	Total Normal Cost	Employee Contribut. Rate	Employer Contributions[1]			Computed Employer Contribut. With Phase-In	Blended ER Rate No Phase-In[5]	Blended ER Rate With Phase-In[5]	Employee Contribut. Conversion Factor[2]
			Employer Normal Cost	Payment of the Unfunded Accrued Liability[4]	Computed Employer Contribut. No Phase-In				
Percentage of Payroll									
01 - SEIU,DPW,WWTP	9.80%	2.25%	-	-	-	-	22.51%	21.34%	
02 - Police NSU	15.77%	10.00%	-	-	-	-	37.87%	35.56%	
05 - Fire	10.49%	7.20%	-	-	-	-	49.05%	46.15%	
10 - Non Union	12.13%	7.20%	-	-	-	-	49.05%	46.15%	
12 - SEIU Clrcl	10.61%	2.25%	-	-	-	-	22.51%	21.34%	
21 - FOP Sprvsn	16.77%	13.00%	-	-	-	-	37.87%	35.56%	
HA - Police Union After 7/1/2012	9.23%	0.00%	9.23%	-9.91%	0.00%	0.00%	37.87%	35.56%	
HB - SEIU Union DPW/Cler aft 7/1/12	5.40%	0.00%	5.40%	-5.50%	0.00%	0.00%	22.51%	21.34%	
HC - Fire & Pol Non-Un aft 4/1/13	7.78%	0.00%	7.78%	-3.49%	4.29%	4.45%	49.05%	46.15%	
HD - Envir Srv	5.54%	0.00%	5.54%	0.00%	5.54%	5.60%			
Estimated Monthly Contribution[3]									
01 - SEIU,DPW,WWTP			$ 2,132	$ 16,930	$ 19,062	$ 18,126			
02 - Police NSU			1,344	15,966	17,310	16,329			
05 - Fire			256	9,830	10,086	9,462			
10 - Non Union			1,989	23,881	25,870	24,253			
12 - SEIU Clrcl			346	410	756	627			
21 - FOP Sprvsn			468	12,964	13,432	12,559			
HA - Police Union After 7/1/2012			4,122	(4,427)	0	0			
HB - SEIU Union DPW/Cler aft 7/1/12			2,993	(3,047)	0	39			
HC - Fire & Pol Non-Un aft 4/1/13			2,144	(963)	1,181	1,226			
HD - Envir Srv			273	0	273	276			
Total Municipality			**$ 16,067**	**$ 71,544**	**$ 87,970**	**$ 82,897**			
Estimated Annual Contribution[3]			**$ 192,804**	**$ 858,528**	**$ 1,055,640**	**$ 994,764**			

1 The above employer contribution requirements are in addition to the employee contributions, if any.

2 If employee contributions are increased/decreased by 1.00% of pay, the employer contribution requirement will decrease/increase by the Employee Contribution Conversion Factor. The conversion factor is usually under 1%, because employee contributions may be refunded at termination of employment, and not used to fund retirement pensions. Employer contributions will all be used to fund pensions.

3 For divisions that are open to new hires, estimated contributions are based on projected fiscal year payroll. Actual contributions will be based on actual reported monthly pays, and will be different from the above amounts. For divisions that will have no new hires (i.e., closed divisions), invoices will be based on the above dollar amounts which are based on projected fiscal year payroll. See description of Open Divisions and Closed Divisions in the Appendix.

4 Note that if the overfunding credit is larger than the normal cost, the full credit is shown above but the total contribution requirement is zero. This will cause the

displayed normal cost and unfunded accrued liability contributions to not add across.

[5] For linked divisions, the employer will be invoiced the Computed Employer Contribution No Phase-in rate shown above for each linked division (a contribution rate for the open division; a contribution dollar for the closed-but-linked division), unless the employer elects to contribute the Blended Employer Contribution rate shown above, by contacting MERS at 800-767-MERS (6377).

Please see the Comments on Asset Smoothing in the Executive Summary of this report.

Table 2: Benefit Provisions

01 - SEIU,DPW,WWTP: Closed to new hires, linked to Division HB

	2019 Valuation	2018 Valuation
Benefit Multiplier:	2.25% Multiplier (80% max)	2.25% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	55/25	55/25
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	2.25%	2.25%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

02 - Police NSU: Closed to new hires, linked to Division HA

	2019 Valuation	2018 Valuation
Benefit Multiplier:	3.00% Multiplier (80% max)	3.00% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	50/25	50/25
Early Retirement (Reduced):	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	10.00%	10.00%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

05 - Fire: Closed to new hires, linked to Division HC

	2019 Valuation	2018 Valuation
Benefit Multiplier:	2.50% Multiplier (80% max)	
Normal Retirement Age:	60	
Vesting:	10 years	
Early Retirement (Unreduced):	55/20	
Early Retirement (Reduced):	50/25	
	55/15	
Final Average Compensation:	5 years	
Employee Contributions:	7.20%	
Act 88:	Yes (Adopted 9/9/1968)	

10 - Non Union: Closed to new hires, linked to Division HC

	2019 Valuation	2018 Valuation
Benefit Multiplier:	2.50% Multiplier (80% max)	2.50% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	55/20	55/20
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	7.20%	7.20%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

12 - SEIU Clrcl: Closed to new hires, linked to Division HB

	2019 Valuation	2018 Valuation
Benefit Multiplier:	2.25% Multiplier (80% max)	2.25% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	55/20	55/20
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	2.25%	2.25%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

21 - FOP Sprvsn: Closed to new hires, linked to Division HA

	2019 Valuation	2018 Valuation
Benefit Multiplier:	3.00% Multiplier (80% max)	3.00% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	10 years	10 years
Early Retirement (Unreduced):	50/25	50/25
Early Retirement (Reduced):	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	13.00%	13.00%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

HA - Police Union After 7/1/2012: Open Division, linked to Division 02, 21

	2019 Valuation	2018 Valuation
Benefit Multiplier:	1.75% Multiplier (no max)	1.75% Multiplier (no max)
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	55/25	55/25
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

HB - SEIU Union DPW/Cler aft 7/1/12: Open Division, linked to Division 01, 12

	2019 Valuation	2018 Valuation
Benefit Multiplier:	1.25% Multiplier (no max)	1.25% Multiplier (no max)
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	-	-
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

HC - Fire & Pol Non-Un aft 4/1/13: Open Division, linked to Division 05, 10

	2019 Valuation	2018 Valuation
Benefit Multiplier:	1.75% Multiplier (no max)	1.75% Multiplier (no max)
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	55/25	55/25
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

HD - Envir Srv: Open Division

	2019 Valuation	2018 Valuation
Benefit Multiplier:	1.25% Multiplier (no max)	1.25% Multiplier (no max)
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	55/25	55/25
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 9/9/1968)	Yes (Adopted 9/9/1968)

Table 3: Participant Summary

Division	2019 Valuation Number	2019 Valuation Annual Payroll[1]	2018 Valuation Number	2018 Valuation Annual Payroll[1]	2019 Valuation Average Age	2019 Valuation Average Benefit Service[2]	2019 Valuation Average Eligibility Service[2]
01 - SEIU,DPW,WWTP							
Active Employees	6	$ 346,649	5	$ 279,689	46.6	15.2	15.2
Vested Former Employees	1	8,974	1	8,974	54.4	11.4	30.3
Retirees and Beneficiaries	19	352,105	19	352,104	70.9		
Pending Refunds	1		1				
02 - Police NSU							
Active Employees	4	$ 271,189	3	$ 191,531	38.2	13.3	13.9
Vested Former Employees	4	46,787	3	37,789	43.7	7.5	13.6
Retirees and Beneficiaries	14	324,671	14	324,671	67.6		
Pending Refunds	0		1				
05 - Fire							
Active Employees	1	$ 88,497	0	$ 0	31.0	12.3	12.3
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	8	244,938	0	0	63.7		
Pending Refunds	0		0				
10 - Non Union							
Active Employees	7	$ 525,137	11	$ 778,551	49.5	20.8	20.8
Vested Former Employees	3	18,144	3	18,143	54.9	6.4	16.8
Retirees and Beneficiaries	22	502,333	30	703,317	65.5		
Pending Refunds	0		0				
12 - SEIU Clrcl							
Active Employees	1	$ 50,243	1	$ 49,920	54.2	12.9	12.9
Vested Former Employees	0	0	1	15,533	0.0	0.0	0.0
Retirees and Beneficiaries	4	51,550	3	36,936	65.9		
Pending Refunds	1		1				
21 - FOP Sprvsn							
Active Employees	2	$ 151,261	3	$ 223,248	44.7	18.4	18.4
Vested Former Employees	0	0	1	47,778	0.0	0.0	0.0
Retirees and Beneficiaries	7	246,491	6	200,996	63.3		
Pending Refunds	0		0				
HA - Police Union After 7/1/2012							
Active Employees	8	$ 473,250	7	$ 403,138	35.6	3.1	5.8
Vested Former Employees	2	5,206	1	2,957	32.2	3.0	6.5
Retirees and Beneficiaries	0	0	0	0	0.0		
Pending Refunds	0		0				

Table 3 (continued)

Division	2019 Valuation Number	2019 Valuation Annual Payroll[1]	2018 Valuation Number	2018 Valuation Annual Payroll[1]	2019 Valuation Average Age	2019 Valuation Average Benefit Service[2]	2019 Valuation Average Eligibility Service[2]
HB - SEIU Union DPW/Cler aft 7/1/12							
Active Employees	14	$ 581,670	14	$ 563,822	32.0	2.7	5.6
Vested Former Employees	1	2,021	1	2,021	55.0	3.6	14.3
Retirees and Beneficiaries	0	0	0	0	0.0		
Pending Refunds	0		0				
HC - Fire & Pol Non-Un aft 4/1/13							
Active Employees	4	$ 230,037	1	$ 67,169	32.5	2.2	2.2
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	0	0	0	0	0.0		
Pending Refunds	0		0				
HD - Envir Srv							
Active Employees	1	$ 54,831	1	$ 48,000	35.8	1.2	1.2
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	0	0	0	0	0.0		
Pending Refunds	0		0				
Total Municipality							
Active Employees	**48**	**$ 2,772,764**	**46**	**$ 2,605,068**	**38.6**	**8.8**	**10.2**
Vested Former Employees	**11**	**81,132**	**11**	**133,195**	**46.7**	**6.4**	**14.8**
Retirees and Beneficiaries	**74**	**1,722,089**	**72**	**1,618,024**	**66.9**		
Pending Refunds	**2**		**3**				
Total Participants	**135**		**132**				

1 Annual payroll for active employees; annual deferred benefits payable for vested former employees; annual benefits being paid for retirees and beneficiaries.

2 Descriptions can be found under Miscellaneous and Technical Assumptions in the Appendix.

Table 4: Reported Assets (Market Value)

Division	2019 Valuation		2018 Valuation	
	Employer and Retiree[1]	Employee[2]	Employer and Retiree[1]	Employee[2]
01 - SEIU,DPW,WWTP	$ 1,824,402	$ 98,811	$ 1,860,017	$ 68,067
02 - Police NSU	1,460,081	310,602	1,453,754	285,605
05 - Fire	1,321,348	49,962	0	0
10 - Non Union	3,436,113	497,642	4,513,710	535,917
12 - SEIU Clrcl	612,836	17,297	555,262	30,891
21 - FOP Sprvsn	1,369,344	219,946	1,258,884	381,872
HA - Police Union After 7/1/2012	681,209	0	469,628	0
HB - SEIU Union DPW/Cler aft 7/1/12	502,000	0	337,686	0
HC - Fire & Pol Non-Un aft 4/1/13	175,405	0	93,611	0
HD - Envir Srv	3,691	0	444	0
Municipality Total[3]	**$ 11,386,429**	**$ 1,194,261**	**$ 10,542,996**	**$ 1,302,352**
Combined Assets[3]	**$12,580,690**		**$11,845,348**	

[1] Reserve for Employer Contributions and Benefit Payments.

[2] Reserve for Employee Contributions.

[3] Totals may not add due to rounding.

The December 31, 2019 valuation assets (actuarial value of assets) are equal to 1.013179 times the reported market value of assets (compared to 1.095342 as of December 31, 2018). Refer to the Appendix for a description of the valuation asset derivation and a detailed calculation of valuation assets.

Table 5: Flow of Valuation Assets

Year Ended 12/31	Employer Contributions Required	Employer Contributions Additional	Employee Contributions	Investment Income (Valuation Assets)	Benefit Payments	Employee Contribution Refunds	Net Transfers	Valuation Asset Balance
2009	$ 372,531		$ 145,516	$ 530,509	$ (810,311)	$ (2,270)	$ 0	$ 12,393,669
2010	392,668		134,938	647,146	(837,297)	(8,217)	0	12,722,907
2011	390,991	$ 0	143,105	635,427	(938,501)	0	77,570	13,031,499
2012	383,794	0	147,329	557,053	(1,018,163)	0	0	13,101,512
2013	412,929	0	134,946	739,591	(1,130,538)	(12,382)	0	13,246,058
2014	440,591	0	131,690	728,236	(1,237,873)	(144)	0	13,308,558
2015	488,614	0	133,942	619,190	(1,303,433)	0	0	13,246,871
2016	560,878	0	133,756	632,343	(1,353,372)	(33,064)	0	13,187,412
2017	621,969	33,866	125,815	760,918	(1,468,713)	(3,270)	0	13,257,997
2018	667,801	58,215	116,735	466,956	(1,592,997)	0	0	12,974,707
2019	748,947	20,956	105,682	572,357	(1,676,157)	0	0	12,746,492

Notes:

Transfers in and out are usually related to the transfer of participants between municipalities, and to employer and employee payments for service credit purchases (if any) that the governing body has approved.

Additional employer contributions, if any, are shown separately starting in 2011. Prior to 2011, additional contributions are combined with the required employer contributions.

The investment income column reflects the recognized investment income based on Valuation Assets. It does not reflect the market value investment return in any given year.

The Valuation Asset balance includes assets from Surplus divisions, if any.

Years where historical information is not available, will be displayed with zero values.

Table 6: Actuarial Accrued Liabilities and Valuation Assets as of December 31, 2019

Division	Actuarial Accrued Liability: Active Employees	Vested Former Employees	Retirees and Beneficiaries	Pending Refunds	Total	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
01 - SEIU,DPW,WWTP	$ 968,687	$ 99,430	$ 3,471,429	$ 3,459	$ 4,543,005	$ 1,948,559	42.9%	$ 2,594,446
02 - Police NSU	818,267	153,751	3,254,489	0	4,226,507	1,794,020	42.5%	2,432,487
05 - Fire	128,837	0	2,764,080	0	2,892,917	1,389,382	48.0%	1,503,535
10 - Non Union	2,235,293	169,627	5,256,189	0	7,661,109	3,985,598	52.0%	3,675,511
12 - SEIU Clrcl	126,897	0	555,615	5,123	687,635	638,438	92.9%	49,197
21 - FOP Sprvsn	769,363	0	2,855,954	0	3,625,317	1,610,236	44.4%	2,015,081
HA - Police Union After 7/1/2012	163,884	8,027	0	0	171,911	690,187	401.5%	(518,276)
HB - SEIU Union DPW/Cler aft 7/1/12	133,388	15,527	0	0	148,915	508,616	341.6%	(359,701)
HC - Fire & Pol Non-Un aft 4/1/13	64,504	0	0	0	64,504	177,716	275.5%	(113,212)
HD - Envir Srv	3,507	0	0	0	3,507	3,740	106.6%	(233)
Total	**$ 5,412,627**	**$ 446,362**	**$ 18,157,756**	**$ 8,582**	**$ 24,025,327**	**$ 12,746,492**	**53.1%**	**$ 11,278,835**

The following results show the combined accrued liabilities and assets for each set of linked divisions. These results are already shown in the table on the prior page(s).

Table 6 (continued)

Division	Actuarial Accrued Liability: Active Employees	Vested Former Employees	Retirees and Beneficiaries	Pending Refunds	Total	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
Linked Divisions HA, 02, 21	$ 1,751,514	$ 161,778	$ 6,110,443	$ 0	$ 8,023,735	$ 4,094,443	51.0%	$ 3,929,292
Linked Divisions HB, 01, 12	1,228,972	114,957	4,027,044	8,582	5,379,555	3,095,613	57.5%	2,283,942
Linked Divisions HC, 05, 10	2,428,634	169,627	8,020,269	0	10,618,530	5,552,696	52.3%	5,065,834

Please see the Comments on Asset Smoothing in the Executive Summary of this report.

Table 7: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2005	$ 13,679,913	$ 10,699,124	78%	$ 2,980,789
2006	14,521,558	11,297,810	78%	3,223,748
2007	15,255,703	11,935,577	78%	3,320,126
2008	16,351,826	12,157,694	74%	4,194,132
2009	16,698,529	12,393,669	74%	4,304,860
2010	17,697,293	12,722,907	72%	4,974,386
2011	18,428,684	13,031,499	71%	5,397,185
2012	18,390,180	13,101,512	71%	5,288,668
2013	18,921,858	13,246,058	70%	5,675,800
2014	20,093,324	13,308,558	66%	6,784,766
2015	21,576,863	13,246,871	61%	8,329,992
2016	22,299,124	13,187,412	59%	9,111,712
2017	22,812,781	13,257,997	58%	9,554,784
2018	23,006,322	12,974,707	56%	10,031,615
2019	24,025,327	12,746,492	53%	11,278,835

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012, 2015 and 2019 actuarial valuations.

The Valuation Assets include assets from Surplus divisions, if any.

Years where historical information is not available will be displayed with zero values.

Throughout this report are references to valuation results generated prior to the 2018 valuation date. Results prior to 2018 were received directly from the prior actuary or extracted from the previous valuation system by MERS's technology service provider.

Tables 8 and 9: Division-Based Comparative Schedules

Division 01 - SEIU,DPW,WWTP

Table 8-01: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 3,732,278	$ 2,949,119	79%	$ 783,159
2010	3,947,965	2,974,050	75%	973,915
2011	3,959,902	2,977,521	75%	982,381
2012	4,078,087	2,955,585	73%	1,122,502
2013	4,131,441	2,954,368	72%	1,177,073
2014	4,203,532	2,803,702	67%	1,399,830
2015	4,388,030	2,641,520	60%	1,746,510
2016	4,469,610	2,501,998	56%	1,967,612
2017	4,503,193	2,342,841	52%	2,160,352
2018	4,302,441	2,111,911	49%	2,190,530
2019	4,543,005	1,948,559	43%	2,594,446

Notes: Actuarial assumptions were revised for the 2009, 2010, 2011, 2012, 2015 and 2019 actuarial valuations.

Table 9-01: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2009	14	$ 656,730	13.40%	2.25%
2010	14	677,637	14.72%	2.25%
2011	14	629,004	15.66%	2.25%
2012	12	563,786	$ 8,683	2.25%
2013	11	534,485	$ 9,133	2.25%
2014	8	401,454	$ 9,870	2.25%
2015	7	360,834	$ 12,188	2.25%
2016	7	373,112	$ 13,629	2.25%
2017	5	266,771	$ 14,668	2.25%
2018	5	279,689	$ 15,179	2.25%
2019	6	346,649	$ 19,062	2.25%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-02: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 3,123,061	$ 2,146,523	69%	$ 976,538
2010	3,318,148	2,264,712	68%	1,053,436
2011	3,598,162	2,421,310	67%	1,176,852
2012	3,453,258	2,402,869	70%	1,050,389
2013	3,346,230	2,293,153	69%	1,053,077
2014	3,429,783	2,278,542	66%	1,151,241
2015	3,652,176	2,251,099	62%	1,401,077
2016	3,769,514	2,142,975	57%	1,626,539
2017	3,827,152	2,069,309	54%	1,757,843
2018	3,888,497	1,905,193	49%	1,983,304
2019	4,226,507	1,794,020	42%	2,432,487

Notes: Actuarial assumptions were revised for the 2009, 2010, 2011, 2012, 2015 and 2019 actuarial valuations.

Table 9-02: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2009	12	$ 623,618	15.05%	6.80%
2010	10	563,696	17.02%	6.80%
2011	10	541,005	19.19%	6.80%
2012	8	444,899	$ 7,388	8.00%
2013	5	279,414	$ 6,533	9.00%
2014	5	289,048	$ 7,272	10.00%
2015	5	298,189	$ 9,282	10.00%
2016	4	246,247	$ 10,646	10.00%
2017	4	250,304	$ 11,565	10.00%
2018	3	191,531	$ 13,209	10.00%
2019	4	271,189	$ 17,310	10.00%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.
2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-05: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 0	$ 0	0%	$ 0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	0	0	0%	0
2014	0	0	0%	0
2015	0	0	0%	0
2016	0	0	0%	0
2017	0	0	0%	0
2018	0	0	0%	0
2019	2,892,917	1,389,382	48%	1,503,535

Notes: Actuarial assumptions were revised for the 2009, 2010, 2011, 2012, 2015 and 2019 actuarial valuations.

Table 9-05: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2009	0	$ 0	$0.00	0.00%
2010	0	0	$0.00	0.00%
2011	0	0	$0.00	0.00%
2012	0	0	$0.00	0.00%
2013	0	0	$0.00	0.00%
2014	0	0	$0.00	0.00%
2015	0	0	$0.00	0.00%
2016	0	0	$0.00	0.00%
2017	0	0	$0.00	0.00%
2018	0	0	$0.00	0.00%
2019	1	88,497	$ 10,086	7.20%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.
2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-10: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 7,054,360	$ 5,390,569	76%	$ 1,663,791
2010	7,451,187	5,459,358	73%	1,991,829
2011	7,747,836	5,494,799	71%	2,253,037
2012	7,601,714	5,513,963	73%	2,087,751
2013	8,250,614	5,793,804	70%	2,456,810
2014	8,772,768	5,842,154	67%	2,930,614
2015	9,497,473	5,757,438	61%	3,740,035
2016	9,785,458	5,667,455	58%	4,118,003
2017	9,973,157	5,676,389	57%	4,296,768
2018	10,084,576	5,531,068	55%	4,553,508
2019	7,661,109	3,985,598	52%	3,675,511

Notes: Actuarial assumptions were revised for the 2009, 2010, 2011, 2012, 2015 and 2019 actuarial valuations.

Table 9-10: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2009	16	$ 937,969	16.50%	4.36%
2010	16	1,013,182	17.63%	4.36%
2011	15	936,509	17.85%	7.20%
2012	14	872,934	19.33%	7.20%
2013	12	724,526	$ 15,487	7.20%
2014	12	742,403	$ 18,577	7.20%
2015	12	765,569	$ 24,709	7.20%
2016	12	797,771	$ 27,187	7.20%
2017	12	820,575	$ 28,692	7.20%
2018	11	778,551	$ 30,763	7.20%
2019	7	525,137	$ 25,870	7.20%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.
2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-12: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 514,542	$ 519,955	101%	$ (5,413)
2010	552,654	579,387	105%	(26,733)
2011	580,295	629,554	109%	(49,259)
2012	629,227	674,085	107%	(44,858)
2013	416,220	453,510	109%	(37,290)
2014	442,969	497,046	112%	(54,077)
2015	518,878	540,838	104%	(21,960)
2016	576,361	586,458	102%	(10,097)
2017	613,524	629,600	103%	(16,076)
2018	673,895	642,038	95%	31,857
2019	687,635	638,438	93%	49,197

Notes: Actuarial assumptions were revised for the 2009, 2010, 2011, 2012, 2015 and 2019 actuarial valuations.

Table 9-12: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2009	5	$ 195,528	6.82%	2.25%
2010	5	209,134	6.00%	2.25%
2011	5	201,495	4.94%	2.25%
2012	5	202,323	$ 740	2.25%
2013	4	158,417	$ 524	2.25%
2014	3	118,696	$ 68	2.25%
2015	3	127,448	$ 566	2.25%
2016	3	138,946	$ 697	2.25%
2017	2	95,480	$ 393	2.25%
2018	1	49,920	$ 627	2.25%
2019	1	50,243	$ 756	2.25%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-21: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 2,274,288	$ 1,387,503	61%	$ 886,785
2010	2,427,339	1,445,400	60%	981,939
2011	2,542,489	1,508,315	59%	1,034,174
2012	2,628,452	1,552,075	59%	1,076,377
2013	2,769,561	1,703,192	62%	1,066,369
2014	3,200,263	1,740,366	54%	1,459,897
2015	3,431,419	1,774,114	52%	1,657,305
2016	3,560,234	1,826,699	51%	1,733,535
2017	3,716,217	1,841,334	50%	1,874,883
2018	3,768,632	1,797,190	48%	1,971,442
2019	3,625,317	1,610,236	44%	2,015,081

Notes: Actuarial assumptions were revised for the 2009, 2010, 2011, 2012, 2015 and 2019 actuarial valuations.

Table 9-21: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2009	4	$ 243,775	23.44%	10.03%
2010	4	262,418	24.24%	10.03%
2011	4	258,489	26.20%	10.03%
2012	4	215,837	$ 6,060	11.00%
2013	4	259,679	$ 6,453	12.00%
2014	4	268,644	$ 8,721	13.00%
2015	4	277,620	$ 10,278	13.00%
2016	4	287,915	$ 10,821	13.00%
2017	3	222,308	$ 11,916	13.00%
2018	3	223,248	$ 12,826	13.00%
2019	2	151,261	$ 13,432	13.00%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-HA: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 0	$ 0	0%	$ 0
2010	0	0	0%	0
2011	0	0	0%	0
2012	(444)	1,647	0%	(2,091)
2013	6,376	33,458	525%	(27,082)
2014	28,652	94,774	331%	(66,122)
2015	48,343	167,309	346%	(118,966)
2016	66,997	260,272	389%	(193,275)
2017	67,130	376,987	562%	(309,857)
2018	116,833	514,403	440%	(397,570)
2019	171,911	690,187	401%	(518,276)

Notes: Actuarial assumptions were revised for the 2009, 2010, 2011, 2012, 2015 and 2019 actuarial valuations.

Table 9-HA: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2009	0	$ 0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	2	58,827	7.24%	0.00%
2013	5	212,569	6.08%	0.00%
2014	6	272,900	5.00%	0.00%
2015	6	286,193	4.22%	0.00%
2016	6	306,023	2.86%	0.00%
2017	6	306,669	0.45%	0.00%
2018	7	403,138	0.02%	0.00%
2019	8	473,250	0.00%	0.00%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-HB: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 0	$ 0	0%	$ 0
2010	0	0	0%	0
2011	0	0	0%	0
2012	(114)	1,288	0%	(1,402)
2013	1,572	9,183	584%	(7,611)
2014	10,772	35,562	330%	(24,790)
2015	28,941	82,631	286%	(53,690)
2016	53,126	150,927	284%	(97,801)
2017	84,681	246,508	291%	(161,827)
2018	134,228	369,882	276%	(235,654)
2019	148,915	508,616	342%	(359,701)

Notes: Actuarial assumptions were revised for the 2009, 2010, 2011, 2012, 2015 and 2019 actuarial valuations.

Table 9-HB: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2009	0	$ 0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	1	23,363	4.50%	0.00%
2013	4	122,391	5.94%	0.00%
2014	6	198,333	4.44%	0.00%
2015	8	267,410	3.55%	0.00%
2016	10	372,644	3.29%	0.00%
2017	11	442,184	2.23%	0.00%
2018	14	563,822	1.69%	0.00%
2019	14	581,670	0.00%	0.00%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-HC: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 0	$ 0	0%	$ 0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	(156)	5,390	0%	(5,546)
2014	4,585	16,412	358%	(11,827)
2015	11,603	31,922	275%	(20,319)
2016	17,824	50,628	284%	(32,804)
2017	27,727	75,029	271%	(47,302)
2018	37,220	102,536	275%	(65,316)
2019	64,504	177,716	276%	(113,212)

Notes: Actuarial assumptions were revised for the 2009, 2010, 2011, 2012, 2015 and 2019 actuarial valuations.

Table 9-HC: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2009	0	$ 0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	0	0	$ 0	0.00%
2013	1	46,397	6.47%	0.00%
2014	1	53,303	5.19%	0.00%
2015	1	60,253	6.04%	0.00%
2016	1	58,289	5.68%	0.00%
2017	1	65,125	5.29%	0.00%
2018	1	67,169	4.50%	0.00%
2019	4	230,037	4.29%	0.00%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 8-HD: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 0	$ 0	0%	$ 0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	0	0	0%	0
2014	0	0	0%	0
2015	0	0	0%	0
2016	0	0	0%	0
2017	0	0	0%	0
2018	0	486	0%	(486)
2019	3,507	3,740	107%	(233)

Notes: Actuarial assumptions were revised for the 2009, 2010, 2011, 2012, 2015 and 2019 actuarial valuations.

Table 9-HD: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2009	0	$ 0	$0.00	0.00%
2010	0	0	$0.00	0.00%
2011	0	0	$0.00	0.00%
2012	0	0	$0.00	0.00%
2013	0	0	$0.00	0.00%
2014	0	0	$0.00	0.00%
2015	0	0	$0.00	0.00%
2016	0	0	$0.00	0.00%
2017	0	0	$0.00	0.00%
2018	1	48,000	5.45%	0.00%
2019	1	54,831	5.54%	0.00%

1 For open divisions, a percent of pay contribution is shown. For closed divisions, a monthly dollar contribution is shown.

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer contribution will be adjusted.

Note: The contributions shown in Table 9 for the 12/31/2015 through 12/31/2019 valuations do **not** reflect the phase-in of the increased contribution requirements associated with the new actuarial assumptions. The full contribution without phase-in is shown in Table 9 above.

See the Benefit Provision History, later in this report, for past benefit provision changes.

Years where historical information is not available, will be displayed with zero values.

Table 10: Division-Based Layered Amortization Schedule

Division 01 - SEIU,DPW,WWTP

Table 10-01: Layered Amortization Schedule

				Amounts for Fiscal Year Beginning 7/1/2021		
Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 1,746,510	23	$ 1,855,130	19	$ 143,064
(Gain)/Loss	12/31/2016	176,075	22	199,577	19	15,396
(Gain)/Loss	12/31/2017	149,539	21	168,369	19	12,984
(Gain)/Loss	12/31/2018	(4,736)	20	(5,309)	19	(408)
(Gain)/Loss	12/31/2019	252,430	19	280,766	19	21,648
Assumption	12/31/2019	135,311	19	135,903	19	10,476
Total				**$ 2,634,436**		**$ 203,160**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2019 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2019 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-02: Layered Amortization Schedule

				Amounts for Fiscal Year Beginning 7/1/2021		
Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 1,401,077	23	$ 1,491,782	19	$ 115,044
(Gain)/Loss	12/31/2016	185,752	22	210,538	19	16,236
(Gain)/Loss	12/31/2017	93,290	21	105,041	19	8,100
(Gain)/Loss	12/31/2018	197,495	20	221,367	19	17,076
(Gain)/Loss	12/31/2019	280,766	19	312,282	19	24,084
Assumption	12/31/2019	141,142	19	143,332	19	11,052
Total				**$ 2,484,342**		**$ 191,592**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2019 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2019 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-05: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2021: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 1,036,717	23	$ 1,108,719	19	$ 85,500
(Gain)/Loss	12/31/2016	72,324	22	81,975	19	6,324
(Gain)/Loss	12/31/2017	24,657	21	27,756	19	2,136
(Gain)/Loss	12/31/2018	56,854	20	63,721	19	4,920
(Gain)/Loss	12/31/2019	137,615	19	153,062	19	11,808
Assumption	12/31/2019	92,370	19	94,354	19	7,272
Total				**$ 1,529,587**		**$ 117,960**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2019 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2019 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-10: Layered Amortization Schedule

				Amounts for Fiscal Year Beginning 7/1/2021		
Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 2,703,318	23	$ 2,891,085	19	$ 222,948
(Gain)/Loss	12/31/2016	188,591	22	213,768	19	16,488
(Gain)/Loss	12/31/2017	64,295	21	72,390	19	5,580
(Gain)/Loss	12/31/2018	148,250	20	166,168	19	12,816
(Gain)/Loss	12/31/2019	109,758	19	122,078	19	9,420
Assumption	12/31/2019	243,484	19	250,492	19	19,320
Total				**$ 3,715,981**		**$ 286,572**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2019 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2019 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-12: Layered Amortization Schedule

				Amounts for Fiscal Year Beginning 7/1/2021		
Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
(Gain)/Loss	12/31/2018	$ 33,922	15	$ 37,380	14	$ 3,564
(Gain)/Loss	12/31/2019	(7,060)	15	(7,853)	15	(708)
Assumption	12/31/2019	20,557	15	22,689	15	2,064
Total				**$ 52,216**		**$ 4,920**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2019 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2019 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-21: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2021: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 1,657,305	23	$ 1,757,638	19	$ 135,540
(Gain)/Loss	12/31/2016	31,774	22	36,012	19	2,772
(Gain)/Loss	12/31/2017	115,134	21	129,630	19	9,996
(Gain)/Loss	12/31/2018	71,683	20	80,347	19	6,192
(Gain)/Loss	12/31/2019	(106,169)	19	(118,087)	19	(9,108)
Assumption	12/31/2019	128,667	19	131,994	19	10,176
Total				**$ 2,017,534**		**$ 155,568**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2019 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2019 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-HA: Layered Amortization Schedule

				Amounts for Fiscal Year Beginning 7/1/2021		
Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ (118,966)	10	$ (98,070)	10	$ (12,156)
(Gain)/Loss	12/31/2016	(72,985)	15	(76,815)	12	(8,244)
(Gain)/Loss	12/31/2017	(114,187)	15	(123,330)	13	(12,444)
(Gain)/Loss	12/31/2018	(82,064)	15	(90,416)	14	(8,628)
(Gain)/Loss	12/31/2019	(119,049)	15	(132,412)	15	(12,024)
Assumption	12/31/2019	868	15	4,036	15	372
Total				**$ (517,007)**		**$ (53,124)**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2019 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2019 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-HB: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2021 Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ (53,690)	10	$ (47,143)	10	$ (5,844)
(Gain)/Loss	12/31/2016	(40,378)	15	(42,507)	12	(4,560)
(Gain)/Loss	12/31/2017	(62,069)	15	(67,034)	13	(6,768)
(Gain)/Loss	12/31/2018	(70,374)	15	(77,536)	14	(7,404)
(Gain)/Loss	12/31/2019	(121,205)	15	(134,811)	15	(12,240)
Assumption	12/31/2019	545	15	2,760	15	252
Total				**$ (366,271)**		**$ (36,564)**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2019 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2019 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-HC: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2021: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ (20,319)	10	$ (16,177)	10	$ (2,004)
(Gain)/Loss	12/31/2016	(12,685)	15	(13,358)	12	(1,428)
(Gain)/Loss	12/31/2017	(14,328)	15	(15,476)	13	(1,560)
(Gain)/Loss	12/31/2018	(17,412)	15	(19,190)	14	(1,836)
(Gain)/Loss	12/31/2019	(47,302)	15	(52,612)	15	(4,776)
Assumption	12/31/2019	(193)	15	463	15	48
Total				**$ (116,350)**		**$ (11,556)**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2019 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2019 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

Table 10-HD: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 7/1/2021: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
(Gain)/Loss	12/31/2018	$ (485)	15	$ (535)	14	$ (48)
(Gain)/Loss	12/31/2019	298	15	332	15	36
Assumption	12/31/2019	(7)	15	(6)	15	0
Total				**$ (209)**		**$ (12)**

[1] For each type of UAL (layer), this is the original balance as of the date the layer was established.

[2] According to the MERS amortization policy, each type of UAL (layer) is amortized over a specific period (see Appendix on MERS website).

[3] This is the remaining balance as of the valuation date, projected to the beginning of the fiscal year shown above.

The unfunded accrued liability (UAL) as of December 31, 2019 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2019 valuation to take into account the expected future contributions that are based on past valuations. Each type of UAL (layer) is amortized over the appropriate period. Please see the Appendix on the MERS website for a detailed description of the amortization policy.

Note: The original balance and original amortization periods prior to 12/31/2018 were received from the prior actuary.

GASB 68 Information

The following information has been prepared to provide some of the information necessary to complete GASB Statement No. 68 disclosures. Statement 68 is effective for fiscal years beginning after June 15, 2014. Additional resources, including an Implementation Guide, are available at http://www.mersofmich.com/.

Actuarial Valuation Date:		12/31/2019
Measurement Date of the Total Pension Liability (TPL):		12/31/2019
At 12/31/2019, the following employees were covered by the benefit terms:		
Inactive employees or beneficiaries currently receiving benefits:		74
Inactive employees entitled to but not yet receiving benefits (including refunds):		13
Active employees:		48
		135
Total Pension Liability as of 12/31/2018 measurement date:	$	22,446,387
Total Pension Liability as of 12/31/2019 measurement date:	$	23,428,102
Service Cost for the year ending on the 12/31/2019 measurement date:	$	258,238
Change in the Total Pension Liability due to:		
- Benefit changes[1]:	$	0
- Differences between expected and actual experience[2]:	$	(68,761)
- Changes in assumptions[2]:	$	729,401
Average expected remaining service lives of all employees (active and inactive):		4

[1] A change in liability due to benefit changes is immediately recognized when calculating pension expense for the year.

[2] Changes in liability due to differences between actual and expected experience, and changes in assumptions, are recognized in pension expense over the average remaining service lives of all employees.

Covered employee payroll: (Needed for Required Supplementary Information)	$	2,772,764

Sensitivity of the Net Pension Liability to changes in the discount rate:

	1% Decrease (6.60%)	Current Discount Rate (7.60%)	1% Increase (8.60%)
Change in Net Pension Liability as of 12/31/2019:	$ 2,552,762	$ -	$ (2,149,832)

Note: The current discount rate shown for GASB 68 purposes is higher than the MERS assumed rate of return. This is because for GASB 68 purposes, the discount rate must be gross of administrative expenses, whereas for funding purposes it is net of administrative expenses.

Benefit Provision History

The following benefit provision history is provided by MERS. Any corrections to this history or discrepancies between this information and information displayed elsewhere in the valuation report should be reported to MERS. All provisions are listed by date of adoption.

01 - SEIU,DPW,WWTP	
12/1/2016	Service Credit Purchase Estimates - Yes
7/1/2012	Day of work defined as 160 Hours a Month for All employees.
7/1/2012	Exclude Temporary Employees requiring less than 12 months
2/1/2008	Member Contribution Rate 2.25%
7/1/2007	Benefit B-3 (80% max)
1/1/2004	E 2% COLA Adopted (01/01/2004)
1/1/2000	E 2% COLA Adopted (01/01/2000)
7/8/1996	Blanket Resolution (All Service)
1/1/1995	Flexible E 2% COLA Adopted (01/01/1995)
7/1/1994	Member Contribution Rate 0.00%
7/1/1992	Benefit F55 (With 25 Years of Service)
7/1/1992	Member Contribution Rate 5.00%
1/1/1992	Benefit B-2
1/1/1992	Member Contribution Rate 3.00%
12/1/1990	Temporary Benefit B-1 (12/01/1990 - 02/03/1991)
1/1/1984	E 2% COLA Adopted (01/01/1984)
7/1/1976	Member Contribution Rate 0.00%
9/9/1968	Covered by Act 88
7/1/1967	Benefit C-1 (Old)
1/1/1950	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1950	10 Year Vesting
1/1/1950	Benefit C (Old)
1/1/1950	Member Contribution Rate 3.00% Under $4,200.00 - Then 5.00%
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

02 - Police NSU	
1/1/2020	Non-Standard Transfer Rules
12/1/2016	Service Credit Purchase Estimates - Yes
7/1/2014	Member Contribution Rate 10.00%
7/1/2013	Member Contribution Rate 9.00%
7/1/2012	Day of work defined as 160 Hours a Month for All employees.
7/1/2012	Exclude Temporary Employees requiring less than 12 months
7/1/2012	Member Contribution Rate 8.00%
7/1/2005	3.0% Multiplier (80% max)
7/1/2005	Member Contribution Rate 6.80%
1/1/2004	E 2% COLA Adopted (01/01/2004)
1/1/2000	E 2% COLA Adopted (01/01/2000)
7/1/1997	Benefit F50 (With 25 Years of Service)
7/1/1997	Member Contribution Rate 5.80%
7/8/1996	Blanket Resolution (All Service)

02 - Police NSU

7/1/1996	Benefit B-4 (80% max)
7/1/1996	Member Contribution Rate 3.91%
1/1/1995	Flexible E 2% COLA Adopted (01/01/1995)
7/1/1994	Member Contribution Rate 0.00%
7/1/1993	Member Contribution Rate 1.00%
7/1/1992	Member Contribution Rate 3.00%
7/1/1991	Member Contribution Rate 4.00%
1/1/1991	Benefit B-2
7/1/1990	Member Contribution Rate 2.00%
1/1/1990	Benefit F55 (With 25 Years of Service)
1/1/1984	E 2% COLA Adopted (01/01/1984)
7/1/1976	Member Contribution Rate 0.00%
9/9/1968	Covered by Act 88
7/1/1967	Benefit B-1
1/1/1950	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1950	10 Year Vesting
1/1/1950	Benefit B
1/1/1950	Member Contribution Rate 5.00%
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

05 - Fire

1/1/2020	Day of Work Defined as 180 hours a Month for All Employees
1/1/2020	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/2020	Exclude Temporary Employees requiring less than 12 months
1/1/2020	10 Year Vesting
1/1/2020	Defined Benefit Normal Retirement Age - 60
1/1/2020	Service Credit Purchase Estimates - Yes
1/1/2020	Benefit B-4 (80% max)
1/1/2020	Benefit F55 (With 20 Years of Service)
1/1/2020	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years
1/1/2020	Participant Contribution Rate 7.2%
9/9/1968	Covered by Act 88
1/1/1950	Fiscal Month - July

10 - Non Union

9/1/2019	Non-Standard Transfer Rules
12/1/2016	Service Credit Purchase Estimates - Yes
7/1/2012	Day of work defined as 160 Hours a Month for All employees.
7/1/2012	Exclude Temporary Employees requiring less than 12 months
7/1/2011	Member Contribution Rate 7.20%
6/1/2009	Temporary 8 Year Vesting (06/01/2009 - 07/31/2009)
1/1/2004	E 2% COLA Adopted (01/01/2004)
1/1/2003	Benefit B-4 (80% max)
1/1/2003	Member Contribution Rate 4.36%
1/1/2000	E 2% COLA Adopted (01/01/2000)
7/1/1998	Benefit B-3 (80% max)
7/1/1998	Member Contribution Rate 2.25%

10 - Non Union

7/8/1996	Blanket Resolution (All Service)
1/1/1995	Flexible E 2% COLA Adopted (01/01/1995)
7/1/1991	Benefit B-2
7/1/1989	Benefit F55 (With 20 Years of Service)
7/1/1989	Member Contribution Rate 0.00%
10/1/1988	Benefit FAC-5 (5 Year Final Average Compensation)
10/1/1988	Member Contribution Rate 2.00%
1/1/1984	E 2% COLA Adopted (01/01/1984)
12/1/1970	10 Year Vesting
9/9/1968	Covered by Act 88
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

12 - SEIU Clrcl

12/1/2016	Service Credit Purchase Estimates - Yes
7/1/2012	Day of work defined as 160 Hours a Month for All employees.
7/1/2012	Exclude Temporary Employees requiring less than 12 months
1/1/2004	E 2% COLA Adopted (01/01/2004)
1/1/2003	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/2003	10 Year Vesting
1/1/2003	Benefit B-3 (80% max)
1/1/2003	Benefit F55 (With 20 Years of Service)
1/1/2003	Member Contribution Rate 2.25%
7/8/1996	Blanket Resolution (All Service)
9/9/1968	Covered by Act 88
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

21 - FOP Sprvsn

9/1/2019	Non-Standard Transfer Rules
12/1/2016	Service Credit Purchase Estimates - Yes
7/1/2014	Member Contribution Rate 13.00%
7/1/2013	Member Contribution Rate 12.00%
7/1/2012	Day of work defined as 160 Hours a Month for All employees.
7/1/2012	Exclude Temporary Employees requiring less than 12 months
7/1/2012	Member Contribution Rate 11.00%
7/1/2006	3.0% Multiplier (80% max)
7/1/2006	Member Contribution Rate 10.03%
1/1/2004	E 2% COLA Adopted (01/01/2004)
1/1/2000	E 2% COLA Adopted (01/01/2000)
8/1/1998	Temporary 25 Years & Out (08/01/1998 - 10/02/1998)
7/1/1997	Benefit B-4 (80% max)
7/1/1997	Member Contribution Rate 7.73%
7/8/1996	Blanket Resolution (All Service)
7/1/1996	Benefit F50 (With 25 Years of Service)
7/1/1996	Member Contribution Rate 3.07%
7/1/1995	Member Contribution Rate 0.00%

21 - FOP Sprvsn

1/1/1995	Flexible E 2% COLA Adopted (01/01/1995)
7/1/1992	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1992	10 Year Vesting
7/1/1992	Benefit B-2
7/1/1991	Member Contribution Rate 4.00%
7/1/1990	Member Contribution Rate 2.00%
1/1/1990	Benefit F55 (With 25 Years of Service)
1/1/1990	Member Contribution Rate 1.00%
9/9/1968	Covered by Act 88
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

HA - Police Union After 7/1/2012

7/1/2012	Day of work defined as 160 Hours a Month for All employees.
7/1/2012	Benefit FAC-3 (3 Year Final Average Compensation)
7/1/2012	Exclude Temporary Employees requiring less than 12 months
7/1/2012	6 Year Vesting
7/1/2012	1.75% Multiplier
7/1/2012	Benefit F55 (With 25 Years of Service)
9/9/1968	Covered by ACT 88
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

HB - SEIU Union DPW/Cler aft 7/1/12

7/1/2012	Benefit FAC-3 (3 Year Final Average Compensation)
7/1/2012	6 Year Vesting
7/1/2012	1.25% Multiplier
9/9/1968	Covered by ACT 88
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

HC - Fire & Pol Non-Un aft 4/1/13

4/1/2013	Benefit FAC-3 (3 Year Final Average Compensation)
4/1/2013	Exclude Temporary Employees requiring less than 12 months
4/1/2013	6 Year Vesting
4/1/2013	1.75% Multiplier
4/1/2013	Benefit F55 (With 25 Years of Service)
9/9/1968	Covered by ACT 88
1/1/1950	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

HD - Envir Srv

11/1/2018	Day of work defined as ten 8 hour days for all EEs
11/1/2018	Benefit FAC-3 (3 Year Final Average Compensation)
11/1/2018	6 Year Vesting

HD - Envir Srv

11/1/2018	Defined Benefit Normal Retirement Age - 60
11/1/2018	Medicare Taxable Wages
11/1/2018	1.25% Multiplier
11/1/2018	Benefit F55 (With 25 Years of Service)
9/9/1968	Covered by ACT 88
1/1/1950	Fiscal Month - July

Plan Provisions, Actuarial Assumptions, and Actuarial Funding Method

Details on MERS plan provisions, actuarial assumptions, and actuarial methodology can be found in the Appendix. Some actuarial assumptions are specific to this municipality and its divisions. These are listed below.

Increase in Final Average Compensation

Division	FAC Increase Assumption
All Divisions	2.00%

Withdrawal Rate Scaling Factor

Division	Withdrawal Rate Scaling Factor
All Divisions	100%

Miscellaneous and Technical Assumptions

Loads – None.

Risk Commentary

Determination of the accrued liability, the employer contribution, and the funded ratio 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, the actuarially determined contribution and the funded ratio that result from the differences between actual experience and the actuarial assumptions.

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

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

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

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

PLAN MATURITY MEASURES

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

	12/31/2019	12/31/2018
1. Ratio of the market value of assets to total payroll	4.5	4.5
2. Ratio of actuarial accrued liability to payroll	8.7	8.8
3. Ratio of actives to retirees and beneficiaries	0.6	0.6
4. Ratio of market value of assets to benefit payments	7.5	7.4
5. Ratio of net cash flow to market value of assets (boy)	-6.8%	-5.7%

RATIO OF MARKET VALUE OF ASSETS TO TOTAL 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.

RATIO OF ACTIVES TO RETIREES AND BENEFICIARIES

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

RATIO OF MARKET VALUE OF ASSETS TO BENEFIT PAYMENTS

The MERS' Actuarial Policy requires a total minimum contribution equal to the excess (if any) of three times the expected annual benefit payments over the projected market value of assets as of the participating municipality or court's Fiscal Year for which the contribution applies. The ratio of market value of assets to benefit payments as of the valuation date provides an indication of whether the division is at risk for triggering the minimum contribution rule in the near term. If the division triggers this minimum contribution rule, the required employer contributions could increase dramatically relative to previous valuations.

RATIO OF NET CASH FLOW TO MARKET VALUE OF ASSETS

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

State Reporting

The following information has been prepared to provide some of the information necessary to complete the pension reporting requirements for the State of Michigan's Local Government Retirement System Annual Report (Form No. 5572). Additional resources are available at www.mersofmich.com and on the State website.

Form 5572 Line Reference	Description	Result
10	**Membership as of December 31, 2019**	
11	Indicate number of active members	48
12	Indicate number of inactive members (excluding pending refunds)	11
13	Indicate number of retirees and beneficiaries	74
14	**Investment Performance for Calendar Year Ending December 31, 2019**[1]	
15	Enter actual rate of return - prior 1-year period	14.02%
16	Enter actual rate of return - prior 5-year period	6.39%
17	Enter actual rate of return - prior 10-year period	7.97%
18	**Actuarial Assumptions**	
19	Actuarial assumed rate of investment return[2]	7.35%
20	Amortization method utilized for funding the system's unfunded actuarial accrued liability, if any	Level Percent
21	Amortization period utilized for funding the system's unfunded actuarial accrued liability, if any[3]	19
22	Is each division within the system closed to new employees?[4]	No
23	**Uniform Assumptions**	
24	Enter retirement pension system's actuarial value of assets using uniform assumptions	$12,672,667
25	Enter retirement pension system's actuarial accrued liabilities using uniform assumptions	$25,564,296
27	Actuarially Determined Contribution (ADC) using uniform assumptions, Fiscal Year Ending June 30, 2020	$1,130,304

1. The Municipal Employees' Retirement System's investment performance has been provided to GRS from MERS Investment Staff and included here for reporting purposes. This investment performance figures reported are net of investment expenses on a rolling calendar-year basis for the previous 1-, 5-, and 10-year periods as required under PA 530.
2. Net of administrative and investment expenses.
3. Populated with the longest amortization period remaining in the amortization schedule, across all divisions in the plan. This is when each division and the plan in total is expected to reach 100% funded if all assumptions are met.
4. If all divisions within the employer are closed, "yes." If at least one division is open (including shadow divisions) indicate "no."