

Bay County Employees' Retirement System

Annual Actuarial Valuation Report
for County Employers Other Than BABH
December 31, 2018



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October 2, 2019

Board of Trustees
Bay County Employees'
Retirement System
Bay City, Michigan

**Re: Bay County Employees' Retirement System - excluding BABH Actuarial Valuation
as of December 31, 2018**

Dear Board Members:

The results of the December 31, 2018 Annual Actuarial Valuation of the Bay County Employees' Retirement System - excluding BABH are presented in this report.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The purposes of the valuation are to measure the System's funding progress, and to determine the employer contribution rate for the fiscal year ending December 31, 2020. 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.

The computed contribution rate shown in this report is determined using the actuarial assumptions and methods disclosed in Section D of this report. This report includes risk metrics on pages F-1 and F-2 but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

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 the County, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the County.

This report was prepared using assumptions adopted by the Board. All actuarial assumptions used in this report are reasonable for the purposes of this valuation. Additional information about the actuarial assumptions is included in the section of this report entitled Actuarial Cost Methods and Assumptions.

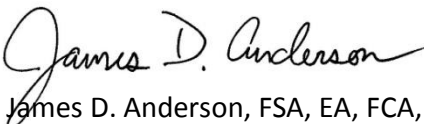
This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of the Bay County Employees' Retirement System - excluding BABH as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

James D. Anderson and Mark Buis are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The signing individuals are independent of the plan sponsor.

Gabriel, Roeder, Smith & Company will be pleased to review this valuation and Report with the Board of Trustees and to answer any questions pertaining to the valuation.

Respectfully submitted,


James D. Anderson, FSA, EA, FCA, MAAA



Mark Buis, FSA, EA, FCA, MAAA

JDA/MB:ah



SECTION A

EXECUTIVE SUMMARY

Executive Summary

1. Required Employer Contributions - Fiscal Year Beginning *January 1, 2020*

The computed employer contributions **exclusive of employer paid "member" contributions** are as follows:

| Division | Valuation Year Fiscal Year | Contribution Rate [#] | |
|-----------------------|-------------------------------|--------------------------------|------------------------|
| | | 12/31/2017 1/1/2019 | 12/31/2018 1/1/2020 |
| General County | | 0.00 % | 0.00 % |
| DWS | | 14.22 | 14.42 |
| Library* | | \$ 10,430 | \$ 7,906 |
| Medical Care Facility | | 0.57 % | 1.37 % |
| Sheriff's Department | | 0.00 | 0.00 |
| Road Commission | | 18.66 | 18.29 |

* Beginning with the 2013 valuation, the Library contribution is calculated as a level dollar amount, since the Library is closed to future hires.

Beginning with the 2015 valuation, BABH results are provided in a separate report.

It is important to remember that the current contribution rates for General County, Library, Medical Care Facility, and Sheriff's Department are lower than the long-term cost of the plan (the normal cost). This is because these divisions have overfunding credits. The credits reduce the required contributions below the normal costs until the overfunding is eliminated. ***If future experience were to exactly match each of the assumptions, the employer contribution rates would not remain level. Increases would occur over time and contribution rates would increase towards the normal cost or long-term cost of the benefits.***

2. Funded Ratio Comparison

The funding percentage for each of the valuation groups are shown below.

| Division | Funded Ratio | |
|-----------------------|--------------|------------|
| | 12/31/2017 | 12/31/2018 |
| General County | 120 % | 120 % |
| DWS | 85 | 85 |
| Library | 110 | 110 |
| Medical Care Facility | 115 | 113 |
| Sheriff's Department | 125 | 124 |
| Road Commission | 88 | 88 |

This year for all employment divisions combined, excluding BABH, valuation assets represent 112.1% of accrued liabilities; last year the ratio was 112.6%. If the valuation results were based on market value of assets instead of smoothed funding value, the funded percent of the plan would be 106.2%.

3. Reasons for Change

There are three general reasons why contribution rates change from one valuation to the next. The first is a change in the benefits or eligibility conditions of the plan. The second is a change in the valuation assumptions used to predict future occurrences. The third is the difference during the year between the plan's actual experience and what the assumptions predicted.

The Road Commission group reported a benefit correction related to the benefit multiplier of 1.5% for new members hired after January 1, 2016. The Medical Care Facility group added a new tier with a benefit multiplier of 1.5%, a 70% employer financed maximum, and an unreduced normal retirement at age 62 with 10 years of service for active members hired after February 26, 2018. There were no other changes in benefit provision reported.

There were no changes to valuation assumptions or methods for the 2018 valuation.

4. 2018 Plan Experience

The aggregate experience during 2018 was unfavorable, with an overall gain/(loss) of \$(1,545,805). The gain/(loss) information is shown separately for each group on page B-8.

Investment return on the market value of assets for calendar year 2018 was well short of the assumed rate of return for the valuation (see page C-4). However, the asset smoothing method only recognizes 20% of a given year's investment gain or loss. Partial recognition of gains and losses from prior years along with this year's gain resulted in an overall loss on the funding value of assets. In addition to the investment experience loss, there was a non-investment gain due to greater member termination than expected which was partially offset by a loss on pay due to actual pay increases being greater than assumed for certain groups (DWS, Medical Care Facility, and Sheriff's members).

5. Retiree Reserve Balance

The retiree accrued liabilities for all divisions are larger than the reported retiree reserve balances. For detail see Comment A on page B-5.

6. Looking Ahead

Investment income greater than or less than expected based on the investment return assumption is recognized over a five-year period under the current asset valuation method. As of December 31, 2018, the funding value of assets was 106% of market value. Due to investment performance during the previous five years, unrecognized investment gains and losses exist that are scheduled to be recognized over the next four years. This is expected to put upward pressure on the required contribution amounts calculated in the near term.

SECTION B

VALUATION RESULTS AND COMMENTS

Financial Objective

The financial objective of the Retirement System is to establish and receive contributions, expressed as a percentage of active member payroll, which will remain approximately level from year-to-year and will not have to be increased for future generations of citizens.

Your annual actuarial valuations determine how well the objective is being met.

The Board of Trustees of the Bay County Employees' Retirement System confirms that the System provides for payment of the required employer contribution as described in Section 20m of Michigan Public Act No. 728 of 2002.

Contribution Rates

The Retirement System is supported by contributions from the employers, by member contributions and by the investment income earned on System assets. For some divisions, the required member contributions are paid by the Employer either through contributions to the System or by transferring funds from the employer reserves to the employee reserves. In addition, the Employer provides an actuarially determined contribution.

Member and Employer contributions cover both: i) normal cost, and ii) the financing of the unfunded accrued liability over a period of future years. The normal cost is the portion of System costs allocated to the current year by the valuation method described on page D-1. The unfunded accrued liability is the portion of System costs not covered by present System assets and future normal costs.

The contribution requirements for the fiscal year beginning January 1, 2020 are presented on page B-2.

Contributions to Provide Benefits Member Portion and Employer Portion Fiscal Year Beginning January 1, 2020

| Contributions for | % of Active Payroll | | | | | | |
|---|---------------------|--------------|-----------------|--------------------------|-------------------------|--------------------|---------------------|
| | General County | DWS | Library* | Medical Care Facility | Sheriff's Department | Road Commission | Total |
| Normal cost of benefits: | | | | | | | |
| Age & service | 9.07 % | 12.17 % | \$ 137,563 | 8.66 % | 12.06 % | 13.12 % | 10.00 % |
| Disability | 0.33 | 0.39 | 3,846 | 0.45 | 1.67 | 0.90 | 0.57 |
| Death-in-service | 0.27 | 0.39 | 4,175 | 0.14 | 0.37 | 0.61 | 0.29 |
| Total | 9.67 | 12.95 | 145,584 | 9.25 | 14.10 | 14.63 | 10.86 |
| Member contributions [#] : | | | | | | | |
| Total | 4.11 | 4.00 | 43,950 | 4.00 | 5.03 | 4.77 | 4.25 |
| Future refunds | 0.06 | 0.08 | 2,197 | 0.14 | 0.18 | 0.20 | 0.11 |
| Available for pensions | 4.05 | 3.92 | 41,753 | 3.86 | 4.85 | 4.57 | 4.14 |
| Administrative expenses | 0.50 | 0.50 | 5,494 | 0.50 | 0.50 | 0.50 | 0.50 |
| Employer normal cost | 6.12 | 9.53 | 109,325 | 5.89 | 9.75 | 10.56 | 7.22 |
| Unfunded accrued liability | (8.79) | 4.89 | (101,419) | (4.52) | (12.11) | 7.73 | |
| Computed Employer Rate | 0.00 | 14.42 | | 1.37 | 0.00 | 18.29 | |
| Computed Employer \$ Contribution Amount | | | \$ 7,906 | | | | \$ 1,278,469 |

For certain divisions, the member contributions are paid by the employer, either by directly contributing to the Retirement System or by transferring funds from employer reserves to employee reserves.

* Beginning with the 2013 valuation, the Library contribution is calculated as a level dollar amount, since the Library is closed to future hires.

Unfunded actuarial accrued liabilities were amortized as a level dollar amount for the Library and as a level percent of member payroll for all other groups over a closed period of 24 years and asset surpluses were amortized over an open period of 20 years.

The procedure for determining dollar contribution amounts is shown on page B-3.

Page B-4 displays the unfunded accrued liabilities (asset surpluses) that are amortized by the contribution rates shown above.

Determining Dollar Contributions

For any period of time, the percent-of-payroll contribution rates need to be converted to dollar amounts. We recommend one of the following procedures:

- (1) Contribute dollar amounts for a period which are equal to the employer's percent-of-payroll contribution requirement multiplied by the covered active member payroll for the period. Adjustments should be made as necessary to exclude items of pay that are not covered compensation for Retirement System benefits and to include non-payroll payments that are covered compensation; or
- (2) Contribute the dollars for each group based on the table shown below.

| Group: | General County | DWS | Library | Medical Care Facility | Sheriff's Department | Road Commission | Total |
|----------------------|---------------------------|------------|----------------|----------------------------------|---------------------------------|----------------------------|--------------|
| Contribution: | \$ - | \$ 509,466 | \$ 7,906 | \$ 152,871 | \$ - | \$ 608,226 | \$ 1,278,469 |

These amounts are based on the payroll information provided for the valuation.

Timing of Contribution Payments

The contribution requirements in this report anticipate regular payments throughout the year. Examples would be at each payroll date or in 12 monthly installments. If the employer contribution pattern is significantly different, an adjustment to the costs may be appropriate. For example, a lump sum contribution at the beginning of the year is available for investment throughout the year and, therefore, ought to be somewhat smaller than 12 monthly payments. Similarly, a lump sum contribution at the end of the year will not generate any investment income that year.

Determination of Unfunded Accrued Liability

| | General County | DWS | Library | Medical Care Facility | Sheriff's Department | Road Commission | Total |
|--|-------------------|---------------|--------------|--------------------------|-------------------------|--------------------|----------------|
| A. Accrued liability | | | | | | | |
| 1. For retirees and beneficiaries | \$ 61,396,479 | \$ 11,921,309 | \$ 7,712,042 | \$ 33,223,336 | \$ 18,596,476 | \$ 23,434,765 | \$ 156,284,407 |
| 2. For vested terminated members | 2,149,206 | 77,143 | 288,837 | 761,887 | 591,645 | 128,150 | 3,996,868 |
| 3. For present active members | | | | | | | |
| a. Value of expected future benefit payments | 52,414,965 | 9,121,560 | 4,605,242 | 26,645,682 | 19,255,520 | 14,339,913 | 126,382,882 |
| b. Value of future normal costs | 11,956,029 | 3,787,593 | 1,132,916 | 7,060,744 | 5,838,325 | 4,037,750 | 33,813,357 |
| c. Active member liability: (a) - (b) | 40,458,936 | 5,333,967 | 3,472,326 | 19,584,938 | 13,417,195 | 10,302,163 | 92,569,525 |
| 4. Total actuarial accrued liability | 104,004,621 | 17,332,419 | 11,473,205 | 53,570,161 | 32,605,316 | 33,865,078 | 252,850,800 |
| B. Valuation assets | 125,083,900 | 14,683,296 | 12,593,017 | 60,605,359 | 40,460,608 | 29,900,841 | 283,327,021 |
| C. Unfunded accrued liability (Excess assets): | | | | | | | |
| (A.4) - (B) | (21,079,279) | 2,649,123 | (1,119,812) | (7,035,198) | (7,855,292) | 3,964,237 | (30,476,221) |
| D. Funding ratio: (B) / (A.4) | 120.3% | 84.7% | 109.8% | 113.1% | 124.1% | 88.3% | 112.1% |

Comments

Comment A: We developed the value of anticipated future benefit payments to retired members and their beneficiaries. We then compared this accrued liability to the reported value of the retirement reserve account. The figures below compare the retired liabilities and reserves for each division.

| Division | Retiree Accrued Liability | Reported Retiree Reserve | Unfunded Retiree Liability |
|-----------------------|---------------------------------|--------------------------------|----------------------------------|
| General County | \$ 61,396,479.00 | \$ 54,375,881.05 | \$ 7,020,597.95 |
| DWS | 11,921,309.00 | 10,465,080.59 | 1,456,228.41 |
| Library | 7,712,042.00 | 6,762,467.03 | 949,574.97 |
| Medical Care Facility | 33,223,336.00 | 28,662,798.24 | 4,560,537.76 |
| Sheriff's Department | 18,596,476.00 | 16,583,312.16 | 2,013,163.84 |
| Road Commission | 23,434,765.00 | 21,949,552.44 | 1,485,212.56 |
| Total | \$156,284,407.00 | \$138,799,091.51 | \$17,485,315.49 |

As of the valuation date, there is a shortfall in the retiree reserve for all groups. This valuation anticipates that the difference between the accrued liability and the reported reserve will be transferred from the Retirement System employer reserve to the retiree reserve effective January 1, 2019 to fully fund the retiree accrued liability.

Comment B: Contribution rates increased during the year primarily due to unfavorable investment performance. Results varied by group. In particular, all divisions experienced the impact of unfavorable investment performance. In addition to the investment experience loss, there was a non-investment gain due to greater member termination than expected which was partially offset by a loss on pay due to actual pay increases being greater than assumed for certain groups (DWS, Medical Care Facility, and Sheriff's members).

Comment C: The chart on page B-8 shows the experience gain/(loss) for 2018. The development of the investment gain/(loss) is shown on page B-9.

Comment D: The introduction of GASB Statements No. 67 and No. 68 served to completely disconnect pension accounting from pension funding. This means that the Annual Required Contribution is no longer applicable. As part of good governance, we would be happy to supply the Board with a draft funding policy for consideration. In particular, this document would codify methods, assumptions and other key items related to pension funding, including perhaps a minimum contribution equal to a percentage of the normal cost for currently overfunded plans.

Comment E: Assumptions were updated for the December 31, 2016 valuation after a review was performed. The State of Michigan now requires experience studies once every 5 years, consistent with the practice of the Bay County Employees' Retirement System. Please refer to our experience study report dated August 1, 2017 for more details.

Comments

Comment F: Under Public Act 202 of the State of Michigan, Michigan municipalities are required to report liabilities under new uniform assumption guidelines. While the current guidelines are currently only for reporting purposes (and not funding), governments may be encouraged to use these new assumptions for funding. The uniform assumptions include the following:

- Investment return no higher than 7.0%;
- Assumed wage inflation no lower than 3.5%;
- Mortality assumption that uses a version of the RP-2014 table (with possible update to PUB-2010, developed for the public sector); and
- Amortization period no longer than 20 years for Pension Plans and 30 years for Retiree Health Plans.

For efficiency in compliance, we propose producing this information for inclusion with the annual GASB valuation.

Disclosures

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the DWS and Road Commission contribution allocation procedures, if all actuarial assumptions are met (including the assumption of the plan earning 7.25% on the actuarial value of assets), then the following outcomes are expected, for the above mentioned groups:

1. The employer normal cost as a percentage of pay is expected to remain level as a percentage of payroll.
2. The unfunded liability is expected to be paid off in approximately 24 years, which is the number of years remaining in the closed amortization schedule of the unfunded liability. The funded status of the plan is expected to reach a 100% funded ratio in approximately 24 years, which is the number of years remaining in the closed amortization schedule of the unfunded liability.
3. The funded status of the plan is expected to increase gradually towards a 100% funded ratio.

Given the General, Library, Medical Care Facility, and Sheriff's contribution allocation procedures, if all actuarial assumptions are met (including the assumption of the plan earning 7.25% on the actuarial value of assets), then the following outcomes are expected, for the above mentioned groups:

1. For General, Medical Care Facility and Sheriff's groups - the employer normal cost as a percentage of pay is expected to remain level as a percentage of payroll.
2. For the Library, the Normal cost is calculated as a level dollar amount due to the closure of the plan to future Library active members.
3. The funded status of the plan is expected to decrease gradually towards a 100% funded ratio.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regards to any funded status measurements presented in this report:

1. The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.
2. The measurement is inappropriate for assessing the need for or the amount of future employer contributions.
3. The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

Determination of Experience Gain/(Loss) Year Ended December 31, 2018

Actual experience will never (except by coincidence) exactly match assumed experience. It is hoped that gains and losses will cancel each other over a period of years, but sizable year-to-year fluctuations are common. Detail on the determination of the experience gain/(loss) is shown below:

| | General County | DWS | Library | Medical Care Facility | Sheriff's Department | Road Commission | Total |
|---|-------------------|--------------|----------------|--------------------------|-------------------------|--------------------|-----------------|
| (1) UAAL at start of year | \$ (20,493,124) | \$ 2,427,904 | \$ (1,122,550) | \$ (7,978,760) | \$ (8,035,292) | \$ 4,011,441 | \$ (31,190,381) |
| (2) Normal cost for the year 2018 | 1,717,066 | 449,728 | 164,039 | 1,054,029 | 673,601 | 493,801 | 4,552,264 |
| (3) Actual employer & employee contributions | (682,212) | (628,370) | (122,955) | (693,915) | (239,737) | (804,866) | (3,172,055) |
| (4) Net interest accrual on (1), (2) and (3) | (1,448,676) | 169,623 | (79,913) | (565,558) | (567,015) | 279,685 | (2,211,854) |
| (5) Expected UAAL before changes: (1) + (2) + (3) + (4) | (20,906,946) | 2,418,885 | (1,161,379) | (8,184,204) | (8,168,443) | 3,980,061 | (32,022,026) |
| (6) Change from benefit changes | - | - | - | - | - | - | - |
| (7) Change from revised actuarial assumptions and methods | - | - | - | - | - | - | - |
| (8) Expected UAAL after changes: (5) + (6) + (7) | (20,906,946) | 2,418,885 | (1,161,379) | (8,184,204) | (8,168,443) | 3,980,061 | (32,022,026) |
| (9) Actual UAAL at end of year | (21,079,279) | 2,649,123 | (1,119,812) | (7,035,198) | (7,855,292) | 3,964,237 | (30,476,221) |
| (10) Gain/(Loss): (8) - (9) | 172,333 | (230,238) | (41,567) | (1,149,006) | (313,151) | 15,824 | (1,545,805) |
| (11) Actuarial accrued liabilities at start of year | 102,984,388 | 16,724,711 | 11,457,673 | 51,834,953 | 31,709,385 | 33,764,801 | 248,475,911 |
| (12) Gain/(Loss) as a percent of actuarial accrued liabilities at start of year: (10)/(11) | 0.2% | (1.4)% | (0.4)% | (2.2)% | (1.0)% | 0.0% | (0.6)% |

Development of Valuation Investment Gain/(Loss) Year Ended December 31, 2018

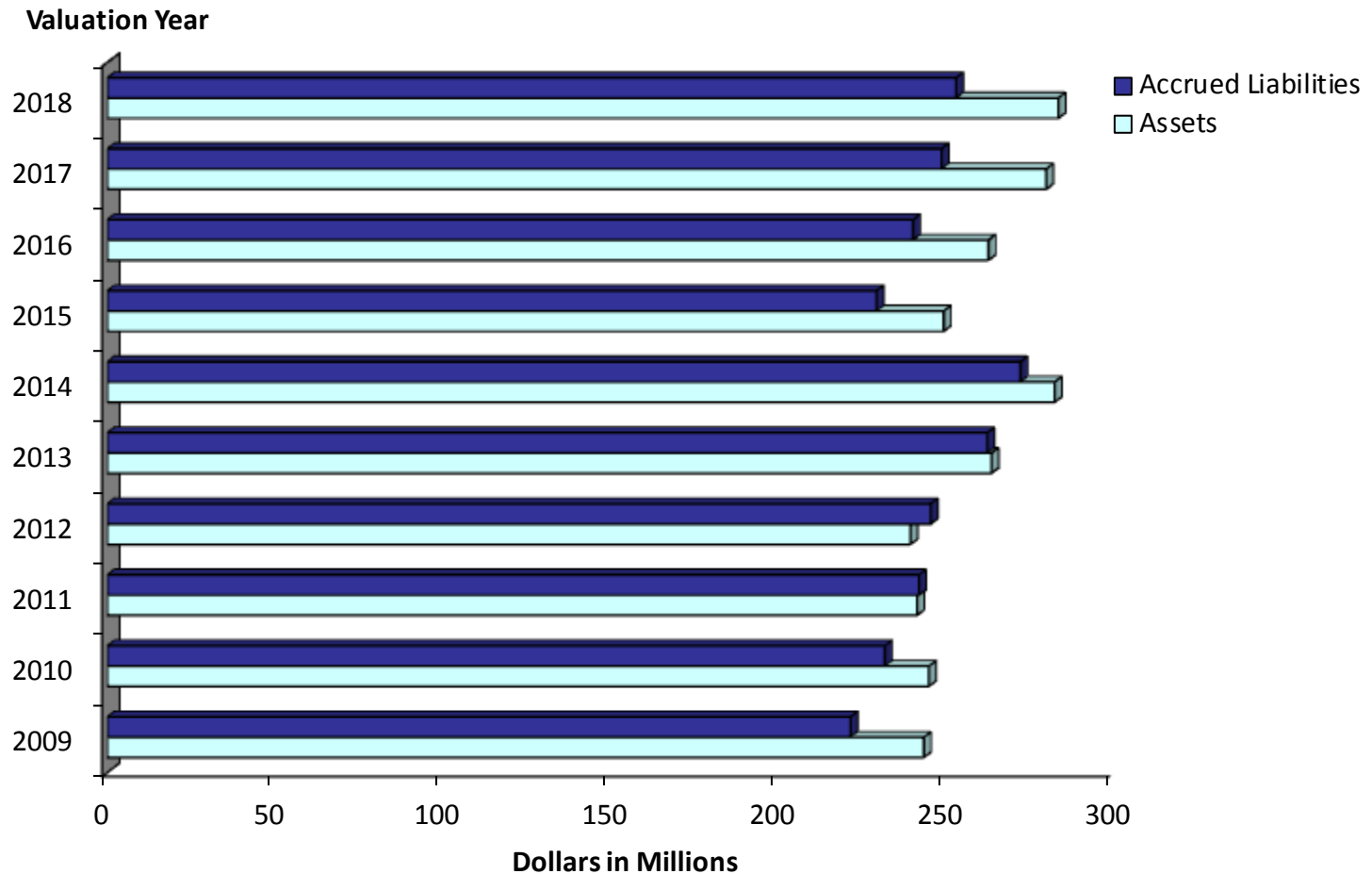
We anticipate an average return on valuation assets of 7.25% for future years. The chart below details the development of the investment gain/(loss) for the entire Bay County Employees' Retirement System, including BABH.

| | |
|--|---------------|
| (1) Total 2018 valuation investment income: | \$ 19,144,197 |
| (2) Average valuation assets: | 326,757,066 |
| (3) Expected investment income: $(.0725) \times (2)$ | 23,689,887 |
| (4) Gain/(Loss)*: $(1) - (3)$ | (4,545,690) |
| (5) Valuation rate of return for 2018: $(1) / (2)$ | 5.86 % |

** Approximate share of the investment gain/(loss) is (\$3,800,000) excluding BABH.*

Please note that this analysis uses asset values and investment income as defined for the actuarial valuation. It is not, therefore, appropriate as a measure of manager performance.

Assets and Accrued Liabilities



For Valuation Years prior to 2015, the results displayed are for the entire Retirement System (including BABH). Beginning with the Valuation Year 2015, the results displayed are for the Retirement System (excluding BABH).

2009 assets equaled 109.9% of accrued liabilities.

2018 assets equaled 112.1% of accrued liabilities.

Computed Contributions - Comparative Statement

| Valuation Date | Valuation Payroll | | | Annual Dollar Requirement | Employer Requirements as Percents of Valuation Payroll@ | | | | | | | |
|----------------|-------------------|----------|---------|---------------------------|---|--------|-----------|--------|-----------------------|----------------------|-----------------|--------|
| | Total | Average | % Incr. | | General County | DWS+ | Library+ | BABH+ | Medical Care Facility | Sheriff's Department | Road Commission | |
| 12/31/1999 # | \$35,763,978 | \$31,072 | 4.0 % | \$ 0 | 0.00 % | | | | | 0.00 % | 0.00 % | 0.00 % |
| 12/31/2000 # | 38,314,967 | 32,090 | 3.3 | 0 | 0.00 | | | | | 0.00 | 0.00 | 0.00 |
| 12/31/2001 #* | 39,761,644 | 33,218 | 3.5 | 0 | 0.00 | 0.00 % | 0.00 % | 0.00 % | | 0.00 | 0.00 | 0.00 |
| 12/31/2002 | 41,331,916 | 33,658 | 1.3 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.00 |
| 12/31/2003 * | 43,053,950 | 35,175 | 4.5 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 | 0.00 |
| 12/31/2004 # | 43,550,999 | 36,202 | 2.9 | 405,110 | 0.00 | 0.00 | 0.68 | 1.11 | | 0.00 | 0.00 | 8.19 |
| 12/31/2005 | 43,104,046 | 36,010 | (0.5) | 588,948 | 0.00 | 0.00 | 1.60 | 2.53 | | 0.00 | 0.00 | 9.34 |
| 12/31/2006 # | 42,024,045 | 37,455 | 4.0 | 644,945 | 0.00 | 0.00 | 0.00 | 3.24 | | 0.00 | 0.00 | 10.82 |
| 12/31/2007 # | 44,687,752 | 39,269 | 4.8 | 688,871 | 0.00 | 0.00 | 0.00 | 3.70 | | 0.00 | 0.00 | 9.17 |
| 12/31/2008 | 46,482,897 | 39,695 | 1.1 | 1,578,548 | 0.00 | 4.44 | 0.00 | 6.95 | | 2.32 | 0.00 | 14.13 |
| 12/31/2009 ^ | 47,244,573 | 40,208 | 1.3 | 2,443,118 | 0.00 | 7.40 | 2.74 | 8.83 | | 5.05 | 0.00 | 17.64 |
| 12/31/2010 | 47,090,560 | 40,771 | 1.4 | 3,074,891 | 1.19 | 11.71 | 6.91 | 9.08 | | 7.36 | 0.00 | 18.05 |
| 12/31/2011 # | 48,583,176 | 41,702 | 2.3 | 4,289,438 | 4.08 | 13.77 | 9.89 | 10.17 | | 9.57 | 0.00 | 20.78 |
| 12/31/2012 * | 48,571,798 | 41,444 | (0.6) | 4,038,100 | 3.87 | 15.75 | 9.26 | 10.01 | | 7.22 | 0.55 | 21.32 |
| 12/31/2013 # | 44,535,708 | 39,447 | (4.8) | 4,477,504 | 0.03 | 15.72 | \$ 89,491 | 27.04 | | 4.20 | 0.00 | 19.14 |
| 12/31/2014 | 46,494,417 | 40,081 | 1.6 | 2,535,295 | 0.00 | 14.16 | 34,265 | 11.36 | | 2.87 | 0.00 | 18.09 |
| 12/31/2015 | 36,658,462 | 39,760 | N/A | 1,088,320 | 0.00 | 12.83 | 57,008 | | | 0.27 | 0.00 | 19.19 |
| 12/31/2016 #* | 36,761,949 | 41,075 | 3.3 | 1,546,699 | 0.00 | 14.91 | 74,780 | | | 2.76 | 0.00 | 21.28 |
| 12/31/2017 | 38,491,118 | 41,929 | 2.1 | 1,152,393 | 0.00 | 14.22 | 10,430 | | | 0.57 | 0.00 | 18.66 |
| 12/31/2018 | 39,208,285 | 42,664 | 1.8 | 1,278,469 | 0.00 | 14.42 | 7,906 | | | 1.37 | 0.00 | 18.29 |

For Valuation Dates prior to 2015, the results displayed are for the entire Retirement System (including BABH). Beginning with the 2015 Valuation Date, the results displayed are for the Retirement System (excluding BABH).

+ Prior to 12/31/2001 included with General County.

Retirement System amended.

* Revised actuarial assumptions or methods.

^ Implementation of a one-year lag between valuation date and first day of the fiscal year to which the contributions apply.

@ Beginning with the 2013 valuation, the Library contribution is calculated as a level dollar amount, since the Library is closed to future hires.

\$ Contribution reflects an advanced payment of the BABH unfunded ERIP liability.

SECTION C

SUMMARY OF BENEFIT PROVISIONS AND VALUATION DATA

Brief Summary of Plan Provisions as of December 31, 2018

| No. | Division Name | Retirement Eligibility | | |
|-----|--|---|--|------------------------------|
| | | Normal | Early | Deferred |
| 1 | Elected Officials and Department Heads | Age 55 with 30 [#] yrs of svc or age 60 with 8/60 with 10 [#] /62 with 10 [#] yrs of svc | Age 55 with 8/55 with 10* yrs of svc | 8/10* yrs of svc |
| 2 | Judges | | | |
| 3 | General County | | | |
| 4 | General Circuit Court | | | |
| 5 | General District Court | | | |
| 6 | General Probate Court | | | |
| 7 | BCAMPS | | | |
| 8 | USWA General | | | |
| 9 | USWA Part-Time Employees | | | |
| 15 | District Court AFSCME | | | |
| 33 | Elected Officials and Department Heads: Elected Sheriff and Appointed Undersheriff | 25 [%] yrs of svc regardless of age, age 55 with 30 [%] yrs of svc, or or age 60 with 8/60 with 10 [#] /62 with 10 [#] yrs of svc | Age 55 with 8/55 with 10* yrs of svc | 8/10* yrs of svc |
| 10 | Nurses | Age 55 with 30 yrs of svc or age 60 with 8/62 with 10 [#] yrs of svc | Age 55 with 8/55 with 10 [#] yrs of svc | 8/10 [#] yrs of svc |
| 16 | Probate Court USWA | Age 55 with 30 yrs of svc or age 60 with 8/62 with 8 [#] yrs of svc | Age 55 with 8 yrs of svc | 8 yrs of svc |
| 18 | Library - Employee Members of UWUA Local 542 | Age 55 with 30 yrs of svc or age 60 with 8/60 with 10! yrs of svc | Age 55 with 8/55 with 10! yrs of svc | 8/10! yrs of svc |
| 19 | General Library | | | |
| 30 | ICEA/PERA 1203 | | | |
| 31 | ICEA/PERA 612 | | | |
| 14 | Circuit Court Govt. Employees Labor Council (GELC) | Age 55 with 30 [@] yrs of svc or age 60 with 8/60 with 10 [@] /62 with 10 [#] yrs of svc | Age 55 with 8/55 with 10 [@] yrs of svc | 8/10 [@] yrs of svc |
| 32 | Road Patrol Supervisory Unit | 25 yrs of svc regardless of age or age 60 with 8/60 with 10 [@] yrs of svc | Age 55 with 8/55 with 10 [@] yrs of svc | 8/10 [@] yrs of svc |
| 11 | Sheriff - Road Patrol | 25 yrs of svc regardless of age or age 60 with 8/60 with 10* yrs of svc | Age 55 with 8/55 with 10* yrs of svc | 8/10* yrs of svc |
| 12 | Sheriff Correctional Facility Officers | Age 55 with 25 yrs of svc or age 60 with 8/60 with 10* yrs of svc | 25 yrs of svc regardless of age or age 55 with 8/55 with 10* yrs of svc | 8/10* yrs of svc |
| 13 | Dispatchers | 30 yrs of svc regardless of age, age 55 with 25 yrs of svc, or age 60 with 8/60 with 10* yrs of svc | 25 yrs of svc regardless of age or age 55 with 8/55 with 10* yrs of svc | 8/10* yrs of svc |
| 20 | Medical Care Facility United Steel Workers Local 15301 | 30 yrs of svc regardless of age, age 55 with 25 ⁺ yrs of svc, or age 60 with 8/60 with 10 [§] /62 with 10 [?] yrs. of svc | Age 55 with 8/55 with 10 [§] yrs of svc | 8/10 [§] yrs of svc |
| 21 | Medical Care Facility RN & LPN Nursing Council - USW 15301-01 | | | |
| 22 | General Medical Care Facility | | | |
| 25 | Road Commission AFSCME Local 1096 | 30 yrs of svc regardless of age | Age 55 with 8/55 with 10* yrs of svc | 8 yrs of svc |
| 26 | Road Commission Class I Supervisory and Admin. Employees | or age 60 with 8/60 with 10* yrs of svc | | |
| 28 | Water and Sewer UWUA Local 546 | 30 yrs of svc regardless of age | Age 55 with 8/55 with 10^ yrs of svc | 8/10^ yrs of svc |
| 29 | Water and Sewer General | or age 60 with 8/60 with 10^ yrs of svc | | |

@ Members hired after 1/1/2006.

* Members hired after 1/1/2007.

^ Members hired after 7/1/2008.

! Members hired after 3/1/2008.

% Members hired on or before 1/1/2012 only.

Members hired after 1/1/2012.

+ Members hired before 7/30/2015 only.

\$ Members hired on or after 7/30/2015.

- Members hired before 2/26/2018 only.

? Members hired on or after 2/26/2018.



Brief Summary of Plan Provisions as of December 31, 2018 (Continued)

| Eligibility | Amount |
|---|--|
| | Normal Retirement |
| See prior page. | <p>Total service times FAC times:</p> <ul style="list-style-type: none"> 2.25% for divisions 1-10, 14, 16, 33 hired before 1/1/2012 2.25% for divisions 18, 19, and 28-31 2.25% for divisions 20-22 hired before 7/30/2015 2.50% for divisions 12, 13, and 15 hired before 1/1/2012 2.50% for division 25 hired before 1/1/2011 2.50% for division 26 hired before 1/1/1996 2.80% for divisions 11 and 32 hired before 1/1/2012 2.25% for division 25 hired on or after 1/1/2011 and before 1/1/2016 2.50% for division 26 hired on or after 1/1/1996 and before 1/1/2016 for service through 3/31/2011 and 2.25% for service after 3/31/2011 1.60% for divisions 1-16, 32, and 33 hired on or after 1/1/2012* 1.75% for divisions 20-22 hired on or after 7/30/2015 and before 2/26/2018 1.50% for divisions 20-22 hired on or after 2/26/2018 1.50% for divisions 25 and 26 hired on or after 1/1/2016 <p>Maximum County-financed is 75% of FAC (70% of FAC for divisions 20-22 hired on or after 2/26/2018)</p> <p>Type of FAC - Highest 5 years. Some lump sums included.</p> |
| See prior page. | <p style="text-align: center;">Early Retirement</p> <p>Normal retirement reduced to the actuarial equivalent of a pension at normal retirement age.</p> |
| Service condition as indicated on page C-1. Benefit begins at age 60 or reduced at age 55. | <p style="text-align: center;">Deferred Retirement</p> <p>Computed as a normal retirement but based on service and final average compensation at time of termination.</p> |
| 10 or more years of credited service at any age. | <p style="text-align: center;">Non-Duty Death-In-Service</p> <p>Computed as a normal retirement but actuarially reduced in accordance with a 100% joint and survivor election.</p> |
| No age or service requirements. Benefits begin upon termination of Worker's Compensation. | <p style="text-align: center;">Duty Death-In-Service</p> <p>To the spouse, a refund of accumulated contributions plus a benefit equal to the Worker's Compensation amount. Unmarried children under 18 and parents receive a benefit equal to the Worker's Compensation amount.</p> |
| <p>* Two members hired after 1/1/2012 continue to be eligible for the multiplier and member contribution rate in effect prior to the implementation of the 1.60% multiplier and 4% member contribution rate for members hired after 1/1/2012.</p> | |

Brief Summary of Plan Provisions as of December 31, 2018 (Concluded)

| Eligibility | Amount |
|--|---|
| Non-Duty Disability | |
| 10 or more years of credited service. | Computed as a normal retirement. Worker's Compensation payments may be offset. |
| Duty Disability | |
| No age or service requirements. | Computed as a normal retirement with additional service credit granted to age 55. Worker's Compensation payments may be offset. |
| Post-Retirement Cost-of-Living Adjustments | |
| One-time increases have been granted. | |
| Member Contributions | |
| For members hired before 1/1/2012, 6% of annual compensation for: | |
| Sheriff-Road Patrol (div. 11) | |
| Sheriff Correctional Facility Officers (div. 12) | |
| Road Patrol Supervisory Unit (div. 32) | |
| Dispatchers (div. 13) | |
| District Court AFSCME (div. 15) | |
| 4% of annual compensation for groups 11-13, 15, and 32 hired on or after 1/1/2012*. | |
| 5% of annual compensation for Road Commission Local 1096 (div. 25). | |
| 4% of annual compensation for remaining groups. | |
| For certain employee groups, the employer pays the member contribution either by directly contributing to the Retirement System or by transferring funds from the employer to the employee reserves. | |
| Employer Contributions | |
| Actuarially determined amounts which, together with member contributions, are sufficient to cover both: i) normal costs of the plan, and ii) financing of unfunded accrued liabilities over a selected period of future years. | |
| Retirement System Eligibility | |
| Library members hired on or after January 1, 2012 are no longer eligible to participate in the Bay County Employees' Retirement System - excluding BABH. | |

* Two members hired after 1/1/2012 continue to be eligible for the multiplier and member contribution rate in effect prior to the implementation of the 1.60% multiplier and 4% member contribution rate for members hired after 1/1/2012.

Reported Financial Information
Year Ended December 31, 2018
Bay County Employees' Retirement System (in Total)
(Market Value)

Revenues and Disbursements during 2018

Revenues:

| | | |
|---------------------------|--------------|----------------|
| a. Employee contributions | \$ 2,093,766 | |
| b. Employer contributions | 2,574,557 | |
| c. Investment income | (18,966,712) | |
| d. Miscellaneous income | <u>0</u> | |
| e. Total | | (\$14,298,389) |

Disbursements:

| | | |
|------------------------------------|------------------|---------------------|
| a. Benefits paid | \$ 18,319,256 | |
| b. Refunds of member contributions | 164,262 | |
| c. Administrative expenses | 193,917 | |
| d. Investment expenses | <u>2,322,875</u> | |
| e. Total | | <u>\$21,000,310</u> |

Reserve Increase:

| | |
|--|------------------------|
| Total revenues minus total disbursements | <u>\$ (35,298,699)</u> |
|--|------------------------|

Assets and Reserves as of December 31, 2018

Assets:

| | |
|------------------------------------|----------------------|
| a. Cash & equivalents [#] | \$ (203,924) |
| b. Short term investments | 6,332,954 |
| c. Stocks | 227,748,834 |
| d. Bonds | 76,982,210 |
| e. Real Estate | 8,521,630 |
| f. Other [^] | <u>1,814,930</u> |
| Total | <u>\$321,196,634</u> |

Reserve Accounts:

| | |
|---|----------------------|
| a. Employee contributions | \$ 30,668,292 |
| b. Reserve for benefits now being paid | 167,667,550 |
| c. Reserve for future benefits | 122,860,792 |
| Total | <u>\$321,196,634</u> |

[#] Adjusted for accruals net of payables and deferred inflows of resources.

[^] Adjusted for deferred outflow of resources.

Development of Valuation Assets Bay County Employees' Retirement System (in Total) December 31, 2018

| | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|--|---------------|---------------|----------------|----------------|----------------|----------------|
| 1. Beginning of Year Assets | | | | | | |
| a) Market Value | \$311,500,974 | \$356,495,333 | | | | |
| b) Valuation Assets | 312,690,822 | 333,761,622 | | | | |
| 2. End of Year Market Value Assets | 356,495,333 | 321,196,634 | | | | |
| 3. Net Additions to Market Value | | | | | | |
| a) Net Contributions | 4,874,027 | 4,668,323 | | | | |
| b) Net Investment Income = (3d) - (3a) - (3c) | 58,230,513 | (21,289,587) | | | | |
| c) Benefit Payments, Refunds, and Admin. Expenses | (18,110,181) | (18,677,435) | | | | |
| d) Total Additions to Market Value = (2) - (1a) | 44,994,359 | (35,298,699) | | | | |
| 4. Average Valuation Assets = (1b) + .5 x [(3a) + (3c)] | 306,072,745 | 326,757,066 | | | | |
| 5. Expected Income at Valuation Rate = 7.25% x (4) | 22,190,274 | 23,689,887 | | | | |
| 6. Gain/(Loss) = (3b) - (5) | 36,040,239 | (44,979,474) | | | | |
| 7. Phased-In Recognition of Investment Return | | | | | | |
| a) Current Year: 0.2 x (6) | 7,208,048 | (8,995,895) | | | | |
| b) First Prior Year | 177,592 | 7,208,048 | \$ (8,995,895) | | | |
| c) Second Prior Year | (3,695,821) | 177,592 | 7,208,048 | \$ (8,995,895) | | |
| d) Third Prior Year | 760,386 | (3,695,821) | 177,592 | 7,208,048 | \$ (8,995,895) | |
| e) Fourth Prior Year | 7,666,475 | 760,386 | (3,695,819) | 177,590 | 7,208,047 | \$ (8,995,894) |
| f) Total Recognized Investment Gain | 12,116,680 | (4,545,690) | (5,306,074) | (1,610,257) | (1,787,848) | (8,995,894) |
| 8. Change in Valuation Assets (3a) + (3c) + (5) + (7f) | 21,070,800 | 5,135,085 | | | | |
| 9. End of Year Assets | | | | | | |
| a) Market Value = (2) | 356,495,333 | 321,196,634 | | | | |
| b) Valuation Assets = (1b) + (8) | 333,761,622 | 338,896,707 | | | | |
| c) Difference Between Market & Valuation Assets | 22,733,711 | (17,700,073) | (12,393,999) | (10,783,742) | (8,995,894) | 0 |
| 10. Recognized Rate of Return = [(5) + (7f)] / (4) | 11.21 % | 5.86 % | | | | |
| 11. Market Rate of Return = 2 x (3b) / [(1a) + (2) - (3b)] | 19.10 % | (6.09)% | | | | |
| 12. Market Value of Assets for County Employers Other Than BABH | 298,715,374 | 268,529,271 | | | | |
| 13. Funding Value of Assets for County Employers Other Than BABH | 279,666,292 | 283,327,021 | | | | |

Retirees and Beneficiaries Comparative Schedule

| Year Ended | Added to Rolls* | | Removed from Rolls | | Rolls End of Year | | % Incr. in | Average | Discounted | |
|------------|-----------------|-------------------|--------------------|-------------------|-------------------|--------------------------------|-------------------|-----------|---------------|-----------|
| | No. | Annual Allowances | No. | Annual Allowances | No. | Annual Allowances [#] | Annual Allowances | Allowance | Total | Average |
| 12/31/1994 | 18 | \$ 131,596 | 14 | \$ 50,875 | 373 | \$ 2,260,128 | 3.7 % | \$ 6,059 | \$ 22,112,422 | \$ 59,283 |
| 12/31/1995 | 24 | 261,820 | 12 | 31,551 | 386 | 2,490,397 | 10.2 | 6,452 | 24,080,999 | 62,386 |
| 12/31/1996 | 29 | 404,810 | 7 | 55,615 | 408 | 2,839,592 | 14.0 | 6,960 | 27,838,060 | 68,231 |
| 12/31/1997 | 28 | 392,818 | 8 | 44,327 | 428 | 3,188,083 | 12.3 | 7,449 | 31,558,085 | 73,734 |
| 12/31/1998 | 24 | 393,550 | 7 | 46,973 | 445 | 3,534,660 | 10.9 | 7,943 | 34,794,848 | 78,191 |
| 12/31/1999 | 23 | 295,915 @ | 29 | 83,717 | 439 | 3,746,858 | 6.0 | 8,535 | 36,670,326 | 83,531 |
| 12/31/2000 | 46 | 645,474 | 27 | 201,656 | 458 | 4,190,676 | 11.8 | 9,150 | 40,970,172 | 89,455 |
| 12/31/2001 | 31 | 732,306 @ | 13 | 45,724 | 476 | 4,877,258 | 16.4 | 10,246 | 46,616,261 | 97,933 |
| 12/31/2002 | 34 | 464,636 | 18 | 126,234 | 492 | 5,215,660 | 6.9 | 10,601 | 49,634,941 | 100,884 |
| 12/31/2003 | 37 | 514,935 | 17 | 72,960 | 512 | 5,657,635 | 8.5 | 11,050 | 53,369,747 | 104,238 |
| 12/31/2004 | 95 | 2,073,773 | 16 | 133,099 | 591 | 7,598,309 | 34.3 | 12,857 | 74,362,328 | 125,825 |
| 12/31/2005 | 43 | 786,641 | 26 | 170,645 | 608 | 8,214,306 | 8.1 | 13,510 | 80,594,476 | 132,557 |
| 12/31/2006 | 39 | 844,464 | 24 | 579,276 | 623 | 8,479,494 | 3.2 | 13,611 | 85,797,333 | 137,716 |
| 12/31/2007 | 29 | 423,246 | 14 | 93,660 | 638 | 8,809,080 | 3.9 | 13,807 | 88,063,580 | 138,031 |
| 12/31/2008 | 47 | 725,060 | 26 | 204,104 | 659 | 9,330,036 | 5.9 | 14,158 | 92,573,860 | 140,476 |
| 12/31/2009 | 58 | 1,303,182 | 34 | 338,544 | 683 | 10,294,674 | 10.3 | 15,073 | 102,921,818 | 150,691 |
| 12/31/2010 | 46 | 1,166,301 | 24 | 210,133 | 705 | 11,250,842 | 9.3 | 15,959 | 112,893,161 | 160,132 |
| 12/31/2011 | 51 | 953,802 | 16 | 199,264 | 740 | 12,005,380 | 6.7 | 16,223 | 119,532,453 | 161,530 |
| 12/31/2012 | 58 | 1,114,368 | 12 | 127,382 | 786 | 12,992,366 | 8.2 | 16,530 | 126,736,278 | 161,242 |
| 12/31/2013 | 98 | 2,545,500 | 1 | 20,928 | 883 | 15,516,938 | 19.4 | 17,573 | 153,936,777 | 174,334 |
| 12/31/2014 | 35 | 826,083 | 2 | 10,254 | 916 | 16,332,767 | 5.3 | 17,831 | 159,912,340 | 174,577 |
| 12/31/2015 | 59 | 1,175,838 | 48 | 599,270 | 808 | 14,182,023 | N/A | 17,552 | 136,341,590 | 168,740 |
| 12/31/2016 | 47 | 880,677 | 41 | 351,083 | 814 | 14,711,617 | 3.7 | 18,073 | 146,461,527 | 179,928 |
| 12/31/2017 | 47 | 1,011,470 | 28 | 376,492 | 833 | 15,346,595 | 4.3 | 18,423 | 152,492,699 | 183,064 |
| 12/31/2018 | 47 | 995,556 | 30 | 864,830 | 850 | 15,477,321 | 0.9 | 18,209 | 156,284,407 | 183,864 |

For Years Ended prior to 2015, the results displayed are for the entire Retirement System (including BABH). Beginning with the Year Ended 2015, the results displayed are for the Retirement System (excluding BABH).

* Includes survivors of deceased retirees and annual allowance adjustments.

@ Includes one-time benefit increases.

Annual Allowances based on pre-change age amount for members with applicable pension benefit types.

Retirees and Beneficiaries December 31, 2018 Tabulated by Type of Pension Paid

| Type of Pensions Being Paid | Group | | | | | | Total |
|----------------------------------|------------|-----------|-----------|------------|-----------|-----------|------------|
| | General | DWS | Library | MCF | Sheriff | Road | |
| Regular | 153 | 9 | 25 | 115 | 21 | 18 | 341 |
| A - 10-Year Certain | 14 | 2 | 4 | 5 | 5 | 2 | 32 |
| B - 100% J & S | 106 | 22 | 11 | 61 | 23 | 41 | 264 |
| C - 50% J & S | 41 | 4 | 3 | 36 | 6 | 4 | 94 |
| Social Security Equated | | | | | | | |
| - Regular | 2 | | | 2 | 3 | | 7 |
| - 10-Year Certain | | | | | | | |
| - 100% J & S | 2 | | | 2 | 3 | 2 | 9 |
| - 50% J & S | | | | 2 | | | 2 |
| Survivor | 38 | 2 | 2 | 13 | 17 | 29 | 101 |
| Total Pensions Being Paid | 356 | 39 | 45 | 236 | 78 | 96 | 850 |

Retirees and Beneficiaries December 31, 2018 Tabulated by Attained Age*

| Attained Age | General | | DWS | | Library | | MCF | | Sheriff | | Road | | Total | |
|---------------|------------|--------------------|-----------|--------------------|-----------|-------------------|------------|--------------------|-----------|--------------------|-----------|--------------------|------------|---------------------|
| | No. | Annual Allowances | No. | Annual Allowances | No. | Annual Allowances | No. | Annual Allowances | No. | Annual Allowances | No. | Annual Allowances | No. | Annual Allowances |
| 40 - 44 | | | 1 | \$ 20,478 | | | 1 | \$ 13,111 | | | 1 | \$ 3,960 | 3 | \$ 37,549 |
| 45 - 49 | 1 | \$ 13,645 | | | | | | | 4 | \$ 78,968 | | | 5 | \$ 92,613 |
| 50 - 54 | 1 | 15,787 | 1 | 38,869 | | | 8 | 153,988 | 6 | 220,297 | 3 | 107,359 | 19 | 536,300 |
| 55 - 59 | 16 | 373,478 | 1 | 18,429 | 1 | \$ 22,990 | 26 | 502,248 | 7 | 219,481 | 13 | 408,146 | 64 | 1,544,772 |
| 60 - 64 | 76 | 1,685,818 | 10 | 350,514 | 6 | 117,352 | 40 | 730,619 | 12 | 366,593 | 10 | 355,601 | 154 | 3,606,497 |
| 65 - 69 | 79 | 1,562,629 | 12 | 402,824 | 12 | 287,586 | 68 | 937,884 | 17 | 375,733 | 18 | 582,632 | 206 | 4,149,288 |
| 70 - 74 | 79 | 1,456,588 | 7 | 147,252 | 11 | 130,022 | 40 | 410,207 | 9 | 205,352 | 15 | 301,167 | 161 | 2,650,588 |
| 75 - 79 | 46 | 538,825 | 4 | 62,457 | 5 | 152,712 | 21 | 247,535 | 12 | 187,292 | 12 | 255,265 | 100 | 1,444,086 |
| 80 - 84 | 27 | 253,555 | 1 | 16,812 | 6 | 85,009 | 18 | 178,508 | 5 | 80,250 | 9 | 143,961 | 66 | 758,095 |
| 85 - 89 | 15 | 155,349 | 1 | 8,314 | 2 | 9,760 | 10 | 61,682 | 5 | 57,708 | 10 | 143,167 | 43 | 435,980 |
| 90 - 94 | 15 | 118,544 | 1 | 16,256 | 1 | 11,119 | 4 | 30,852 | 1 | 9,887 | 2 | 8,680 | 24 | 195,338 |
| 95 - 99 | 1 | 1,987 | | | 1 | 3,694 | | | | | 3 | 20,534 | 5 | 26,215 |
| Totals | 356 | \$6,176,205 | 39 | \$1,082,205 | 45 | \$820,244 | 236 | \$3,266,634 | 78 | \$1,801,561 | 96 | \$2,330,472 | 850 | \$15,477,321 |

* Annual Allowances based on pre-change age amount for members with applicable pension benefit types.

Average Age at Retirement: 58.4 years

Average Age Now: 70.4 years

Inactive Members December 31, 2018

An inactive member is a person who has left County employment with entitlement to a retirement allowance after attaining voluntary retirement age. There were 58 inactive members as of December 31, 2018:

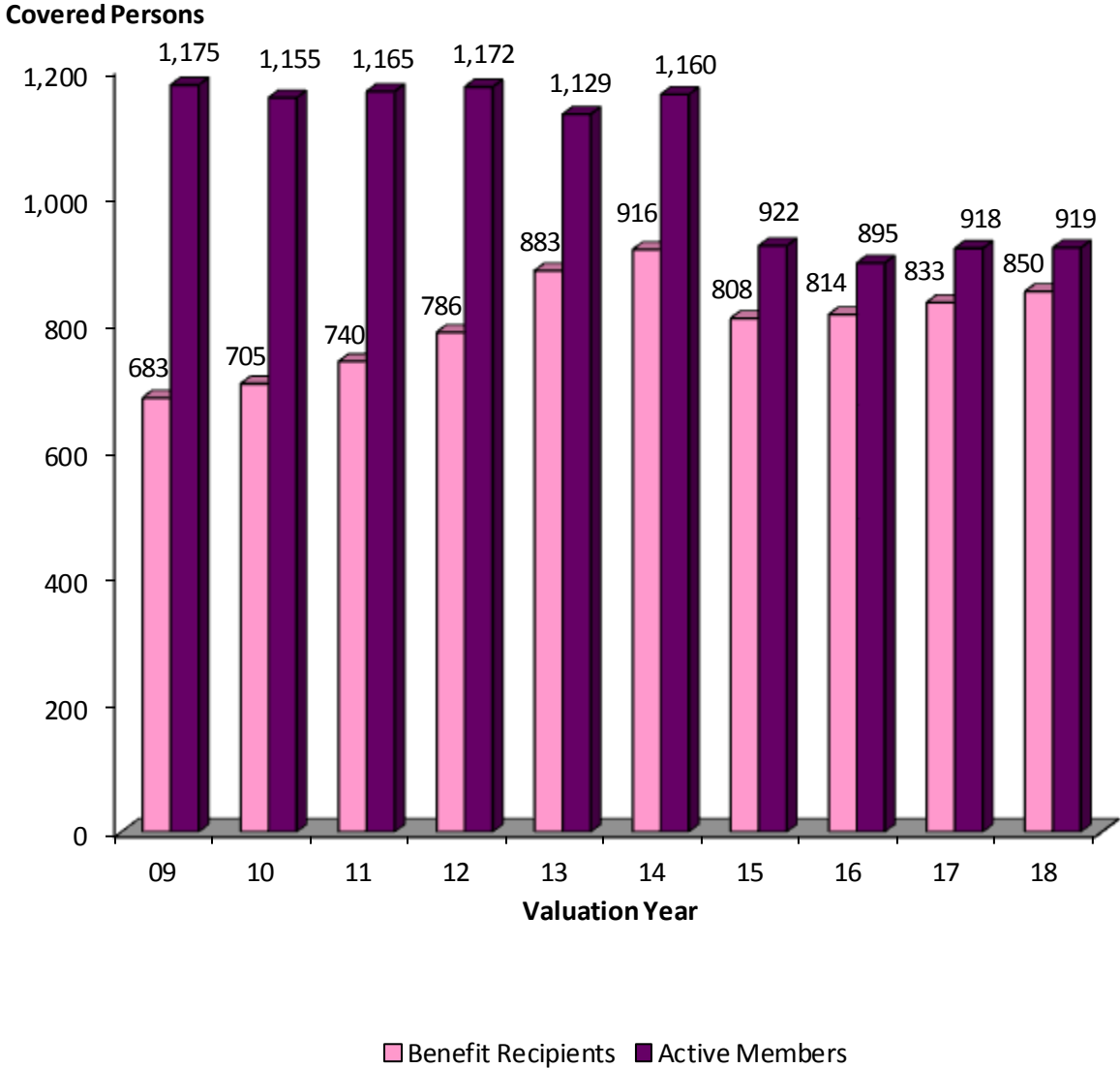
| <u>Valuation Division</u> | <u>Number</u> | <u>Estimated Annual Deferred Pensions</u> |
|---------------------------|---------------|---|
| General County | 31 | \$326,557 |
| DWS | 2 | 14,630 |
| Library | 6 | 33,214 |
| Medical Care Facility | 12 | 114,725 |
| Sheriff's Department | 6 | 100,949 |
| Road Commission | <u>1</u> | <u>13,999</u> |
| Total | 58 | \$604,074 |

The schedule on the next page is an age distribution of the inactive members.

Inactive Members December 31, 2018 Tabulated by Attained Age

| Attained Age | No. | Estimated Deferred Allowances |
|---------------------|------------|--------------------------------------|
| 35 - 39 | 2 | \$ 33,467 |
| 40 - 44 | 4 | 41,004 |
| 45 - 49 | 9 | 114,048 |
| 50 - 54 | 21 | 262,008 |
| 55 - 59 | 18 | 136,888 |
| 60 - 64 | 4 | 16,659 |
| Total | 58 | \$604,074 |

Active Members & Benefit Recipients



For Valuation Years prior to 2015, the results displayed are for the entire Retirement System (including BABH). Beginning with the 2015 Valuation Year, the results displayed are for the Retirement System (excluding BABH).

Active Members December 31, 2018 Tabulated by Valuation Division

| Valuation Division | Number | Annual Payroll |
|-----------------------------|------------|---------------------|
| General County | 399 | \$16,654,373 |
| DWS | 58 | 3,314,132 |
| Library | 25 | 1,183,542 |
| Medical Care Facility | 302 | 10,467,024 |
| Sheriff's Department | 80 | 4,469,813 |
| Road Commission | 55 | 3,119,401 |
| Total Active Members | 919 | \$39,208,285 |

Comparative Schedule

| Valuation Date | Active Members | | | | | | | | Valuation Payroll | Average Age | Average | |
|----------------|----------------|-----|---------|------|-----|-----------|------|-------|-------------------|-------------|-----------|----------|
| | Gen. | DWS | Library | BABH | MCF | Sheriff's | Road | Total | | | Service | Pay |
| 12/31/1999 | 718 | | | | 284 | 76 | 73 | 1,151 | \$35,763,978 | 43.7 | 10.4 yrs. | \$31,072 |
| 12/31/2000 | 742 | | | | 300 | 77 | 75 | 1,194 | 38,314,967 | 43.4 | 10.0 | 32,090 |
| 12/31/2001 | 465 | 40 | 63 | 180 | 296 | 78 | 75 | 1,197 | 39,761,644 | 43.8 | 10.3 | 33,218 |
| 12/31/2002 | 465 | 42 | 64 | 195 | 308 | 80 | 74 | 1,228 | 41,331,916 | 44.0 | 10.5 | 33,658 |
| 12/31/2003 | 456 | 41 | 67 | 206 | 302 | 76 | 76 | 1,224 | 43,053,950 | 44.7 | 10.7 | 35,175 |
| 12/31/2004 | 427 | 41 | 72 | 208 | 303 | 76 | 76 | 1,203 | 43,550,999 | 44.3 | 10.3 | 36,202 |
| 12/31/2005 | 429 | 41 | 74 | 211 | 293 | 75 | 74 | 1,197 | 43,104,046 | 44.7 | 10.5 | 36,010 |
| 12/31/2006 | 412 | 41 | 30 | 205 | 292 | 75 | 67 | 1,122 | 42,024,045 | 45.0 | 11.1 | 37,455 |
| 12/31/2007 | 415 | 39 | 39 | 216 | 288 | 74 | 67 | 1,138 | 44,687,752 | 45.3 | 11.3 | 39,269 |
| 12/31/2008 | 410 | 38 | 42 | 235 | 305 | 75 | 66 | 1,171 | 46,482,897 | 45.3 | 11.4 | 39,695 |
| 12/31/2009 | 407 | 39 | 45 | 253 | 297 | 76 | 58 | 1,175 | 47,244,573 | 45.1 | 11.3 | 40,208 |
| 12/31/2010 | 389 | 37 | 45 | 261 | 295 | 74 | 54 | 1,155 | 47,090,560 | 45.4 | 11.4 | 40,771 |
| 12/31/2011 | 378 | 38 | 44 | 274 | 298 | 77 | 56 | 1,165 | 48,583,176 | 45.3 | 11.2 | 41,702 |
| 12/31/2012 | 365 | 39 | 42 | 276 | 319 | 75 | 56 | 1,172 | 48,571,798 | 45.0 | 11.1 | 41,444 |
| 12/31/2013 | 351 | 36 | 41 | 219 | 350 | 76 | 56 | 1,129 | 44,535,708 | 44.1 | 10.6 | 39,447 |
| 12/31/2014 | 365 | 40 | 36 | 220 | 361 | 79 | 59 | 1,160 | 46,494,417 | 43.8 | 10.4 | 40,081 |
| 12/31/2015 | 359 | 51 | 34 | | 345 | 77 | 56 | 922 | 36,658,462 | 44.2 | 10.9 | 39,760 |
| 12/31/2016 | 372 | 55 | 32 | | 308 | 72 | 56 | 895 | 36,761,949 | 44.8 | 11.1 | 41,075 |
| 12/31/2017 | 397 | 53 | 27 | | 308 | 77 | 56 | 918 | 38,491,118 | 44.7 | 10.6 | 41,929 |
| 12/31/2018 | 399 | 58 | 25 | | 302 | 80 | 55 | 919 | 39,208,285 | 45.1 | 10.5 | 42,664 |

For Valuation Dates prior to 2015, the results displayed are for the entire Retirement System (including BABH). Beginning with the 2015 Valuation Date, the results displayed are for the Retirement System (excluding BABH).

General County Active Members December 31, 2018 by Age and Years of Service

| Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---------------|------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|---------------------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation |
| | | | | | | | | | Payroll |
| 20-24 | 7 | | | | | | | 7 | \$ 151,600 |
| 25-29 | 26 | 1 | | | | | | 27 | 895,962 |
| 30-34 | 21 | 5 | 2 | | | | | 28 | 1,196,517 |
| 35-39 | 23 | 10 | 7 | 5 | | | | 45 | 1,824,953 |
| 40-44 | 16 | 9 | 8 | 6 | 3 | | | 42 | 1,786,136 |
| 45-49 | 12 | 6 | 9 | 14 | 6 | 2 | | 49 | 2,411,998 |
| 50-54 | 13 | 5 | 9 | 11 | 15 | 5 | 5 | 63 | 2,915,429 |
| 55-59 | 10 | 10 | 8 | 16 | 12 | 5 | 7 | 68 | 2,951,078 |
| 60 | | 3 | 4 | | 1 | 2 | | 10 | 419,870 |
| 61 | 3 | 1 | 1 | 5 | 1 | 1 | 3 | 15 | 533,949 |
| 62 | 3 | 1 | 3 | 1 | 2 | | | 10 | 357,454 |
| 63 | 2 | | | | 1 | 1 | | 4 | 258,632 |
| 64 | 2 | 1 | | 1 | 3 | 1 | | 8 | 296,237 |
| 65 | | | 1 | 1 | | | | 2 | 68,817 |
| 66 | 2 | 1 | 2 | 1 | 1 | | | 7 | 158,814 |
| 67 | 1 | 1 | 1 | | 1 | | | 4 | 260,027 |
| 68 | 1 | | 2 | 1 | | | | 4 | 53,408 |
| 69 | 2 | 1 | | | | | | 3 | 40,933 |
| 70 | 1 | | | | | | | 1 | 13,518 |
| 72 | | | 1 | | | | | 1 | 14,363 |
| 73 | | | | | 1 | | | 1 | 44,678 |
| Totals | 145 | 55 | 58 | 62 | 47 | 17 | 15 | 399 | \$16,654,373 |

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 48.0 years

Service: 11.6 years

Annual Pay: \$41,740

DWS Active Members December 31, 2018 by Age and Years of Service

| Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---------------|------------------------------------|-----------|----------|----------|----------|----------|---------|-----------|--------------------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| 20-24 | 3 | | | | | | | 3 | \$ 127,435 |
| 25-29 | 3 | | | | | | | 3 | 128,845 |
| 30-34 | 4 | 2 | | | | | | 6 | 343,511 |
| 35-39 | 4 | 3 | | | | | | 7 | 416,379 |
| 40-44 | 5 | 2 | | | | | | 7 | 381,652 |
| 45-49 | 2 | 2 | 1 | 1 | | 1 | | 7 | 378,332 |
| 50-54 | 6 | | 2 | | 1 | 3 | | 12 | 740,933 |
| 55-59 | 4 | 1 | 1 | 1 | | 1 | | 8 | 430,766 |
| 60 | | | | 1 | | | | 1 | 65,809 |
| 61 | 1 | | | | | | | 1 | 48,251 |
| 62 | 2 | | | | | 1 | | 3 | 252,219 |
| Totals | 34 | 10 | 4 | 3 | 1 | 6 | | 58 | \$3,314,132 |

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 45.1 years

Service: 7.9 years

Annual Pay: \$57,140

Library Active Members December 31, 2018 by Age and Years of Service

| Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---------------|------------------------------------|----------|-----------|----------|----------|----------|----------|-----------|--------------------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| 35-39 | | 2 | | | | | | 2 | \$ 93,930 |
| 40-44 | | 1 | 1 | 1 | | | | 3 | 122,078 |
| 45-49 | | | 2 | | | | | 2 | 73,181 |
| 50-54 | | 1 | 1 | 3 | | | | 5 | 279,223 |
| 55-59 | | | 3 | | 1 | 1 | | 5 | 230,251 |
| 60 | | | | 1 | | | | 1 | 37,148 |
| 61 | | | 1 | 1 | | | | 2 | 101,619 |
| 63 | | | | | | | 1 | 1 | 40,469 |
| 64 | | | 1 | | 1 | | | 2 | 108,467 |
| 66 | | | | 1 | | | | 1 | 38,288 |
| 69 | | | 1 | | | | | 1 | 58,888 |
| Totals | | 4 | 10 | 7 | 2 | 1 | 1 | 25 | \$1,183,542 |

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 53.8 years

Service: 15.7 years

Annual Pay: \$47,342

Medical Care Facility Active Members December 31, 2018 by Age and Years of Service

| Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---------------|------------------------------------|-----------|-----------|-----------|-----------|-----------|----------|------------|---------------------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| 15-19 | 2 | | | | | | | 2 | \$ 65,182 |
| 20-24 | 28 | 4 | | | | | | 32 | 948,999 |
| 25-29 | 25 | 16 | | | | | | 41 | 1,134,693 |
| 30-34 | 13 | 17 | 8 | | | | | 38 | 1,204,042 |
| 35-39 | 9 | 11 | 6 | 4 | | | | 30 | 1,049,690 |
| 40-44 | 9 | 9 | 3 | 4 | 3 | 1 | | 29 | 1,106,004 |
| 45-49 | 16 | 8 | 2 | 2 | 2 | 4 | | 34 | 1,333,418 |
| 50-54 | 11 | 7 | 2 | 7 | 1 | 3 | 5 | 36 | 1,431,328 |
| 55-59 | 8 | 10 | 4 | 6 | 5 | 2 | 1 | 36 | 1,444,697 |
| 60 | | 1 | 2 | | 1 | | | 4 | 115,503 |
| 61 | 2 | | 2 | | 1 | | 1 | 6 | 212,162 |
| 62 | | 1 | | | | | | 1 | 38,707 |
| 63 | 1 | | | | | | | 1 | 53,946 |
| 64 | 1 | 2 | | | | | | 3 | 63,845 |
| 66 | | 3 | | | | | | 3 | 56,931 |
| 67 | | 1 | | | | | | 1 | 126,003 |
| 69 | 2 | | | 1 | | | | 3 | 47,706 |
| 70 | | 1 | | | | | | 1 | 17,100 |
| 76 | | 1 | | | | | | 1 | 17,068 |
| Totals | 127 | 92 | 29 | 24 | 13 | 10 | 7 | 302 | \$10,467,024 |

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 41.2 years

Service: 8.2 years

Annual Pay: \$34,659

Sheriff's Department Active Members December 31, 2018 by Age and Years of Service

| Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---------------|------------------------------------|-----------|-----------|----------|-----------|----------|----------|-----------|--------------------|
| | 0-4 | 5-9 | 10-15 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| 20-24 | 1 | | | | | | | 1 | \$ 51,006 |
| 25-29 | 9 | 2 | | | | | | 11 | 514,341 |
| 30-34 | 8 | 5 | 1 | | | | | 14 | 733,476 |
| 35-39 | 4 | 3 | 6 | | | | | 13 | 694,349 |
| 40-44 | 3 | 2 | 2 | 5 | 3 | | | 15 | 865,012 |
| 45-49 | 2 | 1 | | 1 | 6 | | | 10 | 614,468 |
| 50-54 | | 1 | | 3 | 3 | 2 | 1 | 10 | 608,523 |
| 55-59 | | | 1 | | | | | 1 | 56,436 |
| 63 | | | | | 1 | | | 1 | 57,539 |
| 64 | | | | | 1 | 1 | | 2 | 126,445 |
| 68 | | | | | | | 1 | 1 | 63,924 |
| 69 | | | | | | | 1 | 1 | 84,294 |
| Totals | 27 | 14 | 10 | 9 | 14 | 3 | 3 | 80 | \$4,469,813 |

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 40.7 years

Service: 11.9 years

Annual Pay: \$55,873

Road Commission Active Members December 31, 2018 by Age and Years of Service

| Age | Years of Service to Valuation Date | | | | | | | Totals | |
|---------------|------------------------------------|-----------|----------|----------|-----------|----------|---------|-----------|--------------------|
| | 0-4 | 5-9 | 10-15 | 15-19 | 20-24 | 25-29 | 30 Plus | No. | Valuation Payroll |
| 25-29 | 3 | | | | | | | 3 | \$ 131,152 |
| 30-34 | 1 | 4 | | | | | | 5 | 259,827 |
| 35-39 | 2 | 1 | | 1 | | | | 4 | 219,239 |
| 40-44 | 3 | 1 | | 1 | | | | 5 | 272,194 |
| 45-49 | 2 | 3 | 1 | | 2 | 1 | | 9 | 557,924 |
| 50-54 | 2 | 1 | 1 | 2 | 3 | 6 | | 15 | 948,507 |
| 55-59 | | | 4 | 1 | 3 | 2 | | 10 | 592,413 |
| 60 | | | | | 1 | | | 1 | 54,830 |
| 62 | | | | 1 | 1 | | | 2 | 69,896 |
| 75 | | | 1 | | | | | 1 | 13,419 |
| Totals | 13 | 10 | 7 | 6 | 10 | 9 | | 55 | \$3,119,401 |

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 47.9 years

Service: 14.2 years

Annual Pay: \$56,716

SECTION D

ACTUARIAL COST METHODS AND ACTUARIAL ASSUMPTIONS

Valuation Methodology

Normal Cost/Accrued Liability. Normal cost and the allocation of actuarial present values between service rendered before and after the valuation date were determined using an individual entry-age actuarial cost method having the following characteristics:

- (i) the annual normal costs for each individual active member, payable from date of hire to the member's projected date of retirement, are sufficient to accumulate the actuarial present value of the member's anticipated benefit at the time of retirement; and
- (ii) each annual normal cost is a constant percentage of the member's year-by-year projected covered pay.

Amortization of Unfunded Actuarial Accrued Liabilities. Unfunded Actuarial Accrued Liabilities (UAAL) or asset surpluses were amortized as a level dollar amount for the Library and as level percent-of-payroll contributions (principal and interest combined) for all other groups as follows: If the liabilities exceed the assets (unfunded liabilities), the difference is amortized over a closed period of 24 years; if the assets exceed the liabilities (overfunding) the difference is amortized over an open period of 20 years. The amortization method was first adopted for the December 31, 2016 actuarial valuation. The UAAL payment reflects any payments expected to be made between the valuation date and the date contributions determined by this report are scheduled to begin. For all divisions except Library, active member payroll was assumed to increase 3.25% for the purpose of determining the level-percent contributions.

Asset valuation method. The actuarial value equals:

- (a) Actuarial value of assets from the previous valuation, plus
- (b) employer and member contributions since the last valuation, minus
- (c) benefit payments and refunds since the last valuation, plus
- (d) estimated investment income at the assumed investment return, plus
- (e) portion of gain/(loss) recognized in the current valuation.

For the above purpose, gain/(loss) is defined as the excess during the period of the investment return on the market value of assets over the expected investment income. Twenty percent of the difference is recognized over a five-year period in the actuarial value of assets. This method was first adopted for the December 31, 2003 actuarial valuation.

Actuarial Assumptions Used for the Valuation

The rationale for the assumptions used in this valuation is included in the 5-year experience study ending December 31, 2015, issued August 1, 2017. All assumptions are expectations of future experience, not market measures.

Investment Return (net of investment expenses).

4.0% per year in excess of pay inflation. If pay inflation matches the assumption of 3.25%, this implies a 7.25% rate of return. This assumption was first adopted for the December 31, 2016 actuarial valuation and is used to equate the value of payments due at different points in time. Approximate rates of investment return, for the purpose of comparisons with assumed rates, are shown below for the Bay County Employees' Retirement System (in total). Actual increases in average active member pay for the Bay County Employees' Retirement System (in total) are also shown for comparative purposes.

| | Year Ended December 31 | | | | | 5-Year Average* |
|--------------------------------------|------------------------|------------|------------|------------|------------|--------------------|
| | 2018 | 2017 | 2016 | 2015 | 2014 | |
| Rate of Investment Return | 5.9 % | 11.2 % | 9.9 % | 8.4 % | 11.3 % | 9.3 % |
| Average Increase in Pay [#] | <u>6.6</u> | <u>9.5</u> | <u>4.5</u> | <u>7.1</u> | <u>8.0</u> | <u>7.1</u> |
| Real Rate of Return | (0.7) | 1.7 | 5.4 | 1.3 | 3.3 | 2.2 |

* *Compound rate of increase.*

Based on employees active during both years, for the Bay County Employees' Retirement System (in total).

The nominal rate of return was computed using the approximate formula $i = I \text{ divided by } 1/2 (A + B - I)$, where I is actual investment income net of expenses, A is the beginning of year asset value, and B is the end of year asset value.

Please note that this analysis uses asset values and investment income as defined for the actuarial valuation which deals with market value changes on a gradual basis.

These rates of return should not be used for measurement of an investment advisor's performance or for comparisons with other systems.

Rates of price inflation are not specifically used for this valuation. However, a rate of price inflation of 2.50% would be consistent with other assumptions in this report. This assumption was first adopted for the December 31, 2016 actuarial valuation.

Pay Projections. These assumptions are used to project current pays to those upon which benefits will be based. In addition to the Merit and Longevity rates shown in the table, members are also assumed to receive a base increase of 3.25%.

| Years of Service | Annual Rate of Pay Increase for Merit & Longevity | | | | | |
|------------------|---|-------|---------|-------|-----------|-----------------|
| | General | DWS | Library | MCF | Sheriff's | Road Commission |
| 1 | 3.00% | 3.00% | 3.00% | 0.50% | 5.25% | 5.25% |
| 2 | 2.25% | 2.25% | 2.25% | 0.50% | 4.50% | 3.00% |
| 3 | 1.50% | 1.50% | 1.50% | 0.50% | 4.50% | 3.00% |
| 4 | 1.50% | 1.50% | 1.50% | 0.50% | 3.75% | 3.00% |
| 5 | 0.75% | 0.75% | 0.75% | 0.50% | 3.00% | 0.75% |
| 6+ | 0.75% | 0.75% | 0.75% | 0.50% | 0.75% | 0.75% |

If the number of active members remains constant, the total active member payroll will increase by about the level of pay inflation (assumed to be 3.25% per year). This increasing payroll was recognized in amortizing unfunded actuarial accrued liabilities for all groups except for the Library, which is closed to future hires. The payroll growth assumptions were first adopted for the December 31, 2016 actuarial valuation.

Changes actually experienced in pays have averaged as follows, for the Bay County Employees' Retirement System (in total):

| 2018 | Year Ended December 31 | | | | 2014 | 5-Year Average* |
|------|------------------------|------|------|------|------|-----------------|
| | 2017 | 2016 | 2015 | 2014 | | |
| 6.6% | 9.5% | 4.5% | 7.1% | 8.0% | 7.1% | |

* Compound rate of increase.

Lump sum payments. Lump sum payments for unused sick leave and vacation were assumed to increase final average compensation by 3.5% for the General group, 4.5% for the Library, 5.0% for the Medical Care Facility and Sheriff's groups, 7.0% for the DWS group, and 8.5% for the Road Commission. The lump sum payment assumptions were first adopted for the December 31, 2016 actuarial valuation.

Mortality. The mortality rates utilized are based upon the RP-2014 tables, as extended, and include a margin for future mortality improvements projected using a fully generational improvement scale. The mortality assumptions were first adopted for the December 31, 2016 actuarial valuation. The tables used were as follows:

- **Healthy Pre-Retirement:** The RP-2014 Employee Generational Mortality Tables, with blue-collar adjustments and extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale, resulting in a base year of 2006 with future mortality improvements assumed each year using scale MP-2016.
- **Healthy Post-Retirement:** The RP-2014 Healthy Annuitant Generational Mortality Tables, with blue-collar adjustments and extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale, resulting in a base year of 2006 with future mortality improvements assumed each year using scale MP-2016.
- **Disability Retirement:** The RP-2014 Disabled Mortality Table, extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale, resulting in a base year of 2006 with future mortality improvements assumed each year using scale MP-2016.

| Sample Ages | Healthy Pre-Retirement Future Life Expectancy (Years)^ | | Healthy Post-Retirement Future Life Expectancy (Years)^ | | Disabled Retirement Future Life Expectancy (Years)^ | |
|----------------|--|-------|---|-------|---|-------|
| | Men | Women | Men | Women | Men | Women |
| | 50 | 34.95 | 40.23 | 33.47 | 36.50 | 24.61 |
| 55 | 29.91 | 35.12 | 28.69 | 31.57 | 21.45 | 25.22 |
| 60 | 25.07 | 30.13 | 24.14 | 26.85 | 18.40 | 21.65 |
| 65 | 20.58 | 25.26 | 19.86 | 22.35 | 15.51 | 18.20 |
| 70 | 16.48 | 20.54 | 15.91 | 18.07 | 12.74 | 14.81 |
| 75 | 12.73 | 16.01 | 12.30 | 14.10 | 10.10 | 11.64 |
| 80 | 9.36 | 11.76 | 9.12 | 10.58 | 7.70 | 8.89 |

^ Based on retirements in 2018. Retirements in future years will reflect improvements in life expectancy.

Administration Expenses. Non-investment administration expenses are assumed to average 0.5% of payroll annually. The administrative expenses assumption was first adopted for the December 31, 2016 actuarial valuation. This assumption was changed as a result of the experience study.

Active Member Group Size. The number of active members was assumed to remain constant for all groups except the Library which is closed to future hires. This assumption is unchanged from the previous valuation for all groups.

Rates of separation from active membership. The rates do not apply to members eligible to retire and do not include separation on account of death or disability. This assumption measures the probabilities of members remaining in employment. This assumption was first adopted for the December 31, 2016 actuarial valuation.

| Sample Ages | Years of Service | % of Active Members Separating within Next Year | | | | Road | |
|----------------|---------------------|---|-------|---------|--------|------------|-------------|
| | | General | DWS | Library | MCF | Sheriff's* | Commission* |
| ALL | 0 | 15.00% | 9.00% | 8.25% | 26.25% | N/A | N/A |
| | 1 | 9.00 | 5.40 | 4.95 | 26.25 | N/A | N/A |
| | 2 | 9.00 | 5.40 | 4.95 | 15.75 | N/A | N/A |
| | 3 | 8.00 | 4.80 | 4.40 | 13.13 | N/A | N/A |
| | 4 | 8.00 | 4.80 | 4.40 | 9.19 | N/A | N/A |
| 20 | 5 & Over | 7.50 | 4.50 | 4.13 | 7.88 | 4.50 | 4.50 |
| 25 | | 7.50 | 4.50 | 4.13 | 7.88 | 4.50 | 4.50 |
| 30 | | 7.00 | 4.20 | 3.85 | 5.25 | 3.75 | 3.90 |
| 35 | | 7.00 | 4.20 | 3.85 | 5.25 | 2.25 | 2.30 |
| 40 | | 4.00 | 2.40 | 2.20 | 3.94 | 1.50 | 0.90 |
| 45 | | 3.00 | 1.80 | 1.65 | 2.63 | 1.50 | 0.50 |
| 50 | | 2.00 | 1.20 | 1.10 | 2.10 | 1.25 | 0.50 |
| 55 | | 2.00 | 1.20 | 1.10 | 2.10 | 0.75 | 0.50 |
| 60 | | 2.00 | 1.20 | 1.10 | 2.10 | 0.75 | 0.50 |

* These groups do not have service based rates of separation. All rates of separation are based on ages.

Rates of Disability. These rates represent the probabilities of active members becoming disabled. This assumption was first adopted for the December 31, 2016 actuarial valuation.

| Percent Becoming Disabled within Next Year | | |
|---|---------|---------------------|
| Sample Ages | Sheriff | All Other Groups |
| 20 | 0.15 % | 0.07 % |
| 25 | 0.15 | 0.07 |
| 30 | 0.15 | 0.07 |
| 35 | 0.15 | 0.07 |
| 40 | 0.38 | 0.19 |
| 45 | 0.50 | 0.25 |
| 50 | 0.92 | 0.46 |
| 55 | 1.67 | 0.84 |
| 60 | 2.65 | 1.33 |

We assumed that 50% of disabilities are duty related and 50% are non-duty related for Sheriffs. For all other groups, we assumed 85% of disabilities are non-duty related and 15% are duty related.

Rates of Retirement. These rates are used to measure the probabilities of an eligible member retiring during the next year.

| Retirement Ages | Percent of Active Members Retiring within Next Year | | | | | |
|--------------------|---|------|---------|------|-----------|--------------------|
| | General | DWS | Library | MCF | Sheriff's | Road Commission |
| 50 | | | | 20 % | | 20 % |
| 51 | | | | 20 | | 20 |
| 52 | | | | 20 | | 30 |
| 53 | | | | 20 | | 30 |
| 54 | | | | 20 | | 30 |
| 55 | 20 % | 25 % | 15 % | 30 | | 30 |
| 56 | 13 | 20 | 10 | 40 | | 20 |
| 57 | 13 | 20 | 10 | 50 | | 20 |
| 58 | 13 | 20 | 10 | 50 | | 20 |
| 59 | 13 | 20 | 10 | 50 | | 20 |
| 60 | 30 | 35 | 25 | 30 | 15 % | 20 |
| 61 | 25 | 30 | 20 | 30 | 15 | 20 |
| 62 | 13 | 20 | 10 | 50 | 30 | 40 |
| 63 | 13 | 20 | 10 | 25 | 15 | 40 |
| 64 | 13 | 20 | 10 | 25 | 15 | 40 |
| 65 | 30 | 35 | 25 | 100 | 100 | 100 |
| 66 | 13 | 20 | 10 | | | |
| 67 | 13 | 20 | 10 | | | |
| 68 | 13 | 20 | 10 | | | |
| 69 | 13 | 20 | 10 | | | |
| 70 | 100 | 100 | 100 | | | |

The following table shows the rates of retirement used for the Road Patrol, Road Patrol Supervisory Unit, and Elected Officials and Department Heads: Elected Sheriff and Appointed Undersheriff 25 & Out provision and the Correctional Facility Officers 55 & 25 provision.

| 25 & Out | | 55 & 25 | |
|---------------------|---|---------|-----------------------------------|
| Years of Service | Sheriff's Road Patrol, Road Patrol Supervisory Unit, and Elected Sheriff and Appointed Undersheriff | Age | Correctional Facility Officers |
| 25 | 35% | 55 | 35% |
| 26 | 35 | 56 | 35 |
| 27 | 35 | 57 | 35 |
| 28 | 25 | 58 | 25 |
| 29 | 25 | 59 | 25 |
| 30 | 25 | 60 | 25 |
| 31 | 25 | 61 | 25 |
| 32 | 25 | 62 | 25 |
| 33 | 25 | 63 | 25 |
| 34 | 100 | 64 | 100 |

The following table shows the rates of retirement for the 55 & 8 and/or 55 & 10 Early Retirement provision:

| Retirement Ages | 55 & 8 and/or 55 & 10 Early Retirement* | | |
|--------------------|---|------|---------|
| | General | DWS | Library |
| 55 | 8 % | 15 % | 5 % |
| 56 | 8 | 15 | 5 |
| 57 | 8 | 15 | 5 |
| 58 | 8 | 15 | 5 |
| 59 | 8 | 15 | 5 |
| 60 | 8 | 15 | 5 |
| 61 | 8 | | |

* These rates do not apply to MCF, Sheriff and Road Commission.

The retirement assumptions were first adopted for the December 31, 2016 actuarial valuation.

Miscellaneous and Technical Assumptions

| | |
|------------------------------------|--|
| Marriage Assumption: | 100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses. |
| Pay Increase Timing: | Six months after the valuation date. |
| Decrement Timing: | Decrements of all types are assumed to occur mid-year. |
| Eligibility Testing: | Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur. |
| Benefit Service: | Exact fractional service is used to determine the amount of benefit payable. |
| Decrement Relativity: | Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects. |
| Decrement Operation: | Disability and death-in-service decrements do not operate during the first 5 years of service. Disability and withdrawal do not operate during retirement eligibility. |
| Normal Form of Benefit: | The assumed normal form of benefit is straight life form. |
| Loads: | Lump sum payments for unused sick leave and vacation. For current retirees who elected a joint and survivor form of payment with a pop-up and retired prior to January 1, 2013 or who elected a social security equated joint and survivor form of payment with a pop-up the liabilities are loaded 2% because the pop-up benefits are not provided in the data. |
| Incidence of Contributions: | Contributions are assumed to be received continuously throughout the year based upon the computed percent-of-payroll shown in this report, and the actual payroll payable at the time contributions are made. New entrant normal cost contributions are applied to the funding of new entrant benefits. |
| Data Adjustment: | Payroll was annualized for new entrants. |

SECTION E

FINANCIAL REPORTING

Schedule of Funding Progress

| Actuarial Valuation Date | Actuarial Value of Assets (a) | Actuarial Accrued Liability (AAL) Entry Age (b) | Unfunded AAL (UAAL) (b) – (a) | Funded Ratio (a)/(b) | Covered Payroll (c) | UAAL as a Percentage of Covered Payroll [(b) – (a)] / (c) |
|--------------------------------|--|---|-------------------------------------|----------------------------|---------------------------|--|
| 12/31/2009 | \$243,271,514 | \$221,407,973 | \$(21,863,541) | 109.9 % | \$47,244,573 | none |
| 12/31/2010 * | 244,728,050 | 231,625,254 | (13,102,796) | 105.7 | 47,090,560 | none |
| 12/31/2011 * | 241,207,722 | 241,791,817 | 584,095 | 99.8 | 48,583,176 | 1.20 % |
| 12/31/2012 # | 239,280,740 | 245,269,867 | 5,989,127 | 97.6 | 48,571,798 | 12.33 |
| 12/31/2013 * | 263,364,669 | 262,118,015 | (1,246,654) | 100.5 | 44,535,708 | none |
| 12/31/2014 | 282,166,070 | 271,995,030 | (10,171,040) | 103.7 | 46,494,417 | none |
| 12/31/2015 | 249,163,890 | 229,142,613 | (20,021,277) | 108.7 | 36,658,462 | none |
| 12/31/2016 *# | 262,485,987 | 240,033,781 | (22,452,206) | 109.4 | 36,761,949 | none |
| 12/31/2017 | 279,666,292 | 248,475,911 | (31,190,381) | 112.6 | 38,491,118 | none |
| 12/31/2018 | 283,327,021 | 252,850,800 | (30,476,221) | 112.1 | 39,208,285 | none |

For Actuarial Valuation Dates prior to 2015, the results displayed are for the entire Retirement System (including BABH). Beginning with the 2015 Actuarial Valuation Date, the results displayed are for the Retirement System (excluding BABH).

* Plan amended.

Certain assumptions or methods revised.

| | |
|------------------------|--|
| Actuarial Cost Method | Individual Entry Age Normal Cost. |
| Amortization Method | Level dollar amount for Library Level percent-of-payroll for all other groups |
| Amortization Periods | 24 years closed for groups that are underfunded (unfunded accrued liability is positive). 20 years open for groups that are overfunded (unfunded accrued liability is negative). |
| Asset Valuation Method | Market value with 5-year smoothing of gains and losses. |

Principal Actuarial Assumptions
(last revised for the 12/31/2016 valuation):

| | |
|------------------------------|--|
| - Net Investment Return | 7.25% |
| - Projected Salary Increases | 3.25% pay inflation plus merit and longevity |
| - Price Inflation | 2.50% |
| - Cost-of-Living Adjustments | None |

Schedule of Employer Contributions

| Plan Year Ended December 31 | Fiscal Year Ended December 31 | Annual Required Contribution |
|-----------------------------------|-------------------------------------|---------------------------------|
| 2009 [^] | 2011 | \$ 2,443,118 |
| 2010 | 2012 | 3,074,891 |
| 2011 | 2013 | 4,289,438 |
| 2012 | 2014 | 4,038,100 |
| 2013 [§] | 2015 | 4,477,504 |
| 2014 | 2016 | 2,535,295 |
| 2015 | 2017 | 1,088,320 |
| 2016 | 2018 | 1,546,699 |
| 2017 | 2019 | 1,152,393 |
| 2018 | 2020 | 1,278,469 |

For Plan Years Ended prior to December 31, 2015, the results displayed are for the entire Retirement System (including BABH). Beginning with the Plan Year Ended December 31, 2015, the results displayed are for the Retirement System (excluding BABH).

[^] *Implementation of a one year lag between valuation date and first day of the calendar year to which the contributions apply.*

[§] *Annual Required Contribution reflects an advanced payment of the BABH unfunded ERIP liability.*

SECTION F

RISK DISCLOSURES

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

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

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

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

1. **Investment Risk** – actual investment returns may differ from the expected returns;
2. **Asset/Liability Mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. **Contribution Risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. **Salary and Payroll Risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. **Longevity Risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. **Other Demographic Risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

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

The computed contribution rate shown on page B-2 may be considered as a minimum contribution rate that complies with the Board's funding policy. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

Plan 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:

| | <u>2018</u> | <u>2017</u> |
|--|-------------|-------------|
| Ratio of the market value of assets to total payroll | 6.8 | 7.8 |
| Ratio of actuarial accrued liability to payroll | 6.4 | 6.5 |
| Ratio of actives to retirees and beneficiaries | 1.1 | 1.1 |
| Ratio of net cash flow to market value of assets | -4.6% | -3.9% |

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time. The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 2.5 times the payroll, a change in liability 2% other than assumed would equal 5% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

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 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.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

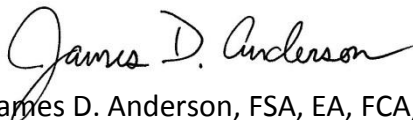
October 2, 2019

Ms. Katie Zanotti
Retirement Administrator/Accountant
Bay County Employees' Retirement System
515 Center Avenue, Suite 706
Bay City, Michigan 48708

Dear Ms. Zanotti:

Enclosed please find 20 copies of the December 31, 2018 report of the Annual Actuarial Valuation for the Bay County Employees' Retirement System - excluding BABH.

Sincerely,



James D. Anderson, FSA, EA, FCA, MAAA

JDA:ah
Enclosures

cc: Mark Buis (GRS)
Shana M. Neeson (GRS)
Jerry Desloover (Rehman, Robson)