MERS
Municipal Employees' Retirement System

Municipal Employees' Retirement System of Michigan

Annual Actuarial Valuation Report
December 31, 2019 - Walled Lake, City of (6324)

GRS

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Spring, 2020

Walled Lake, 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 Walled Lake, City of (6324) 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. Walled Lake, 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 Walled Lake, 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*	31%	32%

* 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 - Pblc Wrks	42.72%	46.76%	24.06%	24.68%	$ 5,269	$ 5,767	$ 4,672	$ 4,793
02 - FT Police and Command	-	-	123.37%	123.45%	39,369	39,792	36,145	36,169
05 - Fire	-	-	16.22%	17.24%	1,676	1,931	1,481	1,574
10 - Clerical	-	-	15.93%	17.11%	268	358	609	654
11 - Admn Unit	-	-	-	-	32,652	34,455	29,276	29,738
12 - FT Admin ee's after 7/1/2013	5.85%	5.87%	5.70%	5.75%	3,438	3,447	2,550	2,571
21 - Fire & Police hrd aft 06/30/16	3.88%	3.87%	-	-	942	939	0	0
Municipality Total					**$ 83,614**	**$ 86,689**	**$ 74,733**	**$ 75,499**

Employee contribution rates:

	Employee Contribution Rate	
Valuation Date:	12/31/2019	12/31/2018
Division		
01 - Pblc Wrks	5.00%	5.00%
02 - FT Police and Command	8.00%	8.00%
05 - Fire	5.00%	5.00%
10 - Clerical	5.00%	5.00%
11 - Admn Unit	5.25%	5.25%
12 - FT Admin ee's after 7/1/2013	3.00%	3.00%
21 - Fire & Police hrd aft 06/30/16	5.00%	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 $130,081, instead of $86,689.

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 30% (instead of 31%); and
- Your total employer contribution requirement for the fiscal year starting July 1, 2021 would be $1,046,112 (instead of $1,040,268).

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	$ 21,428,552	$ 17,364,353	$ 17,019,698
Valuation Assets[1]	$ 5,228,554	$ 5,228,554	$ 5,228,554
Unfunded Accrued Liability	$ 16,199,998	$ 12,135,799	$ 11,791,144
Funded Ratio	24%	30%	31%
Monthly Normal Cost	$ 15,710	$ 8,991	$ 7,619
Monthly Amortization Payment	$ 90,901	$ 80,231	$ 79,070
Total Employer Contribution[2]	$ 106,611	$ 89,222	$ 86,689

[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.

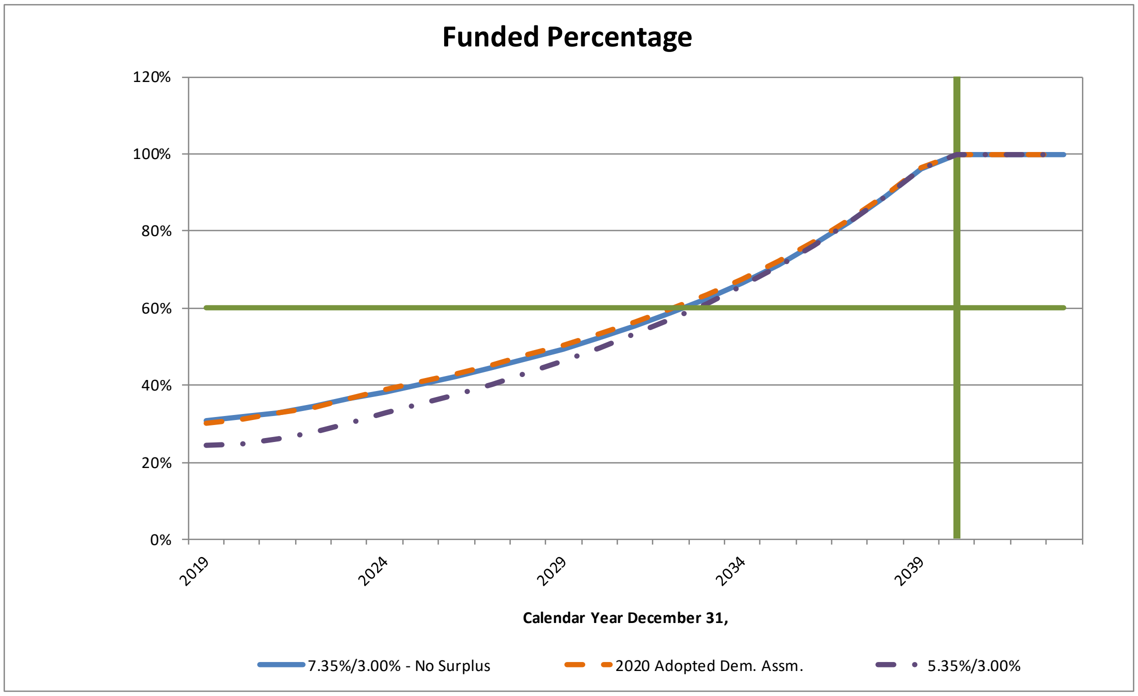
The 7.35%/3.00% scenario provides an estimate of computed employer contributions based on current actuarial assumptions, and a projected 7.35% market return. The other two scenarios may be useful if the municipality chooses to budget more conservatively, and make contributions in addition to the minimum 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.

Please note that one or more of your divisions trigger the 3 times benefit payout minimum contribution requirement during the projection period (see table following the projections and the graphs). This contribution requirement was designed so that a plan does not run out of money. This means that if assets in the plan are not enough to pay 3 years of benefit payouts, a minimum contribution is required to raise the level of the assets to be equal to at least 3 years of benefit payments. For a full description of this contribution requirement see the Appendix on the MERS website.

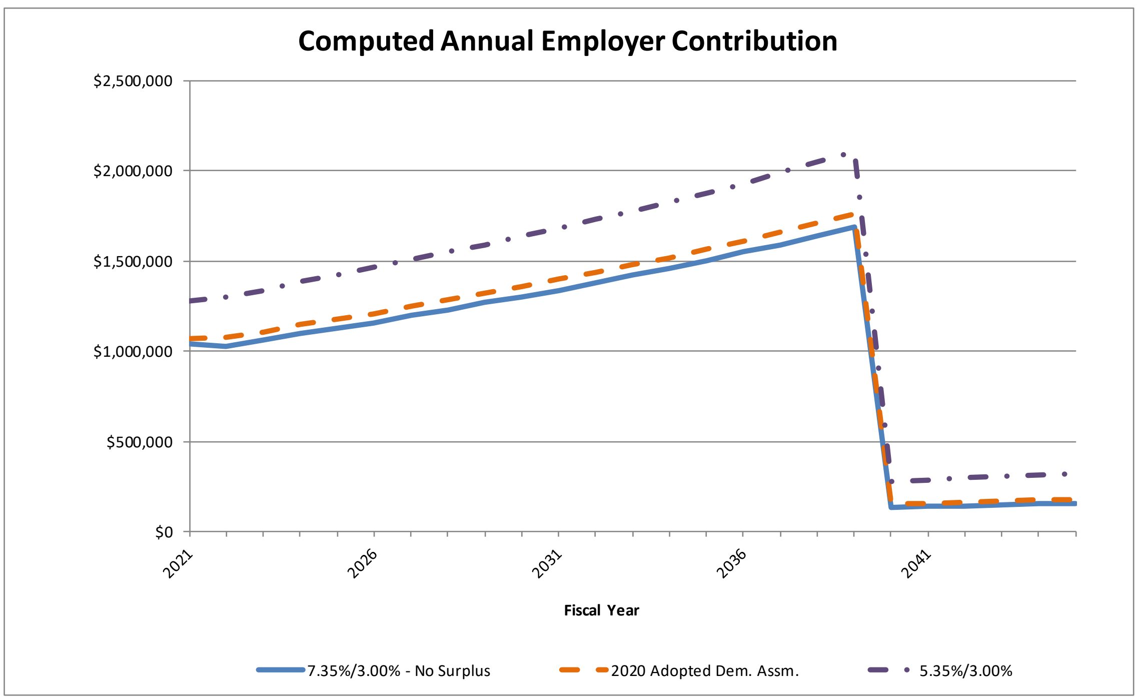
Valuation Year Ending 12/31	Fiscal Year Beginning 7/1	Actuarial Accrued Liability	Valuation Assets[2]	Funded Percentage	Computed Annual Employer Contribution
7.35%[1]/3.00% - Current Demographic Assumptions					
NO 5-YEAR PHASE-IN					
2019	2021	$ 17,019,698	$ 5,228,554	31%	$ 1,040,268
2020	2022	$ 17,400,000	$ 5,490,000	32%	$ 1,030,000
2021	2023	$ 17,700,000	$ 5,820,000	33%	$ 1,060,000
2022	2024	$ 18,000,000	$ 6,170,000	34%	$ 1,100,000
2023	2025	$ 18,300,000	$ 6,640,000	36%	$ 1,130,000
2024	2026	$ 18,600,000	$ 7,120,000	38%	$ 1,160,000
7.35%[1]/3.00% - Adopted 2020 Demographic Assumptions					
NO 5-YEAR PHASE-IN					
2019	2021	$ 17,364,353	$ 5,228,554	30%	$ 1,070,664
2020	2022	$ 17,800,000	$ 5,530,000	31%	$ 1,080,000
2021	2023	$ 18,200,000	$ 5,940,000	33%	$ 1,110,000
2022	2024	$ 18,600,000	$ 6,380,000	34%	$ 1,150,000
2023	2025	$ 19,000,000	$ 6,940,000	37%	$ 1,180,000
2024	2026	$ 19,400,000	$ 7,510,000	39%	$ 1,210,000
5.35%[1]/3.00% - Current Demographic Assumptions					
NO 5-YEAR PHASE-IN					
2019	2021	$ 21,428,552	$ 5,228,554	24%	$ 1,279,332
2020	2022	$ 21,800,000	$ 5,400,000	25%	$ 1,300,000
2021	2023	$ 22,100,000	$ 5,750,000	26%	$ 1,340,000
2022	2024	$ 22,400,000	$ 6,230,000	28%	$ 1,390,000
2023	2025	$ 22,700,000	$ 6,870,000	30%	$ 1,420,000
2024	2026	$ 23,000,000	$ 7,520,000	33%	$ 1,470,000

[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.

Valuation Year Ending 12/31	Fiscal Year Beginning 7/1	7.35%/3.00% No Phase-In	2020 Dem. Assm. No Phase-In	5.35%/3.00% No Phase-In
2019	2021	02	02	02
2020	2022	No	No	No
2021	2023	No	No	No
2022	2024	No	No	No
2023	2025	No	No	No
2024	2026	No	No	No

This table shows in any given year which division(s) are impacted by the 3 times benefit payout minimum required contribution. If "No" appears in the table, it means none of the divisions are impacted.

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

Division	Total Normal Cost	Employee Contribut. Rate	Employer Contributions[1] Employer Normal Cost	Employer Contributions[1] Payment of the Unfunded Accrued Liability[4]	Employer Contributions[1] Computed Employer Contribut. No Phase-In	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]
Percentage of Payroll									
01 - Pblc Wrks	8.87%	5.00%	3.87%	42.89%	46.76%	42.72%			0.92%
02 - FT Police and Command	10.61%	8.00%	-	-	-	-	83.25%	81.93%	
05 - Fire	8.18%	5.00%	-	-	-	-	83.25%	81.93%	
10 - Clerical	0.00%	5.00%	-	-	-	-			
11 - Admn Unit	17.41%	5.25%	-	-	-	-	48.48%	46.17%	
12 - FT Admin ee's after 7/1/2013	8.35%	3.00%	5.35%	0.52%	5.87%	5.85%	48.48%	46.17%	0.92%
21 - Fire & Police hrd aft 06/30/16	8.61%	5.00%	3.61%	0.26%	3.87%	3.88%	83.25%	81.93%	0.85%
Estimated Monthly Contribution[3]									
01 - Pblc Wrks			$ 477	$ 5,290	$ 5,767	$ 5,269			
02 - FT Police and Command			431	39,361	39,792	39,369			
05 - Fire			333	1,598	1,931	1,676			
10 - Clerical			0	358	358	268			
11 - Admn Unit			2,359	32,096	34,455	32,652			
12 - FT Admin ee's after 7/1/2013			3,144	303	3,447	3,438			
21 - Fire & Police hrd aft 06/30/16			875	64	939	942			
Total Municipality			**$ 7,619**	**$ 79,070**	**$ 86,689**	**$ 83,614**			
Estimated Annual Contribution[3]			**$ 91,428**	**$ 948,840**	**$ 1,040,268**	**$ 1,003,368**			

[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 - Pblc Wrks: Open Division

	2019 Valuation	2018 Valuation
Benefit Multiplier:	Bridged Benefit: 2.25% Multiplier (80% max) Frozen FAC; 1.70% Multiplier (no max)	Bridged Benefit:2.25% Multiplier (80% max) Frozen FAC;1.70% Multiplier (no max)
Bridged Benefit Date:	8/31/2013	8/31/2013
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:	5.00%	5.00%
Act 88:	Yes (Adopted 10/16/2001)	Yes (Adopted 10/16/2001)

02 - FT Police and Command: Closed to new hires, linked to Division 21

	2019 Valuation	2018 Valuation
Benefit Multiplier:	Bridged Benefit: 2.50% Multiplier (80% max) Frozen FAC; 1.90% Multiplier (80% max)	Bridged Benefit:2.50% Multiplier (80% max) Frozen FAC;1.90% Multiplier (80% max)
Bridged Benefit Date:	9/30/2013	9/30/2013
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:	3 years	3 years
Employee Contributions:	8.00%	8.00%
D-2:	D2 (25%)	D2 (25%)
Act 88:	Yes (Adopted 10/16/2001)	Yes (Adopted 10/16/2001)

05 - Fire: Closed to new hires, linked to Division 21

	2019 Valuation	2018 Valuation
Benefit Multiplier:	Bridged Benefit: 2.50% Multiplier (80% max) Frozen FAC; 1.70% Multiplier (no max)	Bridged Benefit:2.50% Multiplier (80% max) Frozen FAC;1.70% Multiplier (no max)
Bridged Benefit Date:	8/31/2013	8/31/2013
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:	3 years	3 years
Employee Contributions:	5.00%	5.00%
D-2:	D2 (25%)	D2 (25%)
Act 88:	Yes (Adopted 10/16/2001)	Yes (Adopted 10/16/2001)

10 - Clerical: Open Division

	2019 Valuation	2018 Valuation
Benefit Multiplier:	Bridged Benefit: 2.25% Multiplier (80% max) Frozen FAC; 1.70% Multiplier (no max)	Bridged Benefit:2.25% Multiplier (80% max) Frozen FAC;1.70% Multiplier (no max)
Bridged Benefit Date:	8/31/2013	8/31/2013
Normal Retirement Age:	60	60
Vesting:	6 years	6 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:	5.00%	5.00%
Act 88:	Yes (Adopted 10/16/2001)	Yes (Adopted 10/16/2001)

11 - Admn Unit: Closed to new hires, linked to Division 12

	2019 Valuation	2018 Valuation
Benefit Multiplier:	2.50% Multiplier (80% max)	2.50% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	50/25	50/25
Early Retirement (Reduced):	55/15	55/15
Final Average Compensation:	3 years	3 years
COLA for Future Retirees:	2.50% (Non-Compound)	2.50% (Non-Compound)
Employee Contributions:	5.25%	5.25%
Act 88:	Yes (Adopted 10/16/2001)	Yes (Adopted 10/16/2001)

12 - FT Admin ee's after 7/1/2013: Open Division, linked to Division 11

	2019 Valuation	2018 Valuation
Benefit Multiplier:	1.50% Multiplier (no max)	1.50% Multiplier (no max)
Normal Retirement Age:	60	60
Vesting:	3 years	3 years
Early Retirement (Unreduced):	55/25	55/25
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	3 years	3 years
COLA for Future Retirees:	1.00% (Non-Compound)	1.00% (Non-Compound)
Employee Contributions:	3.00%	3.00%
Act 88:	Yes (Adopted 10/16/2001)	Yes (Adopted 10/16/2001)

21 - Fire & Police hrd aft 06/30/16: Open Division, linked to Division 02, 05

	2019 Valuation	2018 Valuation
Benefit Multiplier:	1.50% Multiplier (no max)	
Normal Retirement Age:	60	
Vesting:	10 years	
Early Retirement (Unreduced):	55/25	
Early Retirement (Reduced):	50/25	
	55/15	
Final Average Compensation:	3 years	
Employee Contributions:	5.00%	
D-2:	D2 (25%)	
Act 88:	No	

Table 3: Participant Summary

	2019 Valuation		2018 Valuation		2019 Valuation		
Division	Number	Annual Payroll[1]	Number	Annual Payroll[1]	Average Age	Average Benefit Service[2]	Average Eligibility Service[2]
01 - Pblc Wrks							
Active Employees	3	$ 137,451	4	$ 212,556	46.8	20.2	20.9
Vested Former Employees	1	44,053	0	0	49.0	35.1	35.1
Retirees and Beneficiaries	4	91,544	4	91,544	67.5		
Pending Refunds	1		1				
02 - FT Police and Command							
Active Employees	4	$ 203,420	5	$ 320,619	49.2	18.4	18.9
Vested Former Employees	4	79,563	4	79,563	50.0	10.9	14.4
Retirees and Beneficiaries	17	526,096	16	491,234	70.6		
Pending Refunds	10		10				
05 - Fire							
Active Employees	2	$ 122,279	2	$ 99,858	49.1	21.4	21.4
Vested Former Employees	1	28,424	1	28,424	40.9	15.9	15.9
Retirees and Beneficiaries	0	0	0	0	0.0		
Pending Refunds	0		0				
10 - Clerical							
Active Employees	0	$ 0	1	$ 41,812	0.0	0.0	0.0
Vested Former Employees	2	20,700	2	20,701	41.5	10.1	13.3
Retirees and Beneficiaries	4	40,198	4	30,773	68.1		
Pending Refunds	3		3				
11 - Admn Unit							
Active Employees	4	$ 545,508	4	$ 435,500	52.0	18.7	18.7
Vested Former Employees	5	90,674	5	90,674	52.6	10.4	18.2
Retirees and Beneficiaries	9	287,490	8	277,872	68.8		
Pending Refunds	3		3				
12 - FT Admin ee's after 7/1/2013							
Active Employees	5	$ 325,659	5	$ 298,294	36.5	4.0	4.0
Vested Former Employees	2	10,737	2	10,737	47.9	4.1	5.3
Retirees and Beneficiaries	0	0	0	0	0.0		
Pending Refunds	1		1				
21 - Fire & Police hrd aft 06/30/16							
Active Employees	4	$ 245,380	0	$ 0	36.3	0.6	4.4
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	0	0	0	0	0.0		
Pending Refunds	1		0				
Total Municipality							
Active Employees	**22**	**$ 1,579,697**	**21**	**$ 1,408,639**	**44.1**	**12.5**	**13.3**
Vested Former Employees	**15**	**274,150**	**14**	**230,099**	**48.8**	**11.7**	**15.8**
Retirees and Beneficiaries	**34**	**945,328**	**32**	**891,423**	**69.5**		
Pending Refunds	**19**		**18**				
Total Participants	**90**		**85**				

[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 - Pblc Wrks	$ 767,270	$ 246,305	$ 704,414	$ 233,847
02 - FT Police and Command	682,219	457,722	600,961	528,675
05 - Fire	209,125	207,529	154,501	198,263
10 - Clerical	346,261	43,371	282,679	89,015
11 - Admn Unit	1,496,650	462,026	1,239,961	426,604
12 - FT Admin ee's after 7/1/2013	174,577	56,048	129,618	45,554
21 - Fire & Police hrd aft 06/30/16	3,835	7,604	0	0
Municipality Total[3]	**$ 3,679,938**	**$ 1,480,605**	**$ 3,112,133**	**$ 1,521,958**
Combined Assets[3]	**$5,160,543**		**$4,634,090**	

[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	$ 491,076		$ 122,421	$ 251,187	$ (506,045)	$ (25,446)	$ 0	$ 4,537,674
2010	379,859		102,789	238,738	(561,809)	(7,964)	0	4,689,287
2011	472,250	$ 0	105,210	236,967	(636,237)	(19,175)	0	4,848,302
2012	473,117	0	92,400	186,905	(730,607)	0	0	4,870,117
2013	452,131	4,198	81,476	272,455	(756,752)	(8,740)	0	4,914,885
2014	352,649	0	61,854	252,496	(808,774)	(63,911)	(2)	4,709,197
2015	385,001	0	72,984	210,774	(846,034)	(29,962)	67,565	4,569,525
2016	512,897	0	71,495	203,384	(873,127)	0	0	4,484,174
2017	839,587	20,000	82,905	262,601	(878,910)	0	0	4,810,357
2018	883,775	0	80,989	185,959	(885,167)	0	0	5,075,913
2019	733,781	0	82,543	236,574	(900,257)	0	0	5,228,554

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 - Pblc Wrks	$ 481,734	$ 338,326	$ 1,009,327	$ 4,966	$ 1,834,353	$ 1,026,933	56.0%	$ 807,420
02 - FT Police and Command	958,338	443,803	5,413,275	23,669	6,839,085	1,154,965	16.9%	5,684,120
05 - Fire	585,257	79,148	0	0	664,405	422,146	63.5%	242,259
10 - Clerical	0	61,716	387,706	3,985	453,407	394,767	87.1%	58,640
11 - Admn Unit	2,490,709	821,999	3,596,189	21,932	6,930,829	1,984,489	28.6%	4,946,340
12 - FT Admin ee's after 7/1/2013	155,202	118,951	0	4,282	278,435	233,664	83.9%	44,771
21 - Fire & Police hrd aft 06/30/16	18,475	0	0	709	19,184	11,590	60.4%	7,594
Total	**$ 4,689,715**	**$ 1,863,943**	**$ 10,406,497**	**$ 59,543**	**$ 17,019,698**	**$ 5,228,554**	**30.7%**	**$ 11,791,144**

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 12, 11	$ 2,645,911	$ 940,950	$ 3,596,189	$ 26,214	$ 7,209,264	$ 2,218,153	30.8%	$ 4,991,111
Linked Divisions 21, 02, 05	1,562,070	522,951	5,413,275	24,378	7,522,674	1,588,701	21.1%	5,933,973

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	$ 9,593,477	$ 2,996,775	31%	$ 6,596,702
2006	10,095,789	3,364,957	33%	6,730,832
2007	10,729,701	3,829,627	36%	6,900,074
2008	11,315,544	4,204,481	37%	7,111,063
2009	11,771,007	4,537,674	39%	7,233,333
2010	11,966,601	4,689,287	39%	7,277,314
2011	12,677,526	4,848,302	38%	7,829,224
2012	13,099,306	4,870,117	37%	8,229,189
2013	12,267,691	4,914,885	40%	7,352,806
2014	12,762,525	4,709,197	37%	8,053,328
2015	14,028,993	4,569,525	33%	9,459,468
2016	14,547,139	4,484,174	31%	10,062,965
2017	15,299,824	4,810,357	31%	10,489,467
2018	15,695,260	5,075,913	32%	10,619,347
2019	17,019,698	5,228,554	31%	11,791,144

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 - Pblc Wrks

Table 8-01: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 1,268,605	$ 804,102	63%	$ 464,503
2010	1,304,133	888,721	68%	415,412
2011	1,343,739	965,293	72%	378,446
2012	1,458,864	1,014,082	70%	444,782
2013	1,398,094	1,041,336	75%	356,758
2014	1,439,777	1,032,533	72%	407,244
2015	1,557,223	1,022,389	66%	534,834
2016	1,602,788	1,018,975	64%	583,813
2017	1,657,459	1,032,846	62%	624,613
2018	1,692,172	1,027,717	61%	664,455
2019	1,834,353	1,026,933	56%	807,420

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	6	$ 344,248	12.34%	4.70%
2010	6	336,311	11.90%	4.70%
2011	6	342,379	11.56%	4.70%
2012	5	286,326	15.10%	4.70%
2013	4	223,089	12.90%	5.00%
2014	4	220,452	14.49%	5.00%
2015	4	212,288	19.61%	5.00%
2016	4	211,727	21.27%	5.00%
2017	4	224,648	21.78%	5.00%
2018	4	212,556	24.68%	5.00%
2019	3	137,451	46.76%	5.00%

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 8-02: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 3,500,653	$ 1,506,973	43%	$ 1,993,680
2010	3,901,086	1,807,076	46%	2,094,010
2011	4,083,493	1,923,857	47%	2,159,636
2012	4,268,419	2,048,389	48%	2,220,030
2013	2,970,234	1,734,072	58%	1,236,162
2014	5,908,094	1,421,726	24%	4,486,368
2015	6,248,945	1,133,237	18%	5,115,708
2016	6,315,722	967,694	15%	5,348,028
2017	6,388,938	1,111,365	17%	5,277,573
2018	6,462,143	1,237,337	19%	5,224,806
2019	6,839,085	1,154,965	17%	5,684,120

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	15	$ 1,113,476	15.81%	5.25%
2010	16	1,195,329	15.64%	5.25%
2011	14	1,037,423	17.99%	5.25%
2012	14	1,018,735	19.73%	5.25%
2013	6	349,349	23.87%	8.00%
2014	4	264,859	109.51%	8.00%
2015	5	281,188	227.38%	8.00%
2016	5	301,679	107.14%	8.00%
2017	5	320,548	105.70%	8.00%
2018	5	320,619	123.45%	8.00%
2019	4	203,420	$ 39,792	8.00%

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	668,275	458,224	69%	210,051
2014	751,151	516,005	69%	235,146
2015	904,720	578,688	64%	326,032
2016	450,358	319,084	71%	131,274
2017	495,816	357,585	72%	138,231
2018	587,758	386,397	66%	201,361
2019	664,405	422,146	64%	242,259

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	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	0	0	$ 0	0.00%
2013	4	269,466	7.88%	5.00%
2014	4	273,304	8.37%	5.00%
2015	4	262,344	11.24%	5.00%
2016	2	130,989	9.08%	5.00%
2017	2	131,610	9.92%	5.00%
2018	2	99,858	17.24%	5.00%
2019	2	122,279	$ 1,931	5.00%

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 8-10: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 509,605	$ 361,587	71%	$ 148,018
2010	534,508	376,861	71%	157,647
2011	568,434	394,666	69%	173,768
2012	610,052	425,576	70%	184,476
2013	514,519	449,176	87%	65,343
2014	522,394	448,919	86%	73,475
2015	564,443	452,302	80%	112,141
2016	582,572	457,885	79%	124,687
2017	513,779	417,449	81%	96,330
2018	487,868	407,131	83%	80,737
2019	453,407	394,767	87%	58,640

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 Number	Active Employees Annual Payroll	Computed Employer Contribution[1]	Employee Contribution Rate[2]
2009	4	$ 178,974	9.95%	4.50%
2010	4	183,136	10.08%	4.50%
2011	6	261,314	9.14%	4.50%
2012	5	228,318	10.44%	4.50%
2013	2	96,969	7.14%	5.00%
2014	2	86,590	8.45%	5.00%
2015	2	91,700	11.39%	5.00%
2016	2	111,011	10.62%	5.00%
2017	1	41,692	19.12%	5.00%
2018	1	41,812	17.11%	5.00%
2019	0	0	$ 358	5.00%

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 8-11: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2009	$ 3,377,751	$ 1,403,444	42%	$ 1,974,307
2010	3,469,755	1,386,496	40%	2,083,259
2011	3,835,308	1,436,466	38%	2,398,842
2012	3,982,528	1,336,212	34%	2,646,316
2013	4,019,879	1,280,249	32%	2,739,630
2014	4,115,214	1,268,668	31%	2,846,546
2015	4,675,294	1,314,586	28%	3,360,708
2016	5,484,535	1,628,546	30%	3,855,989
2017	6,082,704	1,739,907	29%	4,342,797
2018	6,245,534	1,825,458	29%	4,420,076
2019	6,930,829	1,984,489	29%	4,946,340

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

Table 9-11: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2009	4	$ 293,551	45.80%	5.25%
2010	4	275,881	49.68%	5.25%
2011	3	215,040	71.45%	5.25%
2012	3	221,190	82.01%	5.25%
2013	2	135,897	$ 15,353	5.25%
2014	2	141,376	$ 16,346	5.25%
2015	2	300,978	$ 22,095	5.25%
2016	3	334,196	$ 25,351	5.25%
2017	4	515,476	$ 29,890	5.25%
2018	4	435,500	$ 29,738	5.25%
2019	4	545,508	$ 34,455	5.25%

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.

Division 12 - FT Admin ee's after 7/1/2013

Table 8-12: 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	5,153	8,018	156%	(2,865)
2014	25,895	21,346	82%	4,549
2015	78,368	68,323	87%	10,045
2016	111,164	91,990	83%	19,174
2017	161,128	151,205	94%	9,923
2018	219,785	191,873	87%	27,912
2019	278,435	233,664	84%	44,771

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	0	$ 0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	0	0	$ 0	0.00%
2013	3	98,108	4.22%	3.00%
2014	4	210,727	5.66%	3.00%
2015	3	187,858	6.82%	3.00%
2016	5	331,088	6.55%	3.00%
2017	5	343,365	6.32%	3.00%
2018	5	298,294	5.75%	3.00%
2019	5	325,659	5.87%	3.00%

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 8-21: 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	19,184	11,590	60%	7,594

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	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	4	245,380	3.87%	5.00%

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 - Pblc Wrks

Table 10-01: 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	$ 534,834	23	$ 574,440	19	$ 44,304
(Gain)/Loss	12/31/2016	31,062	22	35,206	19	2,712
(Gain)/Loss	12/31/2017	27,204	21	30,631	19	2,364
(Gain)/Loss	12/31/2018	31,591	20	35,406	19	2,736
(Gain)/Loss	12/31/2019	55,629	19	61,873	19	4,776
Assumption	12/31/2019	80,614	19	85,349	19	6,588
Total				**$ 822,905**		**$ 63,480**

[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

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	$ 5,115,708	23	$ 5,079,888	19	$ 391,752
(Gain)/Loss	12/31/2016	22,432	22	25,426	19	1,956
(Gain)/Loss	12/31/2017	45,650	21	51,403	19	3,960
(Gain)/Loss	12/31/2018	77,871	20	87,281	19	6,732
(Gain)/Loss	12/31/2019	172,101	19	191,420	19	48,828
Assumption	12/31/2019	251,475	19	247,644	19	19,104
Total				**$ 5,683,062**		**$ 472,332**

[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	$ 326,032	23	$ 351,163	19	$ 27,084
(Gain)/Loss	12/31/2016	(202,918)	22	(230,005)	19	(17,736)
(Gain)/Loss	12/31/2017	11,961	21	13,476	19	1,044
(Gain)/Loss	12/31/2018	68,522	20	76,799	19	5,928
(Gain)/Loss	12/31/2019	(11,169)	19	(12,423)	19	(960)
Assumption	12/31/2019	45,496	19	49,432	19	3,816
Total				**$ 248,442**		**$ 19,176**

[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

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	$ 112,141	23	$ 121,340	19	$ 9,360
(Gain)/Loss	12/31/2016	7,562	22	8,567	19	660
(Gain)/Loss	12/31/2017	(30,975)	21	(34,869)	19	(2,688)
(Gain)/Loss	12/31/2018	(14,508)	20	(16,264)	19	(1,260)
(Gain)/Loss	12/31/2019	(36,691)	19	(40,810)	19	(3,144)
Assumption	12/31/2019	16,140	19	17,714	19	1,368
Total				**$ 55,678**		**$ 4,296**

[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.

Division 11 - Admn Unit

Table 10-11: 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	$ 3,360,708	23	$ 3,590,802	19	$ 276,912
(Gain)/Loss	12/31/2016	398,038	22	451,168	19	34,788
(Gain)/Loss	12/31/2017	389,106	21	438,101	19	33,780
(Gain)/Loss	12/31/2018	(688)	20	(767)	19	(60)
(Gain)/Loss	12/31/2019	234,183	19	260,470	19	20,088
Assumption	12/31/2019	254,007	19	254,745	19	19,644
Total				**$ 4,994,519**		**$ 385,152**

[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

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	$ 10,045	23	$ 16,058	19	$ 1,236
(Gain)/Loss	12/31/2016	5,120	22	5,795	19	444
(Gain)/Loss	12/31/2017	(11,362)	21	(12,801)	19	(984)
(Gain)/Loss	12/31/2018	18,518	20	20,760	19	1,596
(Gain)/Loss	12/31/2019	10,740	19	11,946	19	924
Assumption	12/31/2019	5,120	19	5,453	19	420
Total				**$ 47,211**		**$ 3,636**

[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
(Gain)/Loss	12/31/2019	$ 7,451	15	$ 8,287	15	$ 756
Assumption	12/31/2019	185	15	159	15	12
Total				**$ 8,446**		**$ 768**

[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:	34
Inactive employees entitled to but not yet receiving benefits (including refunds):	34
Active employees:	22
	90

Total Pension Liability as of 12/31/2018 measurement date:	$	15,291,706
Total Pension Liability as of 12/31/2019 measurement date:	$	16,582,562
Service Cost for the year ending on the 12/31/2019 measurement date:	$	176,704
Change in the Total Pension Liability due to:		
- Benefit changes[1]:	$	0
- Differences between expected and actual experience[2]:	$	204,807
- Changes in assumptions[2]:	$	615,209
Average expected remaining service lives of all employees (active and inactive):		2

[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)	$	1,579,697

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:	$ 1,917,941	$ -	$ (1,603,080)

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 - Pblc Wrks

12/1/2016	Service Credit Purchase Estimates - Yes
9/1/2013	Day of work defined as 170 Hours a Month for All employees.
9/1/2013	Non Standard Compensation Definition
9/1/2013	Exclude Temporary Employees requiring less than 12 months
9/1/2013	Benefit B-1
9/1/2013	Member Contribution Rate 5.00%
8/31/2013	Frozen FAC
12/16/2003	Blanket Resolution (All Service)
10/16/2001	Covered by Act 88
10/16/2001	Day of work defined as 150 Hours a Month for All employees.
9/1/1999	Temporary 20 Years & Out (09/01/1999 - 02/03/2000)
9/1/1999	Temporary Benefit FAC-3 (3 Year Final Average Compensation) (09/01/1999 - 02/03/2000)
9/1/1999	Temporary Benefit B-4 (80% max) (09/01/1999 - 02/03/2000)
7/1/1995	Benefit B-3 (80% max)
7/1/1995	Benefit F55 (With 20 Years of Service)
7/1/1995	Member Contribution Rate 4.70%
7/1/1992	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1992	10 Year Vesting
7/1/1992	Benefit C-1 (New)
7/1/1992	Member Contribution Rate 0.00%
7/1/1992	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 - FT Police and Command

12/1/2016	Service Credit Purchase Estimates - Yes
10/1/2013	Day of work defined as 170 Hours a Month for All employees.
10/1/2013	Non Standard Compensation Definition
10/1/2013	Exclude Temporary Employees requiring less than 12 months
10/1/2013	1.9% multiplier (80% max)
10/1/2013	Member Contribution Rate 8.00%
9/30/2013	Frozen FAC
6/1/2005	Benefit D2 Plan
6/1/2005	Benefit FAC-3 (3 Year Final Average Compensation)
6/1/2005	Benefit B-4 (80% max)
6/1/2005	Member Contribution Rate 5.25%
3/1/2002	Temporary 24 Years & Out (03/01/2002 - 06/03/2002)
10/16/2001	Blanket Resolution (All Service)
10/16/2001	Covered by Act 88
10/16/2001	Day of work defined as 150 Hours a Month for All employees.
9/1/1999	Temporary 20 Years & Out (09/01/1999 - 02/03/2000)
9/1/1999	Temporary Benefit FAC-3 (3 Year Final Average Compensation) (09/01/1999 - 02/03/2000)

02 - FT Police and Command

9/1/1999	Temporary Benefit B-4 (80% max) (09/01/1999 - 02/03/2000)
7/1/1995	Benefit B-3 (80% max)
7/1/1995	Member Contribution Rate 4.50%
7/1/1992	Benefit FAC-5 (5 Year Final Average Compensation)
7/1/1992	10 Year Vesting
7/1/1992	Benefit B-1
7/1/1992	Benefit F55 (With 25 Years of Service)
7/1/1992	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

12/1/2016	Service Credit Purchase Estimates - Yes
9/1/2013	Day of work defined as 170 Hours a Month for All employees.
9/1/2013	Non Standard Compensation Definition
9/1/2013	Benefit B-1
9/1/2013	Member Contribution Rate 5.00%
8/31/2013	Frozen FAC
8/1/2013	Benefit D2 Plan
8/1/2013	Benefit FAC-3 (3 Year Final Average Compensation)
8/1/2013	Exclude Temporary Employees requiring less than 12 months
8/1/2013	10 Year Vesting
8/1/2013	Benefit B-4 (80% max)
8/1/2013	Benefit F55 (With 25 Years of Service)
8/1/2013	Member Contribution Rate 5.25%
10/16/2001	Covered by Act 88
7/1/1992	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

10 - Clerical

12/1/2016	Service Credit Purchase Estimates - Yes
9/1/2013	Day of work defined as 170 Hours a Month for All employees.
9/1/2013	Non Standard Compensation Definition
9/1/2013	Exclude Temporary Employees requiring less than 12 months
9/1/2013	Benefit B-1
9/1/2013	Member Contribution Rate 5.00%
8/31/2013	Frozen FAC
12/16/2003	Blanket Resolution (All Service)
10/16/2001	Covered by Act 88
10/16/2001	Day of work defined as 150 Hours a Month for All employees.
4/1/1997	Benefit B-3 (80% max)
4/1/1997	Benefit F55 (With 25 Years of Service)
4/1/1997	Member Contribution Rate 4.50%
11/1/1994	6 Year Vesting
1/1/1994	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1994	10 Year Vesting
1/1/1994	Benefit C-1 (New)
1/1/1994	Member Contribution Rate 0.00%

10 - Clerical

7/1/1992	Fiscal Month - July
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

11 - Admn Unit

12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2006	E2 2.5% COLA for future retirees (06/01/2005)
6/1/2005	Benefit FAC-3 (3 Year Final Average Compensation)
6/1/2005	Benefit B-4 (80% max)
6/1/2005	Benefit F50 (With 25 Years of Service)
6/1/2005	Member Contribution Rate 5.25%
12/16/2003	Blanket Resolution (All Service)
10/16/2001	Covered by Act 88
10/16/2001	Day of work defined as 150 Hours a Month for All employees.
10/1/1995	Benefit FAC-5 (5 Year Final Average Compensation)
10/1/1995	6 Year Vesting
10/1/1995	Benefit B-3 (80% max)
10/1/1995	Benefit F55 (With 25 Years of Service)
10/1/1995	Member Contribution Rate 4.50%
7/1/1992	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 - FT Admin ee's after 7/1/2013

12/1/2016	Service Credit Purchase Estimates - Yes
7/1/2013	Day of work defined as 170 Hours a Month for All employees.
7/1/2013	Benefit FAC-3 (3 Year Final Average Compensation)
7/1/2013	Non Standard Compensation Definition
7/1/2013	Exclude Temporary Employees requiring less than 12 months
7/1/2013	3 Year Vesting
7/1/2013	Benefit C-1 (New)
7/1/2013	Benefit F55 (With 25 Years of Service)
7/1/2013	Member Contribution Rate 3.00%
7/1/2013	E2 1% COLA for future retirees
10/16/2001	Covered by Act 88
7/1/1992	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 - Fire & Police hrd aft 06/30/16

12/1/2018	Day of work defined as 170 Hours a Month for Full Time employees.
12/1/2018	Benefit D2 Plan
12/1/2018	Benefit FAC-3 (3 Year Final Average Compensation)
12/1/2018	Non Standard Compensation Definition
12/1/2018	Exclude Temporary Employees requiring less than 12 months
12/1/2018	10 Year Vesting
12/1/2018	Defined Benefit Normal Retirement Age - 60
12/1/2018	Service Credit Purchase Estimates - Yes
12/1/2018	Benefit C-1 (New)

21 - Fire & Police hrd aft 06/30/16

12/1/2018	Benefit F55 (With 25 Years of Service)
12/1/2018	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years
12/1/2018	Participant Contribution Rate 5%
7/1/1992	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
01 - Pblc Wrks	4.00%
02 - FT Police and Command	4.00%
05 - Fire	4.00%
10 - Clerical	4.00%
11 - Admn Unit	4.00%
12 - FT Admin ee's after 7/1/2013	4.00%
21 - Fire & Police hrd aft 06/30/16	0.00%

Withdrawal Rate Scaling Factor

Division	Withdrawal Rate Scaling Factor
All Divisions	100%

Miscellaneous and Technical Assumptions

Loads – None.

Amortization Policy for Closed Divisions

Closed Division	Amortization Option
10 - Clerical	Non-Accelerated Amortization

Please see the Appendix on MERS website for a detailed description of the amortization options available for closed divisions within an open municipality.

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	3.3	3.3
2. Ratio of actuarial accrued liability to payroll	10.8	11.1
3. Ratio of actives to retirees and beneficiaries	0.6	0.7
4. Ratio of market value of assets to benefit payments	5.7	5.2
5. Ratio of net cash flow to market value of assets (boy)	-1.8%	1.7%

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	22
12	Indicate number of inactive members (excluding pending refunds)	15
13	Indicate number of retirees and beneficiaries	34
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	$5,198,272
25	Enter retirement pension system's actuarial accrued liabilities using uniform assumptions	$18,068,106
27	Actuarially Determined Contribution (ADC) using uniform assumptions, Fiscal Year Ending June 30, 2020	$1,048,584

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."