# Town of Johnston, Rhode Island Police and Firefighters Pension System

## Actuarial Valuation and Review as of June 30, 2018

Segal Consulting
2018 Powers Ferry Road SE Suite 850 Atlanta, GA 30339-7200
T 678.306.3100 www.segalco.com

November 7, 2018

Joe Chiodo, CPA, MBA
Finance Director
Town of Johnston, Rhode Island Police and Firefighters Pension System
1385 Hartford Avenue
Johnston, Rhode Island 02919

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of June 30, 2018. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for the fiscal year ending June 30, 2020.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Pension System.The census information on which our calculations were based was prepared by the staff of the Town of Johnston and the financial information was obtained from the Town of Johnston trial balance and journal entries for the fiscal year ended June 30, 2018. That assistance is gratefully acknowledged.

The actuarial calculations were directed under our supervision. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions recommended by Segal in our experience study for the period July 1, 2014 to June 30, 2017, dated November 30, 2017, as approved by the Town are reasonably related to the experience of and the expectations for the System.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By: Jeanette R. Cooper

Jeanette R. Cooper, FSA, FCA, MAAA, EA
Vice President and Consulting Actuary

Malichi Waterman

Malichi S. Waterman, FCA, MAAA, EA
Consulting Actuary

# Table of Contents

**Town of Johnston, Rhode Island Police and Firefighters Pension System Actuarial Valuation and Review as of June 30, 2018**

# Section 1: Actuarial Valuation Summary

## Purpose and Basis

This report was prepared by Segal Consulting to present a valuation of the Town of Johnston, Rhode Island Police and Firefighters Pension System as of June 30, 2018. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. 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; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

Certain disclosure information required by GASB Statements No 67 and 68 as of June 30, 2018 for the System is provided separately.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension System, as administered by the Town;
- The characteristics of covered active participants and retired participants and beneficiaries as of June 30, 2018, provided by the Town;
- The assets of the Plan as of June 30, 2018, provided by the Town;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc. and
- The funding policy adopted by the Town.

## Significant Issues

1. Segal Consulting ("Segal") strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and the principal balance. The funding policy adopted by the Town as outlined in the 2017 settlement agreement meets this standard.
2. Under the settlement agreement, the actuarially determined employer contribution for the fiscal year ending June 30, 2018 was $8,755,000. Actual contributions made during the fiscal year ending June 30, 2018 were $8,756,200. In the prior fiscal year, actual contributions were $8,721,128.
3. The total contributions made during the fiscal year ending June 30, 2018 were insufficient to reduce the unfunded actuarial accrued liability.
4. The actuarial value of assets for the System is equal to market value. The funded ratio (the ratio of the actuarial value of assets to actuarial accrued liability) is 28.32%, compared to the prior year funded ratio of 27.17%. This ratio is one measure of funding status, and its history is a measure of funding progress. These measurements are not necessarily appropriate for assessing the sufficiency of the System's assets to cover the estimated cost of settling the System's benefit obligation or the need for or the amount of future contributions.
5. The actuarially determined contribution for the fiscal year ending June 30, 2020 is $9,288,180, an increase of $270,530 from last year. The increase is due to the required 3.0% increase outlined in the settlement agreement.
6. The effective amortization period for the unfunded actuarial accrued liability is 27.16 years.
7. The unfunded actuarial accrued liability is $111,500,952, which is an increase of $1,956,816 since the prior valuation.
8. The actuarial gain from investment and other experience is $4,655,454 or 3.11% of actuarial accrued liability.
9. The net experience gain from sources other than investment experience was 2.92% of the actuarial accrued liability prior to reflection of assumption and method changes. This gain was primarily due to a reduction in benefit amounts for retirees receiving longevity payments or stipends. It is our understanding that these benefits are paid directly by the Town, and should not be valued as System liabilities.
10. The rate of return on the actuarial and market value of assets was 8.15% for the July 1, 2017 to June 30, 2018 plan year.
11. In addition to the decrease in the investment return assumption from 7.50% to 7.25%, numerous actuarial assumptions were approved by the Board and changed with this valuation, following the completion of a comprehensive experience study. Details of the new assumptions are provided in *Section 4, Exhibit I.* The assumption changes increased the actuarial accrued liability by $5,725,894 or 3.8%, increased the total benefit normal cost by $316,821, and increased the effective amortization period by about 3.4 years.
12. The actuarial cost method was changed from Ultimate Entry Age Cost Method to the Traditional Entry Age Cost Method.
13. There were no changes in plan provisions since the last valuation

14. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined contribution under the System's funding policy and measuring the progress of that funding policy. The Net Pension Liability (NPL) and Pension Expense under Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68, for inclusion in the plan and employer's financial statements as of June 30, 2018, will be provided separately.
15. This actuarial report as of June 30, 2018 is based on financial and demographic data as of that date. Changes subsequent to that date are not reflected and will affect future actuarial costs of the plan.
16. Since the actuarial valuation results are dependent on a given set of assumptions, there is a risk that emerging results may differ significantly as actual experience proves to be different from the assumptions. We have included a discussion of various risks that may affect the Plan in Section 2.

## Summary of Key Valuation Results

| | | 2018 | 2017 |
|---|---|---|---|
| **Contributions for plan year beginning July 1:** | • Actuarially determined employer contributions | $9,288,180 | $9,017,650 |
| **Actuarial accrued liability for plan year beginning July 1:** | • Retired participants and beneficiaries | $117,211,266 | $114,483,829 |
| | • Active participants | 38,335,817 | 35,929,802 |
| | • Total | 155,547,083 | 150,413,631 |
| | • Normal cost including administrative expenses for plan year beginning July 1 | 2,273,697 | 2,142,505 |
| **Assets for plan year beginning July 1:** | • Market value of assets (MVA) | $44,046,131 | $40,869,495 |
| | • Actuarial value of assets (AVA) | 44,046,131 | 40,869,495 |
| | • Actuarial value of assets as a percentage of market value of assets | 100.00% | 100.00% |
| **Funded status for plan year beginning July 1:** | • Unfunded actuarial accrued liability on market value of assets | $111,500,952 | $109,544,136 |
| | • Funded percentage on MVA basis | 28.32% | 27.17% |
| | • Unfunded actuarial accrued liability on actuarial value of assets | $111,500,952 | $109,544,136 |
| | • Funded percentage on AVA basis | 28.32% | 27.17% |
| | • Effective amortization period on an AVA basis | 27.16 years | 28.55 years |
| **Key assumptions:** | • Net investment return | 7.25% | 7.50% |
| | • Inflation rate | 2.50% | 2.75% |
| | • Payroll increase | 3.75% | 4.00% |
| **Demographic data for plan year beginning July 1** | • Number of retired participants and beneficiaries | 196 | 195 |
| | • Number of active participants | 68 | 71 |
| | • Total payroll | $6,810,010 | $7,013,944 |
| | • Average payroll | 100,147 | 98,788 |

## Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal Consulting ("Segal") relies on a number of input items. These include:

| | |
|---|---|
| **Plan of benefits** | Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits. |
| **Participant data** | An actuarial valuation for a plan is based on data provided to the actuary by the Town. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data. |
| **Assets** | The valuation is based on the market value of assets as of the valuation date, as provided by the Town. |
| **Actuarial assumptions** | In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan's assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable. |

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the Town. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- Actuarial results in this report are not rounded, but that does not imply precision.
- If the Town is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Town should look to their other advisors for expertise in these areas.

As Segal Consulting has no discretionary authority with respect to the management or assets of the System, it is not a fiduciary in its capacity as actuaries and consultants with respect to the System.

# Section 2: Actuarial Valuation Results

## Participant Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active participants, inactive vested participants, retired participants and beneficiaries.

This section presents a summary of significant statistical data on these participant groups. The plan has been closed to new firefighters since July 1, 1999 and new police participants since July 1, 2010 as shown by the declining active count.

More detailed information for this valuation year and the preceding valuation can be found in *Section 3*, *Exhibits A*, *B*, and *C*.

### PARTICIPANT POPULATION: 2007 – 2018

| Year Ended June 30 | Active Participants | Retired Participants and Beneficiaries* | Ratio of Non-Actives to Actives |
|---|---|---|---|
| 2007 | 132 | 127 | 0.96 |
| 2009 | 115 | 154 | 1.34 |
| 2011 | 109 | 167 | 1.53 |
| 2012 | 108 | 168 | 1.56 |
| 2013 | 95 | 176 | 1.85 |
| 2014 | 86 | 182 | 2.12 |
| 2015 | 85 | 181 | 2.13 |
| 2016 | 76 | 189 | 2.49 |
| 2017 | 71 | 195 | 2.75 |
| 2018 | 68 | 196 | 2.88 |

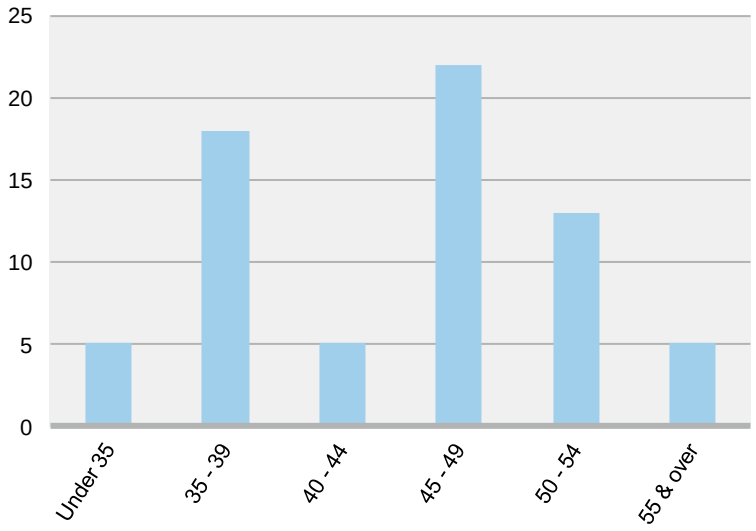
*Includes disabled retirees and QDROs.

## Active Participants

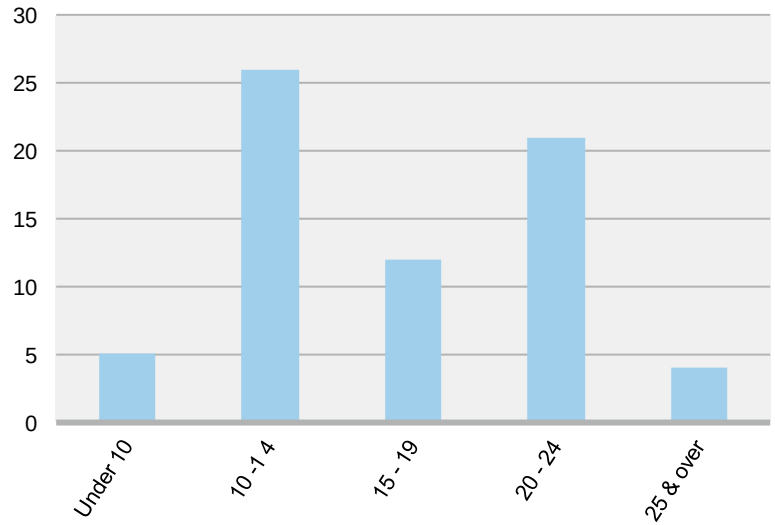
Plan costs are affected by the age, years of service and payroll of active participants. In this year's valuation, there were 68 active participants with an average age of 45.5, average years of service of 16.8 years and average payroll of $100,147. The 71 active participants in the prior valuation had an average age of 44.5, average service of 15.9 years and average payroll of $98,788.

### Distribution of Active Participants as of June 30, 2018

ACTIVES BY AGE




ACTIVES BY YEARS OF SERVICE




## Inactive Participants

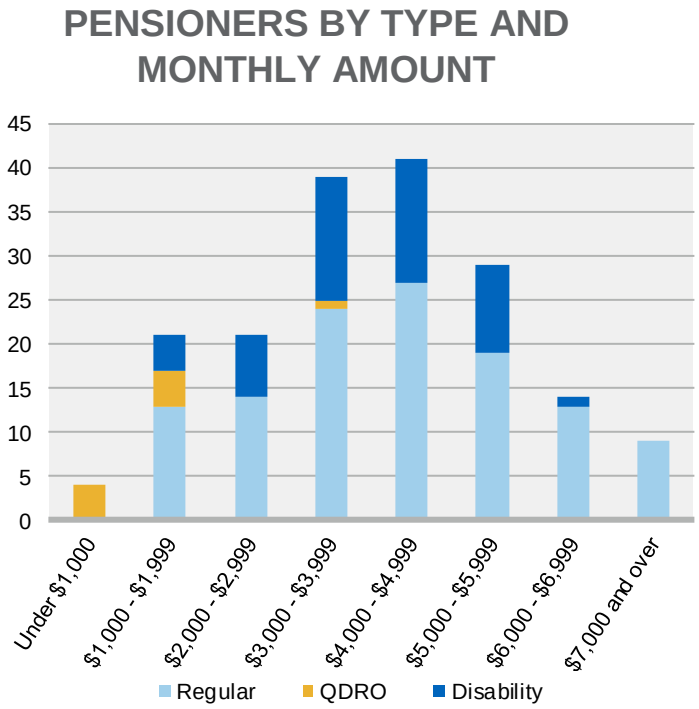
In this year's valuation, there were no participants with a vested right to a deferred or immediate vested benefit.

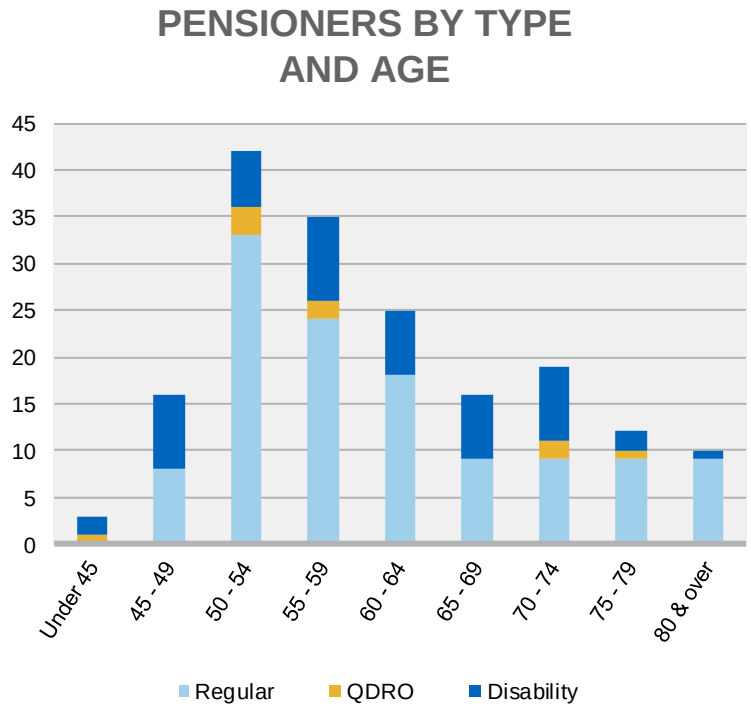
## Retired Participants and Beneficiaries

As of June 30, 2018, 178 retired participants (including nine QDROs) and 18 beneficiaries were receiving total monthly benefits of $771,101. For comparison, in the previous valuation, there were 177 retired participants (including nine QDROs) and 18 beneficiaries receiving monthly benefits of $781,311.

As of June 30, 2018, the average monthly benefit for retired participants is $4,103, compared to $4,190 in the previous valuation. The average age for retired participants is 60.5 in the current valuation, compared with 59.6 in the prior valuation.

### Distribution of Pensioners as of June 30, 2018



## Historical Plan Population

The chart below demonstrates the decrease of the active population over the last ten valuations. The chart also shows the growth among the retired population over the same time period.

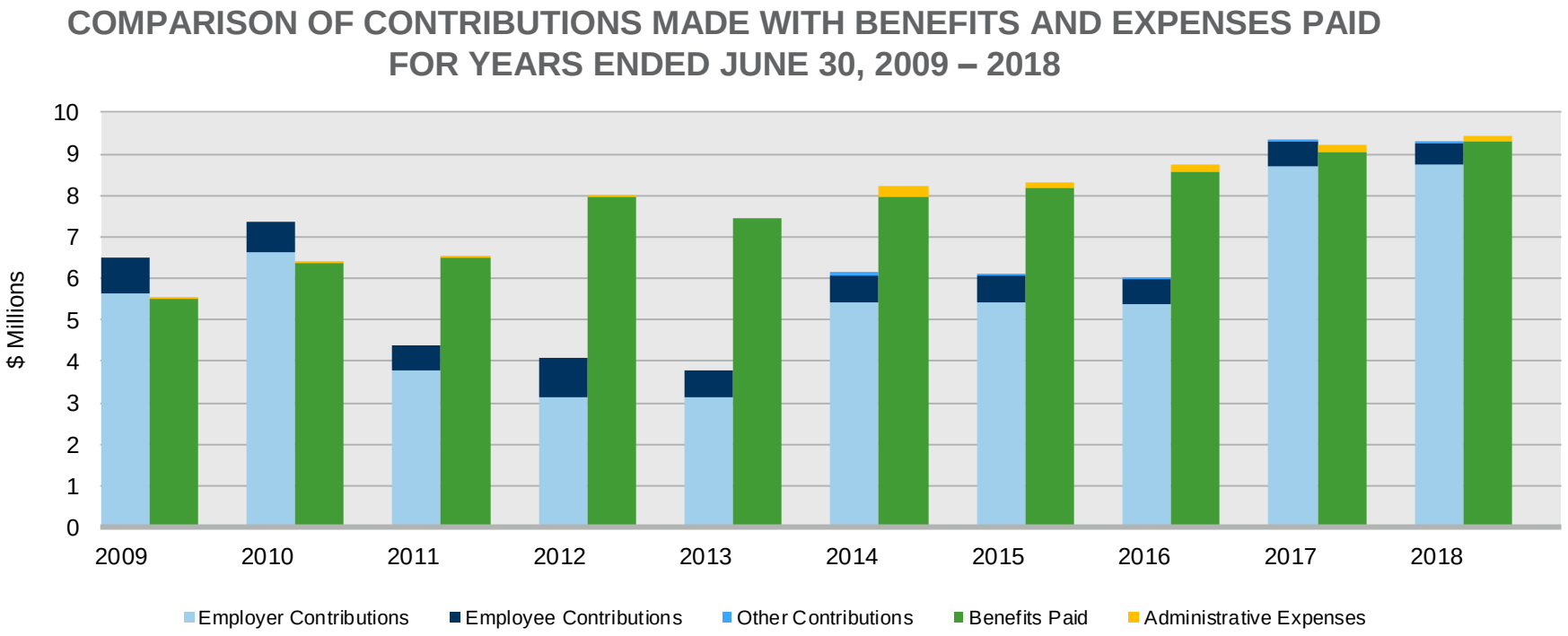
### PARTICIPANT DATA STATISTICS: 2007 – 2018

| | Active Participants | | | Retired Participants and Beneficiaries | | |
|---|---|---|---|---|---|---|
| Year Ended June 30 | Count | Average Age | Average Service | Count | Average Age | Average Monthly Amount |
| 2007 | 132 | 39.8 | 13.3 | 127 | 58.8 | $2,846 |
| 2009 | 115 | 40.0 | 12.3 | 154 | 59.0 | 3,198 |
| 2011 | 109 | 40.6 | 12.6 | 167 | 58.0 | 3,366 |
| 2012 | 108 | 41.5 | 13.4 | 168 | 58.6 | 3,488 |
| 2013 | 95 | 41.9 | 13.6 | 176 | 59.0 | 3,497 |
| 2014 | 86 | 42.5 | 14.0 | 182 | 58.9 | 3,753 |
| 2015 | 85 | 43.4 | 15.0 | 181 | 59.6 | 3,826 |
| 2016 | 76 | 43.8 | 15.4 | 189 | 60.0 | 3,961 |
| 2017 | 71 | 44.5 | 15.9 | 195 | 60.6 | 4,007 |
| 2018 | 68 | 45.5 | 16.8 | 196 | 61.5 | 3,934 |

## Financial Information

Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and investment earnings (less investment fees) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of transactions for the valuation year, is presented in *Section 3, Exhibits D and E.*



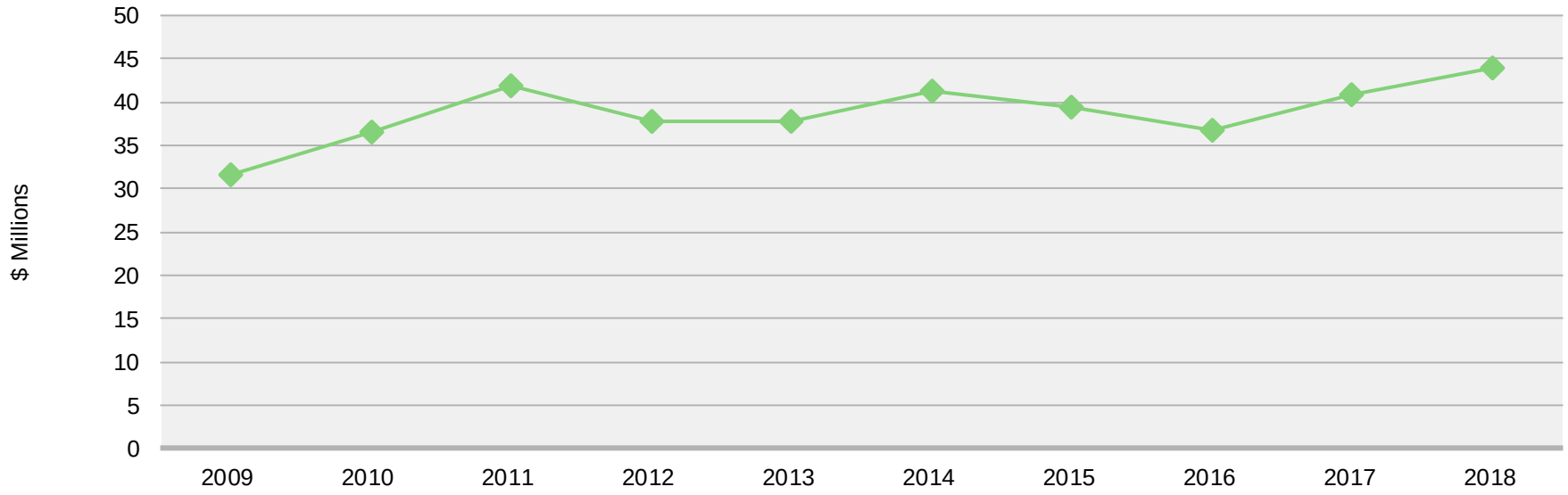
It is desirable to have level and predictable plan costs from one year to the next. However, the Town has approved an asset valuation method that uses market value. Under this valuation method, the full value of market fluctuation is recognized in a single year and, as a result, the asset value and the plan costs are relatively volatile.

## DETERMINATION OF ACTUARIAL VALUE OF ASSETS FOR YEAR ENDED JUNE 30, 2018

| | |
|---|---|
| Actuarial value of assets at beginning of year (equal to market value) | $40,869,495 |
| Employer contributions | 8,756,200 |
| Employee contributions | 524,044 |
| Purchase of service | 2,203 |
| Other income | 2,012 |
| Net investment income | 3,326,607 |
| Benefit payments | -9,288,210 |
| Administrative expense | -146,220 |
| Actuarial value of assets at end of year (equal to market value) | $44,046,131 |

The actuarial value (equal to the market value of assets) is a representation of the System's financial status. The actuarial asset value is significant because the System's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

## ACTUARIAL VALUE OF ASSETS (EQUAL TO MARKET VALUE OF ASSETS) AS OF JUNE 30, 2009 – 2018



## Actuarial Experience

To calculate any actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), any contribution requirement will decrease from the previous year. On the other hand, any contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total gain is $4,655,454, which includes $267,019 from investment gains and $4,388,435 in gains from all other sources. The net experience variation from individual sources other than investments was 2.9% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

### ACTUARIAL EXPERIENCE FOR YEAR ENDED JUNE 30, 2018

| | | |
|---|---|---|
| 1 | Net gain/(loss) from investments* | $267,019 |
| 2 | Net gain/(loss) from administrative expenses | 9,744 |
| 3 | Net gain/(loss) from other experience | 4,378,691 |
| 4 | Net experience gain/(loss): 1 + 2 + 3 | $4,655,454 |

* Details on next page.

## Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Town of Johnston's investment policy. The rate of return on both an actuarial and market value of assets was 8.15% for the year ended June 30, 2018.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.25%. However, the gain is measured against the 7.50% assumption that was in place for last year. Since the actual return for the year was greater than the assumed return, the System experienced an actuarial gain during the year ended June 30, 2018 with regard to its investments.

### INVESTMENT EXPERIENCE

| | | Year Ended June 30, 2018 | Year Ended June 30, 2017 |
|---|---|---|---|
| | | Actuarial and Market Value | Actuarial and Market Value |
| 1 | Net investment income | $3,326,607 | $4,037,715 |
| 2 | Average value of assets | 40,794,510 | 36,783,399 |
| 3 | Rate of return: 1 ÷ 2 | 8.15% | 10.98% |
| 4 | Assumed rate of return | 7.50% | 7.50% |
| 5 | Expected investment income: 2 x 4 | 3,059,588 | 2,758,755 |
| 6 | Actuarial gain/(loss): 1 – 5 | $267,019 | $1,278,960 |

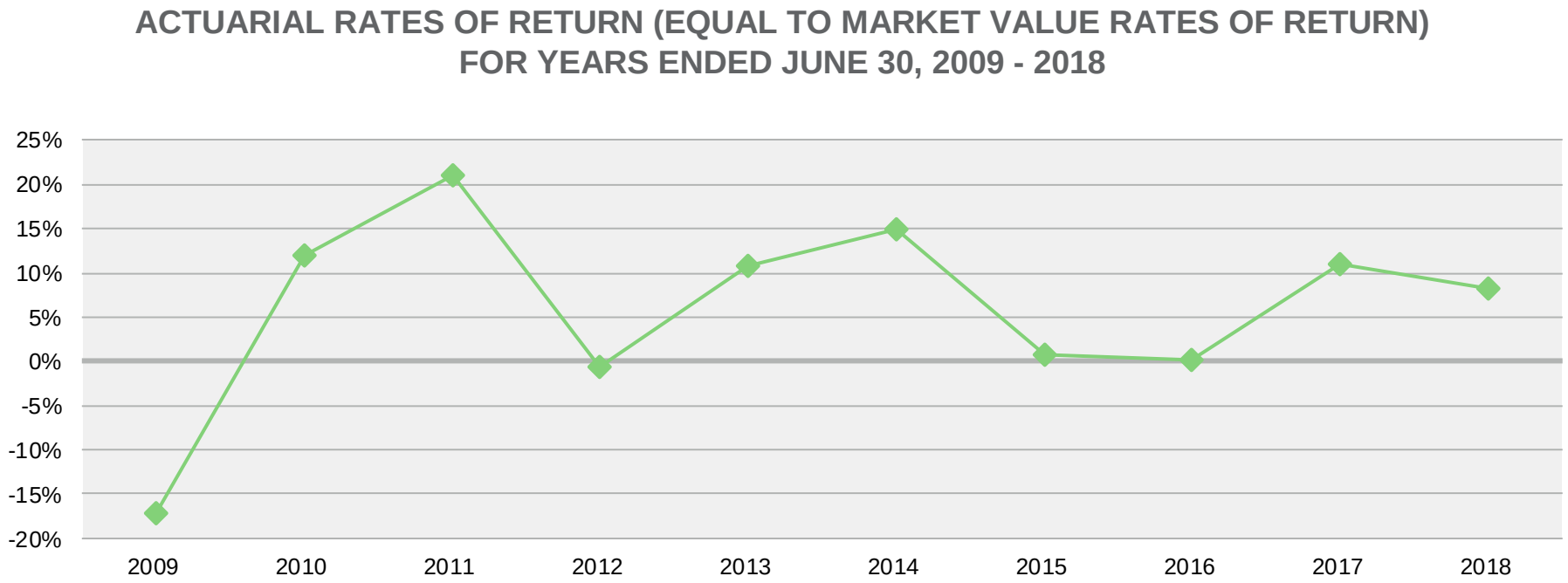
Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis for the last ten years, including averages over select time periods.

## INVESTMENT RETURN – ACTUARIAL VALUE OF ASSETS (EQUAL TO MARKET VALUE OF ASSETS): 2009 - 2018

| | Actuarial and Market Value Investment Return | |
|---|---|---|
| Year Ended June 30 | Amount | Percent |
| 2009 | -$6,432,489 | -17.10% |
| 2010 | 3,841,298 | 11.95 |
| 2011 | 7,463,380 | 21.08 |
| 2012 | -218,756 | -0.55 |
| 2013 | 3,841,617 | 10.71 |
| 2014 | 5,529,774 | 15.01 |
| 2015 | 341,030 | 0.85 |
| 2016 | 50,542 | 0.13 |
| 2017 | 4,037,715 | 10.98 |
| 2018 | 3,326,607 | 8.15 |
| | $21,780,718 | |
| | Most recent five-year average return | 6.90% |
| | Most recent ten-year average return | 5.83% |

Note: Each year's yield is weighted by the average asset value in that year.

The actuarial value of assets has been equal to market value for the last ten years. This has resulted in relatively volatile actuarial rates of return and pension plan cost.



## Administrative Expenses

Administrative expenses for the year ended June 30, 2018 totaled $146,220 compared to the assumption of $150,000. This resulted in a gain of $9,744 for the year. Because it is expected that these expenses will continue to increase, we have changed the assumption from $150,000 to $175,000 for the current year.

## Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among participants,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected), and
- salary increases (greater or smaller than projected).

The net gain from this other experience for the year ended June 30, 2018 amounted to $4,378,691, which is 2.9% of the actuarial accrued liability.

### LIABILITY CHANGES DUE TO DEMOGRAPHIC EXPERIENCE FOR YEAR ENDED JUNE 30, 2018

| | |
|---|---|
| Changes in benefit amounts | $2,932,696 |
| Mortality experience | -212,720 |
| Retirement experience different than expected | 73,273 |
| Salary increases less than expected | 132,268 |
| Disability retirement experience different than expected | 266,166 |
| Withdrawal experience greater than expected | 248,784 |
| Miscellaneous | 938,224 |
| **Total** | **$4,378,691** |

## Changes in the Actuarial Accrued Liability

The actuarial accrued liability as of June 30, 2018 is $155,547,083, an increase of $5,133,452, or 3.4%, from the actuarial accrued liability as of the prior valuation date. The liability is expected to grow each year with normal cost and interest, and to decline due to benefit payments made. Additional fluctuations can occur due to actual experience that differs from expected (as discussed in the previous subsection).

## Actuarial Assumptions

A comprehensive Actuarial Experience Review, covering the period July 1, 2014 through June 30, 2017, was completed in 2017. As a result of that study, the following assumption changes were proposed by the actuary and subsequently were approved by the Board in May, 2018. These changes are reflected for the first time in this valuation.

- The investment return assumption was lowered from 7.50% to 7.25%.
- The inflation assumption was lowered from 2.75% to 2.50%.
- The payroll growth rate assumption was decreased from 3.25% to 3.00%, maintaining the productivity assumption of 0.75%.
- The salary scale assumption was decreased from a flat rate of 4.00% per year to 3.75%.
- The administrative expense assumption of $75,000 payable at the beginning of the year was increased to $87,500.
- The pre-retirement mortality assumption for males was changed from 115% of the RP-2000 Combined Healthy White Collar Mortality Table for males to the RP-2014 Employee Table for males. For females, the assumption was changed from 95% of the RP-2000 Combined Healthy White Collar Mortality Table for females to the RP-2014 Employee Table for females. The generational projection scale for pre-retirement mortality was removed.
- The post-retirement mortality assumption for healthy male retirees and beneficiaries was changed from 115% of the RP-2000 Combined Healthy White Collar Mortality Table for males to the RP-2014 Blue Collar Healthy Annuitant Mortality Table for males. The post-retirement mortality assumption for healthy female retirees and beneficiaries was changed from 95% of the RP-2000 Combined Healthy White Collar Mortality Table for females to the RP-2014 Combined Healthy Annuitant Mortality Table for females. The generational projection scale for post-retirement mortality was also revised from the sex-distinct Scale AA, projected from 2000 to the sex-distinct Scale MP-2016.
- The mortality assumption for disabled retirees was changed from 60% of the sex-distinct PBGC Table VI(a) for disabled participants eligible for Social Security disability benefits to the sex-distinct RP-2014 Disabled Retiree Table. In conjunction with the revised mortality table for disabled lives, a sex-distinct generational projection of Scale MP-2016 was introduced.
- The actuarial cost method was changed from the Ultimate Entry Age Cost Method to the Traditional Entry Age Cost Method.

- The changes in assumptions and cost method increased the actuarial accrued liability by $5,725,894, increased the total benefit normal cost at beginning of year by $316,821 and increased the effective amortization period by about 3.4 years.
- Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

## Plan Provisions

- There were no changes in plan provisions since the prior valuation.
- A summary of plan provisions is in *Section 4, Exhibit II*.

# Development of Unfunded Actuarial Accrued Liability

## DEVELOPMENT FOR YEAR ENDED JUNE 30, 2018

| | | | |
|---|---|---|---|
| 1 | Unfunded actuarial accrued liability at beginning of year | | $109,544,136 |
| 2 | Total normal cost at beginning of year | | 2,142,505 |
| 3 | Total contributions | | -9,284,459 |
| 4 | Interest | | |
| | • For whole year on 1 + 2 | $8,376,498 | |
| | • For half year on 3 | -348,168 | |
| | Total interest | | 8,028,330 |
| 5 | Expected unfunded actuarial accrued liability | | $110,430,512 |
| 6 | Changes due to: | | |
| | • (Gain)/loss | -4,655,454 | |
| | • Assumptions | 5,725,894 | |
| | Total changes | | $1,070,440 |
| 7 | Unfunded actuarial accrued liability at end of year | | $111,500,952 |

## Actuarially Determined Contribution

The actuarially determined contribution is based on settlement agreements whereby the employer contribution for the fiscal year ending June 30, 2017 cannot be less than $8,500,000 with this amount increasing 3.00% per year. For the fiscal year ending June 30, 2020, the actuarially determined contribution is $9,288,180.

Based upon the required contribution of $9,288,180, the unfunded actuarial accrued liability of $111,500,952 as of June 30, 2018 is effectively being amortized over 27.16 years.

The contribution requirement for the fiscal year ending June 30, 2020 are based on the data previously described, the actuarial assumptions and plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

### ACTUARIALLY DETERMINED CONTRIBUTION FOR YEAR BEGINNING JULY 1

| | | 2018 | 2017 |
|---|---|---|---|
| | | Amount | Amount |
| 1. | Total normal cost | $2,098,697 | $1,992,505 |
| 2. | Administrative expenses | 175,000 | 150,000 |
| 3. | Expected employee contributions | -544,801 | -561,116 |
| 4. | Employer normal cost: (1) + (2) - (3) | $1,728,896 | $1,581,389 |
| 5. | Actuarial accrued liability | $155,547,083 | $150,413,631 |
| 6. | Actuarial value of assets | 44,046,131 | 40,869,495 |
| 7. | Unfunded actuarial accrued liability: (5) - (6) | 111,500,952 | 109,544,136 |
| 8. | Payment on unfunded actuarial accrued liability | 6,628,458 | 6,503,923 |
| 9. | Adjustment for timing* | 930,826 | 932,338 |
| 10. | Total recommended contribution: (4) + (8) + (9) | $9,288,180 | $9,017,650 |

*Actuarially determined contributions are assumed to be paid at the middle of the next fiscal year.

## History of Employer Contributions

A history of the most recent years of contributions is shown below.

### HISTORY OF EMPLOYER CONTRIBUTIONS: 2010 – 2019

| | Actuarially Determined Employer Contribution (ADEC)* | Actual Employer Contribution | |
|---|---|---|---|
| Fiscal Year Ended June 30 | Amount | Amount | Percent Contributed |
| 2010 | $7,288,144 | $6,609,967 | 90.69% |
| 2011 | 9,271,954 | 3,785,547 | 40.83% |
| 2012 | 9,596,472 | 2,926,827 | 30.50% |
| 2013 | 9,925,723 | 3,118,405 | 31.42% |
| 2014 | 12,959,095 | 5,417,483 | 41.80% |
| 2015 | 12,910,527 | 5,406,640 | 41.88% |
| 2016 | 13,805,159 | 5,360,260 | 38.83% |
| 2017 | 15,028,231 | 8,721,128 | 58.03% |
| 2018 | 15,939,806 | 8,756,200 | 54.93% |
| 2019 | 9,017,650 | - - | - - |

*Prior to 2015, this amount was the Annual Required Contribution (ARC)

## Risk

Since the actuarial valuation results are dependent on a given set of assumptions and data as of a specific date, there is a risk that emerging results may differ significantly as actual experience differs from the assumptions.

This report does not contain a detailed analysis of the potential range of future measurements, but does include a brief discussion of some risks that may affect the System. Upon request, a more detailed assessment of the risks can be provided to enable a better understanding of the risks specific to your System.

- Investment Risk (the risk that returns will be different than expected)

  If the actual return on market value for the next Plan year were 1% different from the assumed (either higher or lower), the projected unfunded actuarial liability would change by 0.4% or about $430,000.

  The market value rate of return over the last ten years has ranged from a low of -17.10% to a high of 21.08%.

- Longevity Risk (the risk that mortality experience will be different than expected)

  The actuarial valuation includes an expectation of future improvement in life expectancy. Emerging plan experience that does not match these expectations will result in either an increase or decrease in the actuarially determined contribution.

- Contribution Risk (the risk that actual contributions will be different from actuarially determined contribution)

  The System's funding policy requires payment of the actuarially determined contribution. As long as this policy is adhered to, contribution risk is negligible.

- Demographic Risk (the risk that participant experience will be different than assumed)

  Examples of this risk include:

  - Actual retirements occurring earlier or later than assumed. The value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.
  - More or less active participant turnover than assumed.

- Actual Experience Over the Past Ten Valuation Cycles and Implications for the Future

  Past experience can help demonstrate the sensitivity of key results to the Pension System's actual experience. Over the past ten valuation cycles:

  The investment gain(loss) for a year has ranged from a loss of $3,308,645 to a gain of $6,067,983. If all investment returns were equal to the assumed return over the last ten years, the market value of assets as of the current valuation date would be approximately $45,234,116 as opposed to the actual value of $44,046,131.

  The non-investment gain(loss) for a year has ranged from a loss of $5,329,882 to a gain of $6,036,186.

  The funded percentage on the actuarial value of assets has ranged from a low of 21.5% to a high of 36.3% since 2007.

- Maturity Measures

  As pension plans mature, the cash need to fulfill benefit obligations will increase over time. Therefore, cash flow projections and analysis should be performed to assure that the Pension System's asset allocation is aligned to meet emerging pension liabilities.

  Currently the Police and Firefighters System has a non-active to active participant ratio of 2.88. For the prior year benefits paid were $3,751 more than contributions received. As the Pension System matures, more cash will be needed from the investment portfolio to meet benefit payments.

## Volatility Ratios

Retirement plans are subject to volatility in the level of required contributions. This volatility tends to increase as retirement plans become more mature.

The Asset Volatility Ratio (AVR), which is equal to the market value of assets divided by total payroll, provides an indication of the potential contribution volatility for any given level of investment volatility. A higher AVR indicates that the plan is subject to a greater level of contribution volatility. This is a current measurement since it is based on the current level of assets.

The current AVR is about 6.3. This means that a 1% asset gain or loss (relative to the assumed investment return) translates to about 6.3% of one-year's payroll. The Liability Volatility Ratio (LVR), which is equal to the Actuarial Accrued Liability divided by payroll, provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. This is because, over an extended period of time, the System's assets should track the System's liabilities. For example, if a plan is 50% funded on a market value basis, the liability volatility ratio would be double the asset volatility ratio and the plan sponsor should expect contribution volatility to increase over time as the plan becomes better funded.

The LVR also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions. The current LVR is about 22.4. This is about 256% higher than the AVR. Therefore, we would expect that contribution volatility will increase over the long term.

### VOLATILITY RATIOS FOR YEARS ENDED 2007 - 2018

| Year Ended June 30 | Asset Volatility Risk | Liability Volatility Risk |
|---|---|---|
| 2007 | 3.8 | 10.6 |
| 2009 | 3.7 | 13.9 |
| 2011 | 4.8 | 15.1 |
| 2012 | 4.1 | 16.0 |
| 2013 | 4.6 | 17.9 |
| 2014 | 5.4 | 20.9 |
| 2015 | 4.6 | 19.3 |
| 2016 | 4.7 | 22.1 |
| 2017 | 5.5 | 20.1 |
| 2018 | 6.3 | 22.4 |

# Section 3: Supplemental Information

## EXHIBIT A – TABLE OF PLAN COVERAGE

| Category | Year Ended June 30 | | Change From Prior Year |
|---|---|---|---|
| | 2018 | 2017 | |
| **Active participants in valuation:** | | | |
| • Number | 68 | 71 | -4.2% |
| • Average age | 45.5 | 44.5 | 1.0 |
| • Average years of service | 16.8 | 15.9 | 0.9 |
| • Total payroll | $6,810,010 | $7,013,944 | -2.9% |
| • Average payroll | 100,147 | 98,788 | 1.4% |
| • Total active vested participants | 63 | 60 | 5.0% |
| **Retired participants*:** | | | |
| • Number in pay status | 128 | 126 | 1.6% |
| • Average age | 60.9 | 60.1 | 0.8 |
| • Average monthly benefit | $4,171 | $4,275 | -2.4% |
| **Disabled participants:** | | | |
| • Number in pay status | 50 | 51 | -2.0% |
| • Average age | 59.6 | 58.7 | 0.9 |
| • Average monthly benefit | $3,928 | $3,978 | -1.3% |
| **Beneficiaries:** | | | |
| • Number in pay status | 18 | 18 | 0.0% |
| • Average age | 71.0 | 70.0 | 1.0 |
| • Average monthly benefit | $2,265 | $2,206 | 2.7% |

*Includes alternate payees receiving benefits subject to a QDRO.

# EXHIBIT B – PARTICIPANTS IN ACTIVE SERVICE AS OF JUNE 30, 2018 BY AGE, YEARS OF SERVICE, AND AVERAGE PAYROLL

| | | Years of Service | | | | | |
|---|---|---|---|---|---|---|---|
| Age | Total | 5 - 9 | 10 - 14 | 15 - 19 | 20 - 24 | 25 - 29 | 30 - 34 |
| 30 - 34 | 5 | 3 | 2 | - - | - - | - - | - - |
| | $96,207 | $96,641 | $95,558 | - - | - - | - - | - - |
| 35 - 39 | 18 | 2 | 14 | 2 | - - | - - | - - |
| | 93,060 | 91,000 | 91,899 | $103,246 | - - | - - | - - |
| 40 - 44 | 5 | - - | 4 | - - | 1 | - - | - - |
| | 75,575 | - - | 66,849 | - - | $110,479 | - - | - - |
| 45 - 49 | 22 | - - | 4 | 5 | 12 | 1 | - - |
| | 107,258 | - - | 91,155 | 106,747 | 111,211 | $126,784 | - - |
| 50 - 54 | 13 | - - | 2 | 3 | 5 | 2 | 1 |
| | 105,219 | - - | 98,223 | 100,306 | 108,992 | 121,617 | $82,286 |
| 55 - 59 | 3 | - - | - - | 2 | 1 | - - | - - |
| | 100,874 | - - | - - | 91,491 | 119,641 | - - | - - |
| 60 - 64 | 1 | - - | - - | - - | 1 | - - | - - |
| | 132,722 | - - | - - | - - | 132,722 | - - | - - |
| 65 - 69 | - - | - - | - - | - - | - - | - - | - - |
| | - - | - - | - - | - - | - - | - - | - - |
| 70 & over | 1 | - - | - - | - - | 1 | - - | - - |
| | 113,156 | - - | - - | - - | 113,156 | - - | - - |
| Total | 68 | 5 | 26 | 12 | 21 | 3 | 1 |
| | $100,147 | $94,384 | $88,699 | $102,011 | $112,166 | $123,339 | $82,286 |

## EXHIBIT C – RECONCILIATION OF PARTICIPANT DATA

| | Active Participants | Disableds | Retired Participants | Beneficiaries | Total |
|---|---|---|---|---|---|
| **Number as of June 30, 2017** | **71** | **51** | **126** | **18** | **266** |
| • Retirements | -2 | N/A | 2 | N/A | 0 |
| • Deceased | 0 | -1 | 0 | 0 | -1 |
| • Lump sum cash-outs | -1 | 0 | 0 | 0 | -1 |
| **Number as of June 30, 2018** | **68** | **50** | **128** | **18** | **264** |

# EXHIBIT D – SUMMARY STATEMENT OF INCOME AND EXPENSES ON AN ACTUARIAL AND MARKET VALUE BASIS

| | Year Ended June 30, 2018 | | Year Ended June 30, 2017 | |
|---|---|---|---|---|
| Net assets at market value at the beginning of the year | | $40,869,495 | | $36,735,018 |
| **Contribution income:** | | | | |
| • Employer contributions | $8,756,200 | | $8,721,128 | |
| • Employer contributions | 524,044 | | 594,400 | |
| • Purchase of service contributions and other income | 4,215 | | 17,807 | |
| • Less administrative expenses | -146,220 | | -168,314 | |
| *Net contribution income* | | *$9,138,239* | | *$9,165,021* |
| **Investment income** | | *$3,326,607* | | *$4,037,715* |
| **Total income available for benefits** | | **$12,464,846** | | **$13,202,736** |
| **Less benefit payments:** | | | | |
| • Benefit Payments | -$9,288,210 | | -$9,019,014 | |
| • Refunds service buyback | 0 | | -49,245 | |
| *Net benefit payments* | | *-$9,288,210* | | *-$9,068,259* |
| **Change in reserve for future benefits** | | **$3,176,636** | | **$4,134,477** |
| **Net assets at actuarial and market value at the end of the year** | | **$44,046,131** | | **$40,869,495** |

## EXHIBIT E – DEVELOPMENT OF THE FUND THROUGH JUNE 30, 2018

| Year Ended June 30 | Employer Contributions[1] | Employee Contributions[2] | Net Investment Return[3] | Admin. Expenses[4] | Benefit Payments[5] | Actuarial and Market Value of Assets at Year-End |
|---|---|---|---|---|---|---|
| 2009 | $5,650,257 | $843,030 | -$6,432,489 | $3,340 | $5,493,400 | $31,674,743 |
| 2010 | 6,609,967 | 733,959 | 3,841,298 | 3,760 | 6,375,551 | 36,480,656 |
| 2011 | 3,785,547 | 603,274 | 7,463,380 | 3,800 | 6,519,908 | 41,809,149 |
| 2012 | 3,124,957 | 972,481 | -218,756 | 3,495 | 7,973,177 | 37,711,159 |
| 2013 | 3,118,405 | 653,668 | 3,841,617 | 0 | 7,457,405 | 37,867,444 |
| 2014 | 5,417,483 | 726,409 | 5,529,774 | 254,635 | 7,964,640 | 41,321,835 |
| 2015 | 5,406,640 | 683,874 | 341,030 | 142,000 | 8,172,227 | 39,439,152 |
| 2016 | 5,360,260 | 627,636 | 50,542 | 155,657 | 8,586,915 | 36,735,018 |
| 2017 | 8,721,128 | 612,207 | 4,037,715 | 168,314 | 9,068,259 | 40,869,495 |
| 2018 | 8,756,200 | 528,259 | 3,326,607 | 146,220 | 9,288,210 | 44,046,131 |

[1] *Includes employer contribution for claims and judgment*
[2] *Includes single premium deferred annuities and purchase of service*
[3] *Net of investment fees*
[4] *Through 2013, only reflects ING account balance maintenance fees*
[5] *Includes refunds service buybacks*

## EXHIBIT F – DEFINITION OF PENSION TERMS

The following list defines certain technical terms for the convenience of the reader:

| | |
|---|---|
| **Actuarial Accrued Liability for Actives:** | The equivalent of the accumulated normal costs allocated to the years before the valuation date. |
| **Actuarial Accrued Liability for Pensioners and Beneficiaries:** | The single-sum value of lifetime benefits to existing pensioners and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits. |
| **Actuarial Cost Method:** | A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the actuarially determined contribution. |
| **Actuarial Gain or Loss:** | A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield in actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period. |
| **Actuarially Equivalent:** | Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions. |
| **Actuarial Present Value (APV):** | The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:<br>Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)<br>Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and<br>Discounted according to an assumed rate (or rates) of return to reflect the time value of money. |

| | |
|---|---|
| **Actuarial Present Value of Future Plan Benefits:** | The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due. |
| **Actuarial Valuation:** | The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL). |
| **Actuarial Value of Assets (AVA):** | The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC. |
| **Actuarially Determined:** | Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law. |
| **Actuarially Determined Contribution (ADC):** | The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment. |
| **Amortization Method:** | A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase. |
| **Amortization Payment:** | The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability. |

| | |
|---|---|
| **Assumptions or Actuarial Assumptions:** | The estimates upon which the cost of the Fund is calculated, including:<br>Investment return - the rate of investment yield that the Fund will earn over the long-term future;<br>Mortality rates - the death rates of employees and pensioners; life expectancy is based on these rates;<br>Retirement rates - the rate or probability of retirement at a given age or service;<br>Disability rates – the probability of disability retirement at a given age;<br>Withdrawal rates - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;<br>Salary increase rates - the rates of salary increase due to inflation and productivity growth. |
| **Closed Amortization Period:** | A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Open Amortization Period. |
| **Decrements:** | Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal. |
| **Defined Benefit Plan:** | A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service. |
| **Defined Contribution Plan:** | A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance. |
| **Employer Normal Cost:** | The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions. |
| **Experience Study:** | A periodic review and analysis of the actual experience of the Fund that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary. |
| **Funded Ratio:** | The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA. |

| | |
|---|---|
| **GASB 67 and GASB 68:** | Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves. |
| **Investment Return:** | The rate of earnings of the Fund from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next. |
| **Net Pension Liability (NPL):** | The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position. |
| **Normal Cost:** | That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. |
| **Open Amortization Period:** | An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the actuarial assumptions are realized. |
| **Plan Fiduciary Net Position:** | Market value of assets. |
| **Total Pension Liability (TPL):** | The actuarial accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68. |
| **Unfunded Actuarial Accrued Liability:** | The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus. |
| **Valuation Date or Actuarial Valuation Date:** | The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date. |

# Section 4: Actuarial Valuation Basis

## EXHIBIT I – ACTUARIAL ASSUMPTIONS AND ACTUARIAL COST METHOD

| | |
|---|---|
| **Rationale for Assumptions** | The information and analysis used in selecting each demographic assumption that has a significant effect on this actuarial valuation is shown in the Actuarial Experience Review July 1, 2014 to June 30, 2017 dated November 30, 2017. Please see this study for the rationale for each assumption used. As noted in this study, due to the low number of participants in the Police and Firefighters System, the mortality experience is not credible. It is our understanding that the State of Rhode Island deems the mortality assumptions reasonable if they match the assumptions used for the State of Rhode Island Municipal Employees Retirement System (MERS). Therefore, the mortality assumptions shown below match the MERS assumptions used. |
| **Net Investment Return:** | 7.25%<br>The net investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes as well as the System's target asset allocation. |
| **Inflation:** | 2.50% |
| **Salary Increases:** | 3.75%; including 2.50% for inflationary increases, 0.50% for productivity increases and 0.75% for promotional and longevity increases. |
| **Cost-of-Living Adjustments:** | 0% through June 30, 2022; 1.25% compounded annually commencing July 1, 2022. |
| **Mortality Rates:** | |
| *Pre-retirement:* | RP-2014 Employee Mortality Table |
| *Healthy annuitants:* | Male: RP-2014 Blue Collar Healthy Annuitant Mortality Table for males, projected generationally with Scale MP-2016<br>Female: RP-2014 Healthy Annuitant Mortality Table for females, projected generationally with Scale MP-2016 |
| *Disabled annuitants*: | RP-2014 Disabled Retiree Mortality Table, projected generationally with Scale MP-2016 |

**Annuitant Mortality Rates:**

| Age | Rate (%) | | | |
|---|---|---|---|---|
| | Healthy[1] | | Disabled[1] | |
| | Male | Female | Male | Female |
| 55 | 0.60% | 0.36% | 2.34% | 1.45% |
| 60 | 0.85 | 0.52 | 2.66 | 1.70 |
| 65 | 1.26 | 0.80 | 3.17 | 2.09 |
| 70 | 1.97 | 1.29 | 4.03 | 2.82 |
| 75 | 3.15 | 2.09 | 5.43 | 4.10 |
| 80 | 5.19 | 3.48 | 7.66 | 6.10 |
| 85 | 8.68 | 6.05 | 11.33 | 9.04 |
| 90 | 14.64 | 10.71 | 17.30 | 13.27 |

*[1]Rates shown do not include generational projection.*

**Termination Rates before Retirement:**

| Age | Rate (%) | | | | | |
|---|---|---|---|---|---|---|
| | Mortality | | Disability | | Withdrawal | |
| | Male | Female | Male | Female | Male | Female |
| 20 | 0.04% | 0.02% | 0.00% | 0.00% | 0.00% | 0.00% |
| 25 | 0.05 | 0.02 | 0.34 | 0.34 | 0.00 | 0.00 |
| 30 | 0.05 | 0.02 | 0.44 | 0.44 | 0.00 | 0.00 |
| 35 | 0.05 | 0.03 | 0.58 | 0.58 | 0.00 | 0.00 |
| 40 | 0.06 | 0.04 | 0.88 | 0.88 | 0.00 | 0.00 |
| 45 | 0.10 | 0.07 | 1.44 | 1.44 | 0.00 | 0.00 |
| 50 | 0.17 | 0.11 | 2.42 | 2.42 | 0.00 | 0.00 |
| 55 | 0.28 | 0.17 | 0.00 | 0.00 | 0.00 | 0.00 |
| 60 | 0.47 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 |

*Note: 100% of deaths and disabilities are assumed to be service related.*

**Retirement Rates:**

| Police | |
|---|---|
| Years of Service | Retirement Probability |
| 18-20 | 25% |
| 21-22 | 35% |
| 23-24 | 50% |
| 25 or more | 100% |

| Firefighters | |
|---|---|
| Years of Service | Retirement Probability |
| 20 | 75% |
| 21-25 | 50% |
| 26 or more | 100% |

*All employees are assumed to retire no later than age 65.*

| | |
|---|---|
| **Description of Weighted Average Retirement Age:** | Age 50.6, determined as follows: The weighted average retirement age for each participant is calculated as the sum of the product of each potential current or future retirement age times the probability of surviving from current age to that age and then retiring at that age, assuming no other decrements. The overall weighted retirement age is the average of the individual retirement ages based on all the active participants included in the June 30, 2018 actuarial valuation. |
| **Percent Married:** | 85% of all active and retired police officers are assumed to be married. |
| **Age of Spouse:** | Females are assumed to be three years younger than males, unless dates of birth are provided. |
| **Administrative Expenses:** | Administrative expenses are assumed to be $87,500, payable as of the beginning of the year. |
| **Amortization Method:** | Each year, the amortization payment is determined by subtracting the employer normal cost from the required contribution under the settlement agreement. The effective amortization period is then determined from the current unfunded actuarial accrued liability and the calculated amortization payment based on the System's funding interest rate and assuming the payment will increase 3.00% annually. |
| **Actuarial Value of Assets:** | At market value. |
| **Actuarial Cost Method:** | Entry Age Actuarial Cost Method. Entry Age is current age minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary, with Normal Cost determined using the plan of benefits applicable to each participant. |
| **Justification for Changes in Actuarial Assumptions and Cost Method:** | A comprehensive Actuarial Experience Review, covering the period July 1, 2014 through June 30, 2017, was completed in 2017. As a result of that study, the following assumption and method changes were proposed by the actuary and subsequently were approved by the Board in May, 2018. These changes are reflected for the first time in this valuation.<br>➢ The investment return assumption was lowered from 7.50% to 7.25%.<br>➢ The inflation assumption was lowered from 2.75% to 2.50%. |

| | |
|---|---|
| **Justification for Changes in Actuarial Assumptions and Cost Method cont:** | ➢ The payroll growth rate assumption was decreased from 3.25% to 3.00%, maintaining the productivity assumption of 0.75%.<br>➢ The salary scale assumption was decreased from a flat rate of 4.00% per year to 3.75%.<br>➢ The administrative expense assumption of $75,000 payable at the beginning of the year was increased to $87,500.<br>➢ The pre-retirement mortality assumption for males was changed from 115% of the RP-2000 Combined Healthy White Collar Mortality Table for males to the RP-2014 Employee Table for males. For females, the assumption was changed from 95% of the RP-2000 Combined Healthy White Collar Mortality Table for females to the RP-2014 Employee Table for females. The generational projection scale for pre-retirement mortality was removed.<br>➢ The post-retirement mortality assumption for healthy male retirees and beneficiaries was changed from 115% of the RP-2000 Combined Healthy White Collar Mortality Table for males to the RP-2014 Blue Collar Healthy Annuitant Mortality Table for males. The post-retirement mortality assumption for healthy female retirees and beneficiaries was changed from 95% of the RP-2000 Combined Healthy White Collar Mortality Table for females to the RP-2014 Combined Healthy Annuitant Mortality Table for females. The generational projection scale for post-retirement mortality was also revised from the sex-distinct Scale AA projected from 2000 to the sex-distinct Scale MP-2016.<br>➢ The mortality assumption for disabled retirees was changed from 60% of the sex-distinct PBGC Table VI(a) for disabled participants eligible for Social Security disability benefits to the sex-distinct RP-2014 Disabled Retiree Table. In conjunction with the revised mortality table for disabled lives, a sex-distinct generational projection of Scale MP-2016 was introduced.<br>➢ The actuarial cost method was changed from the Ultimate Entry Age Cost Method to the Traditional Entry Age Cost Method. |

## EXHIBIT II-A – SUMMARY OF PLAN PROVISIONS FOR POLICE

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

| | |
|---|---|
| **Plan Year:** | July 1 through June 30 |
| **Plan Status:** | Closed to new entrants as of July 1, 2010 |
| **Normal Retirement:** | |
| *Eligibility* | 18 years of service |
| *Amount* | The annual benefit at retirement is equal to the percentage of final salary specified in the table below. For pension purposes, final average salary is a three-year average of pay which is documented on the W-2 tax form, except monies paid to the Town of Johnston which were funded by private companies to hire officers for non-municipal detail assignments and the officer's gun/qualification allowance, with overtime limited to $35,000 each year. |

| Years of Service | Benefit as a Percentage of Final Average Salary |
|---|---|
| 18 | 45.0% |
| 19 | 47.5 |
| 20 | 50.0 |
| 21 | 52.5 |
| 22 | 55.0 |
| 23 | 57.5 |
| 24 | 60.0 |
| 25 | 65.0 |
| 26 | 66.0 |
| 27 | 67.0 |
| 28 | 68.0 |
| 29 | 69.0 |
| 30 or more | 70.0 |

| | |
|---|---|
| *Commencement Date* | Retirement benefits commence as of the first payroll period after retirement. |

| | |
|---|---|
| **Service Related Disability:** | |
| *Eligibility* | Retirement because of a job related mental or physical incapacity |
| *Amount* | 66 2/3% of final salary |
| *Commencement Date* | Benefits commence as of the first payroll period after disability |
| **Vesting:** | |
| *Eligibility* | Upon termination of employment after 10 years of service a member is eligible for a benefit deferred to retirement age. |
| *Benefit Formula* | 25% of final salary at termination plus cumulative COLA. Member may waive right to deferred retirement benefit in return for refund of employee and employer contribution account. |
| *Commencement Date* | 21st anniversary of employment for deferred annuity. Immediate payment for refund. |
| **Spouse's Pre-Retirement Death Benefit** | |
| *Eligibility* | Death while actively employed |
| *Benefit Formula* | Surviving spouse (or if none, dependent children) receives benefit of 50% of final salary (30% of final salary for non-service related death) |
| *Commencement Date* | Benefits commence as of the first payroll period after death |
| **Retiree Cost-Of-Living Increases:** | Between July 1, 2017 and June 30, 2012, the COLA is suspended. Commencing July 1, 2022 the annual COLA will be 1.25%, compounded annually. |
| **Military Service Purchase:** | A member may purchase up to two years of pension service credit for prior military service by contributing 6% of pay at any time prior to retirement, for each year purchased. |
| **Employee Contributions:** | 8% of pensionable earnings. Employees terminating before retirement may withdraw the employee-provided account and forfeit their right to pension benefits. |
| **Eligibility:** | All members of the Police Department hired before July 1, 2010 (members hired after this date are participants in the Rhode Island Municipal Employees Retirement System). |
| **Optional Forms of Payment:** | All single participants receive a life annuity. All married participants receive a fully subsidized 67.5% joint and survivor annuity. There are no optional forms of payment. |
| **Employer Contributions:** | The Town of Johnston adopted a policy such that the scheduled contribution is at least $4,575,446 for the fiscal year ending June 30, 2017, with this amount to be increased 3.00% annually. |
| **Changes in Plan Provisions:** | There have been no changes in plan provisions since the last valuation. |

## EXHIBIT II-B – SUMMARY OF PLAN PROVISIONS FOR FIREFIGHTERS

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

| | |
|---|---|
| **Plan Year:** | July 1 through June 30 |
| **Plan Status:** | Closed to new entrants as of July 1, 1999 |
| **Normal Retirement:** | |
| *Eligibility* | 20 years of service |
| *Amount* | The annual benefit at retirement is equal to the percentage of final average salary specified in the table below. For pension purposes, final average salary is a three-year average of pay comprising base, holiday and longevity pay and up to $35,000 of overtime pay. |

| Years of Service | Benefit as a Percentage of Final Average Salary |
|---|---|
| 20 | 50.0% |
| 21 | 52.5 |
| 22 | 55.0 |
| 23 | 57.5 |
| 24 | 60.0 |
| 25 | 62.5 |
| 26 | 65.0 |
| 27 | 67.5 |
| 28 | 70.0 |
| 29 | 72.5 |
| 30 or more | 75.0 |

*Note: Years of service include call service.*

| | |
|---|---|
| *Commencement Date* | Retirement benefits commence as of the first payroll period after retirement. |

| | |
|---|---|
| **Disability:** | |
| Service Related | |
| *Eligibility* | Job-related mental or physical incapacity. Disability to be determined by the Town. |
| *Amount* | 66 2/3% of final average salary |
| Non-Service Related | |
| *Eligibility* | Retirement because of a non-job-related mental or physical incapacity. Disability to be determined by the Town. |
| *Amount* | Benefit applicable under retirement or vested termination (25% of final average salary for non-vested member is minimum benefit). |
| *Commencement Date* | Benefits commence as of the first payroll period after disability |
| **Vesting:** | |
| *Eligibility* | 10 years of service |
| *Benefit Formula* | 25% of final average salary at termination with 10 years of service, increasing by 2.5% for each additional year of service up to a maximum of 47.5% of final average salary. |
| *Commencement Date* | Age 55 |
| **Spouse's Pre-Retirement Death Benefit:** | |
| *Eligibility* | Death while actively employed |
| *Benefit Formula* | Surviving spouse (or if none, dependent children) receives 50% of final average salary (30% of final average salary for non-service related death). If surviving spouse has dependent children under age 18, additional percentages of final average salary up to a 66 2/3% benefit if service related or 50% benefit if not service related. |
| **Retiree Cost-of-Living Increases:** | Between July 1, 2017 and June 30, 2022, the COLA is suspended. Commencing July 1, 2022, the annual COLA will be 1.25% compounded annually. |
| **Military Service Purchase:** | A member may purchase up to four years of pension service credit for prior military service by contributing 10% of the member's base pay at hire at any time prior to retirement, for each year purchased. |
| **Employee Contributions:** | 8% of pensionable earnings |
| **Eligibility:** | All members of the fire department hired before July 1, 1999 (members hired after this date are participants in the Rhode Island Municipal Employees Retirement System). |
| **Optional Forms of Payment:** | All single participants receive a life annuity. All married participants receive a fully subsidized 67.5% joint and survivor annuity. There are no optional forms of payment. |

| | |
|---|---|
| **Employer Contributions:** | The Town of Johnston adopted a policy such that the scheduled contribution is at least $3,924,554 for the fiscal year ending June 30, 2017, with this amount to be increased 3.00% annually. |
| **Changes in Plan Provisions:** | There have been no changes in plan provisions since the last valuation. |

8799323v1/05016.004