Municipal Employees' Retirement System of Michigan

Annual Actuarial Valuation Report
December 31, 2018 - Pittsfield Chtr Twp (8110)

GRS Retirement Consulting

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Spring, 2019

Pittsfield Chtr Twp

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 Pittsfield Chtr Twp (8110) 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. Pittsfield Chtr Twp 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 Pittsfield Chtr Twp 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, FSA, FCA, EA, MAAA

Rebecca L. Stouffer, ASA, FCA, MAAA

Mark Buis, FSA, FCA, EA, MAAA

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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*	72%	73%

* 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								
01 - TPOAM	-	-	-	-	$ 5,117	$ 5,256	$ 4,761	$ 5,039
02 - Pol Ptrl	-	-	-	-	24,014	24,648	19,596	20,864
05 - Fire Fght	-	-	-	-	17,365	17,689	14,476	15,124
10 - Elctd Ofc	-	-	-	-	4,923	5,065	4,286	4,570
11 - Dsptchr	-	-	-	-	0	0	0	0
14 - Adm/NonUnion	-	-	-	-	14,508	15,033	12,417	13,467
15 - Utilities Dr	-	-	-	-	909	924	731	761
20 - Pol Cmnd	-	-	-	-	47,275	48,229	41,715	43,623
HA - POLC/cler/Dispatch aft 7/1/14	-	-	-	-	0	0	387	389
HB - IAFF ee's hired on/aft 1/1/14	6.88%	6.91%	6.65%	6.72%	1,181	1,186	998	1,008
HD - POAM on/after 1/1/2015	6.59%	6.62%	6.28%	6.36%	3,728	3,743	2,314	2,344
HE - Non-union on/after 1/1/2015	7.31%	7.35%	7.42%	7.50%	5,552	5,583	6,092	6,154
HF - TPOAM on/aft 3/30/15	7.74%	7.76%	7.10%	7.15%	3,949	3,960	2,945	2,967
HG - Elctd Ofc on/aft 1/1/15	8.84%	8.84%	8.15%	8.15%	1,337	1,337	1,213	1,213
Municipality Total					**$ 129,858**	**$ 132,653**	**$ 111,931**	**$ 117,523**

Employee contribution rates:

	Employee Contribution Rate	
Valuation Date:	12/31/2018	12/31/2017
Division		
01 - TPOAM	2.00%	2.00%
02 - Pol Ptrl	6.17%	6.17%
05 - Fire Fght	5.00%	5.00%
10 - Elctd Ofc	6.93%	6.93%
11 - Dsptchr	5.00%	5.00%
14 - Adm/NonUnion	5.00%	5.00%
15 - Utilities Dr	6.00%	6.00%
20 - Pol Cmnd	9.06%	9.06%
HA - POLC/cler/Dispatch aft 7/1/14	0.00%	0.00%
HB - IAFF ee's hired on/aft 1/1/14	0.00%	0.00%
HD - POAM on/after 1/1/2015	0.00%	0.00%
HE - Non-union on/after 1/1/2015	0.00%	0.00%
HF - TPOAM on/aft 3/30/15	0.00%	0.00%
HG - Elctd Ofc on/aft 1/1/15	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 $184,256, instead of $132,653.

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 66% (instead of 72%); and
- Your total employer contribution requirement for the fiscal year starting January 1, 2020 would be $1,784,256 (instead of $1,591,836)

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	$ 54,165,684	$ 42,394,273	$ 41,097,409
Valuation Assets[1]	$ 29,709,530	$ 29,709,530	$ 29,709,530
Unfunded Accrued Liability	$ 24,456,154	$ 12,684,743	$ 11,387,879
Funded Ratio	55%	70%	72%
Monthly Normal Cost	$ 110,312	$ 55,690	$ 56,488
Monthly Amortization Payment	$ 132,163	$ 83,066	$ 72,428
Total Employer Contribution[2]	$ 242,876	$ 142,038	$ 132,653

[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.

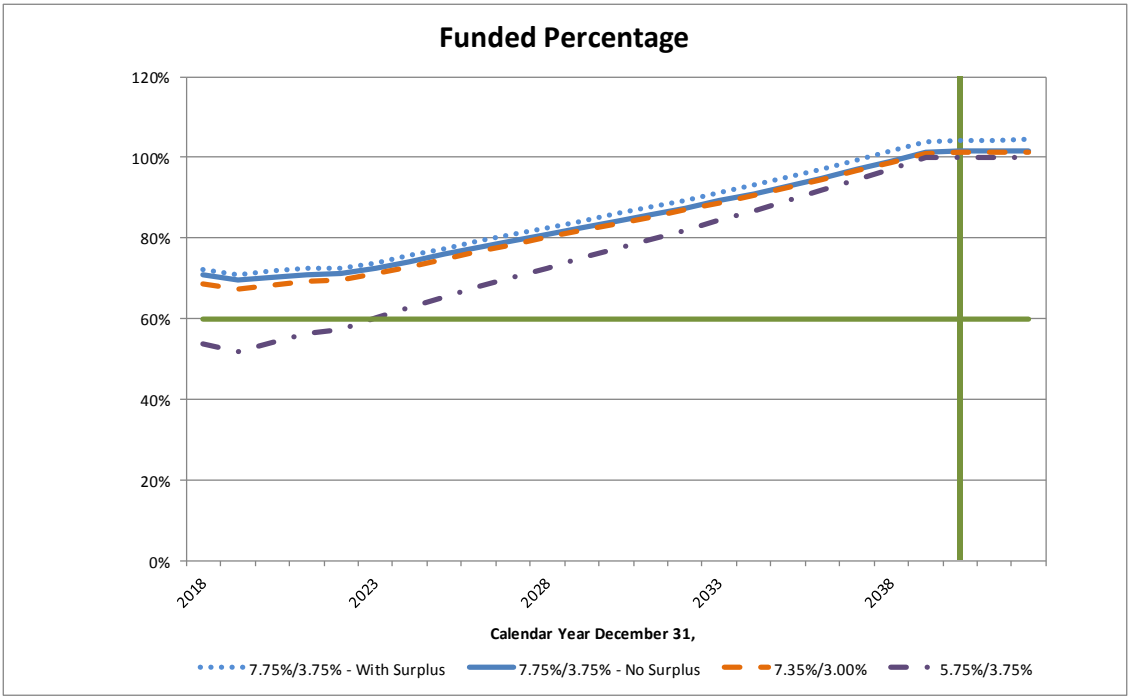
Your municipality includes one or more Surplus divisions. The assets in a Surplus division may be used to reduce future employer contributions or to accelerate the date by which the municipality becomes 100% funded. The timing and use of these Surplus assets is discretionary.

The Funded Percentage graph shows projections of funded status under the 7.75% investment return assumption, both including the Surplus assets (contributed as of the valuation date), and without the Surplus assets. The graph including the Surplus assets assumes these Surplus assets grow with interest and are not used to lower future employer contributions. We modeled the projections including the Surplus assets in this fashion because the use of these assets is discretionary by the employer and we do not know when and how the employer will use them. Once the employer uses these Surplus assets, any future employer contributions are expected to be lower than those shown in the projections.

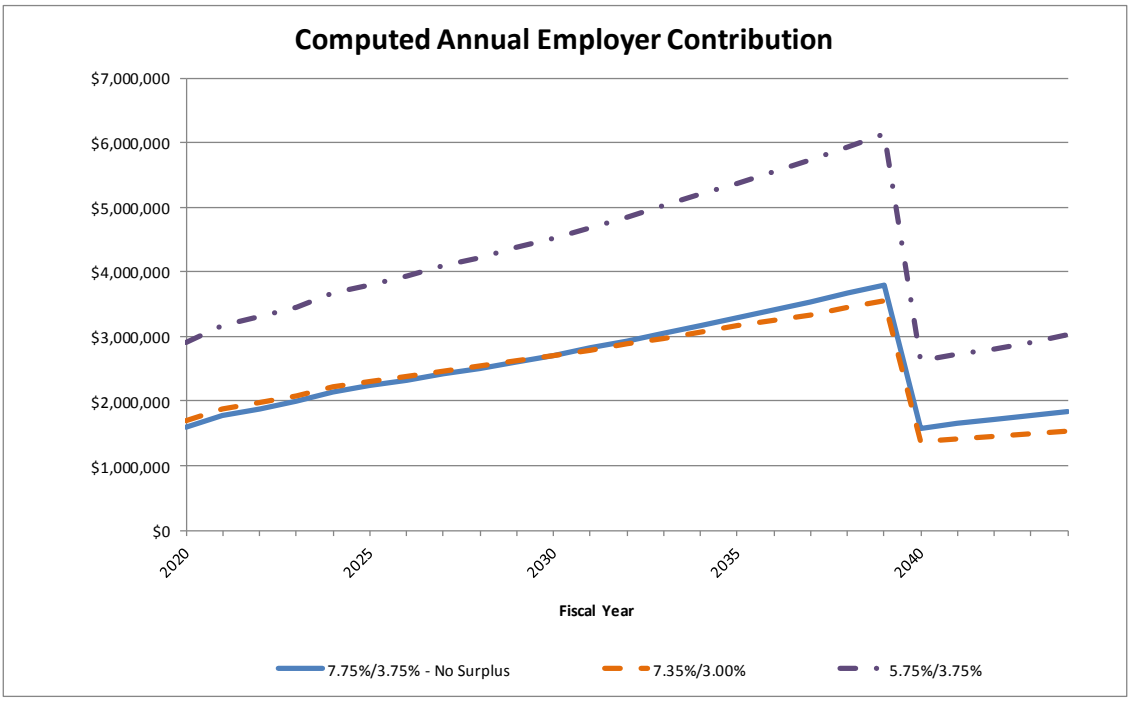
Valuation Year Ending 12/31	Fiscal Year Beginning 1/1	Actuarial Accrued Liability	Valuation Assets[2]	Funded Percentage	Computed Annual Employer Contribution
7.75%[1]/3.75%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 41,097,409	$ 29,115,475	71%	$ 1,591,836
2019	2021	$ 43,500,000	$ 30,200,000	69%	$ 1,770,000
2020	2022	$ 46,300,000	$ 32,500,000	70%	$ 1,870,000
2021	2023	$ 49,200,000	$ 34,900,000	71%	$ 1,990,000
2022	2024	$ 52,100,000	$ 37,000,000	71%	$ 2,140,000
2023	2025	$ 55,000,000	$ 39,800,000	72%	$ 2,240,000
7.35%[1]/3.00%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 42,394,273	$ 29,115,475	69%	$ 1,704,456
2019	2021	$ 44,800,000	$ 30,100,000	67%	$ 1,870,000
2020	2022	$ 47,500,000	$ 32,400,000	68%	$ 1,970,000
2021	2023	$ 50,200,000	$ 34,700,000	69%	$ 2,080,000
2022	2024	$ 52,900,000	$ 36,800,000	70%	$ 2,220,000
2023	2025	$ 55,700,000	$ 39,600,000	71%	$ 2,310,000
5.75%[1]/3.75%					
NO 5-YEAR PHASE-IN					
2018	2020	$ 54,165,684	$ 29,115,475	54%	$ 2,914,512
2019	2021	$ 57,200,000	$ 29,700,000	52%	$ 3,170,000
2020	2022	$ 60,600,000	$ 32,800,000	54%	$ 3,310,000
2021	2023	$ 64,100,000	$ 36,000,000	56%	$ 3,460,000
2022	2024	$ 67,600,000	$ 38,800,000	57%	$ 3,670,000
2023	2025	$ 71,200,000	$ 42,800,000	60%	$ 3,800,000

[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.
Assumes assets from Surplus divisions will not be used to lower employer contributions during the projection period.
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.
Projected employer contributions do not reflect the use of any assets from the Surplus divisions.

Table 1: Employer Contribution Details For the Fiscal Year Beginning January 1, 2020

Division	Total Normal Cost	Employee Contribut. Rate	Employer Contributions[1]			Computed Employer Contribut. With Phase-In	Blended ER Rate No Phase-In[5]	Blended ER Rate With Phase-In[5]	Employee Contribut. Conversion Factor[2]
			Employer Normal Cost	Payment of the Unfunded Accrued Liability[4]	Computed Employer Contribut. No Phase-In				
Percentage of Payroll									
01 - TPOAM	9.41%	2.00%	-	-	-	-	9.34%	9.19%	
02 - Pol Ptrl	14.57%	6.17%	-	-	-	-	14.73%	14.39%	
05 - Fire Fght	11.49%	5.00%	-	-	-	-	10.61%	10.42%	
10 - Elctd Ofc	14.51%	6.93%	-	-	-	-	28.56%	27.92%	
11 - Dsptchr	0.00%	5.00%	-	-	-	-			
14 - Adm/NonUnion	11.52%	5.00%	-	-	-	-	10.66%	10.37%	
15 - Utilities Dr	0.00%	6.00%	-	-	-	-			
20 - Pol Cmnd	17.88%	9.06%	-	-	-	-			
HA - POLC/cler/Dispatch aft 7/1/14	0.00%	0.00%	-	-	-	-			
HB - IAFF ee's hired on/aft 1/1/14	6.51%	0.00%	6.51%	0.40%	6.91%	6.88%	10.61%	10.42%	0.91%
HD - POAM on/after 1/1/2015	6.54%	0.00%	6.54%	0.08%	6.62%	6.59%	14.73%	14.39%	0.95%
Estimated Monthly Contribution[3]									
01 - TPOAM			$ 3,531	$ 1,725	$ 5,256	$ 5,117			
02 - Pol Ptrl			11,441	13,207	24,648	24,014			
05 - Fire Fght			10,433	7,256	17,689	17,365			
10 - Elctd Ofc			553	4,512	5,065	4,923			
11 - Dsptchr			0	(3,558)	0	0			
14 - Adm/NonUnion			7,662	7,371	15,033	14,508			
15 - Utilities Dr			0	924	924	909			
20 - Pol Cmnd			7,025	41,204	48,229	47,275			
HA - POLC/cler/Dispatch aft 7/1/14			0	(179)	0	0			
HB - IAFF ee's hired on/aft 1/1/14			1,117	69	1,186	1,181			
HD - POAM on/after 1/1/2015			3,698	45	3,743	3,728			

Table 1 (continued)

Division	Total Normal Cost	Employee Contribut. Rate	Employer Contributions[1]			Computed Employer Contribut. With Phase-In	Blended ER Rate No Phase-In[5]	Blended ER Rate With Phase-In[5]	Employee Contribut. Conversion Factor[2]
			Employer Normal Cost	Payment of the Unfunded Accrued Liability[4]	Computed Employer Contribut. No Phase-In				
Percentage of Payroll									
HE - Non-union on/after 1/1/2015	7.76%	0.00%	7.76%	-0.41%	7.35%	7.31%	10.66%	10.37%	0.94%
HF - TPOAM on/aft 3/30/15	7.46%	0.00%	7.46%	0.30%	7.76%	7.74%	9.34%	9.19%	0.90%
HG - Elctd Ofc on/aft 1/1/15	8.78%	0.00%	8.78%	0.06%	8.84%	8.84%	28.56%	27.92%	0.88%
Estimated Monthly Contribution[3]									
HE - Non-union on/after 1/1/2015			$ 5,895	$ (312)	$ 5,583	$ 5,552			
HF - TPOAM on/aft 3/30/15			3,805	155	3,960	3,949			
HG - Elctd Ofc on/aft 1/1/15			1,328	9	1,337	1,337			
Total Municipality			**$ 56,488**	**$ 72,428**	**$ 132,653**	**$ 129,858**			
Estimated Annual Contribution[3]			**$ 677,856**	**$ 869,136**	**$ 1,591,836**	**$ 1,558,296**			

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

01 - TPOAM: Closed to new hires, linked to Division HF

	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):	-	-
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	3 years	3 years
Employee Contributions:	2.00%	2.00%
Act 88:	Yes (Adopted 11/10/2003)	Yes (Adopted 11/10/2003)

02 - Pol Ptrl: Closed to new hires, linked to Division HD

	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:	3 years	3 years
COLA for Future Retirees:	2.50% (Non-Compound)	2.50% (Non-Compound)
Employee Contributions:	6.17%	6.17%
Act 88:	Yes (Adopted 11/10/2003)	Yes (Adopted 11/10/2003)

05 - Fire Fght: Closed to new hires, linked to Division HB

	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):	55/15	55/15
Early Retirement (Reduced):	50/25	50/25
Final Average Compensation:	3 years	3 years
Employee Contributions:	5.00%	5.00%
Act 88:	Yes (Adopted 11/10/2003)	Yes (Adopted 11/10/2003)

10 - Elctd Ofc: Closed to new hires, linked to Division HG

	2018 Valuation	2017 Valuation
Benefit Multiplier:	2.25% Multiplier (80% max)	2.25% Multiplier (80% max)
Normal Retirement Age:	60	60
Vesting:	8 years	8 years
Early Retirement (Unreduced):	-	-
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	3 years	3 years
COLA for Future Retirees:	2.50% (Non-Compound)	2.50% (Non-Compound)
Employee Contributions:	6.93%	6.93%
Act 88:	Yes (Adopted 11/10/2003)	Yes (Adopted 11/10/2003)

11 - Dsptchr: Closed to new hires

	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:	3 years	3 years
Employee Contributions:	5.00%	5.00%
Act 88:	Yes (Adopted 11/10/2003)	Yes (Adopted 11/10/2003)

14 - Adm/NonUnion: Closed to new hires, linked to Division HE

	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:	3 years	3 years
Employee Contributions:	5.00%	5.00%
Act 88:	Yes (Adopted 11/10/2003)	Yes (Adopted 11/10/2003)

15 - Utilities Dr: Closed to new hires

	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):	55/25	55/25
Early Retirement (Reduced):	50/25	50/25
	55/15	55/15
Final Average Compensation:	3 years	3 years
Employee Contributions:	6.00%	6.00%
Act 88:	Yes (Adopted 10/1/2007)	Yes (Adopted 10/1/2007)

20 - Pol Cmnd: Closed to new hires, linked to Division HC

	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:	3 years	3 years
COLA for Future Retirees:	2.50% (Non-Compound)	2.50% (Non-Compound)
Employee Contributions:	9.06%	9.06%
Act 88:	Yes (Adopted 11/10/2003)	Yes (Adopted 11/10/2003)

HA - POLC/cler/Dispatch aft 7/1/14: Closed to new hires

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.50% Multiplier (no max)	Hybrid Plan - 1.50% Multiplier
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	-	-
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 11/10/2003)	Yes (Adopted 11/10/2003)

HB - IAFF ee's hired on/aft 1/1/14: Open Division, linked to Division 05

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.50% Multiplier (no max)	Hybrid Plan - 1.50% Multiplier
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	55/25	55/25
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	Yes (Adopted 11/10/2003)	Yes (Adopted 11/10/2003)

HD - POAM on/after 1/1/2015: Open Division, linked to Division 02

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.50% Multiplier (no max)	Hybrid Plan - 1.50% Multiplier
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	55/25	55/25
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	No	No

HE - Non-union on/after 1/1/2015: Open Division, linked to Division 14

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.50% Multiplier (no max)	Hybrid Plan - 1.50% Multiplier
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	-	-
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	No	No

HF - TPOAM on/aft 3/30/15: Open Division, linked to Division 01

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.50% Multiplier (no max)	Hybrid Plan - 1.50% Multiplier
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	-	-
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	No	No

HG - Elctd Ofc on/aft 1/1/15: Open Division, linked to Division 10

	2018 Valuation	2017 Valuation
Benefit Multiplier:	1.50% Multiplier (no max)	Hybrid Plan - 1.50% Multiplier
Normal Retirement Age:	60	60
Vesting:	6 years	6 years
Early Retirement (Unreduced):	-	-
Early Retirement (Reduced):	-	-
Final Average Compensation:	3 years	3 years
Employee Contributions:	0.00%	0.00%
Act 88:	No	No

Table 3: Participant Summary

Division	2018 Valuation Number	2018 Valuation Annual Payroll[1]	2017 Valuation Number	2017 Valuation Annual Payroll[1]	2018 Valuation Average Age	2018 Valuation Average Benefit Service[2]	2018 Valuation Average Eligibility Service[2]
01 - TPOAM							
Active Employees	11	$ 557,979	13	$ 645,141	44.7	9.8	11.1
Vested Former Employees	9	58,097	9	60,463	43.4	8.0	14.1
Retirees and Beneficiaries	10	86,581	9	64,609	69.3		
02 - Pol Ptrl							
Active Employees	21	$ 1,609,322	22	$ 1,648,289	42.1	17.0	17.0
Vested Former Employees	3	20,014	3	20,014	39.3	4.4	9.8
Retirees and Beneficiaries	7	156,694	5	102,386	59.1		
05 - Fire Fght							
Active Employees	24	$ 1,867,173	24	$ 1,781,459	41.5	14.2	14.8
Vested Former Employees	1	27,754	1	27,754	52.1	14.0	14.0
Retirees and Beneficiaries	5	123,060	5	123,060	59.3		
10 - Elctd Ofc							
Active Employees	2	$ 168,193	2	$ 164,902	62.2	10.1	10.8
Vested Former Employees	1	14,444	1	14,444	58.1	8.0	8.0
Retirees and Beneficiaries	5	86,844	5	85,618	79.9		
11 - Dsptchr							
Active Employees	0	$ 0	3	$ 158,953	0.0	0.0	0.0
Vested Former Employees	11	160,920	8	125,050	43.9	12.4	15.1
Retirees and Beneficiaries	0	0	0	0	0.0		
14 - Adm/NonUnion							
Active Employees	20	$ 1,478,235	23	$ 1,619,640	49.8	13.6	16.0
Vested Former Employees	6	78,588	7	80,921	49.1	9.5	13.8
Retirees and Beneficiaries	20	398,511	17	349,349	67.2		
15 - Utilities Dr							
Active Employees	0	$ 0	0	$ 0	0.0	0.0	0.0
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	1	19,167	1	19,167	61.7		
20 - Pol Cmnd							
Active Employees	10	$ 968,461	10	$ 930,835	44.7	20.0	22.4
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	14	559,326	14	546,908	59.6		
HA - POLC/cler/Dispatch aft 7/1/14							
Active Employees	0	$ 0	2	$ 90,378	0.0	0.0	0.0
Vested Former Employees	2	2,655	1	1,691	34.1	1.9	7.0
Retirees and Beneficiaries	0	0	0	0	0.0		

Table 3 (continued)

Division	2018 Valuation Number	2018 Valuation Annual Payroll[1]	2017 Valuation Number	2017 Valuation Annual Payroll[1]	2018 Valuation Average Age	2018 Valuation Average Benefit Service[2]	2018 Valuation Average Eligibility Service[2]
HB - IAFF ee's hired on/aft 1/1/14							
Active Employees	2	$ 116,297	2	$ 106,206	38.7	2.6	2.7
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	0	0	0	0	0.0		
HD - POAM on/after 1/1/2015							
Active Employees	10	$ 539,542	6	$ 315,041	27.1	1.8	2.1
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	0	0	0	0	0.0		
HE - Non-union on/after 1/1/2015							
Active Employees	13	$ 678,770	14	$ 679,581	42.1	2.3	6.2
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	0	0	0	0	0.0		
HF - TPOAM on/aft 3/30/15							
Active Employees	15	$ 541,871	11	$ 411,892	41.6	1.7	1.7
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	0	0	0	0	0.0		
HG - Elctd Ofc on/aft 1/1/15							
Active Employees	1	$ 81,745	1	$ 80,142	49.0	2.3	2.3
Vested Former Employees	0	0	0	0	0.0	0.0	0.0
Retirees and Beneficiaries	0	0	0	0	0.0		
Total Municipality							
Active Employees	**129**	**$ 8,607,588**	**133**	**$ 8,632,459**	**42.7**	**10.7**	**11.9**
Vested Former Employees	**33**	**362,472**	**30**	**330,337**	**44.4**	**9.2**	**13.4**
Retirees and Beneficiaries	**62**	**1,430,183**	**56**	**1,291,097**	**65.2**		
Total Participants	**224**		**219**				

[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]
01 - TPOAM	$ 1,249,591	$ 305,578	$ 1,340,229	$ 316,564
02 - Pol Ptrl	4,606,946	1,772,522	4,800,074	1,776,395
05 - Fire Fght	3,581,377	1,274,876	3,841,717	1,148,056
10 - Elctd Ofc	264,800	182,218	337,239	166,191
11 - Dsptchr	563,711	351,725	616,792	341,967
14 - Adm/NonUnion	4,984,927	1,254,663	5,459,576	1,260,094
15 - Utilities Dr	126,000	0	143,518	0
20 - Pol Cmnd	4,500,992	1,209,607	4,919,514	1,094,202
HA - POLC/cler/Dispatch aft 7/1/14	19,117	0	16,447	0
HB - IAFF ee's hired on/aft 1/1/14	18,654	0	12,254	0
HD - POAM on/after 1/1/2015	76,078	0	53,425	0
HE - Non-union on/after 1/1/2015	162,868	0	101,841	0
HF - TPOAM on/aft 3/30/15	58,314	0	38,125	0
HG - Elctd Ofc on/aft 1/1/15	16,610	0	22,929	0
S1 - Surplus Unassociated	542,347	0	0	0
Municipality Total[3]	**$ 20,772,332**	**$ 6,351,189**	**$ 21,703,680**	**$ 6,103,469**
Combined Assets[3]	**$27,123,521**		**$27,807,149**	

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.

Assets in the Surplus division(s) are employer assets that have been reserved to be used by the employer at some point in the future to stabilize increases in contributions. These assets are not used in calculating the employer contribution for the fiscal year beginning January 1, 2020.

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	$ 510,445		$ 367,989	$ 580,155	$ (199,071)	$ (88,761)	$ 65,728	$ 11,515,448
2009	503,828		365,468	803,796	(310,482)	(84,863)	34,825	12,828,020
2010	742,471		432,920	1,032,060	(448,528)	(69,956)	312,836	14,829,823
2011	784,130	$ 0	413,860	972,208	(482,536)	(39,475)	5,514	16,483,524
2012	751,402	0	415,425	929,886	(580,364)	(51,588)	26,952	17,975,237
2013	815,893	0	444,508	1,210,749	(715,656)	(15,986)	0	19,714,745
2014	808,039	0	427,000	1,197,131	(817,351)	(66,658)	0	21,262,906
2015	992,973	0	433,629	1,178,970	(911,658)	(2,733)	26,929	22,981,016
2016	1,026,766	200,000	433,666	1,382,167	(982,566)	(33,253)	216,138	25,223,934
2017	1,246,097	155,036	415,787	1,654,468	(1,094,800)	(39,880)	561,312	28,121,954
2018	1,275,922	212,042	386,496	1,089,670	(1,374,077)	(5,744)	3,267	29,709,530

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

Division	Actuarial Accrued Liability					Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
	Active Employees	Vested Former Employees	Retirees and Beneficiaries	Pending Refunds	Total			
01 - TPOAM	$ 826,243	$ 298,439	$ 817,107	$ 38,087	$ 1,979,876	$ 1,703,442	86.0%	$ 276,434
02 - Pol Ptrl	6,818,128	55,904	2,225,450	21,969	9,121,451	6,987,700	76.6%	2,133,751
05 - Fire Fght	4,951,858	160,284	1,377,378	2,264	6,491,784	5,319,257	81.9%	1,172,527
10 - Elctd Ofc	347,947	161,393	696,965	22,321	1,228,626	489,637	39.9%	738,989
11 - Dsptchr	0	633,678	0	19,936	653,614	1,002,715	153.4%	(349,101)
14 - Adm/NonUnion	3,538,640	414,695	3,946,259	123,057	8,022,651	6,834,485	85.2%	1,188,166
15 - Utilities Dr	0	0	230,975	0	230,975	138,013	59.8%	92,962
20 - Pol Cmnd	5,568,469	0	7,435,548	0	13,004,017	6,255,059	48.1%	6,748,958
HA - POLC/cler/Dispatch aft 7/1/14	0	3,795	0	0	3,795	20,940	551.8%	(17,145)
HB - IAFF ee's hired on/aft 1/1/14	31,344	0	0	0	31,344	20,432	65.2%	10,912
HD - POAM on/after 1/1/2015	88,387	0	0	0	88,387	83,331	94.3%	5,056
HE - Non-union on/after 1/1/2015	139,864	0	0	0	139,864	178,396	127.5%	(38,532)
HF - TPOAM on/aft 3/30/15	83,035	0	0	0	83,035	63,874	76.9%	19,161
HG - Elctd Ofc on/aft 1/1/15	17,990	0	0	0	17,990	18,194	101.1%	(204)
S1 - Surplus Unassociated	0	0	0	0	0	594,055		(594,055)
Total	**$ 22,411,905**	**$ 1,728,188**	**$ 16,729,682**	**$ 227,634**	**$ 41,097,409**	**$ 29,709,530**	**72.3%**	**$ 11,387,879**

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

Table 6 (continued)

Division	Actuarial Accrued Liability					Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
	Active Employees	Vested Former Employees	Retirees and Beneficiaries	Pending Refunds	Total			
Linked Divisions HB, 05	$ 4,983,202	$ 160,284	$ 1,377,378	$ 2,264	$ 6,523,128	$ 5,339,689	81.9%	$ 1,183,439
Linked Divisions HD, 02	6,906,515	55,904	2,225,450	21,969	9,209,838	7,071,031	76.8%	2,138,807
Linked Divisions HE, 14	3,678,504	414,695	3,946,259	123,057	8,162,515	7,012,881	85.9%	1,149,634
Linked Divisions HF, 01	909,278	298,439	817,107	38,087	2,062,911	1,767,316	85.7%	295,595
Linked Divisions HG, 10	365,937	161,393	696,965	22,321	1,246,616	507,831	40.7%	738,785

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	$ 9,711,666	$ 6,750,466	70%	$ 2,961,200
2005	10,943,440	7,755,416	71%	3,188,024
2006	12,681,900	9,015,922	71%	3,665,978
2007	14,059,796	10,278,963	73%	3,780,833
2008	15,441,447	11,515,448	75%	3,925,999
2009	16,665,216	12,828,020	77%	3,837,196
2010	18,841,079	14,829,823	79%	4,011,256
2011	21,644,476	16,483,524	76%	5,160,952
2012	23,384,220	17,975,237	77%	5,408,983
2013	26,862,373	19,714,745	73%	7,147,628
2014	28,683,079	21,262,906	74%	7,420,173
2015	32,970,609	22,981,016	70%	9,989,593
2016	35,375,796	25,223,934	71%	10,151,862
2017	38,319,574	28,121,954	73%	10,197,620
2018	41,097,409	29,709,530	72%	11,387,879

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 01 - TPOAM

Table 8-01: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 904,962	$ 874,672	97%	$ 30,290
2009	959,704	967,623	101%	(7,919)
2010	1,000,313	1,082,521	108%	(82,208)
2011	1,072,912	1,139,443	106%	(66,531)
2012	1,061,861	1,165,917	110%	(104,056)
2013	1,192,711	1,244,550	104%	(51,839)
2014	1,307,912	1,335,534	102%	(27,622)
2015	1,594,249	1,418,774	89%	175,475
2016	1,783,908	1,560,966	88%	222,942
2017	1,852,461	1,675,550	90%	176,911
2018	1,979,876	1,703,442	86%	276,434

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

Table 9-01: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	20	$ 635,140	4.59%	5.00%
2009	21	697,600	4.23%	5.00%
2010	18	633,150	2.86%	5.00%
2011	17	602,922	4.51%	4.00%
2012	15	528,807	4.17%	3.00%
2013	20	731,576	5.40%	3.00%
2014	20	729,745	6.72%	2.00%
2015	20	822,799	$ 5,946	2.00%
2016	16	741,752	$ 5,707	2.00%
2017	13	645,141	$ 5,039	2.00%
2018	11	557,979	$ 5,256	2.00%

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 8-02: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 2,854,451	$ 2,127,108	75%	$ 727,343
2009	3,131,111	2,459,798	79%	671,313
2010	3,564,633	3,303,703	93%	260,930
2011	4,885,018	3,652,191	75%	1,232,827
2012	5,203,705	3,893,073	75%	1,310,632
2013	6,076,136	4,444,933	73%	1,631,203
2014	6,051,815	4,665,236	77%	1,386,579
2015	6,849,961	5,069,260	74%	1,780,701
2016	7,436,278	5,692,248	77%	1,744,030
2017	8,240,320	6,650,921	81%	1,589,399
2018	9,121,451	6,987,700	77%	2,133,751

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	30	$ 1,769,768	7.64%	5.00%
2009	31	1,827,777	7.28%	6.17%
2010	30	1,872,798	5.85%	6.17%
2011	30	1,860,017	11.47%	6.17%
2012	31	1,908,525	11.59%	6.17%
2013	29	1,997,648	12.58%	6.17%
2014	25	1,686,802	$ 17,642	6.17%
2015	24	1,680,414	$ 21,983	6.17%
2016	23	1,689,595	$ 21,924	6.17%
2017	22	1,648,289	$ 20,864	6.17%
2018	21	1,609,322	$ 24,648	6.17%

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 8-05: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 1,867,228	$ 1,577,772	84%	$ 289,456
2009	2,149,803	1,849,791	86%	300,012
2010	2,522,564	2,164,526	86%	358,038
2011	2,949,361	2,489,043	84%	460,318
2012	3,288,692	2,821,512	86%	467,180
2013	3,787,941	3,230,511	85%	557,430
2014	4,136,363	3,608,244	87%	528,119
2015	4,794,809	3,994,893	83%	799,916
2016	5,256,937	4,546,416	87%	710,521
2017	5,907,246	5,046,262	85%	860,984
2018	6,491,784	5,319,257	82%	1,172,527

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

Table 9-05: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	21	$ 1,097,550	7.04%	5.00%
2009	21	1,270,865	7.32%	5.00%
2010	23	1,517,003	7.42%	5.00%
2011	23	1,579,022	7.84%	5.00%
2012	23	1,614,967	7.96%	5.00%
2013	26	1,792,762	8.16%	5.00%
2014	25	1,734,496	$ 11,804	5.00%
2015	25	1,767,537	$ 14,521	5.00%
2016	25	1,772,309	$ 13,921	5.00%
2017	24	1,781,459	$ 15,124	5.00%
2018	24	1,867,173	$ 17,689	5.00%

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

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer 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	$ 714,664	$ 376,269	53%	$ 338,395
2009	755,823	382,227	51%	373,596
2010	791,255	387,897	49%	403,358
2011	825,575	394,931	48%	430,644
2012	867,718	401,319	46%	466,399
2013	924,647	419,643	45%	505,004
2014	970,282	439,268	45%	531,014
2015	1,086,334	457,917	42%	628,417
2016	1,163,655	484,937	42%	678,718
2017	1,195,603	509,129	43%	686,474
2018	1,228,626	489,637	40%	738,989

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	3	$ 211,712	15.00%	6.93%
2009	3	234,513	15.83%	6.93%
2010	3	234,513	16.45%	6.93%
2011	3	234,513	18.10%	6.93%
2012	3	234,513	19.87%	6.93%
2013	3	243,533	20.46%	6.93%
2014	3	235,013	21.80%	6.93%
2015	3	235,634	26.71%	6.93%
2016	2	164,298	$ 4,423	6.93%
2017	2	164,902	$ 4,570	6.93%
2018	2	168,193	$ 5,065	6.93%

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.

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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	$ 318,643	$ 332,202	104%	$ (13,559)
2009	341,413	383,701	112%	(42,288)
2010	400,978	452,270	113%	(51,292)
2011	480,487	541,624	113%	(61,137)
2012	527,855	611,780	116%	(83,925)
2013	591,020	684,209	116%	(93,189)
2014	637,549	735,554	115%	(98,005)
2015	781,066	801,787	103%	(20,721)
2016	808,497	880,042	109%	(71,545)
2017	728,202	969,613	133%	(241,411)
2018	653,614	1,002,715	153%	(349,101)

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		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	9	$ 369,217	2.82%	5.00%
2009	9	390,756	1.87%	5.00%
2010	8	355,745	2.50%	5.00%
2011	9	395,048	2.54%	5.00%
2012	9	398,795	1.73%	5.00%
2013	8	381,680	1.52%	5.00%
2014	7	346,807	$ 281	5.00%
2015	7	378,771	$ 1,353	5.00%
2016	7	355,374	$ 784	5.00%
2017	3	158,953	$ 0	5.00%
2018	0	0	$ 0	5.00%

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

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

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

Table 8-14: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 3,463,118	$ 3,188,758	92%	$ 274,360
2009	3,794,301	3,593,171	95%	201,130
2010	4,010,400	4,094,239	102%	(83,839)
2011	4,240,151	4,384,685	103%	(144,534)
2012	4,778,491	4,815,785	101%	(37,294)
2013	5,298,463	5,273,961	100%	24,502
2014	5,796,065	5,539,436	96%	256,629
2015	6,645,837	5,930,022	89%	715,815
2016	7,123,332	6,394,697	90%	728,635
2017	7,629,452	6,795,743	89%	833,709
2018	8,022,651	6,834,485	85%	1,188,166

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

Table 9-14: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	29	$ 1,515,248	6.62%	5.00%
2009	33	1,800,059	6.11%	5.00%
2010	34	1,981,088	5.45%	5.00%
2011	33	1,942,390	5.35%	5.00%
2012	34	1,908,244	5.52%	5.00%
2013	34	2,026,959	6.46%	5.00%
2014	35	2,111,436	$ 11,872	5.00%
2015	32	2,025,795	$ 15,246	5.00%
2016	26	1,723,713	$ 12,887	5.00%
2017	23	1,619,640	$ 13,467	5.00%
2018	20	1,478,235	$ 15,033	5.00%

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

2 For each valuation year, the computed employer contribution is based on the employee rate. If the employee rate changes during the applicable fiscal year, the computed employer 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 8-15: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 172,413	$ 133,983	78%	$ 38,430
2009	183,689	160,991	88%	22,698
2010	148,318	186,488	126%	(38,170)
2011	233,539	192,594	83%	40,945
2012	232,326	179,491	77%	52,835
2013	231,296	171,997	74%	59,299
2014	229,922	165,260	72%	64,662
2015	236,208	157,220	67%	78,988
2016	234,687	149,707	64%	84,980
2017	233,070	145,143	62%	87,927
2018	230,975	138,013	60%	92,962

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

Table 9-15: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	1	$ 85,036	11.17%	6.00%
2009	1	88,664	10.94%	6.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 227	0.00%
2012	0	0	$ 295	0.00%
2013	0	0	$ 351	0.00%
2014	0	0	$ 411	0.00%
2015	0	0	$ 566	0.00%
2016	0	0	$ 660	6.00%
2017	0	0	$ 761	6.00%
2018	0	0	$ 924	6.00%

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 8-20: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 5,022,008	$ 2,939,447	59%	$ 2,082,561
2009	5,349,372	3,030,718	57%	2,318,654
2010	6,402,618	3,158,179	49%	3,244,439
2011	6,957,433	3,689,013	53%	3,268,420
2012	7,423,572	4,086,360	55%	3,337,212
2013	8,760,159	4,244,941	49%	4,515,218
2014	9,553,198	4,773,789	50%	4,779,409
2015	10,956,409	5,117,852	47%	5,838,557
2016	11,507,522	5,420,558	47%	6,086,964
2017	12,342,206	6,081,797	49%	6,260,409
2018	13,004,017	6,255,059	48%	6,748,958

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	8	$ 590,492	24.39%	9.06%
2009	5	391,489	38.28%	9.06%
2010	7	559,006	37.18%	9.06%
2011	8	646,496	33.90%	9.06%
2012	9	714,115	34.63%	9.06%
2013	8	690,649	47.79%	9.06%
2014	10	830,122	$ 30,807	9.06%
2015	11	958,619	$ 40,054	9.06%
2016	11	989,066	$ 41,874	9.06%
2017	10	930,835	$ 43,623	9.06%
2018	10	968,461	$ 48,229	9.06%

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-HA: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0	0%	$ 0
2009	0	0	0%	0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	0	0	0%	0
2014	(27)	585	0%	(612)
2015	0	2,367	0%	(2,367)
2016	2,639	6,227	236%	(3,588)
2017	5,813	16,633	286%	(10,820)
2018	3,795	20,940	552%	(17,145)

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

Table 9-HA: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	0	$ 0	$ 0	0.00%
2009	0	0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	0	0	$ 0	0.00%
2013	0	0	$ 0	0.00%
2014	1	33,995	5.99%	0.00%
2015	1	35,002	5.16%	0.00%
2016	2	87,059	5.96%	0.00%
2017	2	90,378	$ 389	0.00%
2018	0	0	$ 0	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-HB: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0	0%	$ 0
2009	0	0	0%	0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	0	0	0%	0
2014	0	0	0%	0
2015	3,331	1,977	59%	1,354
2016	8,263	5,924	72%	2,339
2017	18,157	12,393	68%	5,764
2018	31,344	20,432	65%	10,912

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

Table 9-HB: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	0	$ 0	$ 0	0.00%
2009	0	0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	0	0	$ 0	0.00%
2013	0	0	$ 0	0.00%
2014	0	0	$ 0	0.00%
2015	1	45,728	6.41%	0.00%
2016	1	51,875	6.45%	0.00%
2017	2	106,206	6.72%	0.00%
2018	2	116,297	6.91%	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-HD: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0	0%	$ 0
2009	0	0	0%	0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	0	0	0%	0
2014	0	0	0%	0
2015	11,692	13,467	115%	(1,775)
2016	18,222	29,847	164%	(11,625)
2017	47,316	54,030	114%	(6,714)
2018	88,387	83,331	94%	5,056

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

Table 9-HD: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	0	$ 0	$ 0	0.00%
2009	0	0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	0	0	$ 0	0.00%
2013	0	0	$ 0	0.00%
2014	0	0	$ 0	0.00%
2015	5	240,367	6.79%	0.00%
2016	5	216,567	6.24%	0.00%
2017	6	315,041	6.36%	0.00%
2018	10	539,542	6.62%	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-HE: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0	0%	$ 0
2009	0	0	0%	0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	0	0	0%	0
2014	0	0	0%	0
2015	10,713	12,882	120%	(2,169)
2016	19,752	39,860	202%	(20,108)
2017	74,362	102,994	139%	(28,632)
2018	139,864	178,396	128%	(38,532)

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

Table 9-HE: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	0	$ 0	$ 0	0.00%
2009	0	0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	0	0	$ 0	0.00%
2013	0	0	$ 0	0.00%
2014	0	0	$ 0	0.00%
2015	5	218,662	7.28%	0.00%
2016	9	391,660	8.16%	0.00%
2017	14	679,581	7.50%	0.00%
2018	13	678,770	7.35%	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.

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

Table 8-HF: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0	0%	$ 0
2009	0	0	0%	0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	0	0	0%	0
2014	0	0	0%	0
2015	0	2,598	0%	(2,598)
2016	12,104	12,505	103%	(401)
2017	37,202	38,557	104%	(1,355)
2018	83,035	63,874	77%	19,161

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

Table 9-HF: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	0	$ 0	$ 0	0.00%
2009	0	0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	0	0	$ 0	0.00%
2013	0	0	$ 0	0.00%
2014	0	0	$ 0	0.00%
2015	2	66,861	9.14%	0.00%
2016	7	241,720	7.44%	0.00%
2017	11	411,892	7.15%	0.00%
2018	15	541,871	7.76%	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-HG: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0	0%	$ 0
2009	0	0	0%	0
2010	0	0	0%	0
2011	0	0	0%	0
2012	0	0	0%	0
2013	0	0	0%	0
2014	0	0	0%	0
2015	0	0	0%	0
2016	0	0	0%	0
2017	8,164	23,189	284%	(15,025)
2018	17,990	18,194	101%	(204)

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

Table 9-HG: Computed Employer Contributions - Comparative Schedule

Valuation Date December 31	Active Employees		Computed Employer Contribution[1]	Employee Contribution Rate[2]
	Number	Annual Payroll		
2008	0	$ 0	$ 0	0.00%
2009	0	0	$ 0	0.00%
2010	0	0	$ 0	0.00%
2011	0	0	$ 0	0.00%
2012	0	0	$ 0	0.00%
2013	0	0	$ 0	0.00%
2014	0	0	$ 0	0.00%
2015	0	0	$ 0	0.00%
2016	0	0	$ 0	0.00%
2017	1	80,142	8.15%	0.00%
2018	1	81,745	8.84%	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-S1: Actuarial Accrued Liabilities - Comparative Schedule

Valuation Date December 31	Actuarial Accrued Liability	Valuation Assets	Percent Funded	Unfunded (Overfunded) Accrued Liabilities
2008	$ 0	$ 0		$ 0
2009	0	0		0
2010	0	0		0
2011	0	0		0
2012	0	0		0
2013	0	0		0
2014	0	0		0
2015	0	0		0
2016	0	0		0
2017	0	0		0
2018	0	594,055		(594,055)

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

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

Table 10: Division-Based Layered Amortization Schedule

Division 01 - TPOAM

Table 10-01: 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	$ 175,475	23	$ 204,284	20	$ 14,832
(Gain)/Loss	12/31/2016	22,656	22	24,682	20	1,788
(Gain)/Loss	12/31/2017	(49,510)	21	(53,594)	20	(3,888)
(Gain)/Loss	12/31/2018	101,850	20	109,743	20	7,968
Total				**$ 285,115**		**$ 20,700**

[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 10-02: 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	$ 1,780,701	23	$ 1,883,401	20	$ 136,716
(Gain)/Loss	12/31/2016	(102,473)	22	(111,651)	20	(8,100)
(Gain)/Loss	12/31/2017	(162,626)	21	(176,026)	20	(12,780)
(Gain)/Loss	12/31/2018	545,243	20	587,499	20	42,648
Total				**$ 2,183,223**		**$ 158,484**

[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 10-05: 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	$ 799,916	23	$ 854,696	20	$ 62,040
(Gain)/Loss	12/31/2016	(127,431)	22	(138,851)	20	(10,080)
(Gain)/Loss	12/31/2017	153,111	21	165,727	20	12,036
(Gain)/Loss	12/31/2018	294,954	20	317,813	20	23,076
Total				**$ 1,199,385**		**$ 87,072**

[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	$ 628,417	23	$ 659,624	20	$ 47,880
(Gain)/Loss	12/31/2016	32,200	22	35,082	20	2,544
(Gain)/Loss	12/31/2017	(507)	21	(551)	20	(36)
(Gain)/Loss	12/31/2018	47,965	20	51,682	20	3,756
Total				**$ 745,837**		**$ 54,144**

[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

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	$ (20,721)	10	$ (6,862)	10	$ (840)
(Gain)/Loss	12/31/2016	(63,538)	15	(66,100)	13	(6,552)
(Gain)/Loss	12/31/2017	(165,343)	10	(169,338)	9	(22,608)
(Gain)/Loss	12/31/2018	(96,287)	10	(103,749)	10	(12,696)
Total				**$ (346,049)**		**$ (42,696)**

[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 10-14: 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	$ 715,815	23	$ 785,165	20	$ 57,000
(Gain)/Loss	12/31/2016	(41,144)	22	(44,836)	20	(3,252)
(Gain)/Loss	12/31/2017	101,618	21	109,992	20	7,980
(Gain)/Loss	12/31/2018	341,688	20	368,169	20	26,724
Total				**$ 1,218,490**		**$ 88,452**

[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 10-15: 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	$ 78,988	16	$ 75,068	10	$ 9,180
(Gain)/Loss	12/31/2016	4,991	14	5,107	10	624
(Gain)/Loss	12/31/2017	3,415	12	3,567	10	432
(Gain)/Loss	12/31/2018	6,445	10	6,945	10	852
Total				**$ 90,687**		**$ 11,088**

[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	$ 5,838,557	23	$ 6,114,302	20	$ 443,832
(Gain)/Loss	12/31/2016	92,446	22	100,737	20	7,308
(Gain)/Loss	12/31/2017	114,535	21	123,967	20	9,000
(Gain)/Loss	12/31/2018	438,629	20	472,623	20	34,308
Total				**$ 6,811,629**		**$ 494,448**

[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-HA: 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	$ (2,367)	10	$ (2,276)	10	$ (276)
(Gain)/Loss	12/31/2016	(938)	15	(967)	13	(96)
(Gain)/Loss	12/31/2017	(7,290)	10	(7,467)	9	(996)
(Gain)/Loss	12/31/2018	(5,911)	10	(6,369)	10	(780)
Total				**$ (17,079)**		**$ (2,148)**

[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-HB: 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	$ 1,354	23	$ 1,489	20	$ 108
(Gain)/Loss	12/31/2016	881	22	960	20	72
(Gain)/Loss	12/31/2017	3,343	21	3,620	20	264
(Gain)/Loss	12/31/2018	4,863	20	5,240	20	384
Total				**$ 11,309**		**$ 828**

[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-HD: 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
(Gain)/Loss	12/31/2018	$ 5,680	15	$ 6,120	15	$ 540
Total				**$ 6,120**		**$ 540**

[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-HE: 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	$ (2,169)	10	$ (2,008)	10	$ (252)
(Gain)/Loss	12/31/2016	(17,771)	15	(18,493)	13	(1,836)
(Gain)/Loss	12/31/2017	(7,252)	15	(7,697)	14	(720)
(Gain)/Loss	12/31/2018	(9,738)	15	(10,493)	15	(936)
Total				**$ (38,691)**		**$ (3,744)**

[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-HF: 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
(Gain)/Loss	12/31/2018	$ 19,346	15	$ 20,845	15	$ 1,860
Total				**$ 20,845**		**$ 1,860**

[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-HG: 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
(Gain)/Loss	12/31/2018	$ 1,183	15	$ 1,275	15	$ 108
Total				**$ 1,275**		**$ 108**

[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:	62
Inactive employees entitled to but not yet receiving benefits (including refunds):	82
Active employees:	129
	273

Total Pension Liability as of 12/31/2017 measurement date:	$	37,083,145
Total Pension Liability as of 12/31/2018 measurement date:	$	39,796,219
Service Cost for the year ending on the 12/31/2018 measurement date:	$	958,216
Change in the Total Pension Liability due to:		
- Benefit changes[1]:	$	0
- Differences between expected and actual experience[2]:	$	184,891
- 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):	5
Covered employee payroll: (Needed for Required Supplementary Information)	$ 8,607,588

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:	$ 5,606,153	$ -	$ (4,628,130)

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:	62
Inactive employees entitled to but not yet receiving benefits (including refunds):	82
Active employees:	129
	273

Total Pension Liability as of 12/31/2018 measurement date:	$	39,639,240
Total Pension Liability as of 12/31/2019 measurement date:	$	42,178,549
Service Cost for the year ending on the 12/31/2019 measurement date:	$	981,318
Change in the Total Pension Liability due to:		
- Benefit changes[1]:	$	0
- Differences between expected and actual experience[2]:	$	169,536
- 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):	5
Covered employee payroll: (Needed for Required Supplementary Information)	$ 8,607,588

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:	$ 5,867,876	$ -	$ (4,850,987)

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

Benefit Provision History

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

01 - TPOAM

12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2014	Member Contribution Rate 2.00%
1/1/2012	Member Contribution Rate 3.00%
1/1/2011	Member Contribution Rate 4.00%
1/1/2004	Benefit B-2
11/10/2003	Covered by Act 88
7/11/1995	Blanket Resolution (All Service)
8/1/1991	Benefit FAC-3 (3 Year Final Average Compensation)
8/1/1991	10 Year Vesting
8/1/1991	Benefit C-2/Base B-1
8/1/1991	Member Contribution Rate 5.00%
8/1/1991	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

02 - Pol Ptrl

12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2010	E2 2.5% COLA for future retirees (12/01/2009)
12/1/2009	Benefit F50 (With 25 Years of Service)
12/1/2009	Member Contribution Rate 6.17%
12/1/2006	Benefit B-3 (80% max)
8/1/2006	Temporary Benefit B-3 (80% max) (08/01/2006 - 09/30/2006)
8/1/2006	E2 2.5% Window COLA for future retirees (08/01/2006) to (09/30/2006)
11/10/2003	Covered by Act 88
1/1/2001	Benefit B-2
7/11/1995	Blanket Resolution (All Service)
8/1/1992	Benefit FAC-3 (3 Year Final Average Compensation)
8/1/1992	10 Year Vesting
8/1/1992	Benefit C-2/Base B-1
8/1/1992	Benefit F55 (With 15 Years of Service)
8/1/1992	Member Contribution Rate 5.00%
8/1/1991	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

05 - Fire Fght

12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2007	Benefit B-3 (80% max)
11/10/2003	Covered by Act 88
3/1/2003	Benefit B-2
7/11/1995	Blanket Resolution (All Service)
8/1/1992	Benefit FAC-3 (3 Year Final Average Compensation)

05 - Fire Fght

8/1/1992	10 Year Vesting
8/1/1992	Day of work defined as 96 Hours a Month for All employees.
8/1/1992	Benefit C-2/Base B-1
8/1/1992	Benefit F55 (With 15 Years of Service)
8/1/1992	Member Contribution Rate 5.00%
8/1/1991	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 - Elctd Ofc

12/1/2016	Service Credit Purchase Estimates - Yes
1/1/2005	E2 2.5% COLA for future retirees (11/01/2004)
11/10/2003	Covered by Act 88
5/1/1996	Benefit B-3 (80% max)
5/1/1996	Member Contribution Rate 6.93%
4/30/1996	Member Contribution Rate 0.00%
4/1/1996	2.0% multiplier (80% max)
7/11/1995	Blanket Resolution (All Service)
8/1/1991	Benefit FAC-3 (3 Year Final Average Compensation)
8/1/1991	8 Year Vesting
8/1/1991	Benefit B-2
8/1/1991	Member Contribution Rate 5.00%
8/1/1991	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 - Dsptchr

12/1/2016	Service Credit Purchase Estimates - Yes
12/1/2009	Benefit B-3 (80% max)
11/10/2003	Covered by Act 88
1/1/2003	Benefit B-2
7/11/1995	Blanket Resolution (All Service)
10/1/1992	Benefit FAC-3 (3 Year Final Average Compensation)
10/1/1992	10 Year Vesting
10/1/1992	Benefit C-2/Base B-1
10/1/1992	Member Contribution Rate 5.00%
8/1/1991	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

14 - Adm/NonUnion

12/1/2016	Service Credit Purchase Estimates - Yes
8/1/2008	Member Contribution Rate 5.00%
8/1/2005	Temporary 25 Years & Out (08/01/2005 - 11/03/2005)
1/1/2005	Benefit B-3 (80% max)
1/1/2005	Member Contribution Rate 6.00%
11/10/2003	Covered by Act 88
1/1/2000	Benefit FAC-3 (3 Year Final Average Compensation)
1/1/2000	10 Year Vesting

14 - Adm/NonUnion

1/1/2000	Benefit B-2
1/1/2000	Member Contribution Rate 5.00%
7/11/1995	Blanket Resolution (All Service)
8/1/1991	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

15 - Utilities Dr

12/1/2016	Service Credit Purchase Estimates - Yes
10/1/2007	Benefit FAC-3 (3 Year Final Average Compensation)
10/1/2007	Covered by Act 88
10/1/2007	10 Year Vesting
10/1/2007	Blanket Resolution (All Service)
10/1/2007	Benefit B-3 (80% max)
10/1/2007	Benefit F55 (With 25 Years of Service)
10/1/2007	Member Contribution Rate 6.00%
8/1/1991	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 - Pol Cmnd

12/1/2016	Service Credit Purchase Estimates - Yes
10/1/2009	Temporary 20 Years & Out (10/01/2009 - 01/31/2010)
2/1/2007	Member Contribution Rate 9.06%
7/1/2005	Member Contribution Rate 10.06%
11/10/2003	Covered by Act 88
1/1/2001	E2 2.5% COLA for future retirees (01/01/2001)
1/1/1999	Benefit B-4 (80% max)
1/1/1999	Benefit F50 (With 25 Years of Service)
1/1/1999	Member Contribution Rate 11.06%
7/11/1995	Blanket Resolution (All Service)
6/1/1992	Benefit FAC-3 (3 Year Final Average Compensation)
6/1/1992	10 Year Vesting
6/1/1992	Benefit C-2/Base B-1
6/1/1992	Benefit F55 (With 15 Years of Service)
6/1/1992	Member Contribution Rate 5.00%
8/1/1991	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	Early Reduced (.5%) at Age 50 with 25 Years or Age 55 with 15 Years

HA - POLC/cler/Dispatch aft 7/1/14

7/1/2014	Benefit FAC-3 (3 Year Final Average Compensation)
7/1/2014	6 Year Vesting
7/1/2014	Day of work defined as 8 Hours a Day for All employees.
7/1/2014	1.5% Multiplier
11/10/2003	Covered by ACT 88
8/1/1991	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

HB - IAFF ee's hired on/aft 1/1/14

1/1/2014	Benefit FAC-3 (3 Year Final Average Compensation)
1/1/2014	6 Year Vesting
1/1/2014	Day of work defined as 96 Hours a Month for All employees.
1/1/2014	1.5% Multiplier
1/1/2014	Benefit F55 (With 25 Years of Service)
11/10/2003	Covered by ACT 88
8/1/1991	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

HD - POAM on/after 1/1/2015

1/1/2015	Benefit FAC-3 (3 Year Final Average Compensation)
1/1/2015	6 Year Vesting
1/1/2015	Day of work defined as 8 Hours a Day for All employees.
1/1/2015	1.5% Multiplier
1/1/2015	Benefit F55 (With 25 Years of Service)
8/1/1991	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

HE - Non-union on/after 1/1/2015

1/1/2015	Benefit FAC-3 (3 Year Final Average Compensation)
1/1/2015	6 Year Vesting
1/1/2015	Day of work defined as 8 Hours a Day for All employees.
1/1/2015	1.5% Multiplier
8/1/1991	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

HF - TPOAM on/aft 3/30/15

4/1/2015	Benefit FAC-3 (3 Year Final Average Compensation)
4/1/2015	6 Year Vesting
4/1/2015	Day of work defined as 8 Hours a Day for All employees.
4/1/2015	1.5% Multiplier
8/1/1991	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

HG - Elctd Ofc on/aft 1/1/15

1/1/2015	Benefit FAC-3 (3 Year Final Average Compensation)
1/1/2015	6 Year Vesting
1/1/2015	Non Standard Compensation Definition
1/1/2015	Day of work defined as 8 Hours a Day for All employees.
1/1/2015	1.5% Multiplier
8/1/1991	Fiscal Month - January
	Defined Benefit Normal Retirement Age - 60
	No Early Reduced Conditions

S1 - Surplus Unassociated

8/1/1991 Fiscal Month - January

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	1.00%

Withdrawal Rate Scaling Factor

Division	Withdrawal Rate Scaling Factor
All Divisions	94%

Miscellaneous and Technical Assumptions

Loads – None.

Amortization Policy for Closed Divisions

Closed Division	Amortization Option
15 - Utilities Dr	Accelerated to 5-Year Amortization

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

Risk Commentary

Determination of the accrued liability, the employer contribution, and the funded ratio requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability, the actuarially determined contribution and the funded ratio that result from the differences between actual experience and the actuarial assumptions.

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

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

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

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

PLAN MATURITY MEASURES

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

1. Ratio of the market value of assets to total payroll	3.2
2. Ratio of actuarial accrued liability to payroll	4.8
3. Ratio of actives to retirees and beneficiaries	2.1
4. Ratio of market value of assets to benefit payments	19.7
5. Ratio of net cash flow to market value of assets (boy)	1.8%

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	129
12	Indicate number of inactive members	33
13	Indicate number of retirees and beneficiaries	62
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	$29,709,530
25	Enter retirement pension system's actuarial accrued liabilities using uniform assumptions	$45,402,372
27	Actuarially Determined Contribution (ADC) using uniform assumptions, Fiscal Year Ending December 31,2019	$1,987,956

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."