

# Boston Retirement System

**Governmental Accounting Standards Board  
(GASB) Statements No. 67 and 68  
Accounting Valuation Report**

as of December 31, 2020



This report has been prepared at the request of the Boston Retirement Board to assist the Board and the member units in preparing their financial reports for their liabilities associated with the Boston Retirement System. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Boston Retirement Board and may only be provided to other parties in its entirety. The measurements shown in this actuarial valuation may not be applicable for other purposes.

© 2021 by The Segal Group, Inc. All rights reserved.

**Segal**



116 Huntington Avenue  
8th Floor  
Boston, MA 02116-5744  
segalco.com  
T 617.424.7300

May 25, 2021

Retirement Board  
Boston Retirement System  
City Hall, Room 816  
Boston, MA 02201

Dear Board Members:

We are pleased to submit this Governmental Accounting Standards Board (GASB) Statements No. 67 and 68 Accounting Valuation as of December 31, 2020 for the Boston Retirement System, a cost-sharing multiple employer defined benefit pension plan. It contains the actuarial information that will need to be disclosed in order to comply with GASB 67 and 68. Please refer to the Boston Retirement System Actuarial Valuation Report as of January 1, 2020, dated August 25, 2020, for the data, assumptions and plan of benefits underlying these calculations.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist the Board and the member units in preparing their financial reports for their liabilities associated with the Boston Retirement System. The census and financial information on which our calculations were based were provided by the staff of the Boston Retirement System. That assistance is gratefully acknowledged.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law.

The actuarial calculations were completed under my supervision. I am a member of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of my knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in my opinion, the assumptions as approved by the Board are reasonably related to the experience of and expectations for the Boston Retirement System.

Boston Retirement System  
May 25, 2021  
Page 3

I look forward to reviewing this report with you and to answering any questions.

Sincerely,  
Segal

A handwritten signature in blue ink, appearing to read "Kathleen Riley", is written over a horizontal line.

Kathleen A. Riley, FSA, MAAA, EA  
Senior Vice President and Consulting Actuary

# Table of Contents

Section 1: Actuarial Valuation Summary.....	5
Purpose .....	5
Significant issues.....	5
Important information about actuarial valuations.....	6
Section 2: GASB Information .....	8
General information about the pension plan.....	8
Exhibit 1 – Net Pension Liability .....	9
Exhibit 2 – Schedule of Changes in Net Pension Liability – Last Two Fiscal Years.....	12
Exhibit 3 – Schedule of Contributions – Last Seven Fiscal Years.....	14
Exhibit 4 – Pension Expense.....	15
Exhibit 5 – Determination of Proportionate Share .....	17
Exhibit 6 – Determination of Proportionate Share Amounts by Employer .....	18
Appendix: Definition of Terms .....	22

# Section 1: Actuarial Valuation Summary

## Purpose

This report has been prepared by Segal to present certain disclosure information required by Governmental Accounting Standards Board (GASB) Statements No. 67 and 68 as of December 31, 2020. This report is based on financial information as of December 31, 2020 provided by the Retirement System and the Boston Retirement System Actuarial Valuation and Review as of January 1, 2020, which reflects:

- The benefit provisions of Massachusetts General Law Chapter 32;
- The characteristics of covered active participants, inactive participants, and retired participants and beneficiaries as of December 31, 2019, provided by the staff of the Retirement System;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

## Significant issues

The following key findings were the result of this actuarial valuation:

1. The Net Pension Liability (NPL) is equal to the difference between the Total Pension Liability (TPL) and the Plan Fiduciary Net Position. The Plan Fiduciary Net Position is equal to the market value of assets and therefore, the NPL measure is very similar to an Unfunded Actuarial Accrued Liability (UAAL) on a market value basis. The NPL decreased from \$4.56 billion as of December 31, 2019 to \$3.97 billion as of December 31, 2020, and the Plan's fiduciary Net Position as a percent of the TPL increased from 61.91% to 67.64%.
2. The NPL measured as of December 31, 2020 and December 31, 2019 was determined based upon the results of the actuarial valuations as of January 1, 2020 and January 1, 2018, respectively.
3. The discount rates used to measure the TPL and NPL as of December 31, 2020 and December 31, 2019 were 7.05% for the BRS excluding Teachers and 7.15% for the Teachers.

## Section 1: Actuarial Valuation Summary

### Important information about actuarial valuations

In order to prepare an actuarial valuation, Segal relies on a number of input items. These include:

<b>Plan of Benefits:</b>	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan description in this report (as well as the plan summary included in our funding valuation report) to confirm that Segal has correctly interpreted the plan of benefits.
<b>Participant Data:</b>	An actuarial valuation for a plan is based on data provided to the actuary by the Retirement System. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
<b>Assets:</b>	The valuation is based on the market value of assets as of the valuation date, as provided by the Retirement System. The Retirement System uses an “actuarial value of assets” that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
<b>Actuarial Assumptions:</b>	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.
<b>Models</b>	Segal valuation results are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative and client requirements. Our Actuarial Technology and Systems unit, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuary.

## Section 1: Actuarial Valuation Summary

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

---

The valuation is prepared at the request of the Retirement Board to assist the Board and the member units in preparing items related to the pension plan in their financial reports. Segal is not responsible for the use or misuse of its report, particularly by any other party.

---

An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

---

Sections of this report may include actuarial results that are not rounded, but that does not imply precision.

---

If the Retirement Board is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.

---

Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Board should look to their other advisors for expertise in these areas.

---

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

## Section 2: GASB Information

# Section 2: GASB Information

### General information about the pension plan

*Plan membership.* At December 31, 2019, pension plan membership consisted of the following:

Retired members or beneficiaries currently receiving benefits	14,559
Inactive participants with a vested right to a deferred or immediate benefit	1,147
Inactive participants due a refund of employee contributions	11,531
Active members	<u>20,856</u>
Total	48,093

## Section 2: GASB Information

### Exhibit 1 – Net Pension Liability

	December 31, 2020	December 31, 2019
<b>Components of the Net Pension Liability</b>		
Total Pension Liability <sup>1</sup>	\$12,278,385,766	\$11,964,670,843
Plan Fiduciary Net Position	8,304,874,533	7,407,074,926
Net Pension Liability	3,973,511,233	4,557,595,917
Plan Fiduciary Net Position as a percentage of the Total Pension Liability <sup>2</sup>	67.64%	61.91%

*Actuarial assumptions.* The total pension liability as of December 31, 2020 was measured by an actuarial valuation as of January 1, 2020, using the following actuarial assumptions, applied to all periods included in the measurement:

<b>Salary Increases:</b>	4.00% for Group 1, 4.25% for Group 2 and 4.50% for Group 4, for BRS excluding Teachers; based on years of service, ranging from 7.50% at 0 years of service decreasing to 4.00% after 20 years of service, for Teachers
<b>Wage Inflation:</b>	3.25%
<b>Net Investment Return:</b>	7.05% for BRS excluding Teachers and 7.15% for Teachers
<b>Cost of Living Adjustment:</b>	3% of first \$14,000
<b>Mortality Rates:</b>	<p><u>For BRS excluding Teachers:</u></p> <p>Healthy: Pub-2010 General Employee, Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019 for Groups 1 and 2 and the Pub-2010 Safety Employee, Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2019 for Group 4.</p> <p>Disabled: Pub-2010 General Healthy Retiree Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019 for Groups 1 and 2 and the Pub-2010 Disabled Retiree Amount-Weighted Mortality Tables projected generationally using Scale MP-2019 for Group 4.</p> <p><u>For Teachers:</u></p> <p>Healthy: Pub-2010 Teacher Employee, Healthy Retiree and Contingent Survivor Headcount-Weighted Mortality Tables projected generationally using Scale MP-2019.</p> <p>Disabled: Pub-2010 Teacher Healthy Retiree Headcount-Weighted Mortality Tables projected generationally using Scale MP-2019.</p>

<sup>1</sup> Total pension liability as of December 31, 2019 and December 31, 2020 includes liability associated with COLAs granted prior to July 1, 1998 and reimbursed by the Commonwealth.

<sup>2</sup> These funded percentages are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligation or the need for or the amount of future contributions.

## Section 2: GASB Information

### Target asset allocation

The long-term expected rate of return on pension plan investments was determined using a building-block method in which expected future real rates of return (expected returns, net of inflation) are developed for each major asset class. These returns 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 adding expected inflation. The target allocation (approved by the Board) and projected arithmetic real rates of return for each major asset class, after deducting inflation, but before investment expenses, used in the derivation of the long-term expected investment rate of return assumption are summarized in the following table:

Asset Class	Target Allocation		Long-Term Expected Real Rate of Return
	BRS excluding Teachers	Teachers	
Domestic equity	23.00%	22.00%	6.28%
International developed markets equity	17.00%	12.00%	7.00%
International emerging markets equity	8.00%	5.00%	8.82%
Core fixed income	16.00%	15.00%	0.38%
High-yield fixed income	6.00%	8.00%	2.97%
Emerging Market Debt	4.00%	0.00%	3.16%
Real estate	10.00%	10.00%	3.50%
Timber	0.00%	4.00%	3.45%
Hedge fund, GTAA, Risk parity	5.00%	10.00%	2.35%
Private equity	<u>11.00%</u>	<u>14.00%</u>	10.11%
Total	100.00%	100.00%	

Note: Some asset classes included in the pension plan's target asset allocation have been combined.

*Discount rate.* The discount rates used to measure the TPL as of December 31, 2020 and December 31, 2019 were 7.05% for the BRS excluding Teachers and 7.15% for the Teachers. The projection of cash flows used to determine the discount rates assumed plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the actuarially determined contribution rates. For this purpose, only employer contributions that are intended to fund benefits for current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs for future plan members and their beneficiaries, as well as projected contributions from future plan members, are not included. Based on those assumptions, the Plan Fiduciary Net Position (FNP) was projected to be available to make all projected future benefit payments for current plan members. Therefore, the long-term expected rates of return on pension plan investments were applied to all periods of projected benefit payments to determine the TPL as of both December 31, 2020 and December 31, 2019.

## Section 2: GASB Information

### Discount rate sensitivity

*Sensitivity of the Net Pension Liability to changes in the discount rate.* The following presents the NPL of the Boston Retirement System as of December 31, 2020 calculated using the discount rate of 7.05% for BRS excluding Teachers and 7.15% for Teachers, as well as what the Boston Retirement System's NPL would be if it were calculated using a discount rate that is 1-percentage-point lower (6.05% for BRS excluding Teachers and 6.15% for Teachers) or 1-percentage-point higher (8.05% for BRS excluding Teachers and 8.15% for Teachers) than the current rate.

<b>Net Pension Liability</b>	<b>1% Decrease</b>	<b>Current Discount Rate</b>	<b>1% Increase</b>
Boston Retirement System's net pension liability as of December 31, 2020	\$5,404,783,688	\$3,973,511,233	\$2,775,056,107

## Section 2: GASB Information

### Exhibit 2 – Schedule of Changes in Net Pension Liability – Last Two Fiscal Years

	December 31, 2020	December 31, 2019
<b>Total Pension Liability</b>		
Service cost	\$263,917,290	\$231,992,044
Interest	843,236,212	810,769,244
Change of benefit terms	0	0
Differences between expected and actual experience	-134,303,882	0
Changes of assumptions	0	589,891,742
Benefit payments, including refunds of member contributions	-659,134,697	-657,077,672
Net change in Total Pension Liability	\$313,714,923	\$975,575,358
Total Pension Liability – beginning	<u>11,964,670,843</u>	<u>10,989,095,485</u>
Total Pension Liability – ending	\$12,278,385,766	\$11,964,670,843
<b>Plan Fiduciary Net Position</b>		
Contributions – employer	\$513,508,120	\$486,292,048
Contributions – employee	185,914,377	176,060,009
Net investment income	866,971,800	1,007,666,721
Benefit payments, including refunds of member contributions	-659,134,697	-657,077,672
Administrative expense	-9,459,993	-8,820,161
Net change in Plan Fiduciary Net Position	\$897,799,607	\$1,004,120,945
Plan Fiduciary Net Position – beginning	<u>7,407,074,926</u>	<u>6,402,953,981</u>
Plan Fiduciary Net Position – ending	\$8,304,874,533	\$7,407,074,926
Net Pension Liability – ending	3,973,511,233	4,557,595,917
Plan Fiduciary Net Position as a percentage of the Total Pension Liability	67.64%	61.91%
Covered payroll	\$1,719,830,947	\$1,660,821,914
Plan Net Pension Liability as percentage of covered payroll	231.04%	274.42%

**Notes:**

Total pension liability and plan fiduciary net position calculations were completed separately for the BRS excluding Teachers and the Teachers. Covered-employee payroll for 2020 and 2019 as estimated in the January 1, 2020 and January 1, 2018 valuations, respectively.

## Section 2: GASB Information

### Notes to schedule:

<b>Changes in Actuarial Assumptions:</b>	<p>Effective January 1, 2020:</p> <ul style="list-style-type: none"><li>• BRS excluding Teachers:<ul style="list-style-type: none"><li>– The investment rate of return assumption was lowered from 7.50% to 7.05%.</li><li>– The mortality for non-disabled participants was updated from the RP-2014 Blue Collar Employee and Healthy Annuitant Mortality Tables set forward 1 year for female participants projected generationally using Scale MP-2017 to the Pub-2010 General Employee, Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019 for Groups 1 and 2 and to the Pub-2010 Safety Employee, Healthy Retiree and Contingent Survivor Amount-Weighted Mortality Tables projected generationally using Scale MP-2019 for Group 4.</li><li>– The mortality for disabled participants was updated from the RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward 1 year projected generationally using Scale MP-2017 to the Pub-2010 General Healthy Retiree Amount-Weighted Mortality Tables set forward one year projected generationally using Scale MP-2019 for Groups 1 and 2 and to the Pub-2010 Disabled Retiree Amount-Weighted Mortality Tables projected generationally using Scale MP-2019 for Group 4.</li></ul></li><li>• Teachers:<ul style="list-style-type: none"><li>– The investment rate of return assumption was lowered from 7.35% to 7.15%.</li><li>– The mortality for non-disabled participants was updated from the RP-2014 White Collar Employee and Healthy Annuitant Mortality Tables projected generationally using Scale MP-2016 to the Pub-2010 Teacher Employee, Healthy Retiree and Contingent Survivor Headcount-Weighted Mortality Tables projected generationally using Scale MP-2019.</li><li>– The mortality for disabled participants was updated from the RP-2014 Healthy Annuitant Mortality Tables set forward four years projected generationally using Scale BB2D to the Pub-2010 Teacher Healthy Retiree Headcount-Weighted Mortality Tables projected generationally using Scale MP-2019.</li></ul></li></ul> <p>Effective January 1, 2021:</p> <ul style="list-style-type: none"><li>• None.</li></ul>
<b>Changes in Plan Provisions:</b>	None.

## Section 2: GASB Information

### Exhibit 3 – Schedule of Contributions – Last Seven Fiscal Years

Year Ended December 31	Actuarially Determined Contributions	Contributions in Relation to the Actuarially Determined Contributions	Contribution Deficiency / (Excess)	Covered-Employee Payroll	Contributions as a Percentage of Covered Employee Payroll
2014	\$312,559,621	\$312,559,621	\$0	\$1,444,652,177	21.64%
2015	339,246,904	339,246,904	0	1,493,958,273	22.71%
2016	368,247,904	380,247,904	-12,000,000	1,498,768,546	25.37%
2017	391,462,547	391,462,547	0	1,547,478,524	25.30%
2018	426,334,770	438,334,770	-12,000,000	1,608,544,227	27.25%
2019	465,292,048	486,292,048	-21,000,000	1,660,821,914	29.28%
2020	498,508,120	513,508,120	-15,000,000	1,719,830,947	29.86%

#### Notes to schedule:

<b>Valuation date:</b>	Actuarial determined contribution for year ended December 31, 2020 is determined with the January 1, 2018 actuarial valuation.	
<b>Actuarial cost method:</b>	Entry Age Normal Cost Method	
<b>Amortization method:</b>	Prior year's contribution increased by 8.85% for BRS excluding Teachers; contribution as reported by the State Actuary for Teachers	
<b>Remaining amortization period:</b>	7 years remaining as of July 1, 2018 for BRS excluding Teachers; 18 years remaining as of January 1, 2018 for Teachers	
<b>Asset valuation method:</b>	Sum of actuarial value at beginning of the year, contributions and investment earnings based on the actuarial interest assumption less benefit payments and operating expenses plus 20% of market value at end of year in excess of that sum, plus additional adjustment toward market value as necessary so that final actuarial value is within 20% of market value. Similar formula used for negative adjustment toward market value if actuarial value exceeds market value.	
<b>Actuarial assumptions:</b>		
• Investment rate of return	7.50% for BRS excluding Teachers; 7.35% for Teachers	
• Wage inflation rate	7.50% for BRS excluding Teachers; 7.35% for Teachers	
• Projected salary increases	3.25%	
• Cost of living adjustments	4.00% for Group 1, 4.25% for Group 2 and 4.50% for Group 4, for BRS excluding Teachers; based on years of service, ranging from 7.50% at 0 years of service decreasing to 4.00% after 20 years of service, for Teachers	
• Other assumptions	3% of first \$14,000	
<b>Plan membership:</b>		
• Retired participants and beneficiaries receiving benefits	14,448	
• Inactive participants entitled to a return of their employee contributions	9,514	
• Inactive participants with a vested right to a deferred or immediate benefit	1,109	
• Active participants	20,995	
• Total	46,066	

## Section 2: GASB Information

### Exhibit 4 – Pension Expense

Reporting Date for Employer under GASB 68 Measurement Date for Employer under GASB 68	June 30, 2021 December 31, 2020	June 30, 2020 December 31, 2019
<b>Components of Pension Expense</b>		
Service cost	\$263,917,290	\$231,992,044
Interest on the Total Pension Liability	843,236,212	810,769,244
Current-period benefit changes	0	0
Expensed portion of current-period difference between expected and actual experience in the Total Pension Liability	-22,383,980	0
Expensed portion of current-period changes of assumptions	0	98,315,290
Member contributions	-185,914,377	-176,060,009
Projected earnings on plan investments	-525,192,314	-477,823,565
Expensed portion of current-period differences between actual and projected earnings on plan investments	-68,355,897	-105,968,631
Administrative expense	9,459,993	8,820,161
Recognition of beginning of year deferred outflows of resources as pension expense	371,995,317	381,586,628
Recognition of beginning of year deferred inflows of resources as pension expense	-314,549,095	-209,636,611
<b>Pension Expense</b>	<b>\$372,213,149</b>	<b>\$561,994,551</b>

## Section 2: GASB Information

### Deferred outflows of resources and deferred inflows of resources

Reporting Date for Employer under GASB 68 Measurement Date for Employer under GASB 68	June 30, 2021 December 31, 2020	June 30, 2020 December 31, 2019
<b>Deferred Outflows of Resources</b>		
Changes in proportion and differences between employer's contributions and proportionate share of contributions	\$36,415,498	\$26,497,017
Changes of assumptions	518,980,606	710,432,779
Net difference between projected and actual earnings on plan investments	0	0
Difference between expected and actual experience in the Total Pension Liability	<u>0</u>	<u>0</u>
Total Deferred Outflows of Resources	\$555,396,104	\$736,929,796
<b>Deferred Inflows of Resources</b>		
Changes in proportion and differences between employer's contributions and proportionate share of contributions	\$36,415,498	\$26,497,017
Changes of assumptions	0	15,314,469
Net difference between projected and actual earnings on plan investments	367,459,532	129,197,431
Difference between expected and actual experience in the Total Pension Liability	<u>256,293,096</u>	<u>227,903,188</u>
Total Deferred Inflows of Resources	\$660,168,126	\$398,912,105
Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:		
<b>Reporting Date for Employer under GASB 68 Year Ended June 30:</b>		
2021	N/A	\$57,446,222
2022	-\$61,152,347	29,587,530
2023	100,003,714	190,743,591
2024	-128,814,821	-38,074,944
2025	7,575,414	98,315,292
2026	-22,383,982	0
Thereafter	0	0

**Notes:**

Average expected remaining service life as of December 31, 2020 and December 31, 2019 is 6 years.

Pension expense calculations were completed separately for the BRS excluding Teachers and the Teachers.

Fiscal year for the Boston Water and Sewer Commission is year ended December 31, 2020.

## Section 2: GASB Information

### Exhibit 5 – Determination of Proportionate Share

Employer Name	FY 2020 Total Appropriation	Share of NPL as of January 1, 2020	Share of NPL as of January 1, 2020	FY 2021 Total Appropriation	Share of NPL as of January 1, 2021	Share of NPL as of January 1, 2021
City of Boston	\$253,169,598	83.168445%	\$1,622,820,593	\$279,772,236	84.348499%	\$1,290,179,034
Boston Housing Authority	14,800,409	4.862065%	94,870,824	13,945,438	4.204408%	64,309,854
Boston Planning & Development Agency	2,733,565	0.898000%	17,522,189	3,150,271	0.949775%	14,527,580
Boston Water and Sewer Commission	12,584,956	4.134269%	80,669,740	12,475,171	3.761138%	57,529,669
Public Health Commission	<u>21,117,306</u>	<u>6.937221%</u>	<u>135,362,221</u>	<u>22,342,971</u>	<u>6.736180%</u>	<u>103,035,359</u>
Subtotal Participating Employers, excluding Sheriffs	\$304,405,834	100.000000%	\$1,951,245,567	\$331,686,087	100.000000%	\$1,529,581,496
Sheriff of Suffolk County	<u>3,845,609</u>	<u>N/A</u>	<u>15,943,750</u>	<u>3,845,609</u>	<u>N/A</u>	<u>13,086,618</u>
Subtotal Participating Employers, including Sheriffs	\$308,251,443	N/A	\$1,967,189,317	\$335,531,696	N/A	\$1,542,668,114
Commonwealth of Massachusetts (Other contributing entity - City of Boston Teachers)	\$157,040,605	N/A	\$2,572,923,164	\$162,976,424	N/A	\$2,416,125,225
Commonwealth of Massachusetts (state reimbursed COLA)	<u>N/A</u>	<u>N/A</u>	<u>17,483,436</u>	<u>N/A</u>	<u>N/A</u>	<u>14,717,894</u>
Subtotal Commonwealth of Massachusetts	\$157,040,605	N/A	\$2,590,406,600	\$162,976,424	N/A	\$2,430,843,119
<b>Total for All Entities:</b>	<b>\$465,292,048</b>	<b>N/A</b>	<b>\$4,557,595,917</b>	<b>\$498,508,120</b>	<b>N/A</b>	<b>\$3,973,511,233</b>

## Section 2: GASB Information

### Exhibit 6 – Determination of Proportionate Share Amounts by Employer

Employer Name	2021 Share of Cost Allocation (1)	Net Pension Liability (2)	Covered Employee Payroll (3)	Discount Rate Sensitivity		
				1% Decrease (4)	Current Discount Rate (5)	1% Increase (6)
City of Boston	84.348499%	\$1,290,179,034	\$932,848,076	\$2,057,545,463	\$1,290,179,034	\$643,473,047
Boston Housing Authority	4.204408%	64,309,854	46,498,449	102,559,757	64,309,854	32,074,353
Boston Planning & Development Agency	0.949775%	14,527,580	10,503,988	23,168,224	14,527,580	7,245,588
Boston Water and Sewer Commission	3.761138%	57,529,669	41,596,119	91,746,886	57,529,669	28,692,755
Public Health Commission	<u>6.736180%</u>	<u>103,035,359</u>	<u>74,498,449</u>	<u>164,318,231</u>	<u>103,035,359</u>	<u>51,388,586</u>
Subtotal Participating Employers, excluding Sheriffs	100.000000%	\$1,529,581,496	\$1,105,945,081	\$2,439,338,561	\$1,529,581,496	\$762,874,329
Sheriff of Suffolk County	<u>N/A</u>	<u>13,086,618</u>	<u>0</u>	<u>14,604,311</u>	<u>13,086,618</u>	<u>11,807,566</u>
Subtotal Participating Employers, including Sheriffs	N/A	\$1,542,668,114	\$1,105,945,081	\$2,453,942,872	\$1,542,668,114	\$774,681,895
Commonwealth of Massachusetts (Other contributing entity - City of Boston Teachers)	N/A	\$2,416,125,225	\$613,885,866	\$2,935,371,648	\$2,416,125,225	\$1,986,333,498
Commonwealth of Massachusetts (state reimbursed COLA)	<u>N/A</u>	<u>14,717,894</u>	<u>0</u>	<u>15,469,168</u>	<u>14,717,894</u>	<u>14,040,714</u>
Subtotal Commonwealth of Massachusetts	N/A	\$2,430,843,119	\$613,885,866	\$2,950,840,816	\$2,430,843,119	\$2,000,374,212
<b>Total for All Entities:</b>	<b>N/A</b>	<b>\$3,973,511,233</b>	<b>\$1,719,830,947</b>	<b>\$5,404,783,688</b>	<b>\$3,973,511,233</b>	<b>\$2,775,056,107</b>

## Section 2: GASB Information

Employer Name	Schedule of Contributions				Pension Expense		
	Statutory Required Contribution (7)	Contributions In Relation to the Statutory Required Contribution (8)	Contribution Deficiency/ (Excess) (9)	Contributions as a Percentage of Covered Employee Payroll (10)	Proportionate Share of Plan Pension Expense (11)	Net Amortization of Deferred Amounts from Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (12)	Total Employer Pension Expense (13)
City of Boston	\$279,772,236	\$294,772,236	-\$15,000,000	31.60%	\$159,974,629	\$11,729,866	\$171,704,495
Boston Housing Authority	13,945,438	13,945,438	0	29.99%	7,974,044	-5,352,199	2,621,845
Boston Planning & Development Agency	3,150,271	3,150,271	0	29.99%	1,801,335	-438,354	1,362,981
Boston Water and Sewer Commission	12,475,171	12,475,171	0	29.99%	7,133,342	-2,533,840	4,599,502
Public Health Commission	<u>22,342,971</u>	<u>22,342,971</u>	<u>0</u>	<u>29.99%</u>	<u>12,775,779</u>	<u>-3,405,473</u>	<u>9,370,306</u>
Subtotal Participating Employers, excluding Sheriffs	\$331,686,087	\$346,686,087	-\$15,000,000	31.35%	\$189,659,129	\$0	\$189,659,129
Sheriff of Suffolk County	<u>3,845,609</u>	<u>3,845,609</u>	<u>0</u>	<u>N/A</u>	<u>988,477</u>	<u>0</u>	<u>988,477</u>
Subtotal Participating Employers, including Sheriffs	\$335,531,696	\$350,531,696	-\$15,000,000	31.70%	\$190,647,606	\$0	\$190,647,606
Commonwealth of Massachusetts (Other contributing entity - City of Boston Teachers)	\$162,976,424	\$162,976,424	\$0	26.55%	\$184,649,926	\$0	\$184,649,926
Commonwealth of Massachusetts (state reimbursed COLA)	<u>0</u>	<u>0</u>	<u>0</u>	<u>N/A</u>	<u>-3,084,383</u>	<u>0</u>	<u>-3,084,383</u>
Subtotal Commonwealth of Massachusetts	\$162,976,424	\$162,976,424	\$0	26.55%	\$181,565,543	\$0	\$181,565,543
<b>Total for All Entities:</b>	<b>\$498,508,120</b>	<b>\$513,508,120</b>	<b>-\$15,000,000</b>	<b>29.86%</b>	<b>\$372,213,149</b>	<b>\$0</b>	<b>\$372,213,149</b>

## Section 2: GASB Information

Employer Name	Deferred Outflows of Resources				Deferred Inflows of Resources				
	Differences Between Expected and Actual Experience (14)	Changes of Assumptions (15)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (16)	Total Deferred Outflows of Resources (17)	Differences Between Expected and Actual Experience (18)	Net Difference Between Projected and Actual Investment Earnings on Pension Plan Investments (19)	Changes of Assumptions (20)	Changes in Proportion and Differences Between Employer Contributions and Proportionate Share of Contributions (21)	Total Deferred Inflows of Resources (22)
City of Boston	\$0	\$328,424,779	\$34,862,551	\$363,287,330	\$64,855,131	\$222,868,166	\$0	\$0	\$287,723,297
Boston Housing Authority	0	16,370,555	0	16,370,555	3,232,748	11,109,014	0	13,669,714	28,011,476
Boston Planning & Development Agency	0	3,698,105	706,877	4,404,982	730,277	2,509,524	0	1,361,628	4,601,429
Boston Water and Sewer Commission	0	14,644,610	402,599	15,047,209	2,891,920	9,937,793	0	8,413,036	21,242,749
Public Health Commission	<u>0</u>	<u>26,228,427</u>	<u>443,471</u>	<u>26,671,898</u>	<u>5,179,414</u>	<u>17,798,539</u>	<u>0</u>	<u>12,971,120</u>	<u>35,949,073</u>
Subtotal Participating Employers, excluding Sheriffs	\$0	\$389,366,476	\$36,415,498	\$425,781,974	\$76,889,490	\$264,223,036	\$0	\$36,415,498	\$377,528,024
Sheriff of Suffolk County	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Subtotal Participating Employers, including Sheriffs	\$0	\$389,366,476	\$36,415,498	\$425,781,974	\$76,889,490	\$264,223,036	\$0	\$36,415,498	\$377,528,024
Commonwealth of Massachusetts (Other contributing entity - City of Boston Teachers)	\$0	\$129,176,423	N/A	\$129,176,423	\$177,691,667	\$96,678,973	\$0	N/A	\$274,370,640
Commonwealth of Massachusetts (state reimbursed COLA)	<u>0</u>	<u>437,707</u>	<u>N/A</u>	<u>437,707</u>	<u>1,711,939</u>	<u>6,557,523</u>	<u>0</u>	<u>N/A</u>	<u>8,269,462</u>
Subtotal Commonwealth of Massachusetts	\$0	\$129,614,130	N/A	\$129,614,130	\$179,403,606	\$103,236,496	\$0	N/A	\$282,640,102
<b>Total for All Entities:</b>	<b>\$0</b>	<b>\$518,980,606</b>	<b>\$36,415,498</b>	<b>\$555,396,104</b>	<b>\$256,293,096</b>	<b>\$367,459,532</b>	<b>\$0</b>	<b>\$36,415,498</b>	<b>\$660,168,126</b>

## Section 2: GASB Information

### Deferred Inflows/(Outflows) Recognized In Future Pension Expense (Year Ended January 1)

Employer Name	2022 (23)	2023 (24)	2024 (25)	2025 (26)	2026 (27)	Thereafter (28)
City of Boston	\$1,782,289	\$93,864,214	-\$50,737,110	\$27,396,239	\$3,258,401	\$0
Boston Housing Authority	-3,937,380	1,334,377	-5,711,678	-1,407,635	-1,918,605	0
Boston Planning & Development Agency	-393,024	750,333	-834,197	166,813	113,628	0
Boston Water and Sewer Commission	-1,965,488	2,064,223	-4,449,494	-716,049	-1,128,732	0
Public Health Commission	-3,983,281	3,115,313	-7,351,625	-311,857	-745,725	0
Subtotal Participating Employers, excluding Sheriffs	-\$8,496,884	\$101,128,460	-\$69,084,104	\$25,127,511	-\$421,033	\$0
Sheriff of Suffolk County	0	0	0	0	0	0
Subtotal Participating Employers, including Sheriffs	-\$8,496,884	\$101,128,460	-\$69,084,104	\$25,127,511	-\$421,033	\$0
Commonwealth of Massachusetts (Other contributing entity - City of Boston Teachers)	-\$49,373,835	\$1,090,865	-\$58,228,137	-\$16,906,690	-\$21,776,420	\$0
Commonwealth of Massachusetts (state reimbursed COLA)	-3,281,628	-2,215,611	-1,502,580	-645,407	-186,529	0
Subtotal Commonwealth of Massachusetts	-\$52,655,463	-\$1,124,746	-\$59,730,717	-\$17,552,097	-\$21,962,949	\$0
<b>Total for All Entities:</b>	<b>-\$61,152,347</b>	<b>\$100,003,714</b>	<b>-\$128,814,821</b>	<b>\$7,575,414</b>	<b>-\$22,383,982</b>	<b>\$0</b>

## Section 2: GASB Information

### Appendix: Definition of Terms

Definitions of certain terms as they are used in Statement 68. The terms may have different meanings in other contexts.

<b>Active Employees:</b>	Individuals employed at the end of the reporting or measurement period, as applicable.
<b>Actual Contributions:</b>	Cash contributions recognized as additions to a pension Plan Fiduciary Net Position.
<b>Actuarial Present Value of Projected Benefit Payments:</b>	Projected benefit payments discounted to reflect the expected effects of the time value (present value) of money and the probabilities of payment.
<b>Actuarial Valuation:</b>	The determination, as of a point in time (the actuarial valuation date), of the service cost, Total Pension Liability, and related actuarial present value of projected benefit payments for pensions performed in conformity with Actuarial Standards of Practice unless otherwise specified by the GASB.
<b>Actuarial Valuation Date:</b>	The date as of which an actuarial valuation is performed.
<b>Actuarially Determined Contribution:</b>	A target or recommended contribution to a defined benefit pension plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.
<b>Ad Hoc Cost-of-Living Adjustments (Ad Hoc COLAs):</b>	Cost-of-living adjustments that require a decision to grant by the authority responsible for making such decisions.
<b>Ad Hoc Postemployment Benefit Changes:</b>	Postemployment benefit changes that require a decision to grant by the authority responsible for making such decisions.
<b>Agent Employer:</b>	An employer whose employees are provided with pensions through an agent multiple-employer defined benefit pension plan.
<b>Agent Multiple-Employer Defined Benefit Pension Plan (Agent Pension Plan):</b>	A multiple-employer defined benefit pension plan in which pension plan assets are pooled for investment purposes but separate accounts are maintained for each individual employer so that each employer's share of the pooled assets is legally available to pay the benefits of only its employees.
<b>Allocated Insurance Contract:</b>	A contract with an insurance company under which related payments to the insurance company are currently used to purchase immediate or deferred annuities for individual employees. Also may be referred to as an annuity contract.
<b>Automatic Cost-of-Living Adjustments (Automatic COLAs):</b>	Cost-of-living adjustments that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index).

## Section 2: GASB Information

<b>Automatic Postemployment Benefit Changes:</b>	Postemployment benefit changes that occur without a requirement for a decision to grant by a responsible authority, including those for which the amounts are determined by reference to a specified experience factor (such as the earnings experience of the pension plan) or to another variable (such as an increase in the consumer price index).
<b>Closed Period:</b>	A specific number of years that is counted from one date and declines to zero with the passage of time. For example, if the recognition period initially is five years on a closed basis, four years remain after the first year, three years after the second year, and so forth.
<b>Collective Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions:</b>	Deferred outflows of resources and deferred inflows of resources related to pensions arising from certain changes in the collective Net Pension Liability.
<b>Collective Net Pension Liability:</b>	The Net Pension Liability for benefits provided through (1) a cost-sharing pension plan or (2) a single-employer or agent pension plan in circumstances in which there is a special funding situation.
<b>Collective Pension Expense:</b>	Pension expense arising from certain changes in the collective Net Pension Liability.
<b>Contributions:</b>	Additions to a pension Plan Fiduciary Net Position for amounts from employers, non-employer contributing entities (for example, state government contributions to a local government pension plan), or employees. Contributions can result from cash receipts by the pension plan or from recognition by the pension plan of a receivable from one of these sources.
<b>Cost-of-Living Adjustments:</b>	Postemployment benefit changes intended to adjust benefit payments for the effects of inflation.
<b>Cost-Sharing Employer:</b>	An employer whose employees are provided with pensions through a cost-sharing multiple-employer defined benefit pension plan.
<b>Cost-Sharing Multiple-Employer Defined Benefit Pension Plan (Cost-Sharing Pension Plan):</b>	A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.
<b>Covered-Employee Payroll:</b>	The payroll of employees that are provided with pensions through the pension plan.
<b>Deferred Retirement Option Program (DROP):</b>	A program that permits an employee to elect a calculation of benefit payments based on service credits and salary, as applicable, as of the DROP entry date. The employee continues to provide service to the employer and is paid for that service by the employer after the DROP entry date; however, the pensions that would have been paid to the employee (if the employee had retired and not entered the DROP) are credited to an individual employee account within the defined benefit pension plan until the end of the DROP period.
<b>Defined Benefit Pension Plans:</b>	Pension plans that are used to provide defined benefit pensions.

## Section 2: GASB Information

<b>Defined Benefit Pensions:</b>	Pensions for which the income or other benefits that the employee will receive at or after separation from employment are defined by the benefit terms. The pensions may be stated as a specified dollar amount or as an amount that is calculated based on one or more factors such as age, years of service, and compensation. (A pension that does not meet the criteria of a defined contribution pension is classified as a defined benefit pension for purposes of Statement 68.)
<b>Defined Contribution Pension Plans:</b>	Pension plans that are used to provide defined contribution pensions.
<b>Defined Contribution Pensions:</b>	Pensions having terms that (1) provide an individual account for each employee; (2) define the contributions that an employer is required to make (or the credits that it is required to provide) to an active employee's account for periods in which that employee renders service; and (3) provide that the pensions an employee will receive will depend only on the contributions (or credits) to the employee's account, actual earnings on investments of those contributions (or credits), and the effects of forfeitures of contributions (or credits) made for other employees, as well as pension plan administrative costs, that are allocated to the employee's account.
<b>Discount Rate:</b>	<p>The single rate of return that, when applied to all projected benefit payments, results in an actuarial present value of projected benefit payments equal to the total of the following:</p> <ol style="list-style-type: none"><li>1. The actuarial present value of benefit payments projected to be made in future periods in which (a) the amount of the pension Plan Fiduciary Net Position is projected (under the requirements of Statement 68) to be greater than the benefit payments that are projected to be made in that period and (b) pension plan assets up to that point are expected to be invested using a strategy to achieve the long-term expected rate of return, calculated using the long-term expected rate of return on pension plan investments.</li><li>2. The actuarial present value of projected benefit payments not included in (1), calculated using the municipal bond rate.</li></ol>
<b>Entry Age Actuarial Cost Method:</b>	A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age(s). The portion of this actuarial present value allocated to a valuation year is called the normal cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future normal costs is called the actuarial accrued liability.
<b>Inactive Employees:</b>	Terminated individuals that have accumulated benefits but are not yet receiving them, and retirees or their beneficiaries currently receiving benefits.
<b>Measurement Period:</b>	The period between the prior and the current measurement dates.
<b>Multiple-Employer Defined Benefit Pension Plan:</b>	A defined benefit pension plan that is used to provide pensions to the employees of more than one employer.

## Section 2: GASB Information

<b>Net Pension Liability (NPL):</b>	The liability of employers and non-employer contributing entities to employees for benefits provided through a defined benefit pension plan.
<b>Non-Employer Contributing Entities:</b>	Entities that make contributions to a pension plan that is used to provide pensions to the employees of other entities. For purposes of Statement 68, employees are not considered non-employer contributing entities.
<b>Other Postemployment Benefits:</b>	All postemployment benefits other than retirement income (such as death benefits, life insurance, disability, and long-term care) that are provided separately from a pension plan, as well as postemployment healthcare benefits, regardless of the manner in which they are provided. Other postemployment benefits do not include termination benefits.
<b>Pension Plans:</b>	Arrangements through which pensions are determined, assets dedicated for pensions are accumulated and managed and benefits are paid as they come due.
<b>Pensions:</b>	Retirement income and, if provided through a pension plan, postemployment benefits other than retirement income (such as death benefits, life insurance, and disability benefits). Pensions do not include postemployment healthcare benefits and termination benefits.
<b>Plan Members:</b>	Individuals that are covered under the terms of a pension plan. Plan members generally include (1) employees in active service (active plan members) and (2) terminated employees who have accumulated benefits but are not yet receiving them and retirees or their beneficiaries currently receiving benefits (inactive plan members).
<b>Postemployment:</b>	The period after employment.
<b>Postemployment Benefit Changes:</b>	Adjustments to the pension of an inactive employee.
<b>Postemployment Healthcare Benefits:</b>	Medical, dental, vision, and other health-related benefits paid subsequent to the termination of employment.
<b>Projected Benefit Payments:</b>	All benefits estimated to be payable through the pension plan to current active and inactive employees as a result of their past service and their expected future service.
<b>Public Employee Retirement System:</b>	A special-purpose government that administers one or more pension plans; also may administer other types of employee benefit plans, including postemployment healthcare plans and deferred compensation plans.
<b>Real Rate of Return:</b>	The rate of return on an investment after adjustment to eliminate inflation.
<b>Service Costs:</b>	The portions of the actuarial present value of projected benefit payments that are attributed to valuation years.
<b>Single Employer:</b>	An employer whose employees are provided with pensions through a single-employer defined benefit pension plan.

## Section 2: GASB Information

<b>Single-Employer Defined Benefit Pension Plan (Single-Employer Pension Plan)</b>	A defined benefit pension plan that is used to provide pensions to employees of only one employer.
<b>Special Funding Situations:</b>	<p>Circumstances in which a non-employer entity is legally responsible for making contributions directly to a pension plan that is used to provide pensions to the employees of another entity or entities and either of the following conditions exists:</p> <ol style="list-style-type: none"><li>3. The amount of contributions for which the non-employer entity legally is responsible is not dependent upon one or more events or circumstances unrelated to the pensions.</li><li>4. The non-employer entity is the only entity with a legal obligation to make contributions directly to a pension plan.</li></ol>
<b>Termination Benefits:</b>	Inducements offered by employers to active employees to hasten the termination of services, or payments made in consequence of the early termination of services. Termination benefits include early-retirement incentives, severance benefits, and other termination-related benefits.
<b>Total Pension Liability (TPL):</b>	The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of Statement 68.