Town of Brookline

Actuarial Valuation and Review of Other Postemployment Benefits (OPEB) as of June 30, 2018

Segal Consulting

This report has been prepared at the request of the Town of Brookline to assist in administering the Plan. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Town of Brookline 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.

Segal Consulting

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January 24, 2019

Mr. Michael DiPietro
Comptroller
333 Washington Street
Town Hall
Brookline, MA 02445

Dear Mr. DiPietro:

We are pleased to submit this report on our actuarial valuation of postemployment welfare benefits as of June 30, 2018. The purpose of this report is to calculate an Actuarially Determined Contribution for the Town of Brookline Other Postemployment Benefit (OPEB) plan for the fiscal year ending June 30, 2019. It summarizes the actuarial data used in the valuation and analyzes the experience and changes in assumptions since the prior valuation. The GASB Statements Number 74 and 75 disclosure information for the fiscal year ending June 30, 2019 will be provided in a separate report.

This report is based on information received from the Town of Brookline and vendors employed by the Town of Brookline. Segal Consulting does not audit the data provided. The accuracy and comprehensiveness of the data is the responsibility of those supplying the data. Segal, however, does review the data for reasonableness and consistency.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Accordingly, additional determinations may be needed for other purposes, such as judging benefit security at termination of the plan, or determining short-term cash flow requirements.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: retiree group benefits program experience or rates of return on assets differing from that anticipated by the assumptions; changes in assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in retiree group benefits program provisions or applicable law. Retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements.

An actuarial valuation is a measurement at a specific date – it is not a prediction of a plan's future financial condition. We have not been retained to perform an analysis of the potential range of financial measurements, except where otherwise noted.

The actuarial valuation has been completed in accordance with generally accepted actuarial principles and practices. The actuarial calculations were directed under our supervision. We are members of the American Academy of Actuaries and collectively meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Town of Brookline are reasonably related to the experience of and the expectations for the Plan.

We look forward to discussing this with you at your convenience.

Sincerely,

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

By:

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

Mark J. Noonan, ASA, MAAA
Vice President and Health Actuary

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**Town of Brookline Actuarial Valuation and Review of Other Postemployment Benefits (OPEB)
as of June 30, 2018**

Section 1: Executive Summary

Important Information about Actuarial Valuations

An actuarial valuation is an estimate of future uncertain obligations of a postretirement health plan. As such, it will never forecast the precise future stream of benefit payments. It is an estimated forecast – the actual cost of the plan will be determined by the benefits and expenses paid, not by the actuarial valuation.

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

Plan of Benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. For example, a plan may provide health benefits to post-65 retirees that coordinate with Medicare. If so, changes in the Medicare law or administration may change the plan's costs without any change in the terms of the plan itself. It is important for the Town of Brookline to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Participant Data	An actuarial valuation for a plan is based on data provided to the actuary by the plan. 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 not necessary to have perfect data for an actuarial valuation: the valuation is an estimated forecast, not a prediction. The uncertainties in other factors are such that even perfect data does not produce a "perfect" result. Notwithstanding the above, it is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	Part of the cost of a plan will be paid from existing assets – the balance will need to come from future contributions and investment income. The valuation is based on the asset values as of the valuation date, provided by the Town of Brookline. Some plans include assets, such as private equity holdings, real estate, or hedge funds, that are not subject to valuation by reference to transactions in the marketplace. A snapshot as of a single date may not be an appropriate value for determining a single year's contribution requirement, especially in volatile markets. Plan sponsors often use an "actuarial value of assets" that differs from market value to reflect gradually year-to-year changes in the market value of assets in determining the contribution requirements.
Actuarial Assumptions	In preparing an actuarial valuation, Segal starts by developing a forecast of the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. To determine the future costs of benefits, Segal collects claims, premiums, and enrollment data in order to establish a baseline cost for the valuation measurement, and then develops short- and long-term health care cost trend rates to project increases in costs in future years. This forecast also requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year, as well as forecasts of the plan's benefits for each of those events. In a funding valuation, the forecasted benefits are then discounted to a present value using the expected rate of return that will be achieved on the plan's assets. All of these factors are uncertain and unknowable. Thus, there will be a range of reasonable assumptions, and the results may vary materially based on which assumptions the actuary selects within that range. That is, there is no right answer (except with hindsight). It is important for any user of an actuarial valuation to understand and accept this constraint. The actuarial model necessarily uses approximations and estimates that may lead to significant changes in our results but will have no impact on the actual cost of the plan. In addition, the actuarial assumptions may change over time, and while this can have a significant impact on the reported results, it does not mean that the previous assumptions or results were unreasonable or wrong.

Given the above, the user of Segal's actuarial valuation (or other actuarial calculations) needs to keep the following in mind:

- The actuarial valuation is prepared for use by the Town of Brookline. It includes information for compliance with accounting standards. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- If the Town of Brookline 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.
- An actuarial valuation is a measurement at a specific date — it is not a prediction of a plan's future financial condition. Accordingly, Segal did not perform an analysis of the potential range of financial measurements, except where otherwise noted. 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.
- Critical events for a plan include, but are not limited to, decisions about changes in benefits and contributions. The basis for such decisions needs to consider many factors such as the risk of changes in plan enrollment, emerging claims experience and health care cost trend, and investment losses, not just the current valuation results.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Town of Brookline should look to their other advisors for expertise in these areas.
- While Segal maintains extensive quality assurance procedures, an actuarial valuation involves complex computer models and numerous inputs. In the event that an inaccuracy is discovered after presentation of Segal's valuation, Segal may revise that valuation or make an appropriate adjustment in the next valuation.
- Segal's report shall be deemed to be final and accepted by the Town of Brookline upon delivery and review. The Town of Brookline should notify Segal immediately of any questions or concerns about the final content.

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

Purpose

This report presents the results of our actuarial valuation of the Town of Brookline postemployment welfare benefit plan as of June 30, 2018. The purpose of this report is to calculate a recommended Actuarially Determined Contribution for the OPEB plan for the fiscal year ending June 30, 2019.

Highlights of the Valuation

- The unfunded actuarial accrued liability (UAAL) as of June 30, 2018 is $236,866,000 based on an actuarial accrued liability (AAL) of $282,902,000 and an actuarial value of assets of $46,036,000. Going forward, net unfunded plan obligations will be expected to change due to normal plan operations, which consist of continuing accruals for active members, plus interest on the unfunded actuarial accrued liability, less employer contributions. Future valuations will analyze the difference between actual and expected unfunded actuarial accrued liabilities.
- As of June 30, 2018 the ratio of assets to the AAL (the funded ratio) is 16.27%. This funded percentage is not necessarily appropriate for assessing the sufficiency of OPEB assets to cover the estimated cost of settling the benefit obligations or the need for or the amount of future contributions.
- The discount rate used to determine the liabilities and the Actuarially Determined Contribution is the expected return on assets. Based on the investment allocation of the OPEB Trust, we recommend an expected return on assets of 7.20% for this valuation. The prior valuation report showed liabilities based on a partially funded discount rate of 6.15% (determined in accordance with GASB Statement Nos. 43 and 45) and also using a discount rate equal to an expected return on assets of 7.40%.
- The UAAL of $236,866,000 as of June 30, 2018 represents an increase of $6,866,000 from $230,000,000 as shown in the June 30, 2016 valuation (based on a discount rate of 7.40%). The unfunded liability had been expected to increase by $19,296,000 due to normal plan operations. The difference between the actual and expected increase was the net effect of the following:
  - There was an actuarial experience gain of $1,626,000 for the two-year period ending June 30, 2018, due to an investment gain and employer contributions greater than expected, partially offset by a loss due to demographic experience.
  - The valuation assumption changes decreased obligations by $10,804,000. This was the net result of 1) a decrease in obligations due to updating the per capita costs and 2) a decrease in obligations due to updating the excise tax calculation, partially offset by 3) an increase in obligations due to decreasing the discount rate from 7.40% to 7.20%, 4) an increase in obligations due to changing the funding method to be consistent with the method used for accounting purposes, and 5) an increase in obligations due to updating the mortality assumptions. The complete set of assumptions is shown in Exhibit II.
- The Actuarially Determined Contribution (ADC) for fiscal year 2019 is $22,132,000. The ADC is calculated using a 30-year amortization of the UAAL, with payments increasing at 3.50% per year.

- A summary of the valuation results appears on page 11. A projection of the ADC with the current funding policy appears on page 12. The ADC in this projection is based on a 30-year closed amortization. As shown in the projection, the current funding policy will fund the obligations in 36 years. A 30-year funding schedule appears on page 13. The funding schedule assumes that 100% of the ADC will be contributed beginning in fiscal year 2019. All projections assume that there will be no assumption or plan changes and that experience will develop as assumed.

OPEB Trust Information

As of June 30, 2018, the Town of Brookline has $46,036,209 in assets. The table below shows the increase in assets from June 30, 2016 to June 30, 2018.

Reconciliation of OPEB Balance from June 30, 2016 through June 30, 2018	Total
Balance as of June 30, 2016	$30,016,389
• Fiscal year 2017 OPEB contributions	3,774,839
• Net investment income	3,913,028
Balance as of June 30, 2017	$37,704,256
• Fiscal year 2018 OPEB contributions	4,480,080
• Net investment income	3,851,873
Balance as of June 30, 2018	$46,036,209

OPEB Trust Contributions

The table below shows the breakdown of projected benefit payments and OPEB trust contributions for fiscal year 2019. Please note that this charts will need to be revised if actual OPEB contributions differ from the amounts shown in the table below:

Projected Benefits	OPEB Trust Contributions	Total
$11,673,504	$4,570,465	$16,243,969

Other Considerations

This valuation does not include the potential impact of any future changes due to the Patient Protection and Affordable Care Act (PPACA) and the Health Care and Education Reconciliation Act (HCERA) of 2010 other than the excise tax on high cost health plans beginning in 2022 (reflected in this valuation) and those previously adopted as of the valuation date.

Employer decisions regarding plan design, cost sharing between the Employer and its retirees, actuarial cost method, amortization techniques, and integration with Medicare are just some of the decisions that affect the magnitude of OPEB obligations. We are available to assist you with any investigation of such options you may wish to undertake.

Calculations are based on the benefits provided under the terms of the substantive plan in effect at the time of the valuation and on the pattern of sharing costs between the employer and plan members. The projection of benefits does not incorporate the potential effect of legal or contractual funding limitations on the pattern of cost sharing between the employer and plan members in the future.

Actuarial calculations reflect a long-term perspective, and the methods and assumptions use techniques designed to reduce short-term volatility in accrued liabilities and the actuarial value of assets, if any.

The calculation of an accounting obligation does not, in and of itself, imply that there is any legal liability to provide the benefits valued, nor is there any implication that the Employer is required to implement a funding policy to satisfy the projected expense.

Actuarial valuations involve estimates of the value of reported amounts and assumptions about the probability of events far into the future, and the actuarially determined amounts are subject to continual revision as actual results are compared to past expectations and new estimates are made about the future.

Section 2: Valuation Results

Summary of Valuation Results

	7.40% discount rate June 30, 2016	7.20% discount rate June 30, 2018
Actuarial Accrued Liability		
1. Current retirees, beneficiaries and dependents	$146,190,082	$151,640,057
2. Current active employees	113,824,307	131,262,379
3. Total as of June 30, 2016 and 2018: (1) + (2)	$260,014,388	$282,902,437
4. Actuarial value of assets as of June 30, 2016 and 2018	30,016,389	46,036,209
5. Unfunded actuarial accrued liability (UAAL) as of June 30, 2016 and 2018	$229,997,999	$236,866,228
6. Funded ratio: (4) / (3)	9.66%	16.27%
Actuarially Determined Contribution for Fiscal Year Ending June 30, 2017 and 2019		
7. Normal cost, including adjustment for timing	$8,244,897	$9,137,035
8. 30-year amortization increasing (4.00% per year for fiscal 2017 and 3.50% per year for fiscal 2019) of the unfunded actuarial accrued liability (UAAL), including adjustment for timing	12,189,264	12,995,138
9. Total Actuarially Determined Contribution (ADC): (7) + (8)	$20,434,161	$22,132,173
10. Projected benefit payments	11,482,521	11,673,505

Note: Assumes payment in the middle of the fiscal year.

Projection of the Actuarial Determined Contribution

7.20% Discount Rate, 30-Year Closed Amortization with Funding Policy Contributions

Fiscal Year Ending June 30	(1) Normal Cost	(2) Amortization of UAAL	(3) Actuarially Determined Contribution (1) + (2)	(4) Projected Benefits Paid by the City	(5) Contribution to OPEB Trust	(6) Assets at End of Year	(7) AAL at End of Year	(8) UAAL at End of Year (7) - (6)
2019	$9,137,035	$12,995,138	$22,132,173	$11,673,505	$4,570,465	$54,082,958	$300,645,217	$246,562,259
2020	9,471,016	13,790,962	23,261,978	12,735,019	4,271,536	62,399,570	318,912,208	256,512,638
2021	9,817,205	14,643,378	24,460,583	13,866,852	4,521,536	71,573,821	337,680,986	266,107,165
2022	10,176,048	15,522,631	25,698,679	15,178,350	4,771,536	81,667,462	356,814,762	275,147,300
2023	10,548,008	16,421,155	26,969,163	16,285,321	5,021,536	92,746,689	376,565,158	283,818,469
2024	10,933,564	17,354,371	28,287,935	17,335,454	5,271,536	104,882,464	397,049,497	292,167,033
2025	11,333,213	18,330,810	29,664,023	18,372,172	5,521,536	118,150,858	418,349,103	300,198,245
2026	11,747,470	19,357,636	31,105,106	19,443,447	5,771,536	132,633,420	440,502,021	307,868,601
2027	12,176,869	20,440,045	32,616,914	20,487,494	6,021,536	148,417,570	463,613,559	315,195,989
2028	12,621,964	21,588,590	34,210,554	21,669,823	6,271,536	165,597,022	487,625,814	322,028,792
2029	13,083,328	22,803,835	35,887,163	22,866,772	6,521,536	184,272,239	512,605,346	328,333,107
2030	13,561,556	24,095,780	37,657,336	24,010,111	6,771,536	204,550,915	538,694,765	334,143,850
2031	14,057,265	25,482,025	39,539,290	25,210,616	7,021,536	226,548,499	565,932,895	339,384,396
2032	14,571,093	26,975,234	41,546,327	26,471,147	7,271,536	250,388,753	594,359,053	343,970,300
2033	15,103,703	28,590,954	43,694,657	27,794,705	7,521,536	276,204,349	624,012,967	347,808,618
2034	15,655,781	30,348,570	46,004,351	29,184,440	7,771,536	304,137,511	654,934,674	350,797,163
2035	16,228,039	32,272,649	48,500,688	30,643,662	8,021,536	334,340,704	687,164,405	352,823,701
2036	16,821,214	34,394,919	51,216,133	32,175,845	8,271,536	366,977,371	720,742,451	353,765,080
2037	17,436,071	36,757,227	54,193,298	33,784,637	8,521,536	402,222,721	755,709,022	353,486,301
2038	18,073,403	39,416,113	57,489,516	35,473,869	8,771,536	440,264,580	792,104,076	351,839,496
2039	18,734,031	42,450,131	61,184,162	37,247,563	9,021,536	481,304,297	829,967,134	348,662,837
2040	19,418,807	45,972,039	65,390,846	39,109,941	9,271,536	525,557,717	869,337,073	343,779,356
2041	20,128,613	50,150,143	70,278,756	41,065,438	9,521,536	573,256,227	910,251,891	336,995,664
2042	20,864,364	55,247,917	76,112,281	43,118,710	9,771,536	624,647,873	952,748,449	328,100,576
2043	21,627,009	61,703,264	83,330,273	45,274,645	10,021,536	679,998,561	996,862,182	316,863,621
2044	22,417,530	70,302,857	92,720,387	47,538,377	10,271,536	739,593,342	1,042,626,779	303,033,437
2045	23,236,947	82,618,021	105,854,968	49,915,296	10,521,536	803,737,791	1,090,073,829	286,336,038
2046	24,086,316	102,312,337	126,398,653	52,411,061	10,771,536	872,759,484	1,139,232,431	266,472,947
2047	24,966,731	140,372,090	165,338,821	55,031,614	11,021,536	947,009,582	1,190,128,758	243,119,176
2048	25,879,327	251,719,354	277,598,681	57,783,195	11,271,536	1,026,864,531	1,242,785,583	215,921,052
2049	26,825,281	223,559,114	250,384,395	60,672,355	11,521,536	1,112,727,880	1,297,221,753	184,493,873
2050	27,805,812	191,020,220	218,826,032	63,705,972	11,771,536	1,205,032,234	1,353,451,615	148,419,381
2051	28,822,184	153,669,617	182,491,801	66,891,271	12,021,536	1,304,241,345	1,411,484,376	107,243,031
2052	29,875,707	111,036,681	140,912,388	70,235,834	12,271,536	1,410,852,355	1,471,323,412	60,471,057
2053	30,967,739	62,610,180	93,577,919	73,747,626	12,521,536	1,525,398,201	1,532,965,501	7,567,300
2054	32,099,687	7,834,988	39,934,675	39,934,676	-	1,635,226,871	1,635,226,871	-

Notes: Assumes payment in the middle of the fiscal year.
Normal cost is projected to increase at the payroll growth assumption of 3.50% per year and 0.15% for future mortality improvement and does not reflect the future impact of pension reform for new hires.

Funding Schedule

7.20% Discount Rate, 30-Year Closed Amortization

Fiscal Year Ending June 30	(1) Normal Cost	(2) Amortization of UAAL	(3) Actuarially Determined Contribution (1) + (2)	(4) Projected Benefits Paid by the City	(5) Contributions Needed to Fully Fund the ADC (3) - (4)	(6) Assets at End of Year	(7) AAL at End of Year	(8) UAAL at End of Year (7) - (6)
2019	$9,137,035	$12,995,138	$22,132,173	$11,673,505	$10,458,669	$60,179,453	$300,645,217	$240,465,764
2020	9,471,016	13,449,968	22,920,984	12,735,019	10,185,965	75,058,660	318,912,208	243,853,548
2021	9,817,205	13,920,717	23,737,922	13,866,852	9,871,070	90,683,136	337,680,986	246,997,850
2022	10,176,048	14,407,942	24,583,990	15,178,350	9,405,640	106,950,680	356,814,762	249,864,082
2023	10,548,008	14,912,220	25,460,228	16,285,321	9,174,907	124,150,592	376,565,158	252,414,566
2024	10,933,564	15,434,148	26,367,712	17,335,454	9,032,258	142,441,203	397,049,497	254,608,294
2025	11,333,213	15,974,343	27,307,556	18,372,172	8,935,384	161,948,437	418,349,103	256,400,666
2026	11,747,470	16,533,445	28,280,915	19,443,447	8,837,468	182,758,812	440,502,021	257,743,209
2027	12,176,869	17,112,116	29,288,985	20,487,494	8,801,491	205,030,284	463,613,559	258,583,275
2028	12,621,964	17,711,040	30,333,004	21,669,823	8,663,181	228,762,100	487,625,814	258,863,714
2029	13,083,328	18,330,926	31,414,254	22,866,772	8,547,482	254,082,815	512,605,346	258,522,531
2030	13,561,556	18,972,508	32,534,064	24,010,111	8,523,953	281,202,260	538,694,765	257,492,505
2031	14,057,265	19,636,546	33,693,811	25,210,616	8,483,195	310,232,105	565,932,895	255,700,790
2032	14,571,093	20,323,825	34,894,918	26,471,147	8,423,771	341,290,573	594,359,053	253,068,480
2033	15,103,703	21,035,159	36,138,862	27,794,705	8,344,157	374,502,820	624,012,967	249,510,147
2034	15,655,781	21,771,390	37,427,171	29,184,440	8,242,731	410,001,335	654,934,674	244,933,339
2035	16,228,039	22,533,389	38,761,428	30,643,662	8,117,766	447,926,358	687,164,405	239,238,047
2036	16,821,214	23,322,058	40,143,272	32,175,845	7,967,427	488,426,325	720,742,451	232,316,126
2037	17,436,071	24,138,330	41,574,401	33,784,637	7,789,764	531,658,342	755,709,022	224,050,680
2038	18,073,403	24,983,172	43,056,575	35,473,869	7,582,706	577,788,682	792,104,076	214,315,394
2039	18,734,031	25,857,583	44,591,614	37,247,563	7,344,051	626,993,309	829,967,134	202,973,825
2040	19,418,807	26,762,598	46,181,405	39,109,941	7,071,464	679,458,440	869,337,073	189,878,633
2041	20,128,613	27,699,289	47,827,902	41,065,438	6,762,464	735,381,129	910,251,891	174,870,762
2042	20,864,364	28,668,764	49,533,128	43,118,710	6,414,418	794,969,894	952,748,449	157,778,555
2043	21,627,009	29,672,171	51,299,180	45,274,645	6,024,535	858,445,375	996,862,182	138,416,807
2044	22,417,530	30,710,697	53,128,227	47,538,377	5,589,850	926,041,029	1,042,626,779	116,585,750
2045	23,236,947	31,785,571	55,022,518	49,915,296	5,107,222	998,003,870	1,090,073,829	92,069,959
2046	24,086,316	32,898,066	56,984,382	52,411,061	4,573,321	1,074,595,248	1,139,232,431	64,637,183
2047	24,966,731	34,049,498	59,016,229	55,031,614	3,984,615	1,156,091,674	1,190,128,758	34,037,084
2048	25,879,327	35,241,230	61,120,557	57,783,195	3,337,362	1,242,785,693	1,242,785,693	-

Notes: Assumes payment in the middle of the fiscal year.
Normal cost is projected to increase at the payroll growth assumption of 3.50% per year and 0.15% for future mortality improvement and does not reflect the future impact of pension reform for new hires.
Amortization payments are assumed to increase 3.50% per year.

Department Results

		School	School Enterprise Fund			
			Adult Education	Early Childhood	Food Services	Metco
Actuarial Accrued Liability						
1.	Current retirees, beneficiaries and dependents	$65,716,286	$82,011	$166,044	$903,408	$277,344
2.	Current active employees	64,887,776	561,251	3,255,080	1,810,005	790,478
3.	Total as of June 30, 2018: (1) + (2)	$130,604,062	$643,262	$3,421,123	$2,713,413	$1,067,822
4.	Actuarial value of assets as of June 30, 2018	12,655,657	160,195	1,058,186	1,018,237	347,933
5.	Unfunded actuarial accrued liability (UAAL) as of June 30, 2018	$117,948,405	$483,067	$2,362,937	$1,695,176	$719,889
6.	Funded ratio: (4) / (3)	9.69%	24.90%	30.93%	37.53%	32.58%
Actuarially Determined Contribution for Fiscal Year Ending June 30, 2019						
7.	Normal cost, including adjustment for timing	$4,441,881	$30,296	$185,733	$96,764	$35,174
8.	30-year amortization increasing (3.50% per year) of the unfunded actuarial accrued liability (UAAL) , including adjustment for timing	6,470,977	26,502	129,637	93,002	39,495
9.	Total Actuarially Determined Contribution (ADC): (7) + (8)	$10,912,858	$56,798	$315,370	$189,766	$74,669
10.	Projected benefit payments	5,246,072	4,887	18,313	77,352	24,735
11.	Contribution to OPEB Trust needed to fully fund the ADC: (10) – (9)	$5,666,786	$51,911	$297,057	$112,414	$49,934
12.	Budgeted town contribution	822,000	15,903	84,577	67,082	26,399
13.	Shortfall: (11) – (12)	$4,844,786	$36,008	$212,480	$45,332	$23,535
Actuarially Determined Contribution for Fiscal Year Ending June 30, 2020						
14.	Normal cost, including adjustment for timing	$4,604,243	$31,403	$192,522	$100,301	$36,460
15.	29-year amortization increasing (3.50% per year) of the unfunded actuarial accrued liability (UAAL) , including adjustment for timing	6,867,261	28,125	137,576	98,697	41,914
16.	Total Actuarially Determined Contribution (ADC): (14) + (15)	$11,471,504	$59,528	$330,098	$198,998	$78,374
17.	Projected benefit payments	5,717,184	6,372	33,888	97,068	32,461
18.	Contribution to OPEB Trust needed to fully fund the ADC: (16) – (17)	$5,754,320	$53,156	$296,210	$101,930	$45,913
19.	Budgeted town contribution	822,000	17,630	93,766	74,369	29,267
20.	Shortfall: (18) – (19)	$4,932,320	$35,526	$202,444	$27,561	$16,646

Notes: Assumes payment in the middle of the year.
The asset allocation as of June 30, 2016 was updated to reflect contribution amounts provided by the Town and investment allocated in proportion to average assets. For School Enterprise Funds, contributions were allocated in proportion to actuarial accrued liability.

Department Results (Continued) – 7.20% Discount Rate

		Enterprise Funds						
		Golf	Recreation	Water	Town	CDBG	Retirement	Total
Actuarial Accrued Liability								
1.	Current retirees, beneficiaries and dependents	$0	$1,176,376	$3,887,682	$79,057,541	$308,639	$64,727	$151,640,057
2.	Current active employees	148,666	1,121,851	2,469,187	55,975,333	0	242,753	131,262,379
3.	Total as of June 30, 2018: (1) + (2)	$148,666	$2,298,228	$6,356,869	$135,032,873	$308,639	$307,480	$282,902,437
4.	Actuarial value of assets as of June 30, 2018	97,741	991,185	2,258,821	26,789,767	245,260	413,228	46,036,209
5.	Unfunded actuarial accrued liability (UAAL) as of June 30, 2018	$50,925	$1,307,043	$4,098,048	$108,243,106	$63,379	-$105,748	$236,866,228
6.	Funded ratio: (4) / (3)	65.75%	43.13%	35.53%	19.84%	79.47%	134.39%	16.27%
Actuarially Determined Contribution for Fiscal Year Ending June 30, 2019								
7.	Normal cost, including adjustment for timing	$8,400	$74,432	$107,396	$4,141,529	$0	$15,430	$9,137,035
8.	30-year amortization increasing (3.50% per year) of the unfunded actuarial accrued liability (UAAL), including adjustment for timing	2,793	71,708	224,831	5,938,517	3,477	-5,801	12,995,138
9.	Total Actuarially Determined Contribution (ADC): (7) + (8)	$11,193	$146,140	$332,227	$10,080,046	$3,477	$9,629	$22,132,173
10.	Projected benefit payments	60	96,799	294,570	5,892,591	12,532	5,594	11,673,505
11.	Contribution to OPEB Trust needed to fully fund the ADC: (9) – (10)	$11,133	$49,341	$37,657	$4,187,455	-$9,055	$4,035	$10,458,668
12.	Budgeted town contribution	12,700	40,261	74,991	3,423,092	0	3,460	4,570,465
13.	Shortfall: (11) – (12)	-$1,567	$9,080	-$37,334	$764,363	-$9,055	$575	$5,888,203
Actuarially Determined Contribution for Fiscal Year Ending June 30, 2020								
14.	Normal cost, including adjustment for timing	$8,707	$77,153	$111,322	$4,292,911	$0	$15,994	$9,471,016
15.	29-year amortization increasing (3.50% per year) of the unfunded actuarial accrued liability (UAAL), including adjustment for timing	2,964	76,099	238,600	6,302,192	3,690	-6,156	13,790,962
16.	Total Actuarially Determined Contribution (ADC): (11) + (12)	$11,671	$153,252	$349,922	$10,595,103	$3,690	$9,838	$23,261,978
17.	Projected benefit payments	133	106,076	319,229	6,402,246	13,582	6,780	12,735,019
18.	Contribution to OPEB Trust needed to fully fund the ADC: (16) – (17)	$11,538	$47,176	$30,693	$4,192,857	-$9,892	$3,058	$10,526,959
19.	Budgeted town contribution	12,700	40,261	74,991	3,103,092	0	3,460	4,271,536
20.	Shortfall: (18) – (19)	-$1,162	$6,915	-$44,298	$1,089,765	-$9,892	-$402	$6,255,423

Notes: Assumes payment in the middle of the year.
The asset allocation as of June 30, 2016 was updated to reflect contribution amounts provided by the Town and investment allocated in proportion to average assets. For School Enterprise Funds, contributions were allocated in proportion to actuarial accrued liability.

Section 3: Supporting Information

EXHIBIT I – SUMMARY OF PARTICIPANT DATA AS OF JUNE 30, 2016 AND JUNE 30, 2018

Summary of Participant Data	June 30, 2016	June 30, 2018
Active Employees Covered for Medical Benefits		
• Number of employees		
• Male	632	647
• Female	893	936
• Total	1,525	1,583
• Average age	43.6	43.1
• Average service	11.0	10.9
Retirees, Beneficiaries and Dependents Covered for Medical Benefits		
• Number	1,654	1,696
• Average age	73.1	72.5
Retired employees eligible for life insurance[1]		
• Number	857	927
• Average age	73.2	73.8

[1] June 30, 2016 and 2018 counts include 12 and 81 retirees with life insurance only, respectively.

EXHIBIT II – ACTUARIAL ASSUMPTIONS AND METHODS

Data:	Detailed census data for postemployment welfare benefits were provided by the Town of Brookline.
Actuarial Cost Method:	Entry Age Normal – Level percentage of payroll (previously, Projected Unit Credit)
Per Capita Cost Development:	Per capita costs were based on the fully-insured premium rates effective July 1, 2018. Premiums were combined by taking a weighted average based on the number of participants in each plan, and were then trended to the midpoint of the valuation year at assumed trend rates. Actuarial factors were applied to the premium to estimate individuals retiree and spouse costs by age and by gender.
Valuation Date:	June 30, 2018
Roll-Forward Technique:	To project the Actuarially Determined Contribution for fiscal year 2020 and later, liabilities were rolled forward from June 30, 2018 using standard actuarial techniques.
Expected Return on Assets:	7.20% (previously, 7.40%) Long-term rate of return on investments expected to be used to finance the benefits. The expected return was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of OPEB plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce a 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.
Discount Rate:	7.20% The discount rate is equal to the expected return on assets.

Salary Increases:

4.50% for Group 1 (excluding Teachers) and Group 2 employees

4.75% for Group 4 employees

Service-related increases for Teachers:

Years of Service	Rate per year (%)	Years of Service	Rate per year (%)
0	7.50	9	6.10
1	7.10	10	5.90
2	7.00	11	5.70
3	6.90	12	5.20
4	6.80	13	4.70
5	6.70	14	4.35
6	6.60	15-16	4.20
7	6.50	17-19	4.10
8	6.30	20 and later	4.00

Note: Total payroll is assumed to increase 3.50% per year.

Asset Valuation Method: Market Value

Mortality Rates:

Pre-Retirement: RP-2014 Blue Collar Employee Mortality Table projected generationally using Scale MP-2017 (previously, RP-2000 Healthy Employee Mortality Table projected generationally using Scale BB2D from 2009)

Healthy Retiree: RP-2014 Blue Collar Healthy Annuitant Mortality Table projected generationally using Scale MP-2017 (previously, RP-2000 Healthy Annuitant Mortality Table projected generationally using Scale BB2D from 2009)

Disabled Retiree: RP-2014 Blue Collar Healthy Annuitant Mortality Table set forward one year projected generationally using Scale MP-2017 (previously, RP-2000 Healthy Annuitant Mortality Table projected generationally with Scale BB2D from 2015)

Pre-Retirement (Teachers): RP-2014 White Collar Employee Mortality Table projected generationally with Scale MP-2016 (previously, RP-2014 Employee Mortality Table projected generationally with Scale BB2D)

Healthy (Teachers): RP-2014 White Collar Healthy Annuitant Mortality Table projected generationally using Scale MP-2016 (previously, RP-2014 Healthy Annuitant Mortality Table projected generationally with Scale BB2D)

Disabled (Teachers): RP-2014 White Collar Healthy Annuitant Mortality Table projected generationally with Scale MP-2016 (previously, RP-2014 Healthy Annuitant Mortality Table set forward 4 years projected generationally with Scale BB2D)

The underlying tables with generational projection to the ages of participants as of the measurement date reasonably reflect the mortality experience of the plan as of the measurement date. The mortality tables were then adjusted to future years using generational projection to reflect future mortality improvement between the measurement date and those years.

Non-Teacher Annuitant Mortality Rates:

	Rate per year (%)							
	Healthy				Disabled			
	Current		Previous		Current		Previous	
Age	Male	Female	Male	Female	Male	Female	Male	Female
60	0.85	0.57	0.82	0.62	0.91	0.62	0.82	0.62
70	1.97	1.40	2.22	1.67	2.16	1.54	2.22	1.67
80	5.19	3.82	6.44	4.59	5.74	4.24	6.44	4.59
90	14.64	11.19	18.34	13.17	16.18	12.43	18.34	13.17

Note: Rates shown are before generational projection.

Teacher Annuitant Mortality Rates:

	Rate per year (%)							
	Healthy				Disabled			
	Current		Previous		Current		Previous	
Age	Male	Female	Male	Female	Male	Female	Male	Female
60	0.52	0.39	0.78	0.52	0.52	0.39	1.02	0.74
70	1.24	1.06	1.68	1.29	1.24	1.06	2.43	1.90
80	3.73	3.04	4.47	3.48	3.73	3.04	6.93	5.40
90	12.62	10.02	13.59	10.71	12.62	10.02	20.11	16.30

Note: Rates shown are before generational projection.

Termination Rates Before Retirement:

	Groups 1 and 2 (excluding Teachers) - Rate per year (%)				
	Mortality				
	Current		Previous		
Age	Male	Female	Male	Female	Disability
20	0.05	0.02	0.03	0.02	0.01
25	0.06	0.02	0.04	0.02	0.02
30	0.06	0.02	0.04	0.03	0.03
35	0.07	0.03	0.08	0.05	0.06
40	0.08	0.04	0.11	0.07	0.10
45	0.13	0.07	0.15	0.11	0.15
50	0.22	0.12	0.21	0.17	0.19
55	0.36	0.19	0.30	0.25	0.24
60	0.61	0.27	0.49	0.39	0.28

Notes: 55% of the disability rates shown represent accidental disability.
55% of the mortality rates shown represent accidental death
Rates shown are before generational projection.

Termination Rates Before Retirement (continued):

	Group 4 - Rate per year (%)				
	Mortality				
	Current		Previous		
Age	Male	Female	Male	Female	Disability
20	0.05	0.02	0.03	0.02	0.10
25	0.06	0.02	0.04	0.02	0.20
30	0.06	0.02	0.04	0.03	0.30
35	0.07	0.03	0.08	0.05	0.30
40	0.08	0.04	0.11	0.07	0.30
45	0.13	0.07	0.15	0.11	1.00
50	0.22	0.12	0.21	0.17	1.25
55	0.36	0.19	0.30	0.25	1.20
60	0.61	0.27	0.49	0.40	0.85

Notes: 90% of the disability rates shown represent accidental disability.
90% of the mortality rates shown represent accidental death
Rates shown are before generational projection.

Termination Rates Before Retirement (continued):

	Teachers – Rate per year (%)				
	Mortality				
	Current		Previous		
Age	Male	Female	Male	Female	Disability
20	0.03	0.01	0.04	0.02	0.00
25	0.03	0.01	0.05	0.02	0.01
30	0.03	0.02	0.05	0.02	0.01
35	0.04	0.02	0.05	0.03	0.01
40	0.04	0.03	0.06	0.04	0.01
45	0.07	0.06	0.10	0.07	0.03
50	0.12	0.09	0.17	0.11	0.05
55	0.20	0.14	0.28	0.17	0.07
60	0.33	0.21	0.47	0.24	0.07

Notes: 75% of the death rates shown represent accidental death.
35% of the disability rates shown represent accidental disability.
Rates shown are before generational projection.

Withdrawal Rates:

Rate per year (%)			
Years of Service	Groups 1 and 2	Years of Service	Group 4
0	15.0	0 – 10	1.5
1	12.0	11+	0.0
2	10.0		
3	9.0		
4	8.0		
5 - 9	7.6		
10 - 14	5.4		
15 - 19	3.3		
20 - 24	2.0		
25 - 29	5.9		
30+	5.4		

Teachers - Rate per year (%)						
	0 – 4 Years of Service		5 – 9 Years of Service		10+ Years of Service	
Age	Male	Female	Male	Female	Male	Female
20	13.0	10.0	5.5	7.0	1.5	5.0
30	15.0	15.0	5.4	8.8	1.5	4.5
40	13.3	10.5	5.2	5.0	1.7	2.2
50	16.2	9.8	7.0	5.0	2.3	2.0

Retirement Rates:

Age	Rate per year (%)	
	Groups 1 and 2 (excluding Teachers)	Group 4
55	5.0	15.0
56 – 58	2.5	10.0
59	2.5	15.0
60	10.0	20.0
61	15.0	20.0
62 - 63	10.0	25.0
64	10.0	30.0
65	40.0	100.0
66 - 67	25.0	- -
68 - 69	30.0	- -
70	100.0	- -

Retirement Rates (continued):

Age	Teachers - Rate per year (%) Years of Service					
	Less than 20		20 - 29		30 or more	
	Male	Female	Male	Female	Male	Female
50 – 52	- -	- -	1.0	1.0	2.0	1.5
53	- -	- -	1.5	1.0	2.0	1.5
54	- -	- -	2.5	1.0	2.0	2.0
55	5.0	3.0	3.0	3.0	6.0	5.0
56	5.0	3.0	6.0	5.0	20.0	15.0
57	5.0	4.0	10.0	8.0	40.0	35.0
58	5.0	8.0	15.0	10.0	50.0	35.0
59	10.0	8.0	20.0	15.0	50.0	35.0
60	10.0	10.0	25.0	20.0	40.0	35.0
61	20.0	12.0	30.0	25.0	40.0	35.0
62	20.0	12.0	35.0	30.0	35.0	35.0
63	25.0	15.0	40.0	30.0	35.0	35.0
64	25.0	20.0	40.0	30.0	35.0	35.0
65	25.0	25.0	40.0	40.0	35.0	35.0
66	30.0	25.0	30.0	30.0	40.0	35.0
67	30.0	30.0	30.0	30.0	40.0	30.0
68	30.0	30.0	30.0	30.0	40.0	30.0
69	30.0	30.0	30.0	30.0	40.0	30.0
70	100.0	100.0	100.0	100.0	100.0	100.0

Dependents:

Demographic data was available for spouses of current retirees. For future retirees, husbands were assumed to be three years older than their wives. For future retirees who elect to continue their health coverage at retirement, 65% were assumed to have an eligible spouse who also opts for health coverage at that time.

Per Capita Health Costs:

Fiscal year 2018 - 2019 medical and prescription drug claims costs are shown in the table below for retirees and for spouses at selected ages. These costs are net of deductibles and other benefit plan cost sharing provisions.

	Non-Medicare Plans				Medicare Plans			
	Retiree		Spouse		Retiree		Spouse	
Age	Male	Female	Male	Female	Male	Female	Male	Female
45	$8,061	$10,112	$5,000	$7,548	N/A	N/A	N/A	N/A
50	9,568	10,898	6,683	8,750	N/A	N/A	N/A	N/A
55	11,362	11,731	8,943	10,128	N/A	N/A	N/A	N/A
60	13,494	12,645	11,971	11,747	N/A	N/A	N/A	N/A
65	16,026	13,622	16,026	13,622	$4,186	$3,558	$4,186	$3,558
70	18,574	14,680	18,574	14,680	4,852	3,834	4,852	3,834
75	20,016	15,802	20,016	15,802	5,228	4,127	5,228	4,127
80	21,555	17,036	21,555	17,036	5,630	4,450	5,630	4,450

Annual Medicare Part B Reimbursement:

$1,045 (portion paid by Town)

Weighted Average Annual Retiree Contribution Amount:

Non-Medicare	Medicare
$1,736	$771

Health Care Cost Trend Rates:

Health care trend measures the anticipated overall rate at which health plan costs are expected to increase in future years. The rates shown below are "net" and are applied to the net per capita costs shown above. The trend shown for a particular plan year is the rate that is applied to that year's cost to yield the next year's projected cost.

Year Ending June 30	Medical/ Prescription Drug	Medicare Part B Premium
2019	7.50%	5.00%
2020	7.00%	5.00%
2021	6.50%	5.00%
2022	6.00%	5.00%
2023	5.50%	5.00%
2024 & later	5.00%	5.00%

The medical/prescription drug trend assumption is the same as used in the Commonwealth of Massachusetts Postemployment Benefit Other than Pensions Actuarial Valuation Report GASB 74 for fiscal year ending June 30, 2018, dated January 2, 2019.

Retiree Contribution Increase Rate:

Retiree contributions for medical and prescription drug coverage are expected to increase with medical trend.

Administrative Expenses:

Administrative expenses are assumed to be included in the fully insured premium rates.

Participation and Coverage Election:

100% of active employees with coverage are assumed to elect retiree coverage. We have loaded active liabilities by 20% to account for current employees who have waived health coverage but are expected to receive coverage through the Town as retirees.

100% of retirees over age 65 are assumed to remain in their current medical plan for life.

For future retirees hired before 1986 and current retirees under age 65, 95% are assumed to be eligible for Medicare and are assumed to enroll in a Medicare plan upon reaching age 65 and 5% are assumed to be ineligible for Medicare and to remain enrolled in a non-Medicare indemnity plan.

For future over-65 retirees hired in 1986 or later, 100% are assumed to enroll in a Medicare plan.

Life insurance elections were available for current retirees. 100% future retirees with medical coverage are assumed to have life insurance coverage.

Plan Design:

Development of plan liabilities was based on the substantive plan of benefits in effect as described in Exhibit III.

Missing Participant Data:

A missing census item for a given participant was assumed to equal the average value of that item over all other participants of the same status for whom the item is known.

Health Care Reform Assumption:	This valuation does not include the potential impact of any future changes due to the Patient Protection and Affordable Care Act (PPACA) and the Health Care and Education Reconciliation Act (HCERA) of 2010 other than the excise tax on high cost health plans beginning in 2022 (reflected with this valuation) and those previously adopted as of the valuation date.
Demographic and Salary Increase Assumptions:	Many of the demographic assumptions used in this valuation for non-teachers (including mortality, disability, turnover, and retirement) and the salary increase assumptions are the same as used in the Town of Brookline Contributory Retirement System Actuarial Valuation and Review as of January 1, 2018, dated September 14, 2018, completed by Segal Consulting. The assumptions used in this valuation for teachers are the same as used in the Massachusetts Teachers' Retirement System Actuarial Valuation Report as of January 1, 2018, dated October 10, 2018, completed by PERAC. A review of these demographic assumptions is beyond the scope of this assignment, however, we have no reason to doubt the reasonableness of these assumptions. The remaining demographic assumptions, such as percent married, relative ages of spouses, and enrollment elections, were based on the experience of the Plan and the experience of similar plans
Justification for Assumption Changes Since Prior Valuation:	Based on past experience and future expectations, the following actuarial assumptions were changed: • The per capita health costs were updated to reflect current experience. • The mortality assumptions were changed to match the assumptions used in the Town of Brookline Contributory Retirement System Actuarial Valuation and Review as of January 1, 2018, dated September 14, 2018, and the Massachusetts Teachers' Retirement System Actuarial Valuation Report as of January 1, 2018, dated October 10, 2018. • The excise tax on high cost health plans beginning in 2022 was recalculated with this valuation. • The expected rate of return was decreased from 7.40% to 7.20%. • The funding method was changed to be consistent with the method used for accounting disclosures.

EXHIBIT III – SUMMARY OF PLAN

This exhibit summarizes the major benefit provisions as included in the valuation. To the best of our knowledge, the summary represents the substantive plans as of the measurement date. It is not intended to be, nor should it be interpreted as, a complete statement of all benefit provisions.

Eligibility:	Retired and receiving a pension from the Town of Brookline Contributory Retirement System or the Massachusetts Teachers' Retirement System. • Members hired before April 2, 2012 – Groups 1 and Group 2 (including Teachers): » Retirees with at least 10 years of creditable service are eligible at age 55; » Retirees with at least 20 years of creditable service are eligible at any age. – Group 4 » Retirees are eligible at age 55; » Retirees with at least 20 years of creditable service are eligible at any age. • Members hired on or after April 2, 2012 – Group 1 (including Teachers): » Retirees with at least 10 years of creditable service are eligible at age 60. – Group 2 » Retirees with at least 10 years of creditable service are eligible at age 55. – Group 4 » Retirees are eligible at age 55; » Retirees with at least 10 years of creditable service are eligible at age 50.
Disability:	Accidental (job-related) Disability has no age or service requirement. Ordinary (non-job related) Disability has no age requirement but requires 10 years of creditable service.
Pre-Retirement Death:	Surviving spouses of members who die in active service on Accidental (job-related) Death are eligible at any age. Surviving spouses of members who die in active service on Ordinary (non-job related) Death are eligible after two years of service.
Post-Retirement Death:	Surviving spouse is eligible.
Benefit Types:	Medical and prescription drug benefits are provided to all eligible retirees through plans offered through the Commonwealth of Massachusetts Group Insurance Commission (GIC). (Dental coverage is offered but is 100% retiree paid and therefore has no impact on this valuation.) A life insurance benefit of $5,000 is provided, and the Town pays 50% of the retiree life insurance premium and a portion of the Medicare Part B premium.

Duration of Coverage:	Lifetime.
Dependent Benefits:	Medical and Prescription Drugs.
Dependent Coverage:	Benefits are payable to a spouse for their lifetime, regardless of when the retirees dies.
MGL Chapter 32B, Section 18A:	Effective July 1, 2011.
Retiree Contributions:	Premium rates and retiree contributions as of July 1, 2018 are summarized below:

Non-Medicare Actives and Retirees	Active	Subscribers Retirees	Total	Monthly Premium as of July 1, 2018	Town Cost	Retiree Cost	Retiree Cost %
Fallon Health Direct Care							
• Individual	34	0	34	$566.29	$56.63	$96.27	17.0%
• Family	5	0	5	$1,422.99	$142.30	$241.91	17.0%
Fallon Health Select Care							
• Individual	5	0	5	$765.62	$76.56	$130.16	17.0%
• Family	11	2	13	$1,855.55	$185.56	$315.44	17.0%
Harvard Pilgrim Ind. Plan							
• Individual	124	50	174	$826.68	$82.67	$140.54	17.0%
• Family	211	40	251	$2,009.40	$200.94	$341.60	17.0%
Harvard Pilgrim Prim. Chc. Plan							
• Individual	187	11	198	$603.23	$60.32	$102.55	17.0%
• Family	131	5	136	$1,529.10	$152.91	$259.95	17.0%
Health New England							
• Individual	1	1	2	$603.23	$60.32	$102.55	17.0%
• Family	2	0	2	$1,529.10	$152.91	$259.95	17.0%
NHP Care							
• Individual	93	3	96	$580.43	$58.04	$98.67	17.0%
• Family	59	1	60	$1,496.10	$149.61	$254.33	17.0%
Tufts Health Plan Navigator							
• Individual	163	31	194	$743.45	$74.35	$126.39	17.0%
• Family	250	28	278	$1,811.87	$181.19	$308.02	17.0%
Tufts Health Plan Spirit							
• Individual	63	2	65	$564.24	$56.42	$95.92	17.0%
• Family	13	3	16	$1,355.43	$135.54	$230.42	17.0%
Unicare Basic w/ CIC							
• Individual	0	16	16	$1,058.39	$105.84	$179.93	35.0%
• Family	5	7	12	$2,343.45	$234.35	$398.39	35.0%
Unicare Indemnity Comm. Chc.							
• Individual	49	1	50	$502.16	$50.22	$85.37	17.0%
• Family	41	4	45	$1,236.52	$123.65	$210.21	17.0%
Unicare Indemnity PLUS							
• Individual	57	19	76	$696.09	$69.61	$118.34	17.0%
• Family	79	14	93	$1,654.54	$165.45	$281.27	17.0%
Non-Medicare Total	1,583	238	1,821				

Medicare Retirees	Subscribers: Active	Subscribers: Retirees	Monthly Premium as of July 1, 2018	Town Cost	Retiree Cost	Retiree Cost %
Harvard Pilgrim Medicare Enhance	N/A	376	$382.59	$317.55	$65.04	17.0%
Tufts Health Plan Medicare Complement	N/A	74	$361.73	$300.24	$61.49	17.0%
UniCare Indemnity OME with CIC	N/A	462	$379.67	$315.13	$64.54	17.0%
Tufts Health Plan Medicare Preferred	N/A	26	$332.01	$275.57	$56.44	17.0%
Medicare Total		938				
Retiree Total		1,176				

Notes: 83 of 1,021 over-65 retirees are in a non-Medicare plan.
In addition, there are 520 spouses of retirees covered under and individual or family policy.

Plan Changes Since the Prior Valuation:	None.

EXHIBIT IV – DEFINITION OF TERMS

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

Assumptions or Actuarial Assumptions:	The estimates on which the cost of the Plan is calculated including: (a) Investment return — the rate of investment yield that the Plan will earn over the long-term future; (b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates; (c) Retirement rates — the rate or probability of retirement at a given age; (d) Turnover rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.
Actuarial Accrued Liability (AAL):	Present value of all future benefit payments for current retirees and active employees taking into account assumptions about demographics, turnover, mortality, disability, retirement, health care trends, and other actuarial assumptions.
Unfunded Actuarial Accrued Liability (UAAL):	The extent to which the actuarial accrued liability of the Plan exceeds the assets of the Plan. There are many approaches to paying off the unfunded actuarial accrued liability, from meeting the interest accrual only to amortizing it over a specific period of time.
Normal Cost:	The amount of contributions required to fund the benefit allocated to the current year of service.
Actuarially Determined Contribution:	A target or recommended contribution to an OPEB plan for the reporting period based on the most recent measurement available.
Valuation Date:	The date at which the actuarial valuation is performed
Covered Employee Payroll:	The payroll of the employees that are provided OPEB benefits
Entry Age Actuarial Cost Method:	An actuarial cost method where the present value of the projected benefits for an individual is allocated on a level basis over the earnings or service of the individual between entry age and assumed exit age
Healthcare Cost Trend Rates:	The rate of change in per capita health costs over time
Discount Rate:	The interest rate used to determine the actuarial present value of projected benefit payments.
Expected Return on Assets:	The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Real Rate of Return:	The rate of return on an investment after removing inflation