

***MIDDLESEX COUNTY RETIREMENT SYSTEM***

***FINANCIAL STATEMENTS***

***YEAR ENDED DECEMBER 31, 2017***

**MIDDLESEX COUNTY RETIREMENT SYSTEM**

**FINANCIAL STATEMENTS**

**YEAR ENDED DECEMBER 31, 2017**

**TABLE OF CONTENTS**

|                                                                                            |           |
|--------------------------------------------------------------------------------------------|-----------|
| <b>Financial Section .....</b>                                                             | <b>1</b>  |
| Independent Auditor's Report .....                                                         | 2         |
| Management's Discussion and Analysis.....                                                  | 4         |
| Financial Statements.....                                                                  | 7         |
| Statement of Fiduciary Net Position .....                                                  | 7         |
| Statement of Changes in Fiduciary Net Position.....                                        | 8         |
| Notes to Financial Statements.....                                                         | 9         |
| Required Supplementary Information .....                                                   | 19        |
| Schedule of Changes in the Net Pension Liability and Related Ratios.....                   | 20        |
| Schedule of Contributions .....                                                            | 21        |
| Schedule of Investment Returns .....                                                       | 22        |
| Notes to Required Supplementary Information .....                                          | 23        |
| <b>Audit of Specific Elements, Accounts and Items of Financial Statements .....</b>        | <b>24</b> |
| Independent Auditor's Report .....                                                         | 26        |
| Pension Plan Schedules .....                                                               | 28        |
| Schedule of Employer Allocations .....                                                     | 28        |
| Schedule of Pension Amounts by Employer .....                                              | 29        |
| Notes to Schedule of Employer Allocations and Schedule of Pension Amounts by Employer..... | 48        |

# ***Financial Section***



100 Quannapowitt Parkway

Suite 101

Wakefield, MA 01880

T. 781-914-1700

F. 781-914-1701

[www.powersandsullivan.com](http://www.powersandsullivan.com)

## **Independent Auditor's Report**

To the Honorable Middlesex County Retirement Board  
Middlesex County Retirement System  
Billerica, Massachusetts

## **Report on the Financial Statements**

We have audited the accompanying financial statements of Middlesex County Retirement System (MCRS) as of and for the year ended December 31, 2017, and the related notes to the financial statements, which collectively comprise the Middlesex County Retirement System's financial statements as listed in the table of contents.

## **Management's Responsibility for the Financial Statements**

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

## **Auditor's Responsibility**

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

## **Opinion**

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Middlesex County Retirement System as of December 31, 2017, and the results of its operations and changes in its financial position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

## **Other Matters**

### *Required Supplementary Information*

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis; the Schedule of Changes in the Net Pension Liability and Related Ratios; the Schedule of Contributions; and the Schedule of Investment Returns be presented to supplement the financial statements. Such information, although not a part of the financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the financial statements, and other knowledge we obtained during our audit of the financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

## **Other Reporting Required by Government Auditing Standards**

In accordance with *Government Auditing Standards*, we have also issued our report dated August 7, 2018, on our consideration of the Middlesex County Retirement System's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, grant agreements and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the Middlesex County Retirement System's internal control over financial reporting and compliance.

## **Restriction on Use**

This report is intended solely for the information and use of the Middlesex County Retirement System, the Public Employee Retirement Administration Commission and all member units and is not intended to be and should not be used by anyone other than these specified parties.

A handwritten signature in black ink, appearing to read "Bowers & Sullivan LLC", is written over a horizontal line.

August 7, 2018

## ***Management's Discussion and Analysis***

As management of the Middlesex County Retirement System, we offer readers of these financial statements this narrative overview and analysis of the financial activities for the year ended December 31, 2017. The System complies with financial reporting requirements issued by the Governmental Accounting Standards Board (GASB).

The GASB is the authoritative standard setting body that provides guidance on how to prepare financial statements in conformity with generally accepted accounting principles (GAAP). Users of these financial statements rely on the GASB to establish consistent reporting standards for all governments in the United States. This consistent application is the only way users can assess the financial condition of a public retirement system compared to others.

### **Financial Highlights**

- The System's assets exceeded its liabilities at the close of the most recent year by \$1.4 billion (net position).
- The System's net position increased by \$195.9 million for the year ended December 31, 2017.
- Total investment income was \$195.7 million; investment expenses were \$6.4 million; and net investment income was \$189.3 million.
- Total contributions were \$170.0 million, primarily consisting of \$115.4 million from employers, \$44.2 from members, \$5.7 million in transfers from other systems and \$3.6 million from other retirement systems for their share of retiree pension payments.
- Retirement benefits, refunds, and transfers of member deductions to other systems amounted to \$160.1 million.
- Depreciation, administrative and building expenses were \$3.2 million.
- The Total Pension Liability is \$2.8 billion as of December 31, 2017, while the Net Pension Liability is \$1.4 billion.
- The Plan fiduciary net position as a percentage of the total pension liability is 49.27%.

### ***Overview of the Financial Statements***

This discussion and analysis is intended to serve as an introduction to the System fiduciary financial statements. These fiduciary financial statements comprise of four components: 1) management's discussion and analysis, 2) fiduciary financial statements, 3) notes to the financial statements and 4) required supplementary information.

### **Fiduciary Financial Statements**

The *statement of net position* presents information on all assets and deferred outflows less deferred inflows and liabilities with the difference reported as *net position*. Over time, increases or decreases in net position may serve as a useful indicator of whether the financial position is improving or deteriorating.

The *statement of changes in fiduciary net position* presents information showing how the system's net position changed during the most recent year. All changes in net position are reported as soon as the underlying event giving rise to the change occurs, *regardless of the timing of related cash flows*. Thus, additions and deductions are reported in this statement for some items that will only result in cash flows in future periods.

### **Notes to the financial statements**

The notes provide additional information that is essential to a full understanding of the data provided in the fiduciary financial statements.

## Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the Schedule of Changes in the Net Pension Liability and Related Ratios; the Schedule of Contributions; and the Schedule of Investment Returns be presented to supplement the financial statements. Such information, although not a part of the financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the financial statements in an appropriate operational, economic, or historical context.

## Financial Analysis

As noted earlier, net position may serve over time as a useful indicator of the System's financial position. The System's net position exceeded liabilities by \$1.4 billion at the close of 2017.

The assets accumulated are held to provide pension benefits for qualified retirees along with active and inactive employees of the member units. At year-end the system's net position include investments of \$1.3 billion, cash of \$58.8 million and current accounts receivable of \$9.1 million. The system also had capital assets, net of accumulated depreciation of \$5.4 million at year-end primarily consisting of land, an office building, and building improvements.

In 2017 the System's contributions were \$170.0 million while deductions were \$163.4 million which resulted in a current surplus of \$6.6 million. In 2016 the System's contributions were \$161.4 million while deductions were \$158.4 million which resulted in a prior year surplus of \$3.0 million. Therefore, for these two years the System was able to sustain operations independent of investment income.

The primary change in net position over the prior year relates to each year's investment performance. Net investment income was \$189.3 million and \$74.9 million in 2017 and 2016 respectively. The annual money weighted rate of return was 17.25% and 7.35% in 2017 and 2016 respectively. The system's investment policy is designed to achieve a long-term rate of return of 7.50% and fluctuation in annual investment returns is expected.

The following tables present summarized financial information for the past two years.

|                                                     | 2017                    | 2016                 |
|-----------------------------------------------------|-------------------------|----------------------|
| <b>Assets:</b>                                      |                         |                      |
| Cash.....                                           | \$ 58,763,167           | \$ 69,317,187        |
| Investments.....                                    | 1,305,346,026           | 1,100,286,524        |
| Receivables.....                                    | 9,056,556               | 7,408,840            |
| Capital assets, net of accumulated depreciation.... | 5,353,968               | 5,625,313            |
| <b>Total assets.....</b>                            | <b>1,378,519,717</b>    | <b>1,182,637,864</b> |
| <b>Liabilities:</b>                                 |                         |                      |
| Accounts payable.....                               | 150,658                 | 129,806              |
| Other.....                                          | 17,840                  | 87,864               |
| <b>Total liabilities.....</b>                       | <b>168,498</b>          | <b>217,670</b>       |
| <b>Net Position Restricted for Pensions.....</b>    | <b>\$ 1,378,351,219</b> | <b>1,182,420,194</b> |

|                                                         | 2017                    | 2016                    |
|---------------------------------------------------------|-------------------------|-------------------------|
| <b>Additions:</b>                                       |                         |                         |
| Contributions:                                          |                         |                         |
| Member contributions..... \$                            | 44,177,815              | \$ 47,097,081           |
| Employer contributions.....                             | 115,462,035             | 107,096,707             |
| Other contributions.....                                | 10,320,943              | 7,191,133               |
| Total contributions.....                                | 169,960,793             | 161,384,921             |
| Net investment income (loss):                           |                         |                         |
| Total investment income (loss).....                     | 195,709,657             | 80,720,725              |
| Less, investment expenses.....                          | (6,366,083)             | (5,803,179)             |
| Net investment income (loss).....                       | 189,343,574             | 74,917,546              |
| <b>Total additions.....</b>                             | <b>359,304,367</b>      | <b>236,302,467</b>      |
| <b>Deductions:</b>                                      |                         |                         |
| Administration.....                                     | 2,619,464               | 3,062,521               |
| Retirement benefits, refunds and transfers.....         | 160,139,193             | 154,904,388             |
| Building operations and maintenance.....                | 306,177                 | 235,667                 |
| Depreciation.....                                       | 308,508                 | 162,594                 |
| <b>Total deductions.....</b>                            | <b>163,373,342</b>      | <b>158,365,170</b>      |
| Net increase (decrease) in fiduciary net position....   | 195,931,025             | 77,937,297              |
| <b>Fiduciary net position at beginning of year.....</b> | <b>1,182,420,194</b>    | <b>1,104,482,897</b>    |
| <b>Fiduciary net position at end of year..... \$</b>    | <b>\$ 1,378,351,219</b> | <b>\$ 1,182,420,194</b> |

### ***Requests for Information***

This financial report is designed to provide a general overview of the System's finances for all those with an interest in the System's finances. Questions concerning any of the information provided in this report or requests for additional financial information should be addressed to the System's Chief Administrative Officer, 25 Linnell Circle, Billerica, Massachusetts 01865.

## STATEMENT OF FIDUCIARY NET POSITION

DECEMBER 31, 2017

### Assets

|                                                      |                                |
|------------------------------------------------------|--------------------------------|
| Cash and cash equivalents.....                       | \$ 58,763,167                  |
| Investments:                                         |                                |
| Investments in Pension Reserve Investment Trust...   | 1,295,940,107                  |
| Other Investments.....                               | <u>9,405,919</u>               |
| Total investments.....                               | <u>1,305,346,026</u>           |
| Receivables, net of allowance for uncollectibles:    |                                |
| Member deductions.....                               | 2,871,114                      |
| Member contributions.....                            | 97,485                         |
| Employer pension appropriation.....                  | 51,965                         |
| Reimbursements from other systems.....               | 3,896,021                      |
| Member make-up payments and redeposits.....          | 324,915                        |
| Other accounts receivable.....                       | <u>1,815,056</u>               |
| Total Receivables.....                               | <u>9,056,556</u>               |
| Capital assets, net of accumulated depreciation..... | <u>5,353,968</u>               |
| Total Assets.....                                    | <u>1,378,519,717</u>           |
| Liabilities                                          |                                |
| Accounts payable.....                                | 150,658                        |
| Other liabilities.....                               | <u>17,840</u>                  |
| Total Liabilities.....                               | <u>168,498</u>                 |
| Net Position Restricted for Pensions.....            | \$ <u><u>1,378,351,219</u></u> |

See notes to financial statements.

# STATEMENT OF CHANGES IN FIDUCIARY NET POSITION

YEAR ENDED DECEMBER 31, 2017

## Additions:

### Contributions:

|                                               |                |
|-----------------------------------------------|----------------|
| Employer pension appropriation.....           | \$ 115,377,205 |
| Member contributions.....                     | 44,177,815     |
| Transfers from other systems.....             | 5,727,459      |
| 3(8)(c) contributions from other systems..... | 3,572,503      |
| Workers' compensation settlements.....        | 58,300         |
| Federal grant reimbursements.....             | 26,530         |
| Members' makeup payments and redeposits.....  | 820,577        |
| Interest not refunded.....                    | 112,658        |
| Reimbursement of 91A overearnings.....        | <u>87,746</u>  |

Total contributions..... 169,960,793

### Net investment income:

|                               |                    |
|-------------------------------|--------------------|
| Investment income (loss)..... | 195,709,657        |
| Less: investment expense..... | <u>(6,366,083)</u> |

Net investment income (loss)..... 189,343,574

Total additions..... 359,304,367

## Deductions:

|                                          |                |
|------------------------------------------|----------------|
| Administration.....                      | 2,619,464      |
| Building operations and maintenance..... | 306,177        |
| Retirement benefits and refunds.....     | 144,622,539    |
| Transfers to other systems.....          | 5,051,691      |
| 3(8)(c) transfer to other systems.....   | 10,464,963     |
| Depreciation.....                        | <u>308,508</u> |

Total deductions..... 163,373,342

Net increase (decrease) in fiduciary net position..... 195,931,025

Fiduciary net position at beginning of year..... 1,182,420,194

Fiduciary net position at end of year..... \$ 1,378,351,219

See notes to financial statements.

**NOTE 1 – PLAN DESCRIPTION**

The Middlesex County Retirement System is a multiple-employer, cost-sharing, contributory defined benefit pension plan covering all employees of the governmental member units deemed eligible by the Middlesex County Retirement Board (the Board), with the exception of school department employees who serve in a teaching capacity. The pensions of such school employees are administered by the Commonwealth of Massachusetts' Teachers Retirement System. Membership in the System is mandatory immediately upon the commencement of employment for all permanent employees working a minimum of 20 hours per week. As of January 1, 2018, the System had 71 participating employers.

Instituted in 1937, the System is a member of the Massachusetts Contributory Retirement System and is governed by Chapter 32 of the Massachusetts General Laws. Membership in the Plan is mandatory immediately upon the commencement of employment for all permanent, full-time employees.

Massachusetts contributory retirement system benefits are, with certain exceptions, uniform from system to system. The System provides for retirement allowance benefits up to a maximum of 80% of a member's highest three-year average annual rate of regular compensation for those hired prior to April 2, 2012 and the highest five-year average for members hired after that date. Benefit payments are based upon a member's age, length of creditable service, level of compensation, and group classification.

Members become vested after ten years of creditable service. A superannuation retirement allowance may be received upon the completion of 20 years of service or upon reaching the age of 55 with 10 years of service. Normal retirement for most employees occurs at age 65 (except for certain hazardous duty and public safety positions, whose normal retirement is at age 55).

A retirement allowance consists of two parts: an annuity and a pension. A member's accumulated total deductions and the interest they generate constitute the annuity. The differential between the total retirement benefit and the annuity is the pension.

Active members contribute between 5% and 11% of their gross regular compensation. The percentage rate is keyed to the date upon which an employee's membership commences. These deductions are deposited in the Annuity Savings Fund and earn interest at a rate determined by the Public Employee Retirement Administration Commission's (PERAC) actuary. When a member's retirement becomes effective, his/her deductions and related interest are transferred to the Annuity Reserve Fund. Any cost-of-living adjustments granted between 1981 and 1997 and any increase in other benefits imposed by the Commonwealth of Massachusetts' state law during those years are borne by the Commonwealth and are deposited into the Pension Fund. Cost-of-living adjustments granted after 1997 must be approved by the System and all costs are borne by the System.

The pension portion of any retirement benefit is paid from the Pension Fund. The governmental unit employing the member must annually appropriate and contribute the amount of current-year pension assessment.

Administrative expenses, which were previously appropriated from the governmental entities whose employees are members of the system, are now paid from investment income.

Members who become permanently and totally disabled for further duty may be eligible to receive a disability retirement allowance. The amount of benefits to be received in such cases is dependent on several factors, including whether or not the disability is work related, the member's age, years of creditable service, level of compensation, veterans' status and group classification.

Survivor benefits are extended to eligible beneficiaries of members whose death occurs prior to or following retirement.

**NOTE 2 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES**

The accompanying financial statements of the Middlesex County Retirement System have been prepared in accordance with accounting principles generally accepted in the United States of America (GAAP). The Governmental Accounting Standards Board (GASB) is the recognized standard-setting body for establishing governmental accounting and financial reporting principles.

MCRS is a special-purpose government engaged only in fiduciary activities. Accordingly, the financial statements are reported using the flow of economic resources measurement focus and use the accrual basis of accounting. Under this method, additions are recorded when earned and deductions are recorded when the liabilities are incurred.

**Cash and Investments**

Cash and cash equivalents are considered to be cash on hand, demand deposits and short-term investments with an original maturity of three months or less from the date of acquisition. Investments are carried at fair value. The fair values were determined by the closing price for those securities traded on national stock exchanges and at the average bid-and-asked quotation for those securities traded in the over-the-counter market. The fair value of private equities are based on management's valuation of estimates and assumptions from information and representations provided by the respective general partners, in the absence of readily ascertainable market values. Real estate assets are reported at fair value utilizing an income approach to valuation along with independent appraisals and estimates by management.

**Fair Value Measurements**

The System reports required types of financial instruments in accordance with the fair value standards. These standards require an entity to maximize the use of observable inputs (such as quoted prices in active markets) and minimize the use of unobservable inputs (such as appraisals or valuation techniques) to determine fair value. Fair value standards also require the government to classify these financial instruments into a three-level hierarchy, based on the priority of inputs to the valuation technique or in accordance with net asset value practical expedient rules, which allow for either Level 2 or Level 3 depending on lock up and notice periods associated with the underlying funds.

Instruments measured and reported at fair value are classified and disclosed in one of the following categories:

Level 1 – Quoted prices are available in active markets for identical instruments as of the reporting date. Instruments, which are generally included in this category, include actively traded equity and debt securities, U.S. government obligations, and mutual funds with quoted market prices in active markets.

Level 2 – Pricing inputs are other than quoted in active markets, which are either directly or indirectly observable as of the reporting date, and fair value is determined through the use of models or other valuation methodologies. Certain fixed income securities, primarily corporate bonds, are classified as Level 2 because fair values are estimated using pricing models, matrix pricing, or discounted cash flows.

Level 3 – Pricing inputs are unobservable for the instrument and include situations where there is little, if any, market activity for the instrument. The inputs into the determination of fair value require significant management judgment or estimation.

In some instances the inputs used to measure fair value may fall into different levels of the fair value hierarchy and is based on the lowest level of input that is significant to the fair value measurement.

Market price is affected by a number of factors, including the type of instrument and the characteristics specific to the instrument. Instruments with readily available active quoted prices generally will have a higher degree of market price observability and a lesser degree of judgment used in measuring fair value. It is reasonably possible that change in values of these instruments will occur in the near term and that such changes could materially affect amounts reported in these financial statements. For more information on the fair value of the System's financial instruments, see Note 5 – Cash and Investments.

#### Accounts Receivable

Accounts receivable consist of member deductions, pension fund appropriations, and other miscellaneous reimbursements. These receivables are considered 100% collectible and therefore do not report an allowance for uncollectibles.

#### Deferred Outflows/Inflows of Resources

In addition to assets, the statement of fiduciary net position will sometimes report a separate section for deferred outflows of resources. This separate financial statement element, *deferred outflows of resources*, represents a consumption of fiduciary net position that applies to a future period(s) and so will not be recognized as an outflow of resources (deduction) until then. The MCRS did not have any items that qualify for reporting in this category.

In addition to liabilities, the statement of fiduciary net position will sometimes report a separate section for deferred inflows of resources. This separate financial statement element, *deferred inflows of resources*, represents an acquisition of net position that applies to a future period(s) and so will not be recognized as an inflow of resources (addition) until that time. The MCRS did not have any items that qualify for reporting in this category.

### **NOTE 3 – PLAN ADMINISTRATION**

The System is administered by a five-person Board of Retirement consisting of a first member, who shall serve as Chairman/Treasurer, who shall be appointed by the other four members, a second member elected by the Advisory Council consisting of representatives from the member units, a third and fourth member who shall be elected by the members in or retired from the service of such system, and a fifth member who shall be chosen by the other four members.

|                         |                  |               |            |
|-------------------------|------------------|---------------|------------|
| Chairman                | Thomas F. Gibson | Term Expires: | 12/31/2020 |
| Advisory Council Member | Brian P. Curtin  | Term Expires: | 12/31/2018 |
| Elected Member          | John Brown       | Term Expires: | 12/31/2020 |
| Elected Member          | Joseph W. Kearns | Term Expires: | 12/31/2019 |
| Appointed Member        | Robert Healy     | Term Expires: | 12/17/2020 |

Board members are required to meet at least once a month. The Board must keep a record of all of its proceedings. The Board must annually submit to the appropriate authority an estimate of the expenses of administration and cost of operation of the System. The Board must annually file a financial statement of condition for the System with the Executive Director of PERAC.

The investment of the System's funds is the responsibility of the Board. All retirement allowances must be

approved by the Retirement Board. The PERAC Actuary performs verification prior to payment, unless the System has obtained a waiver for superannuation calculations allowing them to bypass this requirement. All expenses incurred by the System must be approved by a majority vote of the Board. Payments shall be made only upon vouchers signed by three persons designated by the Board.

The following retirement board members and employees are bonded by an authorized agent representing a company licensed to do business in Massachusetts as follows:

|                      |                                 |
|----------------------|---------------------------------|
| Treasurer-Custodian: | ) \$10,000,000 Fiduciary        |
| Ex-Officio Member:   | ) RLI Insurance Company         |
| Elected Members:     | )                               |
| Appointed Members:   | ) \$1,000,000 Fidelity          |
| Staff Employees:     | ) National Union Fire Insurance |

#### NOTE 4 – OFFICE BUILDING

The MCERS owns an office building that was purchased as an investment and for the administrative offices of the System. The building is a two story, 1986-built office building consisting of 62,307 square feet of net rentable area. The property is situated on a 4.23 acre site in Billerica, Middlesex County, Massachusetts

#### NOTE 5 – CASH AND INVESTMENTS

##### Custodial Credit Risk - Deposits

At December 31, 2017, the carrying amount of the System's deposits totaled \$37,962,772, and the bank balance totaled \$39,761,801, all of which was covered by Federal Depository Insurance.

##### Investments

The System's investments are as follows:

| <u>Investment Type</u>            | <u>December 31,<br/>2017</u> |
|-----------------------------------|------------------------------|
| PRIT Pooled Funds..... \$         | 1,295,940,107                |
| Money Market Mutual Funds.....    | 20,800,395                   |
| Pooled Alternative Investments... | 6,432,162                    |
| Pooled Real Estate Funds.....     | 2,973,757                    |
| Total Investments..... \$         | <u>1,326,146,421</u>         |

Approximately 98% of the Retirement System's investments are in Pension Reserve Investment Trust (PRIT). This investment pool was established by the Treasurer of the Commonwealth of Massachusetts, who serves as Trustee. PRIT is administered by the Pension Reserves Investment Management Board. The fair values of the positions in each investment Pool are the same as the value of each Pool's shares. The Administration does not have the ability to control any of the investment decisions relative to its funds in PRIT.

Approximately 1% of the System's funds are invested in pooled alternative investments and pooled real estate funds. The market values of assets in those funds are based on the quoted values obtained from each pool.

Approximately 1% of the System's funds are invested in money market mutual funds. The market values of assets in those funds are valued using prices quoted in active markets for those securities.

The Administration's annual money-weighted rate of return on pension plan investments was 17.25%. The money-weighted rate of return expresses investment performance, net of pension plan investment expense, adjusted for the changing amounts actually invested, measured monthly.

#### Fair Market Value of Investments

The retiree pension defined benefit plan holds significant amounts of investments that are measured at fair value on a recurring basis. Because investing is a key part of the plan's activities, the plan shows greater disaggregation in its disclosures. The plan chooses a tabular format for disclosing the levels within the fair value hierarchy.

The System categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles.

The System has the following recurring fair value measurements as of December 31, 2017:

|                                                      |                  | Fair Value Measurements Using                                                 |                                                           |                                                    |
|------------------------------------------------------|------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------|----------------------------------------------------|
|                                                      |                  | Quoted Prices<br>in Active<br>Markets for<br>Identical<br>Assets (Level<br>1) | Significant<br>Other<br>Observable<br>Inputs<br>(Level 2) | Significant<br>Unobservable<br>Inputs<br>(Level 3) |
| Investment Type                                      | 12/31/2017       |                                                                               |                                                           |                                                    |
| Investments by fair value level.....                 |                  |                                                                               |                                                           |                                                    |
| Other Investments                                    |                  |                                                                               |                                                           |                                                    |
| Money Market Mutual Funds.....                       | \$ 20,800,395    | \$ 20,800,395                                                                 | \$ -                                                      | \$ -                                               |
| Pooled Alternative Investments.....                  | 6,432,162        | -                                                                             | -                                                         | 6,432,162                                          |
| Pooled Real Estate Funds.....                        | 2,973,757        | -                                                                             | -                                                         | 2,973,757                                          |
| Total Investments by fair value level.....           | 30,206,314       | \$ 20,800,395                                                                 | \$ -                                                      | \$ 9,405,919                                       |
| Investments measured at the net asset value (NAV)... |                  |                                                                               |                                                           |                                                    |
| PRIT Investments.....                                | 1,295,940,107    |                                                                               |                                                           |                                                    |
| Total Investments.....                               | \$ 1,326,146,421 |                                                                               |                                                           |                                                    |

Mone

y Market Mutual Funds in Level 1 of the fair value hierarchy are valued using prices quoted in active markets for those securities. Pooled Alternative Investments and Pooled Real Estate Funds classified in level 3 are valued using either a discounted cash flow or market comparable company's technique.

PRIT Investments are valued using the net asset value (NAV) method. This investment pool was established by the Treasurer of the Commonwealth of Massachusetts, who serves as Trustee. PRIT is administered by the Pension Reserves Investment Management Board (PRIM). The fair values of the positions in each investment Pool are the same as the value of each Pool's shares. The System does not have the ability to control any of the investment decisions relative to its funds in PRIT.

**NOTE 6 – CAPITAL ASSETS**

Capital assets are depreciated on a straight-line basis. The estimated useful lives of capital assets are as follows:

| <u>Capital Asset Type</u> | <u>Estimated<br/>Useful<br/>Life<br/>(in years)</u> |
|---------------------------|-----------------------------------------------------|
| Building.....             | 40                                                  |
| Building improvements.... | 40                                                  |
| Pick-up truck.....        | 5                                                   |
| PTG Software.....         | 5                                                   |

Capital asset activity for the year ended December 31, 2017, was as follows:

|                                                  | <u>Beginning<br/>Balance</u> | <u>Increases</u>  | <u>Decreases</u>    | <u>Ending<br/>Balance</u> |
|--------------------------------------------------|------------------------------|-------------------|---------------------|---------------------------|
| <u>Capital assets not being depreciated:</u>     |                              |                   |                     |                           |
| Land.....                                        | \$ 672,657                   | \$ -              | \$ -                | \$ 672,657                |
| Construction in progress.....                    | 729,570                      | -                 | (729,570)           | -                         |
| Total capital assets not being depreciated.      | <u>1,402,227</u>             | <u>-</u>          | <u>(729,570)</u>    | <u>672,657</u>            |
| <u>Capital assets being depreciated:</u>         |                              |                   |                     |                           |
| Buildings.....                                   | 5,417,136                    | -                 | -                   | 5,417,136                 |
| Building improvements.....                       | 1,086,623                    | 6,250             | -                   | 1,092,873                 |
| Vehicles.....                                    | 19,603                       | 30,913            | -                   | 50,516                    |
| PTG Software.....                                | -                            | 729,570           | -                   | 729,570                   |
| Total capital assets being depreciated.....      | <u>6,523,362</u>             | <u>766,733</u>    | <u>-</u>            | <u>7,290,095</u>          |
| <u>Less accumulated depreciation for:</u>        |                              |                   |                     |                           |
| Buildings.....                                   | (1,900,354)                  | (135,428)         | -                   | (2,035,782)               |
| Building improvements.....                       | (380,319)                    | (27,166)          | -                   | (407,485)                 |
| Vehicles.....                                    | (19,603)                     | -                 | -                   | (19,603)                  |
| PTG Software.....                                | -                            | (145,914)         | -                   | (145,914)                 |
| Total accumulated depreciation.....              | <u>(2,300,276)</u>           | <u>(308,508)</u>  | <u>-</u>            | <u>(2,608,784)</u>        |
| Total capital assets being depreciated, net..... | <u>4,223,086</u>             | <u>458,225</u>    | <u>-</u>            | <u>4,681,311</u>          |
| Total capital assets, net.....                   | <u>\$ 5,625,313</u>          | <u>\$ 458,225</u> | <u>\$ (729,570)</u> | <u>\$ 5,353,968</u>       |

**NOTE 7 – MEMBERSHIP**

The following table represents the System's membership at December 31, 2017:

|                                                              | <u>2017</u>          |
|--------------------------------------------------------------|----------------------|
| Active members.....                                          | 9,283                |
| Inactive members.....                                        | 3,110                |
| Disabled members.....                                        | 434                  |
| Retirees and beneficiaries currently receiving benefits..... | <u>5,063</u>         |
| Total.....                                                   | <u><u>17,890</u></u> |

**NOTE 8 – ACTUARIAL VALUATION**

Components of the net pension liability as of December 31, 2017, were as follows:

|                                                                                                  |                         |
|--------------------------------------------------------------------------------------------------|-------------------------|
| Total pension liability.....                                                                     | \$ 2,797,535,970        |
| The pension plan's fiduciary net position.....                                                   | <u>1,378,351,219</u>    |
| The net pension liability.....                                                                   | <u>\$ 1,419,184,751</u> |
| The pension plan's fiduciary net position as a percentage<br>of the total pension liability..... | 49.27%                  |

The total pension liability was determined by an actuarial valuation as of January 1, 2018, using the following actuarial assumptions, applied to all periods included in the measurement that was updated back to December 31, 2017:

|                                    |                                                                                                                                                                                                                                        |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Valuation date.....                | January 1, 2018                                                                                                                                                                                                                        |
| Actuarial cost method.....         | Entry Age Normal Cost Method.                                                                                                                                                                                                          |
| Amortization method.....           | Prior year's total contribution increased by 6.5% for fiscal 2018 through fiscal 2024, and thereafter the remaining unfunded liability will be amortized on a 4.0% annual increasing basis; ERI liability amortized in level payments. |
| Remaining amortization period..... | As of July 1, 2018, 1 year remaining for 2002 ERI liability, 2 years remaining for 2003 ERI liability, 4 years remaining for 2010 ERI liability, and 17 years for remaining unfunded liability.                                        |
| Asset valuation method.....        | The difference between the expected return and the actual investment return on a market value basis is recognized over a five year period. Asset value is adjusted as necessary to be within 20% of the market value.                  |
| Inflation rate.....                | 3.25% (previously 3.5%)                                                                                                                                                                                                                |

|                                              |                                                                                                                                                                                                                                |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Projected salary increases.....              | Varies by length of service with ultimate rates of 4.00% for Group 1, 4.25% for Group 2 and 4.50% for Group 4                                                                                                                  |
| Cost of living adjustments.....              | 3.0% of the first \$14,000 of retirement income.                                                                                                                                                                               |
| Rates of retirement.....                     | Varies based upon age for general employees, police and fire employees.                                                                                                                                                        |
| Rates of disability.....                     | For general employees, it was assumed that 45% of all disabilities are ordinary (55% are service connected).<br>For police and fire employees, 10% of all disabilities are assumed to be ordinary (90% are service connected). |
| Mortality Rates:                             |                                                                                                                                                                                                                                |
| Pre-Retirement.....                          | The RP-2014 Blue Collar Employee Mortality Table projected generationally with Scale MP-2017.                                                                                                                                  |
| Healthy Retiree.....                         | The RP-2014 Blue Collar Healthy Annuitant Mortality Table projected generationally with Scale MP-2017.                                                                                                                         |
| Disabled Retiree.....                        | The RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year and projected generationally with Scale MP-2017.                                                                                                |
| Investment rate of return/Discount rate..... | 7.50%, net of pension plan investment expense, including inflation previously 7.75%                                                                                                                                            |

*Investment policy:* The pension plan's policy in regard to the allocation of invested assets is established by PRIT. Plan assets are managed on a total return basis with a long-term objective of achieving a fully funded status for the benefits provided through the pension plan.

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of January 1, 2018, are summarized in the following table:

| Asset Class                                 | Long-Term Expected<br>Real Rate of Return | Long-Term Expected<br>Asset Allocation |
|---------------------------------------------|-------------------------------------------|----------------------------------------|
| Domestic equity.....                        | 6.15%                                     | 17.50%                                 |
| International developed markets equity..... | 7.11%                                     | 15.50%                                 |
| International emerging markets equity.....  | 9.41%                                     | 6.00%                                  |
| Core fixed income.....                      | 1.68%                                     | 12.00%                                 |
| High-yield fixed income.....                | 4.13%                                     | 10.00%                                 |
| Real estate.....                            | 4.90%                                     | 10.00%                                 |
| Commodities.....                            | 4.71%                                     | 4.00%                                  |
| Hedge funds, GTAA, Risk parity.....         | 3.94%                                     | 13.00%                                 |
| Private equity.....                         | 10.28%                                    | 12.00%                                 |
|                                             |                                           | <hr/> 100.00%                          |

*Discount rate:* The discount rate used to measure the total pension liability was 7.50%. The projection of cash flows used to determine the discount rate assumed plan member contributions will be made at the current contribution rate and that contributions will be made at rates equal to the actuarially determined contribution rate. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

*Sensitivity of the net position liability to changes in the discount rate.* The following presents the net position liability, calculated using the discount rate of 7.50%, as well as what the net position liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.50%) or 1-percentage-point higher (8.50%) than the current rate:

|                                                                                            | 1% Decrease<br>(6.50%) | Current<br>Discount<br>(7.50%) | 1% Increase<br>(8.50%) |
|--------------------------------------------------------------------------------------------|------------------------|--------------------------------|------------------------|
| Middlesex County Retirement System's net<br>pension liability as of December 31, 2017..... | \$ 1,741,812,266       | \$ 1,419,184,751               | \$ 1,147,166,823       |

*Contributions:* Governmental employers are required to pay an annual appropriation as established by PERAC. The total appropriation includes the amounts to pay the pension portion of each member's retirement allowance, an amount to amortize the actuarially determined unfunded liability to zero in accordance with the system's funding schedule, and additional appropriations in accordance with adopted early retirement incentive programs. The pension fund appropriations are allocated amongst employers based on the actuarial valuation.

## NOTE 9 – DISPUTE WITH THE COMMONWEALTH AND STATE EMPLOYEES RETIREMENT SYSTEM

The County of Middlesex was abolished on July 11, 1997, pursuant to Chapter 48 of the Acts of 1997. This Act required that active employees of Middlesex County be transferred to the Commonwealth. Therefore, the MCRS was required to transfer the Annuity Savings Fund Balances of these transferred County employees to the State Employees Retirement System (SERS). This transfer, totaling approximately \$18 million, was made during calendar year 1998.

In December of 1999, the State Legislature enacted Massachusetts General Law, Chapter 34B (Abolition of County Government). This legislation, among other things, defines the components of determining the overall surplus or deficit of an abolished County upon transfer to the Commonwealth and how regional retirement systems will be affected. Sections 8 and 18 addressed how the abolished County's unfunded liabilities in regional retirement systems will be paid for. The MCRS believes, as a result of the abolishment of Middlesex County, that the Commonwealth of Massachusetts owed them \$9,501,680 for the Unfunded Liability for retirees of the former Middlesex County.

The Commonwealth and SERS did not agree with the assertion that the MCRS was owed \$9,501,680. As a result, the MCRS acted to stop 3(8)(c) reimbursements to the State Employees Retirement System and correspondingly the State System began to intercept all COLA reimbursements which were due the MCRS. In 2012 the MCRS reinstated payments for 3(8)(c) reimbursements to the SERS. The SERS and MCRS have agreed upon the amount owed after accounting for the 3(8)(c) reimbursements and COLA reimbursements which were withheld; however, a final payment to resolve the issue has yet to be made.

The net amount of these transactions is not considered significant and has not been reported in these financial statements.

**NOTE 10 – IMPLEMENTATION OF GASB PRONOUNCEMENTS**

During 2017, the following GASB pronouncements were implemented:

- GASB Statement #78, *Pensions Provided through Certain Multiple-Employer Defined Benefit Pension Plans*. This pronouncement did not impact the basic financial statements.
- GASB Statement #82, *Pension Issues – an amendment of GASB Statements #67, #68, and #73*. The basic financial statements and related notes were updated to be in compliance with this pronouncement.

The following GASB pronouncements will be implemented in the future:

- The GASB issued Statement #83, *Certain Asset Retirement Obligations*, which is required to be implemented in 2019.
- The GASB issued Statement #84, *Fiduciary Activities*, which is required to be implemented in 2020.
- The GASB issued Statement #85, *Omnibus 2017*, which is required to be implemented in 2018.
- The GASB issued Statement #86, *Certain Debt Extinguishment Issues*, which is required to be implemented in 2018.
- The GASB issued Statement #87, *Leases*, which is required to be implemented in 2021.

Management is currently assessing the impact the implementation of these pronouncements will have on the basic financial statements.

**NOTE 11 – SUBSEQUENT EVENTS**

Management has evaluated subsequent events through August 7, 2018, which is the date the financial statements were available to be issued.

# ***Required Supplementary Information***

**SCHEDULE OF CHANGES IN THE NET PENSION LIABILITY  
AND RELATED RATIOS**

|                                                                                    | December 31,<br>2014           | December 31,<br>2015           | December 31,<br>2016           | December 31,<br>2017           |
|------------------------------------------------------------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| <b>Total pension liability:</b>                                                    |                                |                                |                                |                                |
| Service cost.....                                                                  | \$ 52,132,389                  | \$ 54,217,685                  | \$ 56,386,392                  | \$ 60,585,598                  |
| Interest.....                                                                      | 172,094,226                    | 179,703,272                    | 187,359,946                    | 200,298,121                    |
| Changes in benefit terms.....                                                      | -                              | -                              | -                              | -                              |
| Differences between expected and actual experience.....                            | -                              | -                              | 7,976,453                      | (9,059,393)                    |
| Changes in assumptions.....                                                        | -                              | -                              | 96,500,754                     | 97,195,824                     |
| Benefit payments.....                                                              | (125,082,678)                  | (134,295,504)                  | (143,428,636)                  | (150,780,931)                  |
| Net change in total pension liability.....                                         | 99,143,937                     | 99,625,453                     | 204,794,909                    | 198,239,219                    |
| Total pension liability - beginning.....                                           | <u>2,195,732,452</u>           | <u>2,294,876,389</u>           | <u>2,394,501,842</u>           | <u>2,599,296,751</u>           |
| Total pension liability - ending (a).....                                          | <u>\$ 2,294,876,389</u>        | <u>\$ 2,394,501,842</u>        | <u>\$ 2,599,296,751</u>        | <u>\$ 2,797,535,970</u>        |
| <b>Plan fiduciary net position:</b>                                                |                                |                                |                                |                                |
| Employer pension appropriation.....                                                | \$ 93,368,685                  | \$ 99,792,641                  | \$ 107,032,211                 | \$ 115,377,205                 |
| Member contributions.....                                                          | 39,048,869                     | 40,340,741                     | 42,015,296                     | 44,177,815                     |
| Other contributions.....                                                           | 6,405,881                      | 8,668,378                      | 12,337,414                     | 10,405,773                     |
| Net investment income (loss).....                                                  | 74,904,315                     | 7,732,128                      | 74,917,546                     | 189,343,574                    |
| Administrative expenses.....                                                       | (2,996,390)                    | (2,824,803)                    | (3,062,521)                    | (2,619,464)                    |
| Building operations and maintenance.....                                           | (381,899)                      | (302,771)                      | (235,667)                      | (306,177)                      |
| Retirement benefits and refunds.....                                               | (125,082,678)                  | (134,295,504)                  | (143,428,636)                  | (150,780,931)                  |
| Other retirement deductions.....                                                   | (5,556,930)                    | (8,025,993)                    | (11,475,752)                   | (9,358,262)                    |
| Depreciation.....                                                                  | (162,594)                      | (162,594)                      | (162,594)                      | (308,508)                      |
| Net increase (decrease) in fiduciary net position.....                             | 79,547,259                     | 10,922,223                     | 77,937,297                     | 195,931,025                    |
| Fiduciary net position - beginning of year.....                                    | <u>1,014,013,415</u>           | <u>1,093,560,674</u>           | <u>1,104,482,897</u>           | <u>1,182,420,194</u>           |
| Fiduciary net position - end of year (b).....                                      | <u>\$ 1,093,560,674</u>        | <u>\$ 1,104,482,897</u>        | <u>\$ 1,182,420,194</u>        | <u>\$ 1,378,351,219</u>        |
| <b>Net pension liability - ending (a)-(b).....</b>                                 | <u><b>\$ 1,201,315,715</b></u> | <u><b>\$ 1,290,018,945</b></u> | <u><b>\$ 1,416,876,557</b></u> | <u><b>\$ 1,419,184,751</b></u> |
| Plan fiduciary net position as a percentage of the total<br>pension liability..... | 47.65%                         | 46.13%                         | 45.49%                         | 49.27%                         |
| Covered-employee payroll.....                                                      | \$ 415,752,810                 | \$ 432,382,921                 | \$ 439,644,322                 | \$ 451,777,105                 |
| Net pension liability as a percentage of<br>covered payroll.....                   | 288.95%                        | 298.35%                        | 322.28%                        | 314.13%                        |

Note: this schedule is intended to present information for 10 years.

Until a 10-year trend is compiled, information is presented for those years for which information is available.

See notes to required supplementary information.

## SCHEDULE OF CONTRIBUTIONS

|                                                                              | December 31,<br>2014 | December 31,<br>2015  | December 31,<br>2016  | December 31,<br>2017  |
|------------------------------------------------------------------------------|----------------------|-----------------------|-----------------------|-----------------------|
| Actuarially determined contribution.....                                     | \$ 92,826,743        | \$ 98,792,642         | \$ 105,246,797        | \$ 112,017,087        |
| Contributions in relation to the actuarially<br>determined contribution..... | <u>(93,400,946)</u>  | <u>(99,820,481)</u>   | <u>(107,067,707)</u>  | <u>(115,426,815)</u>  |
| Contribution deficiency (excess).....                                        | <u>\$ (574,203)</u>  | <u>\$ (1,027,839)</u> | <u>\$ (1,820,910)</u> | <u>\$ (3,409,728)</u> |
| Covered payroll.....                                                         | \$ 415,752,810       | \$ 432,382,921        | \$ 439,644,322        | \$ 451,777,105        |
| Contributions as a percentage of<br>covered payroll.....                     | 22.47%               | 23.09%                | 24.35%                | 25.55%                |

Note: this schedule is intended to present information for 10 years.

Until a 10-year trend is compiled, information is presented for those years for which information is available.

See notes to required supplementary information.

## **SCHEDULE OF INVESTMENT RETURNS**

| <u>Year</u>            | <u>Annual money-weighted<br/>rate of return,<br/>net of investment expense</u> |
|------------------------|--------------------------------------------------------------------------------|
| December 31, 2017..... | 17.25%                                                                         |
| December 31, 2016..... | 7.35%                                                                          |
| December 31, 2015..... | 0.61%                                                                          |
| December 31, 2014..... | 7.54%                                                                          |

Note: this schedule is intended to present information for 10 years.  
Until a 10-year trend is compiled, information is presented for those  
years for which information is available.

See notes to required supplementary information.

**NOTE A – CHANGES IN THE NET PENSION LIABILITY AND RELATED RATIOS**

The Schedule of Changes in the Net Pension Liability and Related Ratios includes the detailed changes in the system's total pension liability, changes in the system's net position, and the ending net pension liability. It also demonstrates the plan's net position as a percentage of the total pension liability and the net pension liability as a percentage of covered payroll.

**NOTE B – CONTRIBUTIONS**

Governmental employers are required to pay an annual appropriation as established by PERAC. The total appropriation includes the amounts to pay the pension portion of each member's retirement allowance, an amount to amortize the actuarially determined unfunded liability to zero in accordance with the system's funding schedule, and additional appropriations in accordance with adopted early retirement incentive programs. The total appropriations are payable on July 1 and January 1. Employers may choose to pay the entire appropriation in July at a discounted rate. Accordingly, actual employer contributions may be less than the "total appropriation". The pension fund appropriations are allocated amongst employers based on the actuarial valuation results. In addition, an employer may contribute more than the amount required.

**NOTE C – MONEY WEIGHTED RATE OF RETURN**

The money weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense. A money weighted rate of return expresses investment performance, net of pension plan investment expense, adjusted for the changing amounts actually invested. Inputs to the money weighted rate of return calculation are determined monthly.

**NOTE D – CHANGES IN ASSUMPTIONS AND PLAN PROVISIONS**Changes in Assumptions

The following assumption changes were reflected in the January 1, 2018 actuarial valuation:

- The mortality tables for healthy participants were changed from the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally using Scale BB2D from 2009 to the RP-2014 Blue Collar Employee and Healthy Annuitant Mortality Tables projected generationally using Scale MP-2017.
- The mortality tables for disabled participants were changed from the RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale BB2D from 2015 to the RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward 1 year projected generationally using Scale MP-2017.
- The long-term salary increase assumption was lowered by 0.25%, to 4.00% for Group 1 participants, 4.25% for Group 2 participants, and 4.50% for Group 4 participants.
- The investment rate of return assumption was reduced from 7.75% to 7.50%.
- The inflation rate was reduced to 3.25% from the previous rate of 3.50%.

Changes in Plan Provisions

None.

# ***Audit of Specific Elements, Accounts and Items of Financial Statements***

This page left intentionally blank



100 Quannapowitt Parkway  
Suite 101

Wakefield, MA 01880

T. 781-914-1700

F. 781-914-1701

[www.powersandsullivan.com](http://www.powersandsullivan.com)

## **Independent Auditor's Report**

To the Honorable Middlesex County Retirement Board  
Middlesex County Retirement System  
Billerica, Massachusetts

We have audited the accompanying schedule of employer allocations of the Middlesex County Retirement System (MCRS) as of and for the year ended December 31, 2017, and the related notes. We have also audited the total for all entities of the rows titled net pension liability, total deferred outflows of resources, total deferred inflows of resources, total pension expense and contributions included in the accompanying schedule of pension amounts by employer of the MCRS Pension Plan as of and for the year ended December 31, 2017, and the related notes.

## **Management's Responsibility for the Schedules**

Management is responsible for the preparation and fair presentation of these schedules in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of the schedules that are free from material misstatement, whether due to fraud or error.

## **Auditor's Responsibility**

Our responsibility is to express opinions on the schedule of employer allocations and the specified row totals included in the schedule of pension amounts by employer based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the schedule of employer allocations and specified row totals included in the schedule of pension amounts by employer are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the schedule of employer allocations and the specified row totals included in the schedule of pension amounts by employer. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the schedule of employer allocations and the specified row totals included in the schedule of pension amounts by employer, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the schedule of employer allocations and the specified row totals included in the schedule of pension amounts by employer in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the schedule of employer allocations and the specified row totals included in the schedule of pension amounts by employer.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

## **Opinions**

In our opinion, the schedules referred to above present fairly, in all material respects, the employer allocations and total for all rows titled net pension liability, total deferred outflows of resources, total deferred inflows of resources, total pension expense and contributions for the total of all participating entities for the Middlesex County Retirement System as of and for the year ended December 31, 2017, in accordance with accounting principles generally accepted in the United States of America.

## **Other Matter**

We have audited, in accordance with auditing standards generally accepted in the United States of America, the financial statements of the Middlesex County Retirement System as of and for the year ended December 31, 2017, and our report thereon, dated August 7, 2018, expressed an unmodified opinion on those financial statements.

## **Restriction on Use**

This report is intended solely for the information and use of the Middlesex County Retirement System management, the Middlesex County Retirement System employers and their auditors and is not intended to be and should not be used by anyone other than these specified parties.

A handwritten signature in black ink, appearing to read "Bowers & Sullivan LLC". The signature is written in a cursive, flowing style.

August 7, 2018

# SCHEDULE OF EMPLOYER ALLOCATIONS

FOR THE YEAR ENDED DECEMBER 31, 2017

| Employer                                                          | Share of<br>Net Pension<br>Liability | Percent of<br>Total Net<br>Pension Liability |
|-------------------------------------------------------------------|--------------------------------------|----------------------------------------------|
| Middlesex County Retirement Board.....                            | \$ -                                 | 0.000000%                                    |
| Middlesex County.....                                             | -                                    | 0.000000%                                    |
| Middlesex Hospital.....                                           | -                                    | 0.000000%                                    |
| Town of Acton.....                                                | 48,182,609                           | 3.395091%                                    |
| Town of Ashby.....                                                | 1,780,532                            | 0.125462%                                    |
| Town of Ashland.....                                              | 32,308,841                           | 2.276578%                                    |
| Town of Ayer.....                                                 | 17,999,043                           | 1.268266%                                    |
| Town of Bedford.....                                              | 49,661,979                           | 3.499331%                                    |
| Town of Billerica.....                                            | 140,303,356                          | 9.886194%                                    |
| Town of Boxborough.....                                           | 10,225,882                           | 0.720546%                                    |
| Town of Burlington.....                                           | 117,368,093                          | 8.270107%                                    |
| Town of Carlisle.....                                             | 9,435,767                            | 0.664872%                                    |
| Town of Chelmsford.....                                           | 103,993,778                          | 7.327712%                                    |
| Town of Dracut.....                                               | 60,106,114                           | 4.235256%                                    |
| Town of Dunstable.....                                            | 2,563,856                            | 0.180657%                                    |
| Town of Groton.....                                               | 21,402,700                           | 1.508098%                                    |
| Town of Holliston.....                                            | 23,773,972                           | 1.675185%                                    |
| Town of Hopkinton.....                                            | 20,653,839                           | 1.455331%                                    |
| Town of Hudson.....                                               | 63,161,014                           | 4.450514%                                    |
| Town of Lincoln.....                                              | 24,841,810                           | 1.750428%                                    |
| Town of Littleton.....                                            | 21,432,789                           | 1.510218%                                    |
| Town of North Reading.....                                        | 48,035,495                           | 3.384725%                                    |
| Town of Pepperell.....                                            | 16,341,195                           | 1.151449%                                    |
| Town of Sherborn.....                                             | 10,500,304                           | 0.739883%                                    |
| Town of Shirley.....                                              | 8,406,745                            | 0.592364%                                    |
| Town of Stow.....                                                 | 10,459,477                           | 0.737006%                                    |
| Town of Sudbury.....                                              | 58,772,716                           | 4.141301%                                    |
| Town of Tewksbury.....                                            | 98,006,180                           | 6.905808%                                    |
| Town of Townsend.....                                             | 8,090,096                            | 0.570052%                                    |
| Town of Tyngsborough.....                                         | 20,897,452                           | 1.472497%                                    |
| Town of Wayland.....                                              | 53,697,606                           | 3.783694%                                    |
| Town of Westford.....                                             | 51,698,881                           | 3.642858%                                    |
| Town of Weston.....                                               | 61,375,790                           | 4.324722%                                    |
| Town of Wilmington.....                                           | 83,422,615                           | 5.878207%                                    |
| Acton-Boxborough Regional School District.....                    | 27,084,083                           | 1.908425%                                    |
| Acton Water Supply.....                                           | 3,370,594                            | 0.237502%                                    |
| Bedford Housing Authority.....                                    | 313,455                              | 0.022087%                                    |
| Billerica Housing Authority.....                                  | 1,359,538                            | 0.095797%                                    |
| Chelmsford Housing Authority.....                                 | 2,029,608                            | 0.143012%                                    |
| Chelmsford Water District.....                                    | 391,160                              | 0.027562%                                    |
| Dracut Housing Authority.....                                     | 2,055,364                            | 0.144827%                                    |
| Dracut Water Supply.....                                          | 3,031,987                            | 0.213643%                                    |
| East Chelmsford Water District.....                               | 317,151                              | 0.022347%                                    |
| East Middlesex Mosquito Control.....                              | 509,331                              | 0.035889%                                    |
| Greater Lowell Regional Vocational Technical School District..... | 15,614,520                           | 1.100246%                                    |
| Groton-Dunstable Regional School District.....                    | 10,714,454                           | 0.754972%                                    |
| Hudson Housing Authority.....                                     | 1,155,540                            | 0.081423%                                    |
| Lincoln-Sudbury Regional School District.....                     | 8,466,429                            | 0.596570%                                    |
| Nashoba Valley Technical High School District.....                | 3,512,891                            | 0.247529%                                    |
| North Chelmsford Water District.....                              | 814,336                              | 0.057381%                                    |
| North Middlesex Regional School District.....                     | 11,610,214                           | 0.818090%                                    |
| Shawsheen Valley Regional Vocational School.....                  | 7,940,619                            | 0.559520%                                    |
| South Middlesex Regional Vocational Technical School.....         | 6,492,906                            | 0.457510%                                    |
| Sudbury Water District.....                                       | 1,701,694                            | 0.119906%                                    |
| Tewksbury Housing Authority.....                                  | 1,527,710                            | 0.107647%                                    |
| Wayland Housing Authority.....                                    | 611,202                              | 0.043067%                                    |
| Hopkinton Housing Authority.....                                  | 458,176                              | 0.032284%                                    |
| Sudbury Housing Authority.....                                    | 436,617                              | 0.030765%                                    |
| Wilmington Housing Authority.....                                 | 335,690                              | 0.023654%                                    |
| Acton Housing Authority.....                                      | 741,792                              | 0.052269%                                    |
| Burlington Housing Authority.....                                 | 56,771                               | 0.004000%                                    |
| Ayer Housing Authority.....                                       | 792,328                              | 0.055830%                                    |
| Holliston Housing Authority.....                                  | 142,446                              | 0.010037%                                    |
| Littleton Housing Authority.....                                  | 465,317                              | 0.032788%                                    |
| Westford Housing Authority.....                                   | 517,839                              | 0.036488%                                    |
| Shirley Water District.....                                       | 335,341                              | 0.023629%                                    |
| Tyngsborough Housing Authority.....                               | 496,440                              | 0.034981%                                    |
| Pepperell Housing Authority.....                                  | 175,037                              | 0.012334%                                    |
| Groton Housing Authority.....                                     | (15,094)                             | -0.001064%                                   |
| Tyngsborough Water District.....                                  | 380,399                              | 0.026804%                                    |
| North Reading Housing Authority.....                              | 139,940                              | 0.009861%                                    |
| West Groton Water.....                                            | 21,871                               | 0.001541%                                    |
| Ayer-Shirley Regional School District.....                        | 4,178,529                            | 0.294432%                                    |
| Total.....                                                        | \$ 1,419,184,751                     | 100.000%                                     |

See notes to schedule of employer allocations and schedule of pension amounts by employer.

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Middlesex<br>County<br>Retirement<br>Board | Middlesex<br>County | Middlesex<br>Hospital | Town of<br>Acton |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|---------------------|-----------------------|------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                                            |                     |                       |                  |
| Beginning net pension liability.....                                                                                                                               | \$ -                                       | \$ -                | \$ -                  | \$ 45,680,759    |
| Ending net pension liability.....                                                                                                                                  | \$ -                                       | \$ -                | \$ -                  | \$ 48,182,609    |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                                            |                     |                       |                  |
| Differences between expected and actual experience.....                                                                                                            | \$ -                                       | \$ -                | \$ -                  | \$ 162,485       |
| Changes of assumptions.....                                                                                                                                        | -                                          | -                   | -                     | 4,605,682        |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | -                                          | -                   | -                     | 1,863,631        |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ -                                       | \$ -                | \$ -                  | \$ 6,631,798     |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                                            |                     |                       |                  |
| Differences between expected and actual experience.....                                                                                                            | \$ -                                       | \$ -                | \$ -                  | \$ 246,059       |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | -                                          | -                   | -                     | 1,308,731        |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | -                                          | -                   | -                     | 2,016,011        |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ -                                       | \$ -                | \$ -                  | \$ 3,570,801     |
| <b>Pension Expense</b>                                                                                                                                             |                                            |                     |                       |                  |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 345,861                                 | \$ -                | \$ -                  | \$ 5,606,949     |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | -                                          | -                   | -                     | (160,007)        |
| Total Employer Pension Expense.....                                                                                                                                | \$ 345,861                                 | \$ -                | \$ -                  | \$ 5,446,942     |
| <b>Contributions</b>                                                                                                                                               |                                            |                     |                       |                  |
| Statutory required contribution.....                                                                                                                               | \$ 345,861                                 | \$ -                | \$ -                  | \$ 3,454,129     |
| Contribution in relation to statutory required contribution.....                                                                                                   | (345,861)                                  | -                   | -                     | (3,454,129)      |
| Contribution deficiency/(excess).....                                                                                                                              | \$ -                                       | \$ -                | \$ -                  | \$ -             |
| Contributions as a percentage of covered payroll.....                                                                                                              | 29.21%                                     | 0.00%               | 0.00%                 | 24.51%           |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                                            |                     |                       |                  |
| June 30, 2019.....                                                                                                                                                 | \$ -                                       | \$ -                | \$ -                  | \$ 1,133,445     |
| June 30, 2020.....                                                                                                                                                 | -                                          | -                   | -                     | 1,099,000        |
| June 30, 2021.....                                                                                                                                                 | -                                          | -                   | -                     | 548,766          |
| June 30, 2022.....                                                                                                                                                 | -                                          | -                   | -                     | 279,786          |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ -                                       | \$ -                | \$ -                  | \$ 3,060,997     |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                                            |                     |                       |                  |
| 1% decrease (6.50%).....                                                                                                                                           | \$ -                                       | \$ -                | \$ -                  | \$ 59,136,110    |
| Current discount rate (7.50%).....                                                                                                                                 | \$ -                                       | \$ -                | \$ -                  | \$ 48,182,609    |
| 1% increase (8.50%).....                                                                                                                                           | \$ -                                       | \$ -                | \$ -                  | \$ 38,947,361    |
| Covered Payroll.....                                                                                                                                               | \$ 1,184,239                               | \$ -                | \$ -                  | \$ 14,091,030    |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    |    | Town of<br>Ashby | Town of<br>Ashland  | Town of<br>Ayer     | Town of<br>Bedford  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------|---------------------|---------------------|---------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |    |                  |                     |                     |                     |
| Beginning net pension liability.....                                                                                                                               | \$ | 1,387,848        | \$ 31,797,911       | \$ 17,032,643       | \$ 50,282,391       |
| Ending net pension liability.....                                                                                                                                  | \$ | 1,780,532        | \$ 32,308,841       | \$ 17,999,043       | \$ 49,661,979       |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |    |                  |                     |                     |                     |
| Differences between expected and actual experience.....                                                                                                            | \$ | 6,004            | \$ 108,954          | \$ 60,698           | \$ 167,473          |
| Changes of assumptions.....                                                                                                                                        |    | 170,198          | 3,088,340           | 1,720,493           | 4,747,091           |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           |    | 368,886          | 1,951,990           | 827,225             | 41,749              |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ | <u>545,088</u>   | \$ <u>5,149,284</u> | \$ <u>2,608,416</u> | \$ <u>4,956,313</u> |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |    |                  |                     |                     |                     |
| Differences between expected and actual experience.....                                                                                                            | \$ | 9,093            | \$ 164,995          | \$ 91,918           | \$ 253,615          |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                |    | 48,363           | 877,569             | 488,887             | 1,348,912           |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           |    | 197,985          | -                   | 975,971             | 1,563,207           |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ | <u>255,441</u>   | \$ <u>1,042,564</u> | \$ <u>1,556,776</u> | \$ <u>3,165,734</u> |
| <b>Pension Expense</b>                                                                                                                                             |    |                  |                     |                     |                     |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ | 207,194          | \$ 3,759,736        | \$ 2,094,532        | \$ 5,779,113        |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... |    | 40,847           | 661,243             | (88,526)            | (462,196)           |
| Total Employer Pension Expense.....                                                                                                                                | \$ | <u>248,041</u>   | \$ <u>4,420,979</u> | \$ <u>2,006,006</u> | \$ <u>5,316,917</u> |
| <b>Contributions</b>                                                                                                                                               |    |                  |                     |                     |                     |
| Statutory required contribution.....                                                                                                                               | \$ | 147,365          | \$ 2,757,454        | \$ 1,363,375        | \$ 3,920,935        |
| Contribution in relation to statutory required contribution.....                                                                                                   |    | (147,365)        | (2,787,173)         | (1,363,375)         | (3,920,935)         |
| Contribution deficiency/(excess).....                                                                                                                              | \$ | <u>-</u>         | \$ <u>(29,719)</u>  | \$ <u>-</u>         | \$ <u>-</u>         |
| Contributions as a percentage of covered payroll.....                                                                                                              |    | 13.37%           | 21.94%              | 21.46%              | 20.82%              |
| <b>Deferred Outflows/(Inflows) Recognized in</b>                                                                                                                   |    |                  |                     |                     |                     |
| <b>Future Pension Expense</b>                                                                                                                                      |    |                  |                     |                     |                     |
| June 30, 2019.....                                                                                                                                                 | \$ | 88,645           | \$ 1,528,568        | \$ 394,655          | \$ 870,969          |
| June 30, 2020.....                                                                                                                                                 |    | 87,370           | 1,505,477           | 381,790             | 835,482             |
| June 30, 2021.....                                                                                                                                                 |    | 45,336           | 1,000,753           | 150,347             | 299,117             |
| June 30, 2022.....                                                                                                                                                 |    | 68,296           | 71,922              | 124,848             | (214,989)           |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ | <u>289,647</u>   | \$ <u>4,106,720</u> | \$ <u>1,051,640</u> | \$ <u>1,790,579</u> |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |    |                  |                     |                     |                     |
| 1% decrease (6.50%).....                                                                                                                                           | \$ | 2,185,313        | \$ 39,653,715       | \$ 22,090,813       | \$ 60,951,777       |
| Current discount rate (7.50%).....                                                                                                                                 | \$ | 1,780,532        | \$ 32,308,841       | \$ 17,999,043       | \$ 49,661,979       |
| 1% increase (8.50%).....                                                                                                                                           | \$ | 1,439,258        | \$ 26,116,148       | \$ 14,549,127       | \$ 40,143,164       |
| Covered Payroll.....                                                                                                                                               | \$ | 1,102,061        | \$ 12,705,217       | \$ 6,354,563        | \$ 18,836,700       |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Town of<br>Billerica | Town of<br>Boxborough | Town of<br>Burlington | Town of<br>Carlisle |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------|-----------------------|---------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                      |                       |                       |                     |
| Beginning net pension liability.....                                                                                                                               | \$ 143,712,635       | \$ 9,977,149          | \$ 114,929,674        | \$ 9,988,584        |
| Ending net pension liability.....                                                                                                                                  | \$ 140,303,356       | \$ 10,225,882         | \$ 117,368,093        | \$ 9,435,767        |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                      |                       |                       |                     |
| Differences between expected and actual experience.....                                                                                                            | \$ 473,141           | \$ 34,484             | \$ 395,797            | \$ 31,820           |
| Changes of assumptions.....                                                                                                                                        | 13,411,327           | 977,472               | 11,218,990            | 901,946             |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 2,146,060            | 841,716               | 1,664,683             | 392,933             |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 16,030,528        | \$ 1,853,672          | \$ 13,279,470         | \$ 1,326,699        |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                      |                       |                       |                     |
| Differences between expected and actual experience.....                                                                                                            | \$ 716,503           | \$ 52,222             | \$ 599,377            | \$ 48,187           |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 3,810,902            | 277,754               | 3,187,938             | 256,293             |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 4,542,749            | 78,222                | 1,005,173             | 408,850             |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 9,070,154         | \$ 408,198            | \$ 4,792,488          | \$ 713,330          |
| <b>Pension Expense</b>                                                                                                                                             |                      |                       |                       |                     |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 16,326,922        | \$ 1,189,977          | \$ 13,657,971         | \$ 1,098,035        |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | (684,453)            | 249,159               | 70,770                | 47,804              |
| Total Employer Pension Expense.....                                                                                                                                | \$ 15,642,469        | \$ 1,439,136          | \$ 13,728,741         | \$ 1,145,839        |
| <b>Contributions</b>                                                                                                                                               |                      |                       |                       |                     |
| Statutory required contribution.....                                                                                                                               | \$ 10,782,713        | \$ 791,841            | \$ 8,877,933          | \$ 877,464          |
| Contribution in relation to statutory required contribution.....                                                                                                   | (10,790,894)         | (791,841)             | (8,877,933)           | (877,464)           |
| Contribution deficiency/(excess).....                                                                                                                              | \$ (8,181)           | \$ -                  | \$ -                  | \$ -                |
| Contributions as a percentage of covered payroll.....                                                                                                              | 33.08%               | 27.84%                | 27.41%                | 17.07%              |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                      |                       |                       |                     |
| June 30, 2019.....                                                                                                                                                 | \$ 3,081,964         | \$ 523,671            | \$ 3,221,494          | \$ 301,105          |
| June 30, 2020.....                                                                                                                                                 | 2,981,694            | 516,360               | 3,137,616             | 294,364             |
| June 30, 2021.....                                                                                                                                                 | 1,859,375            | 385,087               | 2,011,235             | 110,493             |
| June 30, 2022.....                                                                                                                                                 | (962,659)            | 20,356                | 116,637               | (92,593)            |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ 6,960,374         | \$ 1,445,474          | \$ 8,486,982          | \$ 613,369          |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                      |                       |                       |                     |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 172,198,957       | \$ 12,550,559         | \$ 144,049,756        | \$ 11,580,822       |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 140,303,356       | \$ 10,225,882         | \$ 117,368,093        | \$ 9,435,767        |
| 1% increase (8.50%).....                                                                                                                                           | \$ 113,411,149       | \$ 8,265,865          | \$ 94,871,935         | \$ 7,627,191        |
| Covered Payroll.....                                                                                                                                               | \$ 32,623,751        | \$ 2,844,512          | \$ 32,393,793         | \$ 5,141,785        |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Town of<br>Chelmsford | Town of<br>Dracut | Town of<br>Dunstable | Town of<br>Groton |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-------------------|----------------------|-------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                       |                   |                      |                   |
| Beginning net pension liability.....                                                                                                                               | \$ 100,190,226        | \$ 57,818,789     | \$ 2,199,339         | \$ 22,421,400     |
| Ending net pension liability.....                                                                                                                                  | \$ 103,993,778        | \$ 60,106,114     | \$ 2,563,856         | \$ 21,402,700     |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                       |                   |                      |                   |
| Differences between expected and actual experience.....                                                                                                            | \$ 350,695            | \$ 202,694        | \$ 8,646             | \$ 72,176         |
| Changes of assumptions.....                                                                                                                                        | 9,940,564             | 5,745,426         | 245,074              | 2,045,842         |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 2,618,126             | 1,757,566         | 323,309              | 334,544           |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 12,909,385         | \$ 7,705,686      | \$ 577,029           | \$ 2,452,562      |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                       |                   |                      |                   |
| Differences between expected and actual experience.....                                                                                                            | \$ 531,077            | \$ 306,951        | \$ 13,093            | \$ 109,300        |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 2,824,665             | 1,632,594         | 69,639               | 581,337           |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 1,980,299             | 394,812           | 220,949              | 985,825           |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 5,336,041          | \$ 2,334,357      | \$ 303,681           | \$ 1,676,462      |
| <b>Pension Expense</b>                                                                                                                                             |                       |                   |                      |                   |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 12,101,626         | \$ 6,994,484      | \$ 298,352           | \$ 2,490,610      |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | (79,532)              | 347,199           | 16,940               | (180,917)         |
| Total Employer Pension Expense.....                                                                                                                                | \$ 12,022,094         | \$ 7,341,683      | \$ 315,292           | \$ 2,309,693      |
| <b>Contributions</b>                                                                                                                                               |                       |                   |                      |                   |
| Statutory required contribution.....                                                                                                                               | \$ 7,822,651          | \$ 4,506,526      | \$ 206,969           | \$ 1,966,279      |
| Contribution in relation to statutory required contribution.....                                                                                                   | (8,022,651)           | (4,506,526)       | (206,969)            | (1,966,279)       |
| Contribution deficiency/(excess).....                                                                                                                              | \$ (200,000)          | \$ -              | \$ -                 | \$ -              |
| Contributions as a percentage of covered payroll.....                                                                                                              | 32.02%                | 30.70%            | 17.18%               | 27.17%            |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                       |                   |                      |                   |
| June 30, 2019.....                                                                                                                                                 | \$ 2,712,161          | \$ 1,960,736      | \$ 85,766            | \$ 393,634        |
| June 30, 2020.....                                                                                                                                                 | 2,637,839             | 1,917,780         | 83,933               | 378,341           |
| June 30, 2021.....                                                                                                                                                 | 1,793,152             | 1,254,246         | 42,499               | 176,645           |
| June 30, 2022.....                                                                                                                                                 | 430,192               | 238,567           | 61,150               | (172,520)         |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ 7,573,344          | \$ 5,371,329      | \$ 273,348           | \$ 776,100        |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                       |                   |                      |                   |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 127,635,004        | \$ 73,770,209     | \$ 3,146,706         | \$ 26,268,236     |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 103,993,778        | \$ 60,106,114     | \$ 2,563,856         | \$ 21,402,700     |
| 1% increase (8.50%).....                                                                                                                                           | \$ 84,061,092         | \$ 48,585,452     | \$ 2,072,437         | \$ 17,300,400     |
| Covered Payroll.....                                                                                                                                               | \$ 25,052,394         | \$ 14,681,016     | \$ 1,204,830         | \$ 7,236,359      |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Town of<br>Holliston | Town of<br>Hopkinton | Town of<br>Hudson | Town of<br>Lincoln |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|-------------------|--------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                      |                      |                   |                    |
| Beginning net pension liability.....                                                                                                                               | \$ 24,188,374        | \$ 21,332,499        | \$ 62,417,388     | \$ 25,563,964      |
| Ending net pension liability.....                                                                                                                                  | \$ 23,773,972        | \$ 20,653,839        | \$ 63,161,014     | \$ 24,841,810      |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                      |                      |                   |                    |
| Differences between expected and actual experience.....                                                                                                            | \$ 80,172            | \$ 69,650            | \$ 212,996        | \$ 83,773          |
| Changes of assumptions.....                                                                                                                                        | 2,272,508            | 1,974,260            | 6,037,439         | 2,374,580          |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 558,362              | 1,005,346            | 578,603           | 120,389            |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 2,911,042         | \$ 3,049,256         | \$ 6,829,038      | \$ 2,578,742       |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                      |                      |                   |                    |
| Differences between expected and actual experience.....                                                                                                            | \$ 121,409           | \$ 105,475           | \$ 322,552        | \$ 126,863         |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 645,745              | 560,997              | 1,715,571         | 674,750            |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 1,112,223            | 556,184              | 169,818           | 782,893            |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 1,879,377         | \$ 1,222,656         | \$ 2,207,941      | \$ 1,584,506       |
| <b>Pension Expense</b>                                                                                                                                             |                      |                      |                   |                    |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 2,766,550         | \$ 2,403,466         | \$ 7,349,972      | \$ 2,890,816       |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | (129,571)            | 275,087              | 124,386           | (156,765)          |
| Total Employer Pension Expense.....                                                                                                                                | \$ 2,636,979         | \$ 2,678,553         | \$ 7,474,358      | \$ 2,734,051       |
| <b>Contributions</b>                                                                                                                                               |                      |                      |                   |                    |
| Statutory required contribution.....                                                                                                                               | \$ 2,056,036         | \$ 1,984,635         | \$ 5,016,882      | \$ 2,015,466       |
| Contribution in relation to statutory required contribution.....                                                                                                   | (2,132,624)          | (1,984,635)          | (5,016,882)       | (2,015,466)        |
| Contribution deficiency/(excess).....                                                                                                                              | \$ (76,588)          | \$ -                 | \$ -              | \$ -               |
| Contributions as a percentage of covered payroll.....                                                                                                              | 20.63%               | 14.27%               | 23.48%            | 20.70%             |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                      |                      |                   |                    |
| June 30, 2019.....                                                                                                                                                 | \$ 508,637           | \$ 829,535           | \$ 1,819,931      | \$ 510,108         |
| June 30, 2020.....                                                                                                                                                 | 491,646              | 814,779              | 1,774,791         | 492,352            |
| June 30, 2021.....                                                                                                                                                 | 104,296              | 276,575              | 1,018,043         | 162,574            |
| June 30, 2022.....                                                                                                                                                 | (72,914)             | (94,289)             | 8,332             | (170,798)          |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ 1,031,665         | \$ 1,826,600         | \$ 4,621,097      | \$ 994,236         |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                      |                      |                   |                    |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 29,178,578        | \$ 25,349,134        | \$ 77,519,599     | \$ 30,489,170      |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 23,773,972        | \$ 20,653,839        | \$ 63,161,014     | \$ 24,841,810      |
| 1% increase (8.50%).....                                                                                                                                           | \$ 19,217,167        | \$ 16,695,074        | \$ 51,054,820     | \$ 20,080,329      |
| Covered Payroll.....                                                                                                                                               | \$ 10,339,394        | \$ 13,910,712        | \$ 21,363,646     | \$ 9,736,776       |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Town of<br>Littleton | Town of<br>North<br>Reading | Town of<br>Pepperell | Town of<br>Sherborn |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------|----------------------|---------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                      |                             |                      |                     |
| Beginning net pension liability.....                                                                                                                               | \$ 23,959,114        | \$ 47,493,109               | \$ 16,537,163        | \$ 10,736,551       |
| Ending net pension liability.....                                                                                                                                  | \$ 21,432,789        | \$ 48,035,495               | \$ 16,341,195        | \$ 10,500,304       |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                      |                             |                      |                     |
| Differences between expected and actual experience.....                                                                                                            | \$ 72,277            | \$ 161,989                  | \$ 55,107            | \$ 35,410           |
| Changes of assumptions.....                                                                                                                                        | 2,048,718            | 4,591,620                   | 1,562,022            | 1,003,704           |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 2,558,410            | 334,082                     | 1,450,402            | 144,137             |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 4,679,405         | \$ 5,087,691                | \$ 3,067,531         | \$ 1,183,251        |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                      |                             |                      |                     |
| Differences between expected and actual experience.....                                                                                                            | \$ 109,453           | \$ 245,308                  | \$ 83,451            | \$ 53,623           |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 582,154              | 1,304,734                   | 443,857              | 285,208             |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 1,843,015            | 939,537                     | 319,560              | 459,464             |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 2,534,622         | \$ 2,489,579                | \$ 846,868           | \$ 798,295          |
| <b>Pension Expense</b>                                                                                                                                             |                      |                             |                      |                     |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 2,494,113         | \$ 5,589,829                | \$ 1,901,611         | \$ 1,221,905        |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | 338,455              | (239,033)                   | 413,751              | (86,180)            |
| Total Employer Pension Expense.....                                                                                                                                | \$ 2,832,568         | \$ 5,350,796                | \$ 2,315,362         | \$ 1,135,725        |
| <b>Contributions</b>                                                                                                                                               |                      |                             |                      |                     |
| Statutory required contribution.....                                                                                                                               | \$ 2,054,283         | \$ 3,623,078                | \$ 1,254,044         | \$ 916,985          |
| Contribution in relation to statutory required contribution.....                                                                                                   | (3,555,064)          | (3,627,495)                 | (1,254,044)          | (916,985)           |
| Contribution deficiency/(excess).....                                                                                                                              | \$ (1,500,781)       | \$ (4,417)                  | \$ -                 | \$ -                |
| Contributions as a percentage of covered payroll.....                                                                                                              | 30.42%               | 28.78%                      | 27.99%               | 23.15%              |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                      |                             |                      |                     |
| June 30, 2019.....                                                                                                                                                 | \$ 913,814           | \$ 1,050,471                | \$ 852,427           | \$ 195,699          |
| June 30, 2020.....                                                                                                                                                 | 898,493              | 1,016,145                   | 840,753              | 188,198             |
| June 30, 2021.....                                                                                                                                                 | 458,993              | 566,919                     | 603,981              | 47,825              |
| June 30, 2022.....                                                                                                                                                 | (126,517)            | (35,423)                    | (76,498)             | (46,766)            |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ 2,144,783         | \$ 2,598,112                | \$ 2,220,663         | \$ 384,956          |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                      |                             |                      |                     |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 26,305,162        | \$ 58,955,555               | \$ 20,056,080        | \$ 12,887,373       |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 21,432,789        | \$ 48,035,495               | \$ 16,341,195        | \$ 10,500,304       |
| 1% increase (8.50%).....                                                                                                                                           | \$ 17,324,720        | \$ 38,828,442               | \$ 13,209,041        | \$ 8,487,692        |
| Covered Payroll.....                                                                                                                                               | \$ 11,686,136        | \$ 12,602,469               | \$ 4,479,949         | \$ 3,961,023        |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    |    | Town of<br>Shirley | Town of<br>Stow     | Town of<br>Sudbury  | Town of<br>Tewksbury |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|--------------------|---------------------|---------------------|----------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |    |                    |                     |                     |                      |
| Beginning net pension liability.....                                                                                                                               | \$ | 8,912,285          | \$ 10,493,658       | \$ 56,372,784       | \$ 93,491,923        |
| Ending net pension liability.....                                                                                                                                  | \$ | 8,406,745          | \$ 10,459,477       | \$ 58,772,716       | \$ 98,006,180        |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |    |                    |                     |                     |                      |
| Differences between expected and actual experience.....                                                                                                            | \$ | 28,350             | \$ 35,272           | \$ 198,197          | \$ 330,503           |
| Changes of assumptions.....                                                                                                                                        |    | 803,584            | 999,801             | 5,617,969           | 9,368,220            |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           |    | 111,480            | 214,065             | 1,658,187           | 3,136,289            |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ | <u>943,414</u>     | \$ <u>1,249,138</u> | \$ <u>7,474,353</u> | \$ <u>12,835,012</u> |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |    |                    |                     |                     |                      |
| Differences between expected and actual experience.....                                                                                                            | \$ | 42,932             | \$ 53,415           | \$ 300,141          | \$ 500,499           |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                |    | 228,343            | 284,099             | 1,596,376           | 2,662,030            |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           |    | 971,642            | 83,267              | 1,190,337           | 1,135,255            |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ | <u>1,242,917</u>   | \$ <u>420,781</u>   | \$ <u>3,086,854</u> | \$ <u>4,297,784</u>  |
| <b>Pension Expense</b>                                                                                                                                             |    |                    |                     |                     |                      |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ | 978,288            | \$ 1,217,159        | \$ 6,839,316        | \$ 11,404,870        |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... |    | (263,016)          | 52,745              | 14,881              | 327,598              |
| Total Employer Pension Expense.....                                                                                                                                | \$ | <u>715,272</u>     | \$ <u>1,269,904</u> | \$ <u>6,854,197</u> | \$ <u>11,732,468</u> |
| <b>Contributions</b>                                                                                                                                               |    |                    |                     |                     |                      |
| Statutory required contribution.....                                                                                                                               | \$ | 755,576            | \$ 826,612          | \$ 4,185,908        | \$ 7,504,649         |
| Contribution in relation to statutory required contribution.....                                                                                                   |    | (755,576)          | (826,612)           | (4,191,182)         | (7,504,649)          |
| Contribution deficiency/(excess).....                                                                                                                              | \$ | <u>-</u>           | \$ <u>-</u>         | \$ <u>(5,274)</u>   | \$ <u>-</u>          |
| Contributions as a percentage of covered payroll.....                                                                                                              |    | 44.61%             | 23.12%              | 26.41%              | 34.43%               |
| <b>Deferred Outflows/(Inflows) Recognized in</b>                                                                                                                   |    |                    |                     |                     |                      |
| <b>Future Pension Expense</b>                                                                                                                                      |    |                    |                     |                     |                      |
| June 30, 2019.....                                                                                                                                                 | \$ | (37,339)           | \$ 333,528          | \$ 1,592,623        | \$ 2,958,555         |
| June 30, 2020.....                                                                                                                                                 |    | (43,346)           | 326,052             | 1,550,621           | 2,888,515            |
| June 30, 2021.....                                                                                                                                                 |    | (128,741)          | 196,539             | 1,024,670           | 2,128,701            |
| June 30, 2022.....                                                                                                                                                 |    | (90,077)           | (27,762)            | 219,585             | 561,457              |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ | <u>(299,503)</u>   | \$ <u>828,357</u>   | \$ <u>4,387,499</u> | \$ <u>8,537,228</u>  |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |    |                    |                     |                     |                      |
| 1% decrease (6.50%).....                                                                                                                                           | \$ | 10,317,869         | \$ 12,837,261       | \$ 72,133,689       | \$ 120,286,211       |
| Current discount rate (7.50%).....                                                                                                                                 | \$ | 8,406,745          | \$ 10,459,477       | \$ 58,772,716       | \$ 98,006,180        |
| 1% increase (8.50%).....                                                                                                                                           | \$ | 6,795,403          | \$ 8,454,688        | \$ 47,507,631       | \$ 79,221,138        |
| Covered Payroll.....                                                                                                                                               | \$ | 1,693,751          | \$ 3,575,149        | \$ 15,869,459       | \$ 21,795,849        |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    |    | Town of<br>Townsend | Town of<br>Tyngsborough | Town of<br>Wayland  | Town of<br>Westford |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------------------|-------------------------|---------------------|---------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |    |                     |                         |                     |                     |
| Beginning net pension liability.....                                                                                                                               | \$ | 9,167,760           | \$ 22,745,937           | \$ 55,492,666       | \$ 52,904,581       |
| Ending net pension liability.....                                                                                                                                  | \$ | 8,090,096           | \$ 20,897,452           | \$ 53,697,606       | \$ 51,698,881       |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |    |                     |                         |                     |                     |
| Differences between expected and actual experience.....                                                                                                            | \$ | 27,282              | \$ 70,472               | \$ 181,083          | \$ 174,342          |
| Changes of assumptions.....                                                                                                                                        |    | 773,316             | 1,997,547               | 5,132,850           | 4,941,796           |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           |    | 699,438             | 1,843,235               | 104,210             | 1,531,751           |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ | <u>1,500,036</u>    | \$ <u>3,911,254</u>     | \$ <u>5,418,143</u> | \$ <u>6,647,889</u> |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |    |                     |                         |                     |                     |
| Differences between expected and actual experience.....                                                                                                            | \$ | 41,315              | \$ 106,719              | \$ 274,224          | \$ 264,017          |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                |    | 219,742             | 567,614                 | 1,458,527           | 1,404,238           |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           |    | 785,323             | 1,464,675               | 2,903,599           | 928,118             |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ | <u>1,046,380</u>    | \$ <u>2,139,008</u>     | \$ <u>4,636,350</u> | \$ <u>2,596,373</u> |
| <b>Pension Expense</b>                                                                                                                                             |    |                     |                         |                     |                     |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ | 941,440             | \$ 2,431,811            | \$ 6,248,726        | \$ 6,016,136        |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... |    | 48,986              | 259,931                 | (818,950)           | 346,120             |
| Total Employer Pension Expense.....                                                                                                                                | \$ | <u>990,426</u>      | \$ <u>2,691,742</u>     | \$ <u>5,429,776</u> | \$ <u>6,362,256</u> |
| <b>Contributions</b>                                                                                                                                               |    |                     |                         |                     |                     |
| Statutory required contribution.....                                                                                                                               | \$ | 764,434             | \$ 1,832,388            | \$ 4,362,369        | \$ 4,619,903        |
| Contribution in relation to statutory required contribution.....                                                                                                   |    | (764,434)           | (1,832,388)             | (4,364,388)         | (4,619,903)         |
| Contribution deficiency/(excess).....                                                                                                                              | \$ | <u>-</u>            | \$ <u>-</u>             | \$ <u>(2,019)</u>   | \$ <u>-</u>         |
| Contributions as a percentage of covered payroll.....                                                                                                              |    | 25.00%              | 22.53%                  | 23.75%              | 19.05%              |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |    |                     |                         |                     |                     |
| June 30, 2019.....                                                                                                                                                 | \$ | 266,163             | \$ 820,919              | \$ 622,552          | \$ 1,733,966        |
| June 30, 2020.....                                                                                                                                                 |    | 260,383             | 805,985                 | 584,173             | 1,697,019           |
| June 30, 2021.....                                                                                                                                                 |    | 112,683             | 484,884                 | (15,194)            | 837,421             |
| June 30, 2022.....                                                                                                                                                 |    | (185,573)           | (339,542)               | (409,738)           | (216,890)           |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ | <u>453,656</u>      | \$ <u>1,772,246</u>     | \$ <u>781,793</u>   | \$ <u>4,051,516</u> |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |    |                     |                         |                     |                     |
| 1% decrease (6.50%).....                                                                                                                                           | \$ | 9,929,236           | \$ 25,648,133           | \$ 65,904,846       | \$ 63,451,747       |
| Current discount rate (7.50%).....                                                                                                                                 | \$ | 8,090,096           | \$ 20,897,452           | \$ 53,697,606       | \$ 51,698,881       |
| 1% increase (8.50%).....                                                                                                                                           | \$ | 6,539,447           | \$ 16,891,997           | \$ 43,405,282       | \$ 41,789,658       |
| Covered Payroll.....                                                                                                                                               | \$ | 3,057,294           | \$ 8,131,921            | \$ 18,372,533       | \$ 24,255,608       |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Town of<br>Weston | Town of<br>Wilmington | Acton-<br>Boxborough<br>Regional<br>School<br>District | Acton<br>Water<br>Supply |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-----------------------|--------------------------------------------------------|--------------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                   |                       |                                                        |                          |
| Beginning net pension liability.....                                                                                                                               | \$ 63,418,247     | \$ 82,103,885         | \$ 27,434,445                                          | \$ 3,319,310             |
| Ending net pension liability.....                                                                                                                                  | \$ 61,375,790     | \$ 83,422,615         | \$ 27,084,083                                          | \$ 3,370,594             |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                   |                       |                                                        |                          |
| Differences between expected and actual experience.....                                                                                                            | \$ 206,976        | \$ 281,323            | \$ 91,335                                              | \$ 11,367                |
| Changes of assumptions.....                                                                                                                                        | 5,866,793         | 7,974,206             | 2,588,914                                              | 322,188                  |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | -                 | 1,346,216             | 1,048,046                                              | 180,574                  |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 6,073,769      | \$ 9,601,745          | \$ 3,728,295                                           | \$ 514,129               |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                   |                       |                                                        |                          |
| Differences between expected and actual experience.....                                                                                                            | \$ 313,435        | \$ 426,024            | \$ 138,313                                             | \$ 17,213                |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 1,667,081         | 2,265,914             | 735,654                                                | 91,552                   |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 2,575,309         | 362,841               | 283,822                                                | 119,085                  |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 4,555,825      | \$ 3,054,779          | \$ 1,157,789                                           | \$ 227,850               |
| <b>Pension Expense</b>                                                                                                                                             |                   |                       |                                                        |                          |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 7,142,224      | \$ 9,707,791          | \$ 3,151,749                                           | \$ 392,235               |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | (754,358)         | 172,684               | 287,791                                                | 21,223                   |
| Total Employer Pension Expense.....                                                                                                                                | \$ 6,387,866      | \$ 9,880,475          | \$ 3,439,540                                           | \$ 413,458               |
| <b>Contributions</b>                                                                                                                                               |                   |                       |                                                        |                          |
| Statutory required contribution.....                                                                                                                               | \$ 4,792,481      | \$ 6,120,056          | \$ 2,318,753                                           | \$ 203,213               |
| Contribution in relation to statutory required contribution.....                                                                                                   | (4,792,481)       | (7,120,056)           | (2,318,753)                                            | (203,213)                |
| Contribution deficiency/(excess).....                                                                                                                              | \$ -              | \$ (1,000,000)        | \$ -                                                   | \$ -                     |
| Contributions as a percentage of covered payroll.....                                                                                                              | 25.35%            | 31.56%                | 17.99%                                                 | 17.80%                   |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                   |                       |                                                        |                          |
| June 30, 2019.....                                                                                                                                                 | \$ 893,263        | \$ 2,412,148          | \$ 1,014,858                                           | \$ 111,706               |
| June 30, 2020.....                                                                                                                                                 | 849,399           | 2,352,530             | 995,499                                                | 109,295                  |
| June 30, 2021.....                                                                                                                                                 | 281,133           | 1,611,978             | 643,481                                                | 75,650                   |
| June 30, 2022.....                                                                                                                                                 | (505,851)         | 170,310               | (83,332)                                               | (10,372)                 |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ 1,517,944      | \$ 6,546,966          | \$ 2,570,506                                           | \$ 286,279               |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                   |                       |                                                        |                          |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 75,328,538     | \$ 102,387,331        | \$ 33,241,181                                          | \$ 4,136,839             |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 61,375,790     | \$ 83,422,615         | \$ 27,084,083                                          | \$ 3,370,594             |
| 1% increase (8.50%).....                                                                                                                                           | \$ 49,611,776     | \$ 67,432,840         | \$ 21,892,818                                          | \$ 2,724,544             |
| Covered Payroll.....                                                                                                                                               | \$ 18,905,798     | \$ 22,562,358         | \$ 12,887,573                                          | \$ 1,141,452             |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    |    | Bedford<br>Housing<br>Authority | Billerica<br>Housing<br>Authority | Chelmsford<br>Housing<br>Authority | Chelmsford<br>Water<br>District |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------------------------------|-----------------------------------|------------------------------------|---------------------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |    |                                 |                                   |                                    |                                 |
| Beginning net pension liability.....                                                                                                                               | \$ | 312,414                         | \$ 1,343,792                      | \$ 1,193,547                       | \$ 1,165,154                    |
| Ending net pension liability.....                                                                                                                                  | \$ | 313,455                         | \$ 1,359,538                      | \$ 2,029,608                       | \$ 391,160                      |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |    |                                 |                                   |                                    |                                 |
| Differences between expected and actual experience.....                                                                                                            | \$ | 1,057                           | \$ 4,585                          | \$ 6,844                           | \$ 1,319                        |
| Changes of assumptions.....                                                                                                                                        |    | 29,963                          | 129,955                           | 194,006                            | 37,390                          |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           |    | 20,835                          | 98,064                            | 655,085                            | 1,258,693                       |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ | 51,855                          | \$ 232,604                        | \$ 855,935                         | \$ 1,297,402                    |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |    |                                 |                                   |                                    |                                 |
| Differences between expected and actual experience.....                                                                                                            | \$ | 1,601                           | \$ 6,943                          | \$ 10,365                          | \$ 1,998                        |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                |    | 8,514                           | 36,928                            | 55,128                             | 10,625                          |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           |    |                                 | 21,967                            | 29,783                             | 1,071,016                       |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ | 10,115                          | \$ 65,838                         | \$ 95,276                          | \$ 1,083,639                    |
| <b>Pension Expense</b>                                                                                                                                             |    |                                 |                                   |                                    |                                 |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ | 36,476                          | \$ 158,210                        | \$ 236,188                         | \$ 45,523                       |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... |    | 7,221                           | 24,054                            | 160,764                            | 89,320                          |
| Total Employer Pension Expense.....                                                                                                                                | \$ | 43,697                          | \$ 182,264                        | \$ 396,952                         | \$ 134,843                      |
| <b>Contributions</b>                                                                                                                                               |    |                                 |                                   |                                    |                                 |
| Statutory required contribution.....                                                                                                                               | \$ | 29,026                          | \$ 101,238                        | \$ 112,094                         | \$ 107,500                      |
| Contribution in relation to statutory required contribution.....                                                                                                   |    | (29,026)                        | (101,238)                         | (194,843)                          | (607,500)                       |
| Contribution deficiency/(excess).....                                                                                                                              | \$ | -                               | \$ -                              | \$ (82,749)                        | \$ (500,000)                    |
| Contributions as a percentage of covered payroll.....                                                                                                              |    | 18.13%                          | 34.72%                            | 8.19%                              | 45.55%                          |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |    |                                 |                                   |                                    |                                 |
| June 30, 2019.....                                                                                                                                                 | \$ | 15,636                          | \$ 60,550                         | \$ 215,248                         | \$ 99,820                       |
| June 30, 2020.....                                                                                                                                                 |    | 15,410                          | 59,579                            | 213,799                            | 99,540                          |
| June 30, 2021.....                                                                                                                                                 |    | 10,304                          | 47,858                            | 178,512                            | 39,136                          |
| June 30, 2022.....                                                                                                                                                 |    | 390                             | (1,221)                           | 153,100                            | (24,733)                        |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ | 41,740                          | \$ 166,766                        | \$ 760,659                         | \$ 213,763                      |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |    |                                 |                                   |                                    |                                 |
| 1% decrease (6.50%).....                                                                                                                                           | \$ | 384,714                         | \$ 1,668,604                      | \$ 2,491,001                       | \$ 480,078                      |
| Current discount rate (7.50%).....                                                                                                                                 | \$ | 313,455                         | \$ 1,359,538                      | \$ 2,029,608                       | \$ 391,160                      |
| 1% increase (8.50%).....                                                                                                                                           | \$ | 253,375                         | \$ 1,098,951                      | \$ 1,640,586                       | \$ 316,182                      |
| Covered Payroll.....                                                                                                                                               | \$ | 160,096                         | \$ 291,582                        | \$ 2,380,023                       | \$ 1,333,719                    |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Dracut<br>Housing<br>Authority | Dracut<br>Water<br>Supply | East<br>Chelmsford<br>Water<br>District | East<br>Middlesex<br>Mosquito<br>Control |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------|-----------------------------------------|------------------------------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                                |                           |                                         |                                          |
| Beginning net pension liability.....                                                                                                                               | \$ 1,903,315                   | \$ 2,550,634              | \$ 321,683                              | \$ 585,986                               |
| Ending net pension liability.....                                                                                                                                  | \$ 2,055,364                   | \$ 3,031,987              | \$ 317,151                              | \$ 509,331                               |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                                |                           |                                         |                                          |
| Differences between expected and actual experience.....                                                                                                            | \$ 6,931                       | \$ 10,225                 | \$ 1,069                                | \$ 1,718                                 |
| Changes of assumptions.....                                                                                                                                        | 196,468                        | 289,822                   | 30,315                                  | 48,686                                   |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 107,008                        | 342,831                   | 14,471                                  | 46,259                                   |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 310,407                     | \$ 642,878                | \$ 45,855                               | \$ 96,663                                |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                                |                           |                                         |                                          |
| Differences between expected and actual experience.....                                                                                                            | \$ 10,496                      | \$ 15,484                 | \$ 1,620                                | \$ 2,601                                 |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 55,827                         | 82,354                    | 8,614                                   | 13,834                                   |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 111,763                        | 175,391                   | 3,636                                   | 58,979                                   |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 178,086                     | \$ 273,229                | \$ 13,870                               | \$ 75,414                                |
| <b>Pension Expense</b>                                                                                                                                             |                                |                           |                                         |                                          |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 239,180                     | \$ 352,826                | \$ 36,913                               | \$ 59,269                                |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | (12,724)                       | 28,193                    | 4,995                                   | 4,026                                    |
| Total Employer Pension Expense.....                                                                                                                                | \$ 226,456                     | \$ 381,019                | \$ 41,908                               | \$ 63,295                                |
| <b>Contributions</b>                                                                                                                                               |                                |                           |                                         |                                          |
| Statutory required contribution.....                                                                                                                               | \$ 122,310                     | \$ 162,034                | \$ 28,517                               | \$ 43,626                                |
| Contribution in relation to statutory required contribution.....                                                                                                   | (122,310)                      | (162,034)                 | (28,517)                                | (43,626)                                 |
| Contribution deficiency/(excess).....                                                                                                                              | \$ -                           | \$ -                      | \$ -                                    | \$ -                                     |
| Contributions as a percentage of covered payroll.....                                                                                                              | 32.74%                         | 26.41%                    | 14.75%                                  | 13.73%                                   |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                                |                           |                                         |                                          |
| June 30, 2019.....                                                                                                                                                 | \$ 42,452                      | \$ 109,586                | \$ 13,509                               | \$ 17,699                                |
| June 30, 2020.....                                                                                                                                                 | 40,985                         | 107,421                   | 13,278                                  | 17,335                                   |
| June 30, 2021.....                                                                                                                                                 | 33,800                         | 87,826                    | 5,980                                   | 382                                      |
| June 30, 2022.....                                                                                                                                                 | 15,084                         | 64,816                    | (782)                                   | (14,167)                                 |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ 132,321                     | \$ 369,649                | \$ 31,985                               | \$ 21,249                                |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                                |                           |                                         |                                          |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 2,522,614                   | \$ 3,721,260              | \$ 389,243                              | \$ 625,119                               |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 2,055,364                   | \$ 3,031,987              | \$ 317,151                              | \$ 509,331                               |
| 1% increase (8.50%).....                                                                                                                                           | \$ 1,661,407                   | \$ 2,450,842              | \$ 256,357                              | \$ 411,707                               |
| Covered Payroll.....                                                                                                                                               | \$ 373,534                     | \$ 613,589                | \$ 193,307                              | \$ 317,832                               |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Greater Lowell<br>Regional<br>Vocation<br>Technical<br>School District | Groton-<br>Dunstable<br>Regional<br>School District | Hudson<br>Housing<br>Authority | Lincoln-<br>Sudbury<br>Regional<br>School District |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------|----------------------------------------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                                                                        |                                                     |                                |                                                    |
| Beginning net pension liability.....                                                                                                                               | \$ 14,939,992                                                          | \$ 10,353,378                                       | \$ 1,432,356                   | \$ 8,168,982                                       |
| Ending net pension liability.....                                                                                                                                  | \$ 15,614,520                                                          | \$ 10,714,454                                       | \$ 1,155,540                   | \$ 8,466,429                                       |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                                                                        |                                                     |                                |                                                    |
| Differences between expected and actual experience.....                                                                                                            | \$ 52,656                                                              | \$ 36,132                                           | \$ 3,897                       | \$ 28,551                                          |
| Changes of assumptions.....                                                                                                                                        | 1,492,562                                                              | 1,024,173                                           | 110,456                        | 809,290                                            |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 509,189                                                                | 921,862                                             | 5,430                          | 204,134                                            |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 2,054,407                                                           | \$ 1,982,167                                        | \$ 119,783                     | \$ 1,041,975                                       |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                                                                        |                                                     |                                |                                                    |
| Differences between expected and actual experience.....                                                                                                            | \$ 79,740                                                              | \$ 54,717                                           | \$ 5,901                       | \$ 43,236                                          |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 424,120                                                                | 291,024                                             | 31,387                         | 229,964                                            |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 821,777                                                                | 24,048                                              | 279,840                        | 401,183                                            |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 1,325,637                                                           | \$ 369,789                                          | \$ 317,128                     | \$ 674,383                                         |
| <b>Pension Expense</b>                                                                                                                                             |                                                                        |                                                     |                                |                                                    |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 1,817,041                                                           | \$ 1,246,835                                        | \$ 134,466                     | \$ 985,226                                         |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | (150,633)                                                              | 304,693                                             | (78,213)                       | (85,295)                                           |
| Total Employer Pension Expense.....                                                                                                                                | \$ 1,666,408                                                           | \$ 1,551,528                                        | \$ 56,253                      | \$ 899,931                                         |
| <b>Contributions</b>                                                                                                                                               |                                                                        |                                                     |                                |                                                    |
| Statutory required contribution.....                                                                                                                               | \$ 1,179,775                                                           | \$ 859,466                                          | \$ 100,489                     | \$ 605,786                                         |
| Contribution in relation to statutory required contribution.....                                                                                                   | (1,179,775)                                                            | (859,466)                                           | (100,489)                      | (605,786)                                          |
| Contribution deficiency/(excess).....                                                                                                                              | \$ -                                                                   | \$ -                                                | \$ -                           | \$ -                                               |
| Contributions as a percentage of covered payroll.....                                                                                                              | 27.55%                                                                 | 19.81%                                              | 39.00%                         | 20.54%                                             |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                                                                        |                                                     |                                |                                                    |
| June 30, 2019.....                                                                                                                                                 | \$ 268,536                                                             | \$ 592,320                                          | \$ (47,193)                    | \$ 141,985                                         |
| June 30, 2020.....                                                                                                                                                 | 257,375                                                                | 584,662                                             | (48,019)                       | 135,938                                            |
| June 30, 2021.....                                                                                                                                                 | 124,620                                                                | 390,037                                             | (51,781)                       | 66,314                                             |
| June 30, 2022.....                                                                                                                                                 | 78,239                                                                 | 45,359                                              | (50,352)                       | 23,355                                             |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ 728,770                                                             | \$ 1,612,378                                        | \$ (197,345)                   | \$ 367,592                                         |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                                                                        |                                                     |                                |                                                    |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 19,164,220                                                          | \$ 13,150,195                                       | \$ 1,418,236                   | \$ 10,391,129                                      |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 15,614,520                                                          | \$ 10,714,454                                       | \$ 1,155,540                   | \$ 8,466,429                                       |
| 1% increase (8.50%).....                                                                                                                                           | \$ 12,621,657                                                          | \$ 8,660,788                                        | \$ 934,058                     | \$ 6,843,653                                       |
| Covered Payroll.....                                                                                                                                               | \$ 4,282,960                                                           | \$ 4,338,293                                        | \$ 257,663                     | \$ 2,949,693                                       |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Nashoba<br>Valley<br>Technical<br>High<br>School District | North<br>Chelmsford<br>Water<br>District | North<br>Middlesex<br>Regional<br>School District | Shawsheen<br>Valley<br>Regional<br>Vocational<br>Technical School |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                                                           |                                          |                                                   |                                                                   |
| Beginning net pension liability.....                                                                                                                               | \$ 3,254,718                                              | \$ 707,192                               | \$ 11,779,471                                     | \$ 8,457,396                                                      |
| Ending net pension liability.....                                                                                                                                  | \$ 3,512,891                                              | \$ 814,336                               | \$ 11,610,214                                     | \$ 7,940,619                                                      |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                                                           |                                          |                                                   |                                                                   |
| Differences between expected and actual experience.....                                                                                                            | \$ 11,846                                                 | \$ 2,746                                 | \$ 39,153                                         | \$ 26,778                                                         |
| Changes of assumptions.....                                                                                                                                        | 335,791                                                   | 77,841                                   | 1,109,797                                         | 759,029                                                           |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 182,377                                                   | 104,807                                  | 53,258                                            | 190,937                                                           |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 530,014                                                | \$ 185,394                               | \$ 1,202,208                                      | \$ 976,744                                                        |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                                                           |                                          |                                                   |                                                                   |
| Differences between expected and actual experience.....                                                                                                            | \$ 17,940                                                 | \$ 4,159                                 | \$ 59,291                                         | \$ 40,551                                                         |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 95,417                                                    | 22,119                                   | 315,355                                           | 215,682                                                           |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 187,321                                                   | 93,700                                   | 313,125                                           | 501,310                                                           |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 300,678                                                | \$ 119,978                               | \$ 687,771                                        | \$ 757,543                                                        |
| <b>Pension Expense</b>                                                                                                                                             |                                                           |                                          |                                                   |                                                                   |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 408,790                                                | \$ 94,759                                | \$ 1,351,072                                      | \$ 924,036                                                        |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | (23,607)                                                  | 2,545                                    | (65,782)                                          | (78,723)                                                          |
| Total Employer Pension Expense.....                                                                                                                                | \$ 385,183                                                | \$ 97,304                                | \$ 1,285,290                                      | \$ 845,313                                                        |
| <b>Contributions</b>                                                                                                                                               |                                                           |                                          |                                                   |                                                                   |
| Statutory required contribution.....                                                                                                                               | \$ 254,429                                                | \$ 41,187                                | \$ 914,940                                        | \$ 619,993                                                        |
| Contribution in relation to statutory required contribution.....                                                                                                   | (254,429)                                                 | (41,187)                                 | (914,940)                                         | (619,993)                                                         |
| Contribution deficiency/(excess).....                                                                                                                              | \$ -                                                      | \$ -                                     | \$ -                                              | \$ -                                                              |
| Contributions as a percentage of covered payroll.....                                                                                                              | 25.84%                                                    | 7.37%                                    | 18.80%                                            | 24.25%                                                            |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                                                           |                                          |                                                   |                                                                   |
| June 30, 2019.....                                                                                                                                                 | \$ 70,696                                                 | \$ 24,406                                | \$ 245,892                                        | \$ 134,441                                                        |
| June 30, 2020.....                                                                                                                                                 | 68,186                                                    | 23,824                                   | 237,596                                           | 128,765                                                           |
| June 30, 2021.....                                                                                                                                                 | 55,905                                                    | 4,227                                    | 85,910                                            | 66,877                                                            |
| June 30, 2022.....                                                                                                                                                 | 34,549                                                    | 12,959                                   | (54,961)                                          | (110,882)                                                         |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ 229,336                                                | \$ 65,416                                | \$ 514,437                                        | \$ 219,201                                                        |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                                                           |                                          |                                                   |                                                                   |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 4,311,490                                              | \$ 999,469                               | \$ 14,249,592                                     | \$ 9,745,788                                                      |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 3,512,891                                              | \$ 814,336                               | \$ 11,610,214                                     | \$ 7,940,619                                                      |
| 1% increase (8.50%).....                                                                                                                                           | \$ 2,839,571                                              | \$ 658,256                               | \$ 9,384,857                                      | \$ 6,418,628                                                      |
| Covered Payroll.....                                                                                                                                               | \$ 984,562                                                | \$ 558,955                               | \$ 4,866,639                                      | \$ 2,556,591                                                      |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    |    | South<br>Middlesex<br>Regional<br>Vocational<br>Technical School | Sudbury<br>Water District | Tewksbury<br>Housing<br>Authority | Wayland<br>Housing<br>Authority |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|------------------------------------------------------------------|---------------------------|-----------------------------------|---------------------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |    |                                                                  |                           |                                   |                                 |
| Beginning net pension liability.....                                                                                                                               | \$ | 7,274,785                                                        | \$ 2,003,371              | \$ 1,495,958                      | \$ 609,217                      |
| Ending net pension liability.....                                                                                                                                  | \$ | 6,492,906                                                        | \$ 1,701,694              | \$ 1,527,710                      | \$ 611,202                      |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |    |                                                                  |                           |                                   |                                 |
| Differences between expected and actual experience.....                                                                                                            | \$ | 21,896                                                           | \$ 5,739                  | \$ 5,152                          | \$ 2,061                        |
| Changes of assumptions.....                                                                                                                                        |    | 620,645                                                          | 162,661                   | 146,031                           | 58,423                          |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           |    | 92,573                                                           | 220,905                   | 87,247                            | 73,141                          |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ | 735,114                                                          | \$ 389,305                | \$ 238,430                        | \$ 133,625                      |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |    |                                                                  |                           |                                   |                                 |
| Differences between expected and actual experience.....                                                                                                            | \$ | 33,158                                                           | \$ 8,690                  | \$ 7,802                          | \$ 3,121                        |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                |    | 176,360                                                          | 46,221                    | 41,495                            | 16,601                          |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           |    | 589,040                                                          | 283,191                   | 7,731                             | 15,601                          |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ | 798,558                                                          | \$ 338,102                | \$ 57,028                         | \$ 35,323                       |
| <b>Pension Expense</b>                                                                                                                                             |    |                                                                  |                           |                                   |                                 |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ | 755,566                                                          | \$ 198,029                | \$ 177,777                        | \$ 71,127                       |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... |    | (119,539)                                                        | (2,243)                   | 24,477                            | 21,202                          |
| Total Employer Pension Expense.....                                                                                                                                | \$ | 636,027                                                          | \$ 195,786                | \$ 202,254                        | \$ 92,329                       |
| <b>Contributions</b>                                                                                                                                               |    |                                                                  |                           |                                   |                                 |
| Statutory required contribution.....                                                                                                                               | \$ | 540,790                                                          | \$ 119,483                | \$ 123,408                        | \$ 42,233                       |
| Contribution in relation to statutory required contribution.....                                                                                                   |    | (540,790)                                                        | (119,483)                 | (123,408)                         | (42,233)                        |
| Contribution deficiency/(excess).....                                                                                                                              | \$ | -                                                                | \$ -                      | \$ -                              | \$ -                            |
| Contributions as a percentage of covered payroll.....                                                                                                              |    | 23.17%                                                           | 14.12%                    | 28.45%                            | 14.95%                          |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |    |                                                                  |                           |                                   |                                 |
| June 30, 2019.....                                                                                                                                                 | \$ | 54,762                                                           | \$ 43,438                 | \$ 65,488                         | \$ 37,610                       |
| June 30, 2020.....                                                                                                                                                 |    | 50,121                                                           | 42,220                    | 64,395                            | 37,173                          |
| June 30, 2021.....                                                                                                                                                 |    | (19,782)                                                         | 26,335                    | 48,426                            | 25,640                          |
| June 30, 2022.....                                                                                                                                                 |    | (148,545)                                                        | (60,790)                  | 3,093                             | (2,121)                         |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ | (63,444)                                                         | \$ 51,203                 | \$ 181,402                        | \$ 98,302                       |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |    |                                                                  |                           |                                   |                                 |
| 1% decrease (6.50%).....                                                                                                                                           | \$ | 7,968,965                                                        | \$ 2,088,537              | \$ 1,875,009                      | \$ 750,146                      |
| Current discount rate (7.50%).....                                                                                                                                 | \$ | 6,492,906                                                        | \$ 1,701,694              | \$ 1,527,710                      | \$ 611,202                      |
| 1% increase (8.50%).....                                                                                                                                           | \$ | 5,248,403                                                        | \$ 1,375,522              | \$ 1,234,891                      | \$ 494,050                      |
| Covered Payroll.....                                                                                                                                               | \$ | 2,333,768                                                        | \$ 846,401                | \$ 433,785                        | \$ 282,427                      |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Hopkinton<br>Housing<br>Authority | Sudbury<br>Housing<br>Authority | Wilmington<br>Housing<br>Authority | Acton<br>Housing<br>Authority |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------|------------------------------------|-------------------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                                   |                                 |                                    |                               |
| Beginning net pension liability.....                                                                                                                               | \$ 514,197                        | \$ 367,971                      | \$ 319,057                         | \$ 990,778                    |
| Ending net pension liability.....                                                                                                                                  | \$ 458,176                        | \$ 436,617                      | \$ 335,690                         | \$ 741,792                    |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                                   |                                 |                                    |                               |
| Differences between expected and actual experience.....                                                                                                            | \$ 1,545                          | \$ 1,472                        | \$ 1,132                           | \$ 2,502                      |
| Changes of assumptions.....                                                                                                                                        | 43,796                            | 41,735                          | 32,088                             | 70,907                        |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 22,988                            | 96,811                          | 25,159                             | 57,374                        |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 68,329                         | \$ 140,018                      | \$ 58,379                          | \$ 130,783                    |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                                   |                                 |                                    |                               |
| Differences between expected and actual experience.....                                                                                                            | \$ 2,340                          | \$ 2,230                        | \$ 1,714                           | \$ 3,788                      |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 12,445                            | 11,859                          | 9,118                              | 20,148                        |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 48,515                            | 7,609                           | 439                                | 183,157                       |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 63,300                         | \$ 21,698                       | \$ 11,271                          | \$ 207,093                    |
| <b>Pension Expense</b>                                                                                                                                             |                                   |                                 |                                    |                               |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 53,324                         | \$ 50,814                       | \$ 39,060                          | \$ 86,319                     |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | (3,920)                           | 27,583                          | 7,329                              | (26,302)                      |
| Total Employer Pension Expense.....                                                                                                                                | \$ 49,404                         | \$ 78,397                       | \$ 46,389                          | \$ 60,017                     |
| <b>Contributions</b>                                                                                                                                               |                                   |                                 |                                    |                               |
| Statutory required contribution.....                                                                                                                               | \$ 35,639                         | \$ 28,513                       | \$ 28,468                          | \$ 69,639                     |
| Contribution in relation to statutory required contribution.....                                                                                                   | (35,639)                          | (28,513)                        | (28,468)                           | (69,639)                      |
| Contribution deficiency/(excess).....                                                                                                                              | \$ -                              | \$ -                            | \$ -                               | \$ -                          |
| Contributions as a percentage of covered payroll.....                                                                                                              | 51.95%                            | 20.36%                          | 22.78%                             | 18.92%                        |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                                   |                                 |                                    |                               |
| June 30, 2019.....                                                                                                                                                 | \$ 8,379                          | \$ 39,304                       | \$ 16,341                          | \$ (6,389)                    |
| June 30, 2020.....                                                                                                                                                 | 8,053                             | 38,990                          | 16,100                             | (6,920)                       |
| June 30, 2021.....                                                                                                                                                 | (263)                             | 29,781                          | 11,981                             | (18,883)                      |
| June 30, 2022.....                                                                                                                                                 | (11,140)                          | 10,245                          | 2,686                              | (44,118)                      |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ 5,029                          | \$ 118,320                      | \$ 47,108                          | \$ (76,310)                   |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                                   |                                 |                                    |                               |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 562,327                        | \$ 535,869                      | \$ 412,008                         | \$ 910,428                    |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 458,176                        | \$ 436,617                      | \$ 335,690                         | \$ 741,792                    |
| 1% increase (8.50%).....                                                                                                                                           | \$ 370,351                        | \$ 352,926                      | \$ 271,351                         | \$ 599,613                    |
| Covered Payroll.....                                                                                                                                               | \$ 68,604                         | \$ 140,067                      | \$ 124,945                         | \$ 367,987                    |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Burlington<br>Housing<br>Authority | Ayer<br>Housing<br>Authority | Holliston<br>Housing<br>Authority | Littleton<br>Housing<br>Authority |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------------------------------|-----------------------------------|-----------------------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                                    |                              |                                   |                                   |
| Beginning net pension liability.....                                                                                                                               | \$ 54,061                          | \$ 1,891,747                 | \$ 226,087                        | \$ 454,776                        |
| Ending net pension liability.....                                                                                                                                  | \$ 56,771                          | \$ 792,328                   | \$ 142,446                        | \$ 465,317                        |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                                    |                              |                                   |                                   |
| Differences between expected and actual experience.....                                                                                                            | \$ 191                             | \$ 2,672                     | \$ 480                            | \$ 1,569                          |
| Changes of assumptions.....                                                                                                                                        | 5,426                              | 75,737                       | 13,616                            | 44,479                            |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 34,046                             | 739,776                      | 14,655                            | 34,538                            |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 39,663                          | \$ 818,185                   | \$ 28,751                         | \$ 80,586                         |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                                    |                              |                                   |                                   |
| Differences between expected and actual experience.....                                                                                                            | \$ 290                             | \$ 4,046                     | \$ 727                            | \$ 2,376                          |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 1,542                              | 21,521                       | 3,869                             | 12,639                            |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 40,056                             | 854,798                      | 65,267                            | 6,713                             |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 41,888                          | \$ 880,365                   | \$ 69,863                         | \$ 21,728                         |
| <b>Pension Expense</b>                                                                                                                                             |                                    |                              |                                   |                                   |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 6,610                           | \$ 92,200                    | \$ 16,578                         | \$ 54,145                         |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | 1,662                              | 27,289                       | (11,223)                          | 7,927                             |
| Total Employer Pension Expense.....                                                                                                                                | \$ 8,272                           | \$ 119,489                   | \$ 5,355                          | \$ 62,072                         |
| <b>Contributions</b>                                                                                                                                               |                                    |                              |                                   |                                   |
| Statutory required contribution.....                                                                                                                               | \$ 6,473                           | \$ 68,956                    | \$ 18,523                         | \$ 38,079                         |
| Contribution in relation to statutory required contribution.....                                                                                                   | (6,473)                            | (68,956)                     | (18,523)                          | (38,079)                          |
| Contribution deficiency/(excess).....                                                                                                                              | \$ -                               | \$ -                         | \$ -                              | \$ -                              |
| Contributions as a percentage of covered payroll.....                                                                                                              | 5.14%                              | 62.78%                       | 32.39%                            | 45.28%                            |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                                    |                              |                                   |                                   |
| June 30, 2019.....                                                                                                                                                 | \$ 3,186                           | \$ 48,559                    | \$ (7,399)                        | \$ 20,418                         |
| June 30, 2020.....                                                                                                                                                 | 3,149                              | 47,997                       | (7,498)                           | 20,090                            |
| June 30, 2021.....                                                                                                                                                 | (9,325)                            | 39,417                       | (12,329)                          | 17,153                            |
| June 30, 2022.....                                                                                                                                                 | 765                                | (198,153)                    | (13,886)                          | 1,197                             |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ (2,225)                         | \$ (62,180)                  | \$ (41,112)                       | \$ 58,858                         |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                                    |                              |                                   |                                   |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 69,672                          | \$ 972,454                   | \$ 174,826                        | \$ 571,105                        |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 56,771                          | \$ 792,328                   | \$ 142,446                        | \$ 465,317                        |
| 1% increase (8.50%).....                                                                                                                                           | \$ 45,887                          | \$ 640,463                   | \$ 115,141                        | \$ 376,133                        |
| Covered Payroll.....                                                                                                                                               | \$ 125,843                         | \$ 109,841                   | \$ 57,183                         | \$ 84,100                         |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Westford<br>Housing<br>Authority | Shirley<br>Water District | Tyngsborough<br>Housing<br>Authority | Pepperell<br>Housing<br>Authority |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------|--------------------------------------|-----------------------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                                  |                           |                                      |                                   |
| Beginning net pension liability.....                                                                                                                               | \$ 478,025                       | \$ 359,871                | \$ 455,142                           | \$ 159,347                        |
| Ending net pension liability.....                                                                                                                                  | \$ 517,839                       | \$ 335,341                | \$ 496,440                           | \$ 175,037                        |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                                  |                           |                                      |                                   |
| Differences between expected and actual experience.....                                                                                                            | \$ 1,746                         | \$ 1,131                  | \$ 1,674                             | \$ 590                            |
| Changes of assumptions.....                                                                                                                                        | 49,499                           | 32,054                    | 47,454                               | 16,732                            |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 39,828                           | 6,427                     | 38,104                               | 38,261                            |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 91,073                        | \$ 39,612                 | \$ 87,232                            | \$ 55,583                         |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                                  |                           |                                      |                                   |
| Differences between expected and actual experience.....                                                                                                            | \$ 2,644                         | \$ 1,713                  | \$ 2,535                             | \$ 894                            |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 14,065                           | 9,108                     | 13,484                               | 4,754                             |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | -                                | 50,370                    | 8,740                                | 2,078                             |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 16,709                        | \$ 61,191                 | \$ 24,759                            | \$ 7,726                          |
| <b>Pension Expense</b>                                                                                                                                             |                                  |                           |                                      |                                   |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 60,266                        | \$ 39,024                 | \$ 57,765                            | \$ 20,364                         |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | 11,644                           | (12,211)                  | 6,565                                | 11,464                            |
| Total Employer Pension Expense.....                                                                                                                                | \$ 71,910                        | \$ 26,813                 | \$ 64,330                            | \$ 31,828                         |
| <b>Contributions</b>                                                                                                                                               |                                  |                           |                                      |                                   |
| Statutory required contribution.....                                                                                                                               | \$ 43,578                        | \$ 19,480                 | \$ 37,587                            | \$ 13,494                         |
| Contribution in relation to statutory required contribution.....                                                                                                   | (43,578)                         | (19,480)                  | (37,587)                             | (13,494)                          |
| Contribution deficiency/(excess).....                                                                                                                              | \$ -                             | \$ -                      | \$ -                                 | \$ -                              |
| Contributions as a percentage of covered payroll.....                                                                                                              | 36.43%                           | 9.85%                     | 24.32%                               | 14.56%                            |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                                  |                           |                                      |                                   |
| June 30, 2019.....                                                                                                                                                 | \$ 25,545                        | \$ (3,209)                | \$ 19,892                            | \$ 16,163                         |
| June 30, 2020.....                                                                                                                                                 | 25,174                           | (3,448)                   | 19,536                               | 16,042                            |
| June 30, 2021.....                                                                                                                                                 | 17,021                           | (8,410)                   | 16,968                               | 13,256                            |
| June 30, 2022.....                                                                                                                                                 | 6,624                            | (6,512)                   | 6,077                                | 2,396                             |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ 74,364                        | \$ (21,579)               | \$ 62,473                            | \$ 47,857                         |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                                  |                           |                                      |                                   |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 635,552                       | \$ 411,573                | \$ 609,303                           | \$ 214,835                        |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 517,839                       | \$ 335,341                | \$ 496,440                           | \$ 175,037                        |
| 1% increase (8.50%).....                                                                                                                                           | \$ 418,578                       | \$ 271,064                | \$ 401,290                           | \$ 141,492                        |
| Covered Payroll.....                                                                                                                                               | \$ 119,617                       | \$ 197,738                | \$ 154,567                           | \$ 92,703                         |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Groton<br>Housing<br>Authority | Tyngsborough<br>Water District | North<br>Reading<br>Housing<br>Authority | West Groton<br>Water |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------|------------------------------------------|----------------------|
| <b>Net Pension Liability</b>                                                                                                                                       |                                |                                |                                          |                      |
| Beginning net pension liability.....                                                                                                                               | \$ 13,516                      | \$ 405,503                     | \$ 147,057                               | \$ 13,002            |
| Ending net pension liability.....                                                                                                                                  | \$ (15,094)                    | \$ 380,399                     | \$ 139,940                               | \$ 21,871            |
| <b>Deferred Outflows of Resources</b>                                                                                                                              |                                |                                |                                          |                      |
| Differences between expected and actual experience.....                                                                                                            | \$ (51)                        | \$ 1,283                       | \$ 472                                   | \$ 74                |
| Changes of assumptions.....                                                                                                                                        | (1,443)                        | 36,362                         | 13,377                                   | 2,090                |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 6,198                          | 8,651                          | 34,061                                   | 15,750               |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 4,704                       | \$ 46,296                      | \$ 47,910                                | \$ 17,914            |
| <b>Deferred Inflows of Resources</b>                                                                                                                               |                                |                                |                                          |                      |
| Differences between expected and actual experience.....                                                                                                            | \$ (77)                        | \$ 1,943                       | \$ 715                                   | \$ 112               |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | (410)                          | 10,332                         | 3,801                                    | 594                  |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 20,575                         | 20,791                         | 5,414                                    | 8,001                |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 20,088                      | \$ 33,066                      | \$ 9,930                                 | \$ 8,707             |
| <b>Pension Expense</b>                                                                                                                                             |                                |                                |                                          |                      |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ (1,750)                     | \$ 44,266                      | \$ 16,280                                | \$ 2,546             |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | (3,064)                        | (1,274)                        | 10,112                                   | 3,186                |
| Total Employer Pension Expense.....                                                                                                                                | \$ (4,814)                     | \$ 42,992                      | \$ 26,392                                | \$ 5,732             |
| <b>Contributions</b>                                                                                                                                               |                                |                                |                                          |                      |
| Statutory required contribution.....                                                                                                                               | \$ 3,071                       | \$ 31,677                      | \$ 15,481                                | \$ 967               |
| Contribution in relation to statutory required contribution.....                                                                                                   | (3,071)                        | (31,677)                       | (15,481)                                 | (967)                |
| Contribution deficiency/(excess).....                                                                                                                              | \$ -                           | \$ -                           | \$ -                                     | \$ -                 |
| Contributions as a percentage of covered payroll.....                                                                                                              | 9.78%                          | 15.95%                         | 18.46%                                   | 0.85%                |
| <b>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</b>                                                                                        |                                |                                |                                          |                      |
| June 30, 2019.....                                                                                                                                                 | \$ (3,469)                     | \$ 8,938                       | \$ 13,869                                | \$ 3,773             |
| June 30, 2020.....                                                                                                                                                 | (3,459)                        | 8,664                          | 13,772                                   | 3,757                |
| June 30, 2021.....                                                                                                                                                 | (4,193)                        | 608                            | 11,026                                   | 279                  |
| June 30, 2022.....                                                                                                                                                 | (4,263)                        | (4,980)                        | (687)                                    | 1,398                |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ (15,384)                    | \$ 13,230                      | \$ 37,980                                | \$ 9,207             |
| <b>Discount Rate Sensitivity</b>                                                                                                                                   |                                |                                |                                          |                      |
| 1% decrease (6.50%).....                                                                                                                                           | \$ (18,533)                    | \$ 466,875                     | \$ 171,760                               | \$ 26,841            |
| Current discount rate (7.50%).....                                                                                                                                 | \$ (15,094)                    | \$ 380,399                     | \$ 139,940                               | \$ 21,871            |
| 1% increase (8.50%).....                                                                                                                                           | \$ (12,206)                    | \$ 307,487                     | \$ 113,122                               | \$ 17,678            |
| Covered Payroll.....                                                                                                                                               | \$ 31,394                      | \$ 198,543                     | \$ 83,875                                | \$ 113,682           |

See notes to schedule of employer allocations and schedule  
of pension amounts by employer.

(continued)

**SCHEDULE OF PENSION AMOUNTS BY EMPLOYER**

FOR THE YEAR ENDED DECEMBER 31, 2017

|                                                                                                                                                                    | Ayer-Shirley<br>Regional<br>School District | Totals           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------|
| <u>Net Pension Liability</u>                                                                                                                                       |                                             |                  |
| Beginning net pension liability.....                                                                                                                               | \$ 4,668,086                                | \$ 1,416,876,555 |
| Ending net pension liability.....                                                                                                                                  | \$ 4,178,529                                | \$ 1,419,184,751 |
| <u>Deferred Outflows of Resources</u>                                                                                                                              |                                             |                  |
| Differences between expected and actual experience.....                                                                                                            | \$ 14,091                                   | \$ 4,785,871     |
| Changes of assumptions.....                                                                                                                                        | 399,418                                     | 135,657,111      |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 186,529                                     | 40,343,902       |
| Total Deferred Outflows of Resources.....                                                                                                                          | \$ 600,038                                  | \$ 180,786,884   |
| <u>Deferred Inflows of Resources</u>                                                                                                                               |                                             |                  |
| Differences between expected and actual experience.....                                                                                                            | \$ 21,339                                   | \$ 7,247,514     |
| Net difference between projected and actual<br>investment earnings on pension plan investments.....                                                                | 113,497                                     | 38,547,705       |
| Changes in proportion and differences between<br>employer contributions and proportionate<br>share of contributions.....                                           | 674,957                                     | 40,343,902       |
| Total Deferred Inflows of Resources.....                                                                                                                           | \$ 809,793                                  | \$ 86,139,121    |
| <u>Pension Expense</u>                                                                                                                                             |                                             |                  |
| Proportionate share of plan pension expense.....                                                                                                                   | \$ 486,246                                  | \$ 165,494,735   |
| Net amortization of deferred amounts from changes<br>in proportion and differences between employer<br>contributions and proportionate share of contributions..... | (125,594)                                   | -                |
| Total Employer Pension Expense.....                                                                                                                                | \$ 360,652                                  | \$ 165,494,735   |
| <u>Contributions</u>                                                                                                                                               |                                             |                  |
| Statutory required contribution.....                                                                                                                               | \$ 419,892                                  | \$ 112,017,087   |
| Contribution in relation to statutory required contribution.....                                                                                                   | (419,892)                                   | (115,426,815)    |
| Contribution deficiency/(excess).....                                                                                                                              | \$ -                                        | \$ (3,409,728)   |
| Contributions as a percentage of covered payroll.....                                                                                                              | 11.76%                                      | 24.79%           |
| <u>Deferred Outflows/(Inflows) Recognized in<br/>Future Pension Expense</u>                                                                                        |                                             |                  |
| June 30, 2019.....                                                                                                                                                 | \$ (13,422)                                 | \$ 38,097,737    |
| June 30, 2020.....                                                                                                                                                 | (16,407)                                    | 37,083,503       |
| June 30, 2021.....                                                                                                                                                 | (101,156)                                   | 21,398,919       |
| June 30, 2022.....                                                                                                                                                 | (78,770)                                    | (1,932,396)      |
| Total Deferred Outflows/(Inflows) Recognized in<br>Future Pension Expense.....                                                                                     | \$ (209,755)                                | \$ 94,647,763    |
| <u>Discount Rate Sensitivity</u>                                                                                                                                   |                                             |                  |
| 1% decrease (6.50%).....                                                                                                                                           | \$ 5,128,453                                | \$ 1,741,812,266 |
| Current discount rate (7.50%).....                                                                                                                                 | \$ 4,178,529                                | \$ 1,419,184,751 |
| 1% increase (8.50%).....                                                                                                                                           | \$ 3,377,626                                | \$ 1,147,166,823 |
| Covered Payroll.....                                                                                                                                               | \$ 3,569,897                                | \$ 451,777,105   |
| See notes to schedule of employer allocations and schedule<br>of pension amounts by employer.                                                                      |                                             |                  |

(Concluded)

**NOTE I – Schedule of Employer Allocations**

Governmental Accounting Standards Board (GASB) Statement #68 requires employers participating in a cost-sharing pension plan to recognize pension liabilities as employees provide services to the government and earn their pension benefits. Employers participating in cost-sharing plans are required to recognize their proportionate share of the plan's collective pension amounts for all benefits provided through the plan including the net pension liability, deferred outflows of resources, deferred inflows of resources, pension expense, and contributions.

GASB Statement #68 requires the allocation of the collective pension amounts be consistent with the manner in which contributions to the plan are determined. As permissible under GASB Statement #68, The Schedule of Employer Allocations is used to demonstrate the allocation of Middlesex County Retirement System's collective pension amounts.

Massachusetts General Law (MGL) Chapter 32 Section 22 Paragraph 7c dictates that Massachusetts cost sharing defined benefit pension plans allocate the annual required pension fund appropriation to employer units based on their proportionate share of the aggregate of the annual rates of regular compensation of all members in service of the system. The Public Employee Retirement Administration Commission (PERAC) approves each system's proportionate share of the annual required contribution. PERAC can accept alternative allocation methodologies and as such the System has elected to use an actuarial based allocation methodology. Accordingly, the each member unit's proportionate share of the total pension liability has been calculated based on each member unit's actual current employees, retirees and inactive participants. Each member's share of the System's net position at year end is calculated by starting with the balance carried forward from the prior year. Each member unit is then credited with the actual required contribution received during the year along with any excess contributions received. Each member unit's share is reduced by the actual payment made to their specific retirees. Net investment income is allocated based on each member's money-weighted rate of return. All other shared expenses are allocated based the proportionate share of the total pension liability. The difference between the total pension liability and the net position is reported as the net pension liability.

The County of Middlesex was abolished on July 11, 1997, pursuant to Chapter 48 of the Acts of 1997. This Act required that active employees of Middlesex County and Hospital be transferred to the Commonwealth. The legislation required that County and Hospital retirees and beneficiaries remain with the County Retirement System. The Commonwealth provided a mechanism, in the legislation, that fully funded the actuarially determined liability of those retirees. At December 31, 2017, the remaining liabilities for Middlesex County and the Middlesex Hospital retirees and beneficiaries were actuarially determined and are separately identified in the System's funding schedule. No assets have been allocated to cover the remaining liability and therefore the liability has been allocated to the remaining member units.

The current employees, retirees, beneficiaries and inactive participants of the Middlesex County Retirement System have been identified and their total pension liability has been actuarially determined. For transparency purposes, the System has historically paid a contribution as an employer to itself. However with the implementation of GASB 67 & 68 the net pension liability is allocated to each member unit.

When a member unit accepts an Early Retirement Incentive Program (E.R.I. or ERIP), PERAC completes an analysis of the costs and liabilities attributable to the additional benefits payable in accordance with the ERIP. The accrued liability for the members who accept the ERIP as retirees including the ERIP less the accrued liability for the members as active employees excluding the ERIP represents the increase in accrued liability due to the ERIP. The net increase is amortized for each member unit accepting the ERIP, and is separately identified in the system's funding schedule. The 2002 ERIP amortization is straight line ending in fiscal 2019. The 2003 ERIP

amortization is straight line ending in fiscal 2020. The 2010 ERIP amortization is straight line ending in fiscal 2022.

## **NOTE II – Schedule of Pension Amounts by Employer**

The Schedule of Pension Amounts by Employer presents the net pension liability, the various categories of deferred outflows of resources and deferred inflows of resources, contributions and pension expense for all participating employers including differences between expected and actual economic experience; differences between projected and actual investment earnings, net; and changes of assumptions.

### Changes in Assumptions

The following assumption changes were reflected in the January 1, 2018 actuarial valuation:

- The mortality tables for healthy participants were changed from the RP-2000 Employee and Healthy Annuitant Mortality Tables projected generationally using Scale BB2D from 2009 to the RP-2014 Blue Collar Employee and Healthy Annuitant Mortality Tables projected generationally using Scale MP-2017.
- The mortality tables for disabled participants were changed from the RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale BB2D from 2015 to the RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward 1 year projected generationally using Scale MP-2017.
- The long-term salary increase assumption was lowered by 0.25%, to 4.00% for Group 1 participants, 4.25% for Group 2 participants, and 4.50% for Group 4 participants.
- The investment rate of return assumption was reduced from 7.75% to 7.50%.
- The inflation rate was reduced to 3.25% from the previous rate of 3.50%.

### Changes in Plan Provisions

None.