Municipal Employees' Retirement System of Michigan

Annual Actuarial Valuation Report
December 31, 2018 - Lapeer Co (4403)

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Spring, 2019

Lapeer Co

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 Lapeer Co (4403) as of December 31, 2018. 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. Lapeer Co 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, 2018,
- Establish contribution requirements for the fiscal year beginning January 1, 2020,
- 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, 2018. 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. The most recent study was completed in 2015, as prepared by the prior actuary, and is the basis of the 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.** 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-2018AnnualActuarialValuation-Appendix.pdf.

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

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 Lapeer Co 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

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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.

	12/31/2018	12/31/2017
Funded Ratio*	84%	86%

* Reflects assets from Surplus divisions, if any.

There has been a change in actuary and actuarial software since the December 31, 2017 valuation. 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 phased-in over a 5-year period. This valuation reflects the fourth year of the phase-in.

Your minimum required contribution is the amount in the “Phase-in” columns. By default, MERS will invoice you the phased-in contribution amount, but strongly encourages you to contribute more than the minimum required contribution. If you requested and have been billed using No Phase-in rates, your 2019 rates will continue to use the No Phase-in method. If you have been billed using the Phased-in rates and wish to change to rates based on No Phase-in, please contact MERS.

	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:	12/31/2018	12/31/2018	12/31/2017	12/31/2017	12/31/2018	12/31/2018	12/31/2017	12/31/2017
Fiscal Year Beginning:	January 1, 2020	January 1, 2020	January 1, 2019	January 1, 2019	January 1, 2020	January 1, 2020	January 1, 2019	January 1, 2019
Division								
02 - Sheriff Union	16.11%	16.48%	14.77%	15.52%	$ 60,703	$ 62,089	$ 54,750	$ 57,522
04 - S.T.A.R.S.	8.35%	8.44%	7.95%	8.13%	59,063	59,679	55,967	57,199
06 - CMH Union	8.99%	9.15%	8.23%	8.55%	21,200	21,582	19,701	20,465
10 - Health Union	9.30%	9.64%	8.53%	9.24%	12,387	12,839	10,852	11,756
11 - Gnrl Non Union	11.81%	12.07%	10.00%	10.52%	24,508	25,038	20,368	21,428
12 - General Union	11.04%	11.30%	9.58%	10.12%	25,929	26,546	22,108	23,342
13 - Elected & Appt. Dept Heads	9.56%	9.97%	8.74%	9.58%	11,068	11,547	9,958	10,916
20 - Dispatch Union	9.39%	9.60%	9.59%	10.02%	6,182	6,321	6,231	6,509
40 - MCF Non Union	18.51%	18.75%	17.82%	18.33%	97,475	98,718	86,596	89,082
60 - CMH Non Union	11.98%	12.31%	10.51%	11.26%	7,962	8,181	6,140	6,578
Municipality Total					**$ 326,477**	**$ 332,540**	**$ 292,671**	**$ 304,797**

Employee contribution rates:

	Employee Contribution Rate	
Valuation Date:	12/31/2018	12/31/2017
Division		
02 - Sheriff Union	2.49%	2.49%
04 - S.T.A.R.S.	1.27%	1.27%
06 - CMH Union	0.00%	0.00%
10 - Health Union	0.00%	0.00%
11 - Gnrl Non Union	0.00%	0.00%
12 - General Union	0.00%	0.00%
13 - Elected & Appt. Dept Heads	2.53%	2.53%
20 - Dispatch Union	0.00%	0.00%
40 - MCF Non Union	0.00%	0.00%
60 - CMH Non Union	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 2020 for the entire employer would be $415,377, instead of $332,540.

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 **more than half** 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 **7.75%** 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 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. This report includes a "What If" scenario of 7.35%/3.00% in order to show the potential impact of this assumption change.

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 2018 was 3.80%, while the actual market rate of return was (4.12)%.** 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, 2018 the actuarial value of assets is 110% 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 7.75% investment return assumption, or contribution requirements will continue to increase.

If the December 31, 2018 valuation results were based on market value instead of actuarial value:

- The funded percent of your entire municipality would be 77% (instead of 84%); and
- Your total employer contribution requirement for the fiscal year starting January 1, 2020 would be $4,720,872 (instead of $3,990,480)

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 Wage Inflation assumption. Lower investment returns would result in higher required employer contributions, and vice-versa. Lower wage inflation generally results in lower required employer contributions as a dollar amount in the long run, and vice versa.

The relative impact of each economic scenario 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, 2018 valuation, and are for the municipality in total, not by division. These results do not reflect a 5-year 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.

The Retirement Board has adopted a change to the Investment Return Assumption from 7.75% to 7.35%, and the wage inflation from 3.75% to 3.00%. This change will be effective in the December 31, 2019 valuation which will impact the Fiscal Year 2021 contribution. The scenario shown using these assumptions as of December 31, 2018 is illustrative only. The actual impact of this change when reflected in the 2019 valuation will be different.

	Assumed Future Annual Smoothed Rate of Investment Return		
12/31/2018 Valuation Results	**Lower Future Annual Returns**	**Adopted 2019 Assumption**	**Valuation Assumptions**
Investment Return Assumption	**5.75%**	**7.35%**	**7.75%**
Wage Increase Assumption	**3.75%**	**3.00%**	**3.75%**
Accrued Liability	$ 160,196,968	$ 130,836,701	$ 126,978,299
Valuation Assets[1]	$ 107,283,161	$ 107,283,161	$ 107,283,161
Unfunded Accrued Liability	$ 52,913,807	$ 23,553,540	$ 19,695,138
Funded Ratio	67%	82%	84%
Monthly Normal Cost	$ 360,952	$ 209,460	$ 211,615
Monthly Amortization Payment	$ 279,451	$ 149,522	$ 120,925
Total Employer Contribution[2]	$ 640,403	$ 358,982	$ 332,540

[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.

Projection Scenarios

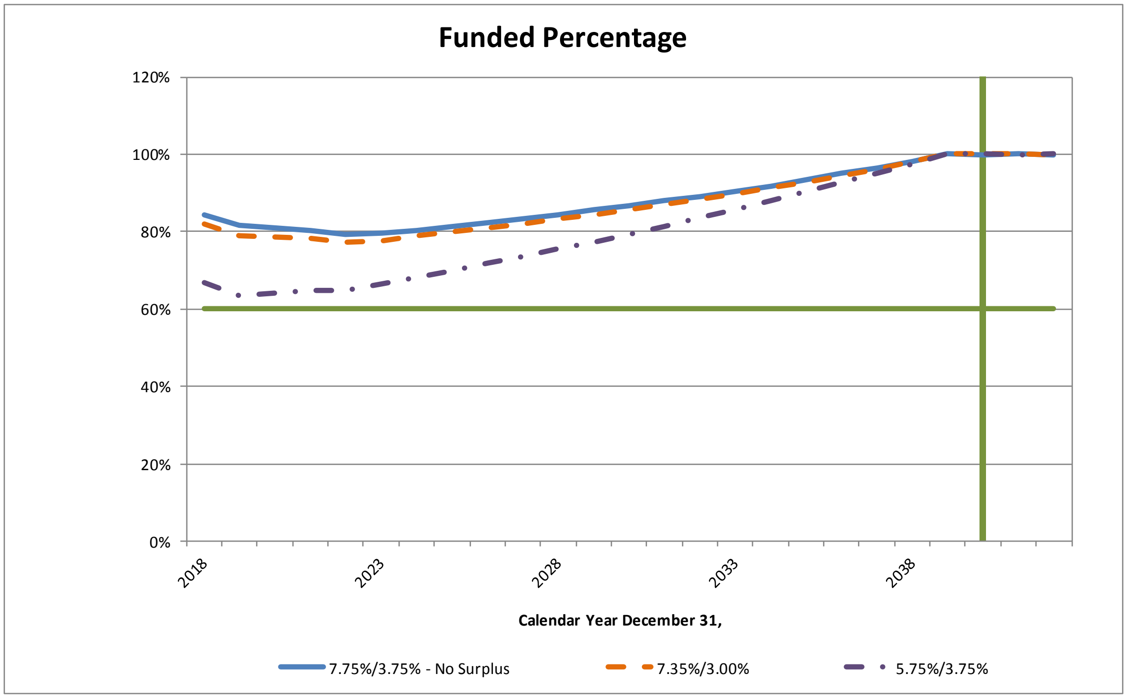
The next two pages show projections of the plan's funded ratio and computed employer contributions under the actuarial assumptions used in the valuation and alternate economic scenarios. All three projections take into account the past investment losses that will continue to affect the actuarial rate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

The 7.75%/3.75% scenario provides an estimate of computed employer contributions based on current actuarial assumptions, and a projected 7.75% 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 7.35%/3.00% and 5.75%/3.75% projections 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 1/1	Actuarial Accrued Liability	Valuation Assets[2]	Funded Percentage	Computed Annual Employer Contribution
7.75%[1]/3.75%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 126,978,299	$ 107,283,161	84%	$ 3,990,480
2019	2021	$ 132,600,000	$ 108,100,000	82%	$ 4,500,000
2020	2022	$ 138,400,000	$ 112,100,000	81%	$ 4,790,000
2021	2023	$ 144,200,000	$ 115,900,000	80%	$ 5,130,000
2022	2024	$ 149,900,000	$ 118,900,000	79%	$ 5,570,000
2023	2025	$ 155,700,000	$ 123,900,000	80%	$ 5,850,000
7.35%[1]/3.00%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 130,836,701	$ 107,283,161	82%	$ 4,307,784
2019	2021	$ 136,200,000	$ 107,700,000	79%	$ 4,810,000
2020	2022	$ 141,800,000	$ 111,500,000	79%	$ 5,080,000
2021	2023	$ 147,200,000	$ 115,200,000	78%	$ 5,390,000
2022	2024	$ 152,500,000	$ 118,000,000	77%	$ 5,810,000
2023	2025	$ 157,800,000	$ 122,700,000	78%	$ 6,050,000
5.75%[1]/3.75%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 160,196,968	$ 107,283,161	67%	$ 7,684,836
2019	2021	$ 167,000,000	$ 106,100,000	64%	$ 8,390,000
2020	2022	$ 174,000,000	$ 111,800,000	64%	$ 8,800,000
2021	2023	$ 181,100,000	$ 117,500,000	65%	$ 9,260,000
2022	2024	$ 188,100,000	$ 121,800,000	65%	$ 9,860,000
2023	2025	$ 195,200,000	$ 129,600,000	66%	$ 10,200,000

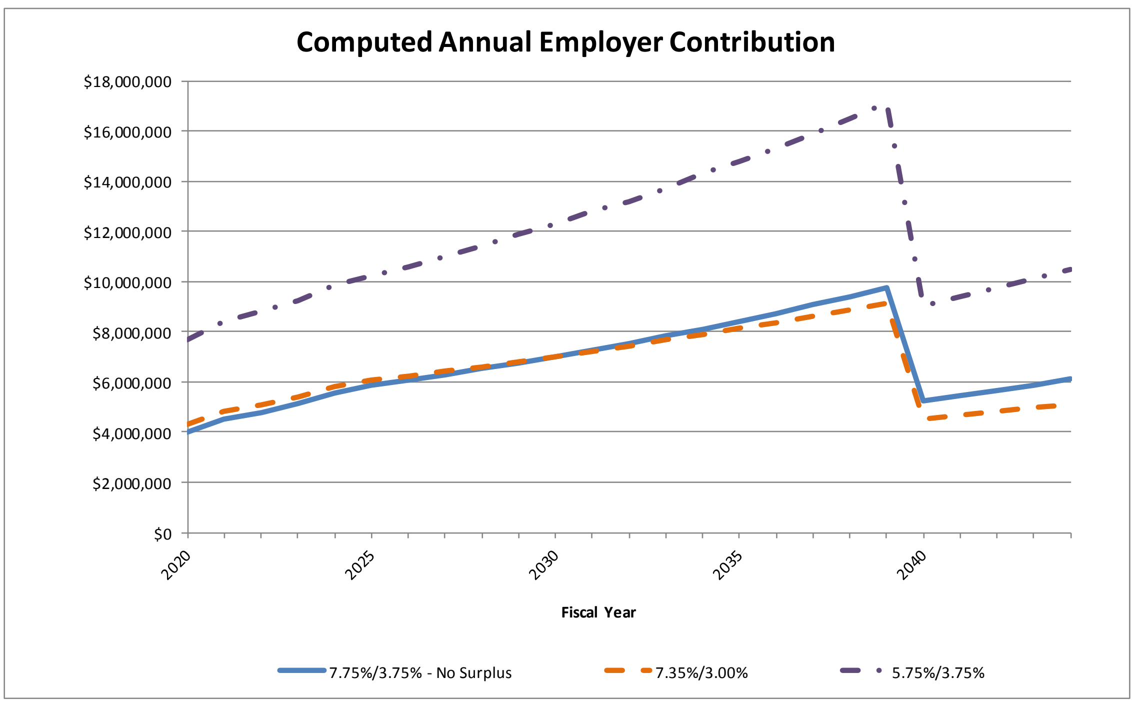
[1] Represents both the interest rate for discounting liabilities and the future investment return assumption on the Market Value of assets.

[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 22 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 January 1, 2020

			Employer Contributions[1]						
Division	Total Normal Cost	Employee Contribut. Rate	Employer Normal Cost	Payment of the Unfunded Accrued Liability[4]	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									
02 - Sheriff Union	10.53%	2.49%	8.04%	8.44%	16.48%	16.11%			0.83%
04 - S.T.A.R.S.	7.79%	1.27%	6.52%	1.92%	8.44%	8.35%			0.85%
06 - CMH Union	7.96%	0.00%	7.96%	1.19%	9.15%	8.99%			0.83%
10 - Health Union	8.36%	0.00%	8.36%	1.28%	9.64%	9.30%			0.82%
11 - Gnrl Non Union	8.24%	0.00%	8.24%	3.83%	12.07%	11.81%			0.82%
12 - General Union	8.00%	0.00%	8.00%	3.30%	11.30%	11.04%			0.80%
13 - Elected & Appt. Dept Heads	10.43%	2.53%	7.90%	2.07%	9.97%	9.56%			0.75%
20 - Dispatch Union	8.83%	0.00%	8.83%	0.77%	9.60%	9.39%			0.84%
40 - MCF Non Union	9.39%	0.00%	9.39%	9.36%	18.75%	18.51%			0.83%
60 - CMH Non Union	7.54%	0.00%	7.54%	4.77%	12.31%	11.98%			0.76%
Estimated Monthly Contribution[3]									
02 - Sheriff Union			$ 30,292	$ 31,797	$ 62,089	$ 60,703			
04 - S.T.A.R.S.			46,109	13,570	59,679	59,063			
06 - CMH Union			18,777	2,805	21,582	21,200			
10 - Health Union			11,139	1,700	12,839	12,387			
11 - Gnrl Non Union			17,091	7,947	25,038	24,508			
12 - General Union			18,801	7,745	26,546	25,929			
13 - Elected & Appt. Dept Heads			9,146	2,401	11,547	11,068			
20 - Dispatch Union			5,811	510	6,321	6,182			
40 - MCF Non Union			49,437	49,281	98,718	97,475			
60 - CMH Non Union			5,012	3,169	8,181	7,962			
Total Municipality			**$ 211,615**	**$ 120,925**	**$ 332,540**	**$ 326,477**			
Estimated Annual Contribution[3]			**$ 2,539,380**	**$ 1,451,100**	**$ 3,990,480**	**$ 3,917,724**			

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 with 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

02 - Sheriff Union: Open Division

	2018 Valuation	2017 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):	50/25	50/25
Early Retirement (Reduced):	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	2.49%	2.49%
Act 88:	Yes (Adopted 10/30/1970)	Yes (Adopted 10/30/1970)

04 - S.T.A.R.S.: Open Division

	2018 Valuation	2017 Valuation
Benefit Multiplier:	2.00% Multiplier (no max)	2.00% Multiplier (no 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:	1.27%	1.27%
Act 88:	Yes (Adopted 10/30/1970)	Yes (Adopted 10/30/1970)

06 - CMH Union: Open Division

	2018 Valuation	2017 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):	-	-
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 10/30/1970)	Yes (Adopted 10/30/1970)

10 - Health Union: Open Division

	2018 Valuation	2017 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):	-	-
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 10/30/1970)	Yes (Adopted 10/30/1970)

11 - Gnrl Non Union: Open Division

	2018 Valuation	2017 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):	-	-
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 10/30/1970)	Yes (Adopted 10/30/1970)

12 - General Union: Open Division

	2018 Valuation	2017 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):	-	-
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 10/30/1970)	Yes (Adopted 10/30/1970)

13 - Elected & Appt. Dept Heads: Open Division

	2018 Valuation	2017 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):	-	-
Early Retirement (Reduced):	50/25 55/15	50/25 55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	2.53%	2.53%
Act 88:	Yes (Adopted 10/30/1970)	Yes (Adopted 10/30/1970)

20 - Dispatch Union: Open Division

	2018 Valuation	2017 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):	50/25	50/25
Early Retirement (Reduced):	55/15	55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 10/30/1970)	Yes (Adopted 10/30/1970)

40 - MCF Non Union: Open Division

	2018 Valuation	2017 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):	55/25	55/25
Early Retirement (Reduced):	50/25 55/15	50/25 55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 10/30/1970)	Yes (Adopted 10/30/1970)

60 - CMH Non Union: Open Division

	2018 Valuation	2017 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):	-	-
Early Retirement (Reduced):	50/25 55/15	50/25 55/15
Final Average Compensation:	5 years	5 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 10/30/1970)	Yes (Adopted 10/30/1970)

Table 3: Participant Summary

Division	2018 Valuation		2017 Valuation		2018 Valuation		
	Number	Annual Payroll[1]	Number	Annual Payroll[1]	Average Age	Average Benefit Service[2]	Average Eligibility Service[2]
02 - Sheriff Union							
Active Employees	75	$ 4,200,275	76	$ 4,130,920	42.5	13.5	13.9
Vested Former Employees	15	94,667	15	88,625	47.2	5.7	16.2
Retirees and Beneficiaries	56	1,298,422	53	1,255,292	68.0		
04 - S.T.A.R.S.							
Active Employees	269	$ 7,883,982	277	$ 7,843,521	37.4	6.1	6.1
Vested Former Employees	47	279,176	45	261,325	48.1	11.2	12.7
Retirees and Beneficiaries	81	621,369	78	591,694	70.4		
06 - CMH Union							
Active Employees	65	$ 2,629,706	63	$ 2,667,609	42.7	8.3	8.3
Vested Former Employees	10	89,690	9	80,255	45.5	9.8	11.6
Retirees and Beneficiaries	31	484,643	25	374,341	67.6		
10 - Health Union							
Active Employees	39	$ 1,485,355	37	$ 1,417,705	51.4	14.2	14.3
Vested Former Employees	13	107,485	15	127,106	53.0	10.8	15.1
Retirees and Beneficiaries	43	418,098	41	397,056	69.7		
11 - Gnrl Non Union							
Active Employees	46	$ 2,312,265	46	$ 2,270,725	50.4	13.5	13.7
Vested Former Employees	12	177,850	13	190,069	51.8	12.8	16.4
Retirees and Beneficiaries	38	616,973	34	512,194	72.6		
12 - General Union							
Active Employees	65	$ 2,619,949	66	$ 2,572,555	49.9	14.6	14.6
Vested Former Employees	15	152,665	14	150,489	49.5	12.1	14.0
Retirees and Beneficiaries	42	591,417	41	558,054	73.4		
13 - Elected & Appt. Dept Heads							
Active Employees	24	$ 1,290,681	25	$ 1,270,726	61.3	18.1	19.6
Vested Former Employees	5	101,539	6	121,638	54.7	11.0	20.5
Retirees and Beneficiaries	26	518,491	23	462,549	72.3		
20 - Dispatch Union							
Active Employees	15	$ 733,705	16	$ 724,132	41.2	10.6	11.0
Vested Former Employees	2	15,887	3	33,425	46.5	8.5	14.8
Retirees and Beneficiaries	7	146,974	5	111,389	62.6		
40 - MCF Non Union							
Active Employees	102	$ 5,869,347	94	$ 5,416,645	43.5	10.3	10.3
Vested Former Employees	20	236,847	17	212,496	47.9	10.3	12.0
Retirees and Beneficiaries	63	1,079,382	62	1,066,784	70.1		

Table 3 (continued)

Division	2018 Valuation		2017 Valuation		2018 Valuation		
	Number	Annual Payroll[1]	Number	Annual Payroll[1]	Average Age	Average Benefit Service[2]	Average Eligibility Service[2]
60 - CMH Non Union							
Active Employees	12	$ 741,002	11	$ 650,991	45.4	14.5	14.5
Vested Former Employees	3	33,240	3	33,240	52.6	12.1	17.6
Retirees and Beneficiaries	11	254,066	11	254,067	68.7		
Total Municipality							
Active Employees	**712**	**$ 29,766,267**	**711**	**$ 28,965,529**	**43.1**	**10.0**	**10.1**
Vested Former Employees	**142**	**1,289,046**	**140**	**1,298,668**	**49.0**	**10.6**	**14.0**
Retirees and Beneficiaries	**398**	**6,029,835**	**373**	**5,583,420**	**70.2**		
Total Participants	**1,252**		**1,224**				

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	2018 Valuation		2017 Valuation	
	Employer and Retiree[1]	Employee[2]	Employer and Retiree[1]	Employee[2]
02 - Sheriff Union	$ 17,717,346	$ 1,463,882	$ 18,902,543	$ 1,360,897
04 - S.T.A.R.S.	10,950,684	640,840	11,491,538	561,735
06 - CMH Union	7,727,407	22,551	8,302,244	31,470
10 - Health Union	7,614,696	41,792	8,107,561	46,419
11 - Gnrl Non Union	10,185,944	16,371	10,736,580	26,879
12 - General Union	10,680,666	10,056	11,487,669	13,858
13 - Elected & Appt. Dept Heads	8,714,996	393,277	9,248,987	379,105
20 - Dispatch Union	2,944,747	0	2,934,472	0
40 - MCF Non Union	14,878,748	76,264	15,601,541	70,476
60 - CMH Non Union	3,860,981	3,652	4,117,284	3,558
Municipality Total[3]	**$ 95,276,214**	**$ 2,668,684**	**$ 100,930,419**	**$ 2,494,397**
Combined Assets[3]	**$97,944,899**		**$103,424,816**	

[1] Reserve for Employer Contributions and Benefit Payments.
[2] Reserve for Employee Contributions.
[3] Totals may not add due to rounding.

The December 31, 2018 valuation assets (actuarial value of assets) are equal to 1.095342 times the reported market value of assets (compared to 1.011321 as of December 31, 2017). 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		Employee Contributions	Investment Income (Valuation Assets)	Benefit Payments	Employee Contribution Refunds	Net Transfers	Valuation Asset Balance
	Required	Additional						
2008	$ 2,820,446		$ 121,929	$ 2,983,475	$ (2,357,504)	$ (5,875)	$ 0	$ 64,884,220
2009	3,356,569		127,565	3,719,493	(2,592,458)	(7,466)	0	69,487,923
2010	2,701,704		120,400	4,108,154	(2,887,422)	(3,985)	0	73,526,774
2011	2,392,517	$ 1,276,817	118,290	4,243,170	(3,227,971)	(18,286)	0	78,311,311
2012	2,469,808	12,604	118,808	3,720,946	(3,576,831)	(2,462)	11,703	81,065,887
2013	2,427,970	104,953	201,995	4,942,034	(3,871,478)	(12,924)	0	84,858,437
2014	2,590,936	1,456,298	213,190	5,008,867	(4,315,512)	(3,232)	2,842	89,811,826
2015	2,866,216	0	224,327	4,518,511	(4,713,623)	(1,488)	(3,220)	92,702,549
2016	3,002,820	1,914,751	222,970	5,202,130	(5,116,753)	(32,929)	(1)	97,895,537
2017	3,374,657	2,376,293	233,100	6,149,445	(5,494,078)	(5,719)	66,453	104,595,688
2018	3,466,895	900,700	236,837	3,910,867	(5,820,903)	(6,924)	1	107,283,161

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, 2018

	Actuarial Accrued Liability							
Division	Active Employees	Vested Former Employees	Retirees and Beneficiaries	Pending Refunds	Total	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
02 - Sheriff Union	$ 12,519,886	$ 463,344	$ 13,164,329	$ 62,308	$ 26,209,867	$ 21,010,005	80.2%	$ 5,199,862
04 - S.T.A.R.S.	7,474,947	1,639,963	5,624,383	171,865	14,911,158	12,696,683	85.1%	2,214,475
06 - CMH Union	3,847,491	323,824	4,753,945	7,004	8,932,264	8,488,854	95.0%	443,410
10 - Health Union	4,074,209	764,274	3,813,342	8,528	8,660,353	8,386,473	96.8%	273,880
11 - Gnrl Non Union	5,470,106	1,084,417	5,892,719	757	12,447,999	11,175,024	89.8%	1,272,975
12 - General Union	6,976,323	780,432	5,198,693	0	12,955,448	11,709,997	90.4%	1,245,451
13 - Elected & Appt. Dept Heads	4,544,038	765,721	5,047,194	2,205	10,359,158	9,976,673	96.3%	382,485
20 - Dispatch Union	1,581,790	116,096	1,615,691	0	3,313,577	3,225,505	97.3%	88,072
40 - MCF Non Union	12,724,400	1,379,505	10,337,776	1,950	24,443,631	16,380,853	67.0%	8,062,778
60 - CMH Non Union	2,098,614	248,649	2,397,581	0	4,744,844	4,233,094	89.2%	511,750
Total	**$ 61,311,804**	**$ 7,566,225**	**$ 57,845,653**	**$ 254,617**	**$ 126,978,299**	**$ 107,283,161**	**84.5%**	**$ 19,695,138**

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
2004	$ 53,364,956	$ 44,605,818	84%	$ 8,759,138
2005	57,449,535	48,484,521	84%	8,965,014
2006	62,191,494	55,548,007	89%	6,643,487
2007	67,484,457	61,321,749	91%	6,162,708
2008	72,924,490	64,884,220	89%	8,040,270
2009	75,451,001	69,487,923	92%	5,963,078
2010	79,860,857	73,526,774	92%	6,334,083
2011	85,385,423	78,311,311	92%	7,074,112
2012	89,282,225	81,065,887	91%	8,216,338
2013	94,903,895	84,858,437	89%	10,045,458
2014	101,824,866	89,811,826	88%	12,013,040
2015	112,789,127	92,702,549	82%	20,086,578
2016	117,376,217	97,895,537	83%	19,480,680
2017	121,537,828	104,595,688	86%	16,942,140
2018	126,978,299	107,283,161	84%	19,695,138

Notes: Actuarial assumptions were revised for the 2004, 2008, 2009, 2010, 2011, 2012 and 2015 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.

Tables 8 and 9: Division-Based Comparative Schedules

Division 02 - Sheriff Union

Table 8-02: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 17,581,765	$ 14,978,476	85%	$ 2,603,289
2009	18,248,875	15,931,563	87%	2,317,312
2010	18,864,025	16,376,070	87%	2,487,955
2011	19,600,877	16,856,101	86%	2,744,776
2012	20,140,990	17,176,086	85%	2,964,904
2013	21,155,855	17,829,275	84%	3,326,580
2014	22,552,782	18,334,793	81%	4,217,989
2015	24,783,267	18,659,484	75%	6,123,783
2016	25,234,701	19,305,011	77%	5,929,690
2017	25,289,813	20,492,842	81%	4,796,971
2018	26,209,867	21,010,005	80%	5,199,862

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 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		
2008	76	$ 3,597,122	11.88%	2.49%
2009	76	3,860,058	11.30%	2.49%
2010	74	3,549,868	12.17%	2.49%
2011	73	3,563,819	12.05%	2.49%
2012	73	3,622,005	12.73%	2.49%
2013	73	3,623,507	13.43%	2.49%
2014	73	3,771,938	14.75%	2.49%
2015	75	3,900,580	17.95%	2.49%
2016	74	3,958,957	17.52%	2.49%
2017	76	4,130,920	15.52%	2.49%
2018	75	4,200,275	16.48%	2.49%

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 contributon 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. The contribution requirements including the 5-year phase-in are shown on page 2.

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 8-04: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 7,953,439	$ 6,673,168	84%	$ 1,280,271
2009	8,026,964	7,220,033	90%	806,931
2010	8,555,727	7,741,169	90%	814,558
2011	9,432,054	8,301,368	88%	1,130,686
2012	9,947,561	8,889,986	89%	1,057,575
2013	11,055,158	9,554,589	86%	1,500,569
2014	11,568,898	10,114,388	87%	1,454,510
2015	12,981,167	10,795,876	83%	2,185,291
2016	13,220,635	11,377,489	86%	1,843,146
2017	14,127,049	12,189,728	86%	1,937,321
2018	14,911,158	12,696,683	85%	2,214,475

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

Table 9-04: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	239	$ 5,520,840	8.24%	0.00%
2009	245	5,700,181	7.73%	0.00%
2010	237	5,527,623	7.99%	0.00%
2011	304	7,210,900	7.75%	0.00%
2012	306	7,290,485	7.78%	0.00%
2013	301	7,164,177	7.89%	1.27%
2014	288	7,237,326	7.79%	1.27%
2015	288	7,802,578	8.32%	1.27%
2016	264	7,176,151	8.12%	1.27%
2017	277	7,843,521	8.13%	1.27%
2018	269	7,883,982	8.44%	1.27%

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 contributon 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. The contribution requirements including the 5-year phase-in are shown on page 2.

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 8-06: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 4,514,708	$ 3,953,621	88%	$ 561,087
2009	4,760,194	4,400,022	92%	360,172
2010	5,152,176	4,946,375	96%	205,801
2011	5,712,715	5,626,574	99%	86,141
2012	6,186,499	6,006,035	97%	180,464
2013	6,545,267	6,325,525	97%	219,742
2014	7,293,162	6,889,317	95%	403,845
2015	8,080,012	7,098,971	88%	981,041
2016	8,541,701	7,738,353	91%	803,348
2017	8,659,542	8,428,060	97%	231,482
2018	8,932,264	8,488,854	95%	443,410

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

Table 9-06: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	61	$ 2,159,843	9.90%	0.00%
2009	61	2,370,711	9.24%	0.00%
2010	64	2,438,785	9.21%	0.00%
2011	62	2,411,865	8.57%	0.00%
2012	63	2,399,198	8.71%	0.00%
2013	60	2,362,295	8.72%	0.00%
2014	66	2,650,699	8.95%	0.00%
2015	64	2,689,589	10.37%	0.00%
2016	62	2,588,429	10.01%	0.00%
2017	63	2,667,609	8.55%	0.00%
2018	65	2,629,706	9.15%	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 contributon 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. The contribution requirements including the 5-year phase-in are shown on page 2.

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
2008	$ 5,844,132	$ 5,790,661	99%	$ 53,471
2009	6,169,658	6,052,906	98%	116,752
2010	6,282,205	6,221,094	99%	61,111
2011	6,641,977	6,539,902	99%	102,075
2012	6,907,582	6,605,789	96%	301,793
2013	7,150,032	6,724,524	94%	425,508
2014	7,485,077	7,306,241	98%	178,836
2015	8,175,205	7,406,424	91%	768,781
2016	8,400,053	7,704,587	92%	695,466
2017	8,470,153	8,246,291	97%	223,862
2018	8,660,353	8,386,473	97%	273,880

Notes: Actuarial assumptions were revised for the 2008, 2009, 2010, 2011, 2012 and 2015 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		
2008	42	$ 1,408,252	8.53%	0.00%
2009	40	1,464,689	8.80%	0.00%
2010	35	1,243,956	8.85%	0.00%
2011	36	1,238,602	8.62%	0.00%
2012	35	1,236,547	9.73%	0.00%
2013	35	1,204,007	10.44%	0.00%
2014	36	1,294,086	9.05%	0.00%
2015	36	1,318,531	12.14%	0.00%
2016	37	1,377,505	11.57%	0.00%
2017	37	1,417,705	9.24%	0.00%
2018	39	1,485,355	9.64%	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 contributon 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. The contribution requirements including the 5-year phase-in are shown on page 2.

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
2008	$ 7,197,635	$ 6,973,554	97%	$ 224,081
2009	7,267,054	7,812,263	108%	(545,209)
2010	7,765,800	8,327,804	107%	(562,004)
2011	8,256,330	8,680,352	105%	(424,022)
2012	8,689,048	8,919,726	103%	(230,678)
2013	8,995,568	9,176,982	102%	(181,414)
2014	9,690,233	9,460,139	98%	230,094
2015	10,724,425	9,641,494	90%	1,082,931
2016	11,495,764	10,486,873	91%	1,008,891
2017	11,687,540	10,885,312	93%	802,228
2018	12,447,999	11,175,024	90%	1,272,975

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

Table 9-11: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees: Number	Active Employees: Annual Payroll	Computed Employer Contribution[1]	Employee Contribution Rate[2]
2008	62	$ 2,736,869	8.86%	0.00%
2009	58	2,699,285	5.98%	0.00%
2010	56	2,515,211	6.25%	0.00%
2011	53	2,388,523	6.39%	0.00%
2012	52	2,334,269	7.22%	0.00%
2013	45	2,085,028	7.19%	0.00%
2014	47	2,142,519	8.86%	0.00%
2015	49	2,287,567	11.15%	0.00%
2016	48	2,292,774	10.90%	0.00%
2017	46	2,270,725	10.52%	0.00%
2018	46	2,312,265	12.07%	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 contributon 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. The contribution requirements including the 5-year phase-in are shown on page 2.

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
2008	$ 7,966,585	$ 7,350,686	92%	$ 615,899
2009	8,124,274	7,811,903	96%	312,371
2010	8,573,000	8,288,251	97%	284,749
2011	9,094,428	8,919,341	98%	175,087
2012	9,477,282	9,157,210	97%	320,072
2013	10,042,023	9,518,699	95%	523,324
2014	10,754,376	10,415,100	97%	339,276
2015	12,000,053	10,708,134	89%	1,291,919
2016	11,990,124	10,940,029	91%	1,050,095
2017	12,484,175	11,631,736	93%	852,439
2018	12,955,448	11,709,997	90%	1,245,451

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

Table 9-12: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees Number	Active Employees Annual Payroll	Computed Employer Contribution[1]	Employee Contribution Rate[2]
2008	78	$ 2,654,706	9.19%	0.00%
2009	74	2,665,630	8.47%	0.00%
2010	68	2,434,100	8.75%	0.00%
2011	66	2,349,500	8.17%	0.00%
2012	66	2,370,512	8.64%	0.00%
2013	67	2,421,245	9.15%	0.00%
2014	68	2,518,253	8.60%	0.00%
2015	70	2,626,856	11.11%	0.00%
2016	65	2,425,005	10.68%	0.00%
2017	66	2,572,555	10.12%	0.00%
2018	65	2,619,949	11.30%	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 contributon 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. The contribution requirements including the 5-year phase-in are shown on page 2.

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 8-13: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 6,316,152	$ 6,299,285	100%	$ 16,867
2009	6,509,265	6,493,331	100%	15,934
2010	6,911,978	6,745,462	98%	166,516
2011	7,159,028	7,370,412	103%	(211,384)
2012	7,416,706	7,533,800	102%	(117,094)
2013	7,688,872	7,768,762	101%	(79,890)
2014	7,945,278	7,966,793	100%	(21,515)
2015	8,598,243	8,131,550	95%	466,693
2016	9,163,879	8,812,991	96%	350,888
2017	9,952,403	9,737,092	98%	215,311
2018	10,359,158	9,976,673	96%	382,485

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

Table 9-13: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	25	$ 1,087,404	7.63%	2.53%
2009	26	1,183,905	7.61%	2.53%
2010	24	1,083,981	8.68%	2.53%
2011	24	1,058,033	5.09%	2.53%
2012	23	1,033,001	6.40%	2.53%
2013	23	1,059,325	7.20%	2.53%
2014	23	1,089,442	7.81%	2.53%
2015	24	1,161,536	10.63%	2.53%
2016	22	1,056,163	10.13%	2.53%
2017	25	1,270,726	9.58%	2.53%
2018	24	1,290,681	9.97%	2.53%

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 contributon 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. The contribution requirements including the 5-year phase-in are shown on page 2.

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 20 - Dispatch Union

Table 8-20: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 1,541,693	$ 1,037,678	67%	$ 504,015
2009	1,566,343	1,229,516	78%	336,827
2010	1,709,932	1,408,578	82%	301,354
2011	1,877,994	1,587,521	85%	290,473
2012	2,010,409	1,706,187	85%	304,222
2013	2,201,118	1,863,562	85%	337,556
2014	2,434,881	2,170,995	89%	263,886
2015	2,753,847	2,311,935	84%	441,912
2016	2,877,322	2,640,725	92%	236,597
2017	3,118,242	2,967,693	95%	150,549
2018	3,313,577	3,225,505	97%	88,072

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

Table 9-20: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	16	$ 695,634	13.26%	0.00%
2009	16	727,271	11.84%	0.00%
2010	16	692,364	11.67%	0.00%
2011	16	705,498	11.21%	0.00%
2012	16	708,848	11.55%	0.00%
2013	16	714,011	11.84%	0.00%
2014	13	619,208	11.45%	0.00%
2015	16	745,795	12.63%	0.00%
2016	15	684,837	10.97%	0.00%
2017	16	724,132	10.02%	0.00%
2018	15	733,705	9.60%	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 contributon 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. The contribution requirements including the 5-year phase-in are shown on page 2.

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 8-40: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 11,401,936	$ 9,463,994	83%	$ 1,937,942
2009	12,140,501	10,075,912	83%	2,064,589
2010	13,313,568	10,837,700	81%	2,475,868
2011	14,665,104	11,561,516	79%	3,103,588
2012	15,454,455	12,140,833	79%	3,313,622
2013	16,800,339	12,973,786	77%	3,826,553
2014	18,601,707	13,764,128	74%	4,837,579
2015	20,642,980	14,356,008	70%	6,286,972
2016	22,132,421	15,069,028	68%	7,063,393
2017	23,198,953	15,849,440	68%	7,349,513
2018	24,443,631	16,380,853	67%	8,062,778

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

Table 9-40: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	89	$ 3,855,445	12.49%	0.00%
2009	93	4,164,596	12.43%	0.00%
2010	96	4,288,706	13.18%	0.00%
2011	95	4,459,948	13.32%	0.00%
2012	93	4,361,594	13.98%	0.00%
2013	97	4,558,300	14.46%	0.00%
2014	95	4,580,417	15.79%	0.00%
2015	91	4,648,259	18.01%	0.00%
2016	93	5,135,406	18.23%	0.00%
2017	94	5,416,645	18.33%	0.00%
2018	102	5,869,347	18.75%	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 contributon 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. The contribution requirements including the 5-year phase-in are shown on page 2.

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 8-60: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 2,606,445	$ 2,363,097	91%	$ 243,348
2009	2,637,873	2,460,474	93%	177,399
2010	2,732,446	2,634,271	96%	98,175
2011	2,944,916	2,868,224	97%	76,692
2012	3,051,693	2,930,235	96%	121,458
2013	3,269,663	3,122,733	96%	146,930
2014	3,498,472	3,389,932	97%	108,540
2015	4,049,928	3,592,673	89%	457,255
2016	4,319,617	3,820,451	88%	499,166
2017	4,549,958	4,167,494	92%	382,464
2018	4,744,844	4,233,094	89%	511,750

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

Table 9-60: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	9	$ 529,886	11.12%	0.00%
2009	9	546,753	9.19%	0.00%
2010	10	582,803	8.77%	0.00%
2011	9	537,109	8.23%	0.00%
2012	9	546,357	8.85%	0.00%
2013	11	638,867	9.12%	0.00%
2014	12	721,577	8.62%	0.00%
2015	14	853,145	11.08%	0.00%
2016	14	885,501	11.19%	0.00%
2017	11	650,991	11.26%	0.00%
2018	12	741,002	12.31%	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 contributon 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. The contribution requirements including the 5-year phase-in are shown on page 2.

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 02 - Sheriff Union

Table 10-02: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 1/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 6,123,783	23	$ 6,440,157	20	$ 467,484
(Gain)/Loss	12/31/2016	(384,286)	22	(418,734)	20	(30,396)
(Gain)/Loss	12/31/2017	(1,157,452)	21	(1,252,807)	20	(90,936)
(Gain)/Loss	12/31/2018	452,807	20	487,900	20	35,412
Total				**$ 5,256,516**		**$ 381,564**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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 10-04: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 1/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 2,185,291	23	$ 2,294,191	20	$ 166,536
(Gain)/Loss	12/31/2016	(406,460)	22	(442,891)	20	(32,148)
(Gain)/Loss	12/31/2017	106,620	21	115,401	20	8,376
(Gain)/Loss	12/31/2018	256,667	20	276,559	20	20,076
Total				**$ 2,243,260**		**$ 162,840**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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 10-06: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 1/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 981,041	23	$ 1,050,383	20	$ 76,248
(Gain)/Loss	12/31/2016	(226,508)	22	(246,809)	20	(17,916)
(Gain)/Loss	12/31/2017	(563,150)	21	(609,540)	20	(44,244)
(Gain)/Loss	12/31/2018	250,257	20	269,652	20	19,572
Total				**$ 463,686**		**$ 33,660**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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 1/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 768,781	23	$ 834,374	20	$ 60,564
(Gain)/Loss	12/31/2016	(122,547)	22	(133,530)	20	(9,696)
(Gain)/Loss	12/31/2017	(469,186)	21	(507,836)	20	(36,864)
(Gain)/Loss	12/31/2018	81,748	20	88,084	20	6,396
Total				**$ 281,092**		**$ 20,400**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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 10-11: Layered Amortization Schedule

				Amounts for Fiscal Year Beginning 1/1/2020		
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	$ 1,082,931	23	$ 1,170,059	20	$ 84,936
(Gain)/Loss	12/31/2016	(138,278)	22	(150,661)	20	(10,932)
(Gain)/Loss	12/31/2017	(205,812)	21	(222,764)	20	(16,176)
(Gain)/Loss	12/31/2018	479,953	20	517,149	20	37,536
Total				**$ 1,313,783**		**$ 95,364**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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 1/1/2020 Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 1,291,919	23	$ 1,399,305	20	$ 101,580
(Gain)/Loss	12/31/2016	(321,890)	22	(350,740)	20	(25,464)
(Gain)/Loss	12/31/2017	(184,466)	21	(199,664)	20	(14,496)
(Gain)/Loss	12/31/2018	400,384	20	431,414	20	31,320
Total				**$ 1,280,315**		**$ 92,940**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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 10-13: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 1/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 466,693	23	$ 514,662	20	$ 37,356
(Gain)/Loss	12/31/2016	(153,740)	22	(167,521)	20	(12,156)
(Gain)/Loss	12/31/2017	(127,968)	21	(138,505)	20	(10,056)
(Gain)/Loss	12/31/2018	174,798	20	188,345	20	13,668
Total				**$ 396,981**		**$ 28,812**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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 10-20: Layered Amortization Schedule

Type of UAL	Date Established	Original Balance[1]	Original Amortization Period[2]	Amounts for Fiscal Year Beginning 1/1/2020: Outstanding UAL Balance[3]	Remaining Amortization Period[2]	Annual Amortization Payment
Initial	12/31/2015	$ 441,912	23	$ 464,543	20	$ 33,720
(Gain)/Loss	12/31/2016	(218,840)	22	(238,458)	20	(17,304)
(Gain)/Loss	12/31/2017	(73,035)	21	(79,050)	20	(5,736)
(Gain)/Loss	12/31/2018	(58,306)	20	(62,825)	20	(4,560)
Total				**$ 84,210**		**$ 6,120**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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 10-40: Layered Amortization Schedule

				Amounts for Fiscal Year Beginning 1/1/2020		
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	$ 6,286,972	23	$ 6,585,608	20	$ 478,044
(Gain)/Loss	12/31/2016	606,588	22	660,955	20	47,976
(Gain)/Loss	12/31/2017	183,595	21	198,715	20	14,424
(Gain)/Loss	12/31/2018	651,170	20	701,636	20	50,928
Total				**$ 8,146,914**		**$ 591,372**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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 10-60: Layered Amortization Schedule

				Amounts for Fiscal Year Beginning 1/1/2020		
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	$ 457,255	23	$ 492,872	20	$ 35,772
(Gain)/Loss	12/31/2016	15,929	22	17,353	20	1,260
(Gain)/Loss	12/31/2017	(122,093)	21	(132,144)	20	(9,588)
(Gain)/Loss	12/31/2018	135,384	20	145,876	20	10,584
Total				**$ 523,957**		**$ 38,028**

[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, 2018 (see Table 6) is projected to the beginning of the fiscal year for which the contributions are being calculated. This allows the 2018 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:	12/31/2018
Measurement Date of the Total Pension Liability (TPL):	12/31/2018

At 12/31/2018, the following employees were covered by the benefit terms:

Inactive employees or beneficiaries currently receiving benefits:	398
Inactive employees entitled to but not yet receiving benefits (including refunds):	855
Active employees:	712
	1,965

Total Pension Liability as of 12/31/2017 measurement date:	$	118,245,146
Total Pension Liability as of 12/31/2018 measurement date:	$	123,582,345
Service Cost for the year ending on the 12/31/2018 measurement date:	$	2,453,628
Change in the Total Pension Liability due to:		
- Benefit changes[1]:	$	0
- Differences between expected and actual experience[2]:	$	(613,247)
- Changes in assumptions[2]:	$	0

[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.

Average expected remaining service lives of all employees (active and inactive):		3
Covered employee payroll: (Needed for Required Supplementary Information)	$	29,766,267

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

	1% Decrease (7.00%)	Current Discount Rate (8.00%)	1% Increase (9.00%)
Change in Net Pension Liability as of 12/31/2018:	$ 14,502,346	$ -	$ (12,249,741)

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.

GASB 68 Information

This page is for those municipalities who need to "roll-forward" their total pension liability due to the timing of completion of the actuarial valuation in relation to their fiscal year-end.

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 www.mersofmich.com.

Actuarial Valuation Date:	12/31/2018
Measurement Date of the Total Pension Liability (TPL):	12/31/2019

At 12/31/2018, the following employees were covered by the benefit terms:

Inactive employees or beneficiaries currently receiving benefits:	398
Inactive employees entitled to but not yet receiving benefits (including refunds):	855
Active employees:	712
	1,965

Total Pension Liability as of 12/31/2018 measurement date:	$	123,982,094
Total Pension Liability as of 12/31/2019 measurement date:	$	129,092,372
Service Cost for the year ending on the 12/31/2019 measurement date:	$	2,537,563

Change in the Total Pension Liability due to:

- Benefit changes[1]:	$	0
- Differences between expected and actual experience[2]:	$	(431,728)
- Changes in assumptions[2]:	$	0

[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.

Average expected remaining service lives of all employees (active and inactive):		3
Covered employee payroll: (Needed for Required Supplementary Information)	$	29,766,267

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

	1% Decrease (7.00%)	Current Discount Rate (8.00%)	1% Increase (9.00%)
Change in Net Pension Liability as of 12/31/2019:	$ 15,022,184	$ -	$ (12,691,414)

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.

02 - Sheriff Union

10/1/2018	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
1/1/1999	Benefit B-4 (80% max)
1/1/1999	Member Contribution Rate 2.49%
1/1/1994	Benefit B-3 (80% max)
1/1/1991	Benefit B-2
1/1/1991	Benefit F50 (With 25 Years of Service)
1/1/1988	Benefit C-2/Base B-1
6/1/1985	Member Contribution Rate 0.00%
1/1/1981	Benefit F55 (With 25 Years of Service)
1/1/1981	Member Contribution Rate 5.00%
4/6/1978	Exclude Temporary Employees
1/1/1973	Benefit C-1 (Old)
10/30/1970	Covered by Act 88
6/1/1966	Benefit FAC-5 (5 Year Final Average Compensation)
6/1/1966	10 Year Vesting
6/1/1966	Benefit C (Old)
6/1/1966	Member Contribution Rate 3.00% Under $4,200.00 - Then 5.00%
	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

04 - S.T.A.R.S.

10/1/2018	Service Credit Purchase Estimates - No
10/1/2017	Probationary Period 3 Months
12/1/2016	Service Credit Purchase Estimates - Yes
2/1/2013	Benefit F55 (With 25 Years of Service)
2/1/2013	Member Contribution Rate 1.27%
5/1/2007	Member Contribution Rate 0.00%
10/1/2005	Benefit B-2
10/1/2005	Member Contribution Rate 2.33%
1/1/1987	Member Contribution Rate 0.00%
1/1/1973	Benefit C-1 (Old)
10/30/1970	Covered by Act 88
6/1/1966	Benefit FAC-5 (5 Year Final Average Compensation)
6/1/1966	10 Year Vesting
6/1/1966	Benefit C (Old)
6/1/1966	Member Contribution Rate 3.00% Under $4,200.00 - Then 5.00%
6/1/1966	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

06 - CMH Union

10/1/2018	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
4/1/2003	Benefit B-3 (80% max)
5/1/2001	Member Contribution Rate 0.00%
1/1/2001	Member Contribution Rate 4.14%
1/1/2000	Member Contribution Rate 4.41%
1/1/1999	Member Contribution Rate 0.23%
11/1/1998	Benefit FAC-5 (5 Year Final Average Compensation)
11/1/1998	10 Year Vesting
11/1/1998	Benefit B-2
11/1/1998	Member Contribution Rate 0.00%
4/6/1978	Exclude Temporary Employees
10/30/1970	Covered by Act 88
	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

10 - Health Union

10/1/2018	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2000	Benefit B-3 (80% max)
3/1/1991	Benefit B-2
1/1/1986	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1986	10 Year Vesting
1/1/1986	Member Contribution Rate 0.00%
10/30/1970	Covered by Act 88
	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

11 - Gnrl Non Union

10/1/2018	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
12/31/2000	Benefit B-3 (80% max)
12/1/1990	Benefit B-2
1/1/1986	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1986	10 Year Vesting
1/1/1986	Member Contribution Rate 0.00%
4/6/1978	Exclude Temporary Employees
10/30/1970	Covered by Act 88
	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

12 - General Union

10/1/2018	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2000	Benefit B-3 (80% max)
1/1/1991	Benefit B-2

12 - General Union

1/1/1986	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1986	10 Year Vesting
1/1/1986	Member Contribution Rate 0.00%
4/6/1978	Exclude Temporary Employees
10/30/1970	Covered by Act 88
	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

13 - Elected & Appt. Dept Heads

10/1/2018	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2005	Benefit B-4 (80% max)
1/1/2005	Member Contribution Rate 2.53%
1/1/2001	Benefit B-3 (80% max)
12/1/1990	Benefit B-2
6/1/1985	Benefit FAC-5 (5 Year Final Average Compensation)
6/1/1985	10 Year Vesting
6/1/1985	Member Contribution Rate 0.00%
4/6/1978	Exclude Temporary Employees
10/30/1970	Covered by Act 88
	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

20 - Dispatch Union

10/1/2018	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
12/31/2000	Benefit FAC-5 (5 Year Final Average Compensation)
12/31/2000	10 Year Vesting
12/31/2000	Benefit B-3 (80% max)
12/31/2000	Benefit F50 (With 25 Years of Service)
12/31/2000	Member Contribution Rate 0.00%
4/6/1978	Exclude Temporary Employees
10/30/1970	Covered by Act 88
	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

40 - MCF Non Union

10/1/2018	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2008	Benefit B-4 (80% max)
1/1/1999	Benefit B-3 (80% max)
1/1/1999	Benefit F55 (With 25 Years of Service)
1/1/1991	Benefit FAC-5 (5 Year Final Average Compensation)
1/1/1991	10 Year Vesting
1/1/1991	Benefit B-2
1/1/1991	Benefit F55 (With 30 Years of Service)

40 - MCF Non Union

1/1/1991	Member Contribution Rate 0.00%
10/30/1970	Covered by Act 88
6/1/1966	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

60 - CMH Non Union

10/1/2018	Service Credit Purchase Estimates - No
12/1/2016	Service Credit Purchase Estimates - Yes
5/1/2001	Benefit B-3 (80% max)
11/1/1998	Benefit FAC-5 (5 Year Final Average Compensation)
11/1/1998	10 Year Vesting
11/1/1998	Benefit B-2
11/1/1998	Member Contribution Rate 0.00%
4/6/1978	Exclude Temporary Employees
10/30/1970	Covered by Act 88
	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

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	123%

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:

1. Ratio of the market value of assets to total payroll	3.3
2. Ratio of actuarial accrued liability to payroll	4.3
3. Ratio of actives to retirees and beneficiaries	1.8
4. Ratio of market value of assets to benefit payments	16.8
5. Ratio of net cash flow to market value of assets (boy)	-1.2%

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, 2018**	
11	Indicate number of active members	712
12	Indicate number of inactive members	142
13	Indicate number of retirees and beneficiaries	398
14	**Investment Performance for Calendar Year Ending December 31, 2018[1]**	
15	Enter actual rate of return - prior 1-year period	-3.64%
16	Enter actual rate of return - prior 5-year period	4.94%
17	Enter actual rate of return - prior 10-year period	8.25%
18	**Actuarial Assumptions**	
19	Actuarial assumed rate of investment return[2]	7.75%
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]	20
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	$107,283,161
25	Enter retirement pension system's actuarial accrued liabilities using uniform assumptions	$138,084,691
27	Actuarially Determined Contribution (ADC) using uniform assumptions, Fiscal Year Ending December 31,2019	$5,088,084

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 fees 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."