



**MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
RETIREMENT FUND**

Financial Statements and Required Supplementary Information

December 31, 2016 and 2015

(With Independent Auditors' Report Thereon)

**MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
RETIREMENT FUND**

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KPMG LLP
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Independent Auditors' Report

The Retirement Board and Participants
Massachusetts Bay Transportation Authority Retirement Fund:

We have audited the accompanying financial statements of the Massachusetts Bay Transportation Authority Retirement Fund (the Fund), which comprise the statements of fiduciary net position as of December 31, 2016 and 2015, and the related statements of changes in fiduciary net position for the years then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements

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

Auditors' Responsibility

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

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

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

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the Massachusetts Bay Transportation Authority Retirement Fund as of December 31, 2016 and 2015 and the changes in fiduciary net position for the years then ended in accordance with U.S. generally accepted accounting principles.



Other Matters

Required Supplementary Information

U.S. generally accepted accounting principles require that the Management's Discussion and Analysis and the required supplementary information as listed in the accompanying table of contents (collectively referred to as RSI) be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the RSI in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

KPMG LLP

July 19, 2017

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Required Supplementary Information
Management's Discussion and Analysis

December 31, 2016

(Unaudited)

This section presents Management's Discussion and Analysis (MD&A) of the Massachusetts Bay Transportation Authority Retirement Fund's (the Fund or MBTARF) financial activity and performance as of and for the years ended December 31, 2016 and 2015. The MD&A is unaudited and is intended to serve as an introduction to the Fund's basic financial statements, as well as to offer readers of the Fund's financial statements a narrative view and analysis of MBTARF's financial activities.

Financial Reporting Structure

The financial statements include the statements of fiduciary net position and changes in fiduciary net position. They present the financial position of the Fund as of December 31, 2016 and 2015 and its financial activities for the years then ended. The notes to the financial statements provide further information that is essential to a full understanding of the financial statements. The notes describe the significant accounting policies of the Fund and provide detailed disclosures on certain account balances. The required supplementary schedules include the schedules of changes in net pension liability and related ratios, investment returns, contributions and related notes as prescribed by the Governmental Accounting Standards Board (GASB).

The Fund's financial statements are prepared on an accrual basis of accounting. This method of accounting requires recognizing and recording financial transactions when they occur and not just in conjunction with the inflows and outflows of cash.

The total assets managed by the Fund are held in the trust for the payment of pension and related benefits to its members. The Fund's Board of Trustees, in its fiduciary capacity, with assistance from its consultants established the Fund's investment policies and oversees their implementation.

Financial Highlights

Year ended December 31, 2016

The net position of the Fund decreased \$12.2 million, or (0.8%), from \$1,497.8 million as of December 31, 2015 to \$1,485.6 million as of December 31, 2016.

Net investment income increased \$82.1 million, or 1746.8%, from \$4.7 million for the year ended December 31, 2015 to \$86.8 million for the year ended December 31, 2016. The Fund had a 6.88% rate of return for the year ended December 2016 compared to a 0.90% rate of return for the year ended December 31, 2015. The returns identified in the MD&A are gross of fees with the exception of hedge funds, which are net of fees.

The total contributions received during the year ended December 31, 2016 were \$105.0 million compared to total contributions received during the year ended December 31, 2015 of \$99.9 million.

Employer contributions during the year ended December 31, 2016 increased \$3.8 million or 5.2% to \$77.2 million from \$73.4 million during the year ended December 31, 2015. This increase is primarily due to the continued execution of the wage agreement that was applied retroactively going back to July 2010.

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Member contributions were \$27.8 million during the year ended December 2016, an increase of \$1.3 million or 4.9% over year ended December 31, 2015 member contributions of \$26.5 million. The change in member contributions is also due to the continued implementation of the 2010 wage agreement.

Benefits paid during the year ended December 31, 2016 were \$195.7 million an increase of \$8.6 million, or 4.6%, over the benefits paid during the year ended December 31, 2015 of \$187.1 million. This increase is primarily due to the increased number of retirees and lengthening life span as well as the continued application of the wage agreement for members who retired after July 1, 2010.

Year ended December 31, 2015

The net position of the Fund decreased \$90.1 million, or 5.67%, from \$1,587.9 million as of December 31, 2014 to \$1,497.8 million as of December 31, 2015.

Net investment income decreased \$68.8 million, or 93.6%, from \$73.5 million for the year ended December 31, 2014 to \$4.7 million for the year ended December 31, 2015. The Fund had a 0.90% rate of return for the year ended December 2015 compared to a 5.51% rate of return for the year ended December 31, 2014. The returns identified in the MD&A are gross of fees with the exception of hedge funds, which are net of fees.

The total contributions received during the year ended December 31, 2015 were \$99.9 million compared to total contributions received during the year ended December 31, 2014 of \$95.9 million.

Employer contributions during the year ended December 31, 2015 increased \$2.8 million or 4.0% to \$73.4 million from \$70.6 million during the year ended December 31, 2014. This increase is primarily due to the continued execution of the new wage agreement that was applied retroactively going back to July 2010.

Member contributions were \$26.5 million during the year ended December 2015, an increase of \$1.2 million or 4.7% over year ended December 31, 2014 member contributions of \$25.3 million. The change in member contributions is also due to the continued implementation of the new wage agreement.

Benefits paid during the year ended December 31, 2015 were \$187.1 million an increase of \$4.6 million, or 2.5%, over the benefits paid during the year ended December 31, 2014 of \$182.5 million. This increase is primarily due to the increased number of retirees and lengthening life span as well as the continued application of the wage agreement for members who retired after July 1, 2010.

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Financial Analysis

The following schedules report the condensed comparative fiduciary net position and activities for the Fund as of and for the years ended December 31.

Condensed Comparative Fiduciary Net Position

(Dollar values expressed in millions)

	December 31		
	2016	2015	2014
Cash	\$ 4.1	3.2	3.0
Receivables	6.8	5.1	5.8
Investments	1,481.8	1,495.9	1,585.9
Cash collateral on securities lending	52.5	66.2	105.9
Total assets	<u>1,545.2</u>	<u>1,570.4</u>	<u>1,700.6</u>
Cash collateral on securities lending	52.5	66.2	105.9
Accounts payable and accrued expenses	5.6	5.1	4.3
Payable for investments purchased	1.5	1.3	2.5
Total liabilities	<u>59.6</u>	<u>72.6</u>	<u>112.7</u>
Net position – restricted for pension benefits	<u>\$ 1,485.6</u>	<u>1,497.8</u>	<u>1,587.9</u>

Total assets were \$1,545.2 million as of December 31, 2016, a decrease of \$25.2 million, or 1.60%, over the year ended December 31, 2015. Investments were valued at \$1,481.8 million, a decrease of \$14.1 million, or (0.9%), over the year ended December 31, 2015. This small investment loss is due to weak corporate revenues and earnings in the first half of the year, although improvements occurred in the third and fourth quarters. The international markets underperformed in the fourth quarter and emerging markets also trended down in the latter part of the year. Fixed income had a turbulent end to 2016 largely due to a spike in interest rates. Cash collateral on securities lending decreased by \$13.7 million or 20.7%. Receivables increased by \$1.7 million, or 33.3%, over the prior calendar year due to increased pending investment sales at the end of the calendar year.

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Total liabilities as of December 31, 2016 decreased by \$13.0 million, or 17.9%, over the prior year. The cash collateral on securities lending decreased by \$13.7 million, or 20.7%, in calendar year 2016. Payable for investment purchased increased by \$0.2 million, or 15.4%.

Condensed Comparative Fiduciary Net Position

(Dollar values expressed in millions)

	December 31		
	2016	2015	2014
Additions:			
Employer contributions	\$ 77.2	73.4	70.6
Member contributions	27.8	26.5	25.3
Income from investments	86.8	4.7	73.5
Total additions	191.8	104.6	169.4
Deductions:			
Retirement benefits	195.7	187.1	182.5
Refunds of contributions	1.8	1.8	1.6
Administrative expense	6.5	5.8	4.0
Total deductions	204.0	194.7	188.1
Total changes in fiduciary net position	\$ (12.2)	(90.1)	(18.7)

Additions to Plan Fiduciary Position

For the calendar year ended December 31, 2016, employer contributions increased by \$3.8 million and member contributions increased by \$1.3 million. Effective July 1, 2016, the employer's contribution rate changed from 16.0286% to 18.0386% and the member contribution rate changed from 5.7914% to 6.4614%, resulting in a 12.5% and 11.6% increase, respectively.

Contributions are required to provide benefits and meet administrative expenses and are made jointly by the Massachusetts Bay Transportation Authority (the Authority) and members. The contribution percentage is negotiated periodically as part of the collective bargaining agreement. The Fund's investment portfolio has been a major source of additions to the Fund's net position. There was a net investment gain in 2016 of \$86.8 million compared to a \$4.7 million net investment gain in 2015. This is primarily the result of a change in the fair value of the investment portfolio.

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Deductions from Fiduciary Net Position

Benefits paid increased by \$8.6 million, or 4.6%, over the year ended 2016. This increase is primarily due to the increased number of retirees and lengthening life span as well as the continued application of the wage agreement for members who retired after July 1, 2010. Administrative expenses increased from \$5.8 million to \$6.5 million, an increase of \$0.7 million, or 12%. As more fully detailed in the Fund's 2015 Comprehensive Annual Financial Report, see link at Fund's website (www.mbtarf.com), during 2015 and 2016 the Fund engaged FTI Consulting ("FTI") and counsel to investigate the Fund's financial performance for fiscal years 2011-2013. The investigation was prompted by allegations published in *The Boston Globe* on June 28, 2015, citing a report authored by, among others, Harry Markopolos, questioning the accuracy of the Fund's financial reporting. Although the years in question, 2011-2013, are not directly related to the reporting period covered here, the allegations triggered legal activity resulting in an extraordinary increase in legal fees in both 2015 and 2016.

Net Pension Liability (NPL)

The Fund retains an independent actuarial firm, Conduent HR Consulting, LLC, formerly known as Buck Consultants, to conduct annual actuarial valuations to monitor net pension liability.

As of December 31, 2016, and 2015, the fiduciary net position as a percentage of the total pension liability was 56.44% and 59.63%, respectively.

Investment Performance 2016

The Fund began the calendar year 2016 with a net position of \$1,497.8 million and ended the calendar year with a net position of \$1,485.6 million, representing a (0.8%) decrease. The Fund invests strategically to achieve the actuarial rate of return while controlling risk through diversification of asset class exposure. The primary determinant of long-term investment performance is the strategic asset allocation policy.

Domestic equity (33.3%), international equity (12.8%), fixed income investments (24.7%), and cash equivalents (3.5%) comprise approximately (74.3%) of invested assets as of December 31, 2016. The remaining (25.7%) of assets are invested in real estate (8.6%), and alternative investments (17.1%), which include private equity, absolute return, and diversified beta. These assets are expected to earn enhanced returns and manage risk through further diversification.

Investment performance results are measured by the relationship of the Fund's portfolio returns for equity and fixed income investment against widely accepted market indices. For the calendar year ended December 31, 2016, the MBTA Retirement Fund's total fund return was 6.88% compared to 0.90% for the calendar year ended December 31, 2015. The 2016 increase in return is due to the markets closing out the year with strong gains.

The domestic large cap equity returned 10.39% compared to the S&P 500 Index of 11.96%. The domestic small cap equity returned 18.63% compared to the Russell 2000 Growth Index of 11.32% and the Russell 2000 Value Index of 31.74%. The global equity and emerging markets returned 1.63% compared to MSCI All

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Country World Index of 7.86%. The international equity returned (0.96)% compared to the MSCI EAFE Index of 1.00%. Fixed Income returned 5.55% compared to the BC Aggregate of 2.65%.

The total fund performance of 6.88% for calendar year 2016 underperformed by 0.54% the total fund custom index (a blended composition of major market indices in proportion to the Fund's asset allocation), which returned 7.42%.

Additionally, for the year ended December 31, 2016, the real estate portfolio returned 9.18% compared to the NCREIF Property Index of 7.97%. The hedge fund portfolio returned 0.39% compared to the CSFB/Tremont Hedge Fund Index of 1.25%. The private equity active portfolio returned 4.84% and the legacy private equity portfolio returned (4.70)% compared to State Street's Customized Benchmark return of 10.61%. State Street Customized Benchmark consists of 36% buyout, 9% venture, 37% debt and 18% fund of funds. Diversified Beta returned 12.90% compared to the 91 Treasury Bill Plus 300 Basis Points return of 3.34%.

Investment Performance 2015

The Fund began the calendar year 2015 with a net position of \$1,587.9 million and ended the calendar year with a net position of \$1,497.8 million, representing a 5.7% decrease. The Fund invests strategically to achieve the actuarial rate of return while controlling risk through diversification of asset class exposure. The primary determinant of long-term investment performance is the strategic asset allocation policy.

Domestic equity (31.3%), international equity (13.9%), fixed income investments (23.1%), and cash equivalents (4.1%) comprise approximately (72.4%) of invested assets as of December 31, 2015. The remaining (27.6%) of assets are invested in real estate (8.7%), and alternative investments (18.9%), which include private equity, absolute return, and diversified beta. These assets are expected to earn enhanced returns and manage risk through further diversification.

Investment performance results are measured by the relationship of the Fund's portfolio returns for equity and fixed income investment against widely accepted market indices. For the calendar year ended December 31, 2015, the MBTA Retirement Fund's total fund return was 0.90% compared to 5.51% for the calendar year ended December 31, 2014. The 2015 decrease in return was primarily due to the poor domestic and global market conditions.

The domestic large cap equity returned (0.16)% compared to the S&P 500 Index of 1.38%. The domestic small cap equity returned (1.62)% compared to the Russell 2000 Growth Index of (1.38)% and the Russell 2000 Value Index of (7.47)%. The global equity and emerging markets returned 1.40% compared to MSCI All Country World Index of (2.36)%. The international equity returned 2.02% compared to the MSCI EAFE Index of (0.81)%. Fixed Income returned (0.60)% compared to the BC Aggregate of 0.55%.

The total fund performance of 0.90% for calendar year 2015 underperformed by 1.11% the total fund custom index (a blended composition of major market indices in proportion to the Fund's asset allocation), which returned 2.01%.

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Additionally, for the year ended December 31, 2015, the real estate portfolio returned 13.94% compared to the NCREIF Property Index of 13.33%. The hedge fund portfolio returned (4.31)% compared to the CSFB/Tremont Hedge Fund Index of (0.71)%. The private equity active portfolio returned 6.83% and the legacy private equity portfolio returned (6.52)% compared to State Street's Customized Benchmark return of 5.40%. State Street Customized Benchmark consists of 36% buyout, 9% venture, 37% debt and 18% fund of funds. Diversified Beta returned (3.15)% compared to the 91 Treasury Bill Plus 300 Basis Points return of 3.1%.

Other Information

For historical information on the Fund's investments in Weston Capital Partners Fund II and White Oak Global Advisors, LLC, which were written down to zero in prior fiscal years. Please refer to the Fund's website, www.mbtarf.com.

Contacting the MBTA Retirement Fund

This financial report is designed to provide a general overview of the Fund's investment results and financial condition of the Fund for the years ended December 31, 2016 and 2015. Please contact the MBTA Retirement Fund Office by emailing invest@mbtarf.com or by phone to 617-316-3800 for additional financial information or questions related to this report.

**MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
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Statement of Fiduciary Net Position
Years ended December 31, 2016 and 2015

	2016	2015
Assets:		
Investments, at fair value:		
Domestic:		
Cash and cash equivalents	\$ 51,979,952	61,253,644
Fixed income	361,903,673	339,671,431
Common stock and equity funds	493,719,994	468,588,759
Real estate	128,148,179	130,266,856
Alternative investments and hedge funds	252,222,874	283,054,021
	1,287,974,672	1,282,834,711
International:		
Cash and cash equivalents	121,317	58,048
Fixed income	4,720,170	5,320,012
Common stock and equity funds	188,951,235	207,659,261
	193,792,722	213,037,321
Total investments	1,481,767,394	1,495,872,032
Cash and cash equivalents	4,125,256	3,233,915
Contribution receivable from Massachusetts Bay Transportation Authority	2,289,769	1,974,341
Cash collateral on securities lending, invested	52,541,468	66,204,476
Receivable for investments sold and other	4,549,186	3,125,680
Total assets	1,545,273,073	1,570,410,444
Liabilities:		
Cash collateral on securities lending, due to borrowers	52,541,468	66,204,476
Accounts payable and accrued expenses	5,588,301	5,056,524
Payable for investments purchased	1,537,420	1,301,409
Total liabilities	59,667,189	72,562,409
Net position – restricted for pension benefits	\$ 1,485,605,884	1,497,848,035

See accompanying notes to financial statements.

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Statement of Changes in Fiduciary Net Position

Years ended December 31, 2016 and 2015

	2016	2015
Additions:		
Contributions by Massachusetts Bay Transportation Authority	\$ 77,239,279	73,373,672
Contributions by members	27,791,543	26,510,946
Total contributions	105,030,822	99,884,618
Investment income:		
Income from investments and other income	47,108,793	56,657,660
Less investment expenses, other than from securities lending	(6,641,836)	(6,611,956)
Net appreciation (depreciation) in fair value of investments	45,975,643	(45,625,486)
Net investment gain	86,442,600	4,420,218
Securities lending activity:		
Securities lending income	930,242	605,634
Less borrower rebates and fees	590,499	314,606
Net income from securities lending activities	339,743	291,028
Total net investment income	86,782,343	4,711,246
Total additions	191,813,165	104,595,864
Deductions:		
Retirement benefits	195,707,470	187,148,675
Refunds of members' contributions	1,854,069	1,757,557
Administrative expenses	6,493,777	5,808,086
Total deductions	204,055,316	194,714,318
Net change in net position	(12,242,151)	(90,118,454)
Net position – restricted for pension benefits:		
Beginning of year	1,497,848,035	1,587,966,489
End of year	\$ 1,485,605,884	1,497,848,035

See accompanying notes to financial statements.

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Notes to Financial Statements

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(1) Description of the Fund

(a) General

The following description of the Massachusetts Bay Transportation Authority Retirement Fund (the Fund), a single employer plan, provides only general information. Employees (members) should refer to the Pension Agreement for a more complete description of the Fund's provisions.

The Fund was established on January 1, 1948, under an agreement and declaration of trust (restated in October 28, 1980) by and among the Massachusetts Bay Transportation Authority (the Authority), Local 589, Amalgamated Transit Union, Boston Carmen's Union, and AFL-CIO (collectively, the Union). The Fund was established as a contributory defined benefit retirement plan in accordance with the Pension Agreement, effective July 1, 1970, adopted by the Authority and the Union for the purpose of receiving contributions and providing pension benefits for its members and qualified beneficiaries.

The general administration and responsibility for the operation of the Fund are vested in a seven-member Retirement Board. The Board consists of three members appointed by the Authority (at least one of whom must be a member of the Authority's Board of Directors), two members appointed by the Boston Carmen's Union, Local Union 589 of the Amalgamated Transit Union, AFL-CIO, one member elected by vote conducted by the Authority for a term of three years by members of the Fund who are not members of the Boston Carmen's Union, Local Union 589 of the Amalgamated Transit Union, AFL-CIO, and one member, who has no vote and is known as the honorary member, who is elected, for such period as the Retirement Board may determine, by the other six members of the Retirement Board.

(b) Membership

The Fund covers all employees of the Authority except the MBTA Police, who are covered separately, and certain executives who elect coverage under an alternate plan. At December 31, 2016 and 2015, Fund membership consisted of:

	<u>2016</u>		<u>2015</u>
Retired members or beneficiaries currently receiving benefits	6,684	(1)	6,472
Active members	5,786		5,885
Active members not presently earning service credit	<u>233</u>		<u>88</u>
Total membership	<u>12,703</u>		<u>12,445</u>

(1) Year 2016 includes 6,566 retirees and beneficiaries and 118 individuals receiving payments under QDROs

(2) Year 2015 includes 6,371 retirees and beneficiaries and 101 individuals receiving payments under QDROs

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(c) Funding Policy

Contributions required to provide benefits and meet administrative expenses are made jointly by the Authority and members. The member contribution rate was increased from 5.7914% to 6.4614% effective July 1, 2016 of pretax compensation. The Authority contribution rate was increased from 16.0286% to 18.0386% effective July 1, 2016. As of July 1, 2017, member contribution and Authority contribution rates will be 7.1189% and 20.0111%, respectively. These contribution rates were calculated based on the most recent actuarial valuation of plan benefits and the Memorandum of Understanding with the Authority. The terms of the Fund's obligations are part of the Pension Agreement contained in the annual report of the Fund. Only parties to the Pension Agreement can amend the terms. The contributions by members and the Authority have been developed to provide normal contributions, interest on the unfunded accrued liability, and administrative expenses.

(d) Benefits

The Fund provides for retirement, disability and death benefits in accordance with the Pension Agreement, as amended.

A summary of benefits is as follows:

(i) Normal Retirement Allowance

Condition for Allowance

Any member may retire at age 65. A member may remain in service after the stated retirement date.

Amount of Allowance

The normal retirement allowance equals 2.46% of 3-year average annual compensation multiplied by the years of service, such allowance not to exceed 75% of such average annual compensation.

(ii) Early Normal Retirement Allowance

Condition for Allowance

Any member hired prior December 6, 2012 and has completed at least 23 years of service may retire on an early normal retirement allowance.

Any member hired on or after December 6, 2012, has attained age 55 and completed at least 25 years of service may retire on an early normal retirement allowance.

Amount of Allowance

The early normal retirement allowance is computed in the same manner as a normal retirement allowance on the basis of the compensation and service to the time of retirement.

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(iii) *Early Reduced Retirement Allowance*

Condition for Allowance

A member who has attained age 55 and has completed at least 20 years of service may be retired on an early reduced retirement allowance.

Amount of Allowance

The early reduced retirement allowance is an immediate allowance, commencing at the date of retirement, and is computed in the same manner as a normal retirement allowance on the basis of compensation and service to the time of early retirement, but reduced by 1/2 of 1% for each month of retirement prior to normal retirement date.

(iv) *Disability Retirement Allowance*

Condition for Allowance

Any member who has completed 4 years of service in case of disablement due to an occupational accident or sickness, or who has completed 6 years of service in case of disablement due to any other cause, and who has become totally and permanently incapacitated, mentally or physically, for the further performance of duty may be retired.

Amount of Allowance

Upon disability retirement, a member receives an allowance commencing immediately, which is computed as a normal retirement allowance on the basis of the compensation and service to the time of disability retirement and is not less than 15% of the member's 3-year average annual compensation.

(v) *Vested Retirement Allowance*

Condition for Allowance

Any member who has completed 10 years of service and who is not eligible for a retirement allowance is eligible for a vested retirement allowance, in lieu of a refund of his/her contributions with interest, in the event his/her employment terminates for reasons other than voluntary quit or discharge for cause.

Amount of Allowance

The vested retirement allowance is a deferred allowance commencing on the member's normal retirement date and equal to a percentage, not exceeding 100%, of the amount computed as a normal retirement allowance on the basis of the compensation and service to the time of termination; the applicable percentage is 5% multiplied by the number of years of creditable service, not in excess of 20, at the time of termination.

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(vi) Survivor Benefit

Condition for Benefit

Upon the death of a member who has completed 10 years of service and who is survived by a spouse and/or dependent children designated to receive the deceased member's contributions with interest, a benefit may be elected by such survivor in lieu of the payment of the contributions with interest.

Amount of Benefit

If the deceased member had completed at least 10 but fewer than 23 years of service, the survivor's benefit, payable for life, is equal to the amount which would have become payable if the member had retired as of the date of his/her death and elected a 50% joint and survivor option in effect as of the date of death with the survivor as the designated person under the option. There is no reduction for early commencement.

If the deceased member had completed at least 23 years of service, the survivor's benefit, payable for life, is equal to the amount which would have become payable if the member had retired as of the date of his/her death and elected a 100% joint and survivor option in effect as of the date of death with the survivor as the designated person under the option. There is no reduction for early commencement.

(vii) Accidental Death Benefit

Condition for Benefit

Upon the death of a member in service whose death results solely from an injury or injuries sustained in the performance of duty, and who is survived by a spouse designated to receive the deceased member's contribution with interest, an allowance shall be payable to said spouse.

Amount of Benefit

The accidental death benefit, payable for life, is equal to the amount which would have become payable to the member if the member had retired as of the date of his/her death on a disability retirement allowance. If there should be insufficient creditable service, the surviving spouse receives the minimum allowance available under the disability retirement provision.

(e) Fund Termination

In the event of termination of the Fund, all of the assets of the Fund shall be used for the benefit of members and retired members or their beneficiaries, and for no other purpose. Each member, and each retired member or their designated beneficiary in receipt of a retirement allowance, shall be entitled to such proportionate part of the assets of the Fund as the reserve, required for their benefits, bears to the total reserves required under the Fund as determined by the Massachusetts Bay Transportation Authority Retirement Board (the Retirement Board) on the basis of actuarial valuation. The Retirement Board may require all such members, and retired members or designated beneficiaries, to withdraw such amounts in cash or in the form of immediate or deferred annuities as it may determine.

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(2) Significant Accounting Policies

(a) Basis of Accounting

The financial statements have been prepared on the accrual basis of accounting in conformity with U.S. generally accepted accounting principles (GAAP), as promulgated by the Governmental Accounting Standards Board (GASB).

(b) Use of Estimates

The preparation of financial statements in conformity with GAAP requires the Fund's management to make estimates and assumptions that affect the amounts reported in the financial statements and accompanying notes. Significant items subject to such estimates and assumptions include, but are not limited to, the assessment of fair values for real estate and alternative investment holdings in the absence of readily available market values, and these estimates may be materially different than values that would have been used had a ready market existed for these investments.

(c) Cash and Cash Equivalents

Cash and cash equivalents generally consist of cash on deposit with banks and financial institutions and highly liquid short-term investments, which have original maturities of three months or less. The Fund maintains its cash deposits with financial institutions, which management considers being of high credit quality and, by policy, limits the allocation of funds to any single major financial institution to minimize the Fund's amount of credit exposure.

(d) Revenue Recognition

Contributions are recognized pursuant to the contractual requirements of the Pension Agreement. Investment income is recognized as it is earned. Net appreciation (depreciation) in the fair value of investments is recorded as an increase (decrease) to investment income based on the valuation of investments as of the date of the financial statements.

(e) Retirement Benefits and Refunds

Retirement benefits and refunds are recognized when they become due and payable.

(f) Investments

Investments are stated at fair value. Securities traded on national security exchanges are valued on the basis of the closing price as of the last business day of the reporting period. Securities traded in the over-the-counter market are normally valued at the mean of the closing bid and asked prices. Securities listed or traded on certain foreign exchanges whose operations are similar to the U.S. over-the-counter market are valued at the price within the limits of the latest available current bid and asked prices deemed best to reflect current value. Gains and losses on sales of investments are determined on the basis of average cost.

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Investments in real estate represent the Fund's percent ownership in private real estate funds and limited partnerships. The Fund's investments are valued based on estimates by the Fund's management as a result of their review of financial information of the underlying real estate investment assets and standards established by the real estate industry, generally using the net asset value of the underlying investment as a practical expedient.

Investments in alternative investments and hedge funds include the Fund's percent ownership in venture capital, leveraged buyouts, private placements, hedge fund-of-funds, and other investments where the structure, risk profile, and return potential differ from traditional equity and fixed income investments. These investments are included in the statement of fiduciary net position at estimated values determined in good faith by the Fund's management, generally using the net asset value of the underlying investment as a practical expedient.

Purchase and sales of investments are selected on a trade-date basis.

(g) Derivatives

A derivative is an investment agreement or security with a value that depends on, or is derived from, the value of an underlying asset, reference rate, or financial index. The Fund has classified its investment in forward exchange contracts as investment derivative instruments. A forward exchange contract is a commitment to purchase or sell a foreign currency at a future date at a negotiated forward rate. The Fund utilizes forward foreign exchange contracts to minimize the effect of fluctuating foreign currencies. Risk associated with such contracts includes movement in the value of a foreign currency relative to the U.S. dollar. Realized gain or loss on forward exchange contracts is the difference between the original contract and the closing value of such contract and is included in the statement of changes in fiduciary net position. At December 31, 2016 and 2015, the Fund held open forward exchange contracts of varying amounts and currencies. Unrealized gains and losses are not significant to the financial statements.

(h) Currency Translation

As a result of having assets and liabilities denominated in foreign currencies, the Fund is exposed to the effect of foreign exchange rate fluctuations. Assets and liabilities denominated in foreign currencies and commitments under forward foreign exchange contracts and currency options are translated into U.S. dollars at the mean of the quoted bid and asked prices of such currencies against the U.S. dollar. Changes in foreign exchanges are reflected directly in income. Purchases and sales of portfolio securities are translated at the rates of exchange prevailing when such securities were acquired or sold. Income and expenses are translated at rates of exchange prevailing when accrued. It is not practical to isolate that portion of the results of operations arising as a result of changes in the foreign exchange rates from the fluctuations arising from changes in the market price of securities during the period. Net realized gains on foreign currency transactions represent net foreign exchange gains from holding foreign currencies, currency gains or losses realized between the trade and settlement dates on security transactions, and the difference between the amounts of dividends, interest, and foreign taxes recorded on the Fund's books and the U.S. dollar equivalent amounts actually received or paid.

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(i) Income Taxes

The Fund is considered a qualified governmental plan under Internal Revenue Code Section 414(d) and, is generally exempt from federal and state income tax under the Internal Revenue Code Section 115.

(3) Cash Deposits, Investments, and Securities Lending

The Fund, in accordance with the declaration of trust agreement, is authorized to make deposits into checking and savings accounts and to invest in any form or type of investment, financial instrument, or financial transaction deemed prudent in the informed opinion of the Retirement Board. State Street Bank & Trust Company serves as the master custodian for the Fund's assets.

For the years ended December 31, 2016 and 2015, the Fund's essential risk information about deposits and investments is presented on the following tables.

(a) Custodial Credit Risk

Custodial credit risk is the risk that, in the event of failure of a depository financial institution, the Fund's deposits may not be returned. The Fund maintains its cash and cash equivalent deposits with various financial institutions, which management considers being of high quality. The Fund limits the allocation of its cash and cash equivalent deposits to any single financial institution to minimize the Fund's exposure. The Fund's Board has not adopted a formal custodial credit risk policy.

The Fund's cash and cash equivalent deposits that are not collateralized are subject to the Federal Deposit Insurance Corporation (FDIC) insurance limits. At December 31, 2016 and 2015, \$3,717,265 and \$2,825,925 of the Fund's cash and cash equivalents deposits were in excess of the FDIC insurance limit.

Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the Fund and are held by either the depository financial institution or the depository financial institution's trust department or agent but not in the Fund's name.

All of the Fund's investments are held by the Fund's custodian in the Fund's name, except for investments in hedge funds, real estate and alternative investments, which by their nature are not required to be categorized.

(b) Investment Policy

The Fund's investment objective is to achieve consistent positive real returns and to maximize long-term total return within prudent levels of risk through a combination of income and capital appreciation. The Fund's goal is to meet or exceed the Fund's actuarial target rate of return in order to maintain and improve upon its funded status.

The Fund is currently invested in stocks (domestic and foreign), fixed income securities (domestic), real estate, private equity, and hedge funds.

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The following was the Board's adopted asset allocation policy as of December 31, 2016 and 2015:

Asset class	Target
Domestic equity	25 %
International equity	11
Global/emerging markets	7
Fixed income	25
Real estate	9
Private equity	10
Hedge funds	8
Risk parity/diversified beta	3
Cash	2
Total	100 %

(c) Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. The following is a listing of the Fund's fixed income investments and related maturity schedule (in years) as of December 31, 2016 and 2015. Certain reclassifications have been made to the 2015 schedules in order to conform with the current year presentation.

Investment type	2016				
	Fair value	Less than 1	1-5	6-10	More than 10
U.S. agencies	\$ 58,697,800	—	56,882,343	1,127,001	688,456
U.S. Treasury notes and bonds	51,315,015	5,091,909	23,841,602	14,124,509	8,256,995
Domestic corporate	196,288,631	563,181	65,773,818	92,249,194	37,702,438
International corporate	4,720,170	1,057,410	2,585,014	899,870	177,876
Asset backed:					
CMOs	14,567,352	—	—	768,983	13,798,369
Mortgage backed	21,989,332	—	—	—	21,989,332
Other	19,045,543	—	7,802,007	1,731,873	9,511,663
	\$ 366,623,843	6,712,500	156,884,784	110,901,430	92,125,129

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Investment type	Fair value	2015			
		Less than 1	1-5	6-10	More than 10
U.S. agencies	\$ 70,163,455	—	66,159,721	1,133,565	2,870,169
U.S. Treasury notes and bonds	25,945,505	2,381,219	15,098,668	4,910,838	3,554,780
Domestic corporate	190,400,467	124,801	53,236,982	93,908,201	43,130,484
International corporate	5,320,012	1,446,327	2,818,135	765,144	290,405
Asset backed:					
CMOs	16,477,835	—	—	—	16,477,835
Mortgage backed	17,829,008	35,096	495,466	—	17,298,446
Other	18,855,161	—	4,868,944	1,270,984	12,715,233
	<u>\$ 344,991,443</u>	<u>3,987,443</u>	<u>142,677,916</u>	<u>101,988,732</u>	<u>96,337,352</u>

The Fund's guidelines limit its effective exposure to interest rate risk by benchmarking the separately managed fixed income investment accounts to an intermediate duration benchmark with a weighted average duration of four to five years. The Fund further constrains its actively managed fixed income portfolios to maintain a duration that shall not exceed 1.5 times the benchmark duration. The manager of each fixed income portfolio is responsible for determining the maturity and commensurate returns of his/her portfolio. Fixed income managers are also expected to report risk statistics and give a description of portfolio characteristics, including quality, duration, allocation by security type, and yield to maturity.

The collateralized mortgage obligations (CMOs) held by the Fund at December 31, 2016 and 2015 are highly sensitive to changes in interest rates.

(d) Credit Risk

Credit risk exists when there is a possibility the issuer or other counterparty to an investment may be unable to fulfill its obligations.

The Fund's Board does not have a formal investment policy governing credit risk; each fixed income securities investment manager is given a specific set of guidelines to invest within based on the mandate for which it was hired. The Fund expects all investment managers to perform their fiduciary duties as prudent people would and conform to all state and federal statutes governing the investment of the funds. Managers are to adhere to the philosophy and style that was articulated to the Retirement Board at the time of hire. The fixed income investment managers have full discretion to invest in fixed income securities in order to exceed their strategy specific benchmarks.

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The Fund's fixed income investments as of December 31, 2016 and 2015 were rated by Standard and Poor's and/or an equivalent national rating organization, and the ratings are presented below using the Standard & Poor's rating scale:

Investment type	2016								
	Fair value	AAA	AA	A	BBB	BB	B	CCC	Not rated
U.S. agencies	\$ 58,697,801	—	2,174,927	1,917,252	54,198,969	—	406,653	—	—
Domestic corporate	196,288,631	—	1,381,445	66,385,908	52,552,153	9,879,528	47,538,616	—	18,550,981
International	4,720,170	982,740	—	1,426,190	535,558	—	193,192	—	1,582,490
Asset backed:									
CMOs	14,567,350	5,846,549	—	1,587,211	162,030	—	—	—	6,971,560
Mortgage backed	21,989,332	—	—	—	—	—	—	—	21,989,332
Other	19,045,544	5,218,413	42,908	2,295,983	2,077,487	—	13,126	219,893	9,177,734
Total credit securities risk	315,308,828	12,047,702	3,599,280	73,612,544	109,526,197	9,879,528	48,151,587	219,893	58,272,097
U.S. government fixed income securities*	51,315,015								
Total fixed income securities	\$ 366,623,843								

Investment type	2015								
	Fair value	AAA	AA	A	BBB	BB	B	CCC	Not rated
U.S. agencies	\$ 70,163,455	—	3,794,824	1,133,565	65,235,066	—	—	—	—
Domestic corporate	190,400,465	407,104	1,719,139	63,904,984	53,007,833	46,933,691	5,452,365	545,671	18,429,678
International	5,320,013	1,003,382	—	1,814,454	737,123	532,894	—	—	1,232,160
Asset backed:									
CMOs	16,477,835	3,523,654	3,038,384	3,862,165	585,238	—	—	—	5,468,394
Mortgage backed	17,829,008	—	—	—	—	—	—	—	17,829,008
Other	18,855,161	4,987,673	4,723	1,652,359	1,427,684	—	14,834	263,570	10,504,318
Total credit securities risk	319,045,937	9,921,813	8,557,070	72,367,527	120,992,944	47,466,585	5,467,199	809,241	53,463,558
U.S. government fixed income securities*	25,945,506								
Total fixed income securities	\$ 344,991,443								

* Obligations of the U.S. government or obligations explicitly guaranteed by the U.S. government are not considered to have credit risk.

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(e) Concentration Risk

Concentration of credit risk is the risk of loss that may be attributed to the magnitude of a government's investment in a single issuer. The Fund places a 5% limit on the individual exposure to any single issuer at the time of purchase. The Fund has no investments, at fair value, that exceed 5% of the Fund's total investments as of December 31, 2016. At December 31, 2015, the Fund had investments in individual commingled funds that represent more than 5% of the Fund's assets, but in each case, these investments are in institutional commingled funds that are invested in diversified portfolios.

(f) Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely affect the fair value of an investment or a deposit. The Fund's exposure to foreign currency risk is attributable to its investments in separately managed and commingled international equity mutual funds and trusts that are invested in diversified portfolios of international stocks that are denominated in foreign currencies. The Fund's combined policy target allocation to all non-U.S. securities is currently 18% of the Fund's total assets. Currency hedging is permitted for defensive purposes. Currency hedging shall be effected through the use of forward currency contracts, which are described more fully in note 2.

Risk of loss arises from changes in currency exchange rates. The Fund's exposure to foreign currency risk as of December 31, 2016 and 2015 are presented on the following tables:

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Currency	2016				
	Short-Term	Fixed Income	Equity	Total	
Argentine peso	\$ —	193,192	—	193,192	
Australian dollar	—	316,947	570,811	887,757	
Brazilian real	—	183,542	—	183,542	
Canadian dollar	51,988	—	1,457,584	1,509,572	
Colombian peso	—	775,532	—	775,532	
Danish krone	—	—	1,978,987	1,978,987	
Euro currency	2,550	—	37,658,553	37,661,103	
Hong Kong dollar	—	—	3,305,102	3,305,102	
Hungarian forint	—	—	—	—	
Indian rupee	—	982,740	—	982,740	
Indonesian rupiah	—	—	439,408	439,408	
Japanese yen	—	—	30,239,692	30,239,692	
Mexican peso	—	2,268,216	—	2,268,216	
New Israeli sheqel	—	—	588,947	588,947	
New Zealand dollar	—	—	607,909	607,909	
Pound sterling	2	—	17,616,494	17,616,496	
Singapore dollar	(8)	—	2,375,594	2,375,585	
South African rand	—	—	3,092,935	3,092,935	
South Korean won	18,264	—	1,018,818	1,037,082	
Swedish krona	—	—	533,901	533,901	
Swiss franc	48,521	—	8,167,398	8,215,919	
Thailand baht	—	—	5,500,658	5,500,658	
International equity pooled funds (various currencies)	—	—	73,798,445	73,798,445	
	Total securities subject to foreign currency risk	121,317	4,720,170	188,951,235	193,792,722
United States dollars (securities held by international investment managers)	—	—	19,590,078	19,590,078	
Total International Investment Securities	\$ 121,317	4,720,170	208,541,313	213,382,800	

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<u>Currency</u>	2015			
	<u>Short term</u>	<u>Fixed income</u>	<u>Equity</u>	<u>Total</u>
Australian dollar	\$ 13,919	550,929	598,296	1,163,144
Brazilian real	—	596,059	937,846	1,533,905
Canadian dollar	7,029	—	1,498,891	1,505,920
Chilean peso	—	278,027	—	278,027
Colombian peso	—	728,101	—	728,101
Danish krone	—	—	922,012	922,012
Euro currency	11,927	—	45,020,789	45,032,716
Hong Kong dollar	—	—	3,020,969	3,020,969
Indian rupee	—	1,003,382	—	1,003,382
Japanese yen	—	—	34,449,442	34,449,442
Mexican peso	—	2,163,514	—	2,163,514
New Zealand dollar	7	—	—	7
Norwegian krone	—	—	831,127	831,127
Pound sterling	25,151	—	23,662,844	23,687,995
Singapore dollar	—	—	2,467,125	2,467,125
South African rand	—	—	2,873,092	2,873,092
South Korean won	—	—	742,058	742,058
Swedish krona	15	—	3,122,044	3,122,059
Swiss franc	—	—	8,437,587	8,437,587
Thailand baht	—	—	4,101,191	4,101,191
International equity pooled funds (various currencies)	—	—	74,973,948	74,973,948
Total securities subject to foreign currency risk	58,048	5,320,012	207,659,261	213,037,321
United States dollars (securities held by international investment managers)	—	—	20,574,921	20,574,921
Total international investment securities	\$ 58,048	5,320,012	228,234,182	233,612,242

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(g) Securities Lending Transactions

The Fund participates in the State Street Bank and Trust Company securities lending program by lending securities to borrowers (subject to borrower limits and program guidelines) and earning additional income, which is included in net investment income in the statement of changes in fiduciary net position.

The Fund did not incur any losses on loaned securities during the year ended December 31, 2016 and 2015. The securities are monitored on a daily basis by the custodian to ensure that the loans are properly collateralized. The collateral value is required to be at least 102% of the fair value of loaned domestic investments and a collateral value of at least 105% of the fair value on loaned international investments. Collateral can consist of both cash and securities. Should the collateral percentage levels fall below the stated figures, the borrowers are required to provide additional collateral to proper levels. The indemnification that State Street Bank provides the Fund in regard to loan risk is that should a borrower default on returning a security from loan, the collateral held is used to buy the security to be returned to the Fund. Any shortfall of proceeds to purchase the securities is taken on by State Street Bank.

Loaned securities are included in the statement of fiduciary net position since the Fund maintains ownership. For loans collateralized by cash, the value of the collateral is recorded as a liability offsetting the cash collateral recorded as an asset. The cash collateral as of December 31, 2016 and 2015 was \$52,541,468 and \$66,204,476, respectively. For loans having collateral other than cash, the related collateral securities are not recorded as assets in the statement of fiduciary net position, and a corresponding liability is not recorded, since the Fund cannot pledge or sell the collateral securities, except in the event of a borrower's default.

At December 31, 2016 and 2015, the fair value of loaned securities outstanding, included in investments, was approximately \$51,224,711 and \$64,045,712, respectively.

(h) Commitments

At December 31, 2016 and 2015, the Fund had contractual commitments to provide approximately \$61.4 million and \$89.6 million, respectively, of additional funding for alternative investments and real estate.

(i) Money Rate of Return

The Annual money-weighted rate of return on the Fund's investments calculated as the internal rate of return on the pension fund net of investment expenses for the years ended December 31, 2016 and 2015 is 5.88% and 0.65%, respectively. A money weighted return expresses investment performance net of pension plan investment expense, adjusted for the changing amounts actually invested.

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(4) Fair Value Measurements

The Fund measures and records its investments using fair value measurement guidelines established by generally accepted accounting principles. The fair value gives the highest priority to unadjusted quoted prices in active markets for identical assets and liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). These levels of fair value hierarchy are described below:

- Level 1 – Unadjusted quoted prices for identical assets or liabilities in active markets
- Level 2 – Observable inputs other than quoted prices in active markets for identical assets and liabilities. Level 2 inputs include the following:
 - Quoted prices for similar assets and liabilities in active markets
 - Quoted prices for identical or similar assets or liabilities in markets that are not active
 - Inputs other than quoted prices that are observable for the asset or liability, such as:
 1. Interest rates and yield curves observable at commonly quoted intervals
 2. Implied volatilities
 3. Credit spreads
- Level 3 – Unobservable inputs for the asset or liability (i.e., supported by little or no market activity). Level 3 inputs include management’s assumptions.

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The following tables' sets forth by fair value hierarchy level, the Fund's assets carried at fair value at December 31, 2016 and 2015:

	Total at December 31, 2016	Fair value measurements using:		
		Quoted prices in active markets for identical assets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)
Cash equivalents:				
Active cash	\$ 2,006,156	2,006,156	—	—
Government issues	2,954,772	2,954,772	—	—
International cash and equivalents	121,317	121,317	—	—
Stif-type instrument	47,019,024	—	47,019,024	—
Total cash equivalents	52,101,269	5,082,245	47,019,024	—
U.S. equities:				
Common stock	429,517,683	418,096,664	11,421,019	—
Depository receipts	22,262,879	22,262,879	—	—
Mutual funds	29,767,778	340,487	29,427,291	—
Preferred stock	2,079,384	2,079,384	—	—
Real estate inv trst	10,092,270	10,092,270	—	—
Total U.S. equities	493,719,994	452,871,684	40,848,310	—
International equities	188,951,235	115,152,790	73,798,445	—
Fixed income:				
U.S. agencies	58,697,801	—	4,498,832	54,198,969
U.S. treasury notes and bonds	51,315,015	—	51,315,015	—
Domestic corporate	196,288,630	—	142,874,825	53,413,805
Asset backed:				
CMO	14,567,352	—	14,567,352	—
Mortgage-backed	21,989,332	—	21,989,332	—
Other asset backed	19,045,543	—	19,045,543	—
Total U.S. fixed income	361,903,673	—	254,290,899	107,612,774
International fixed income	4,720,170	—	4,720,170	—
Total investments by fair value level	1,101,396,341	573,106,719	420,676,848	107,612,774
Total investments measured at net asset value (NAV):				
Hedge fund of funds	112,818,545			
Private equity funds	139,404,329			
Private real estate funds	128,148,179			
Total investments measured at NAV	380,371,053			
Total investments at fair value	\$ 1,481,767,394			

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	Total at December 31, 2015	Fair value measurements using		
		Quoted prices in active markets for identical assets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)
Cash equivalents:				
Active cash	\$ 906,340	906,340	—	—
Government issues	1,091,696	1,091,696	—	—
International cash and equivalents	58,048	58,048	—	—
Stif-type instrument	59,255,608	—	59,255,608	—
Total cash equivalents	61,311,692	2,056,084	59,255,608	—
U.S. equities:				
Common stock	418,305,889	406,105,921	12,199,968	—
Depository receipts	20,012,009	20,012,009	—	—
Mutual funds	22,355,840	—	22,355,840	—
Preferred stock	2,203,885	2,203,885	—	—
Real estate inv trst	5,711,136	5,711,136	—	—
Total U.S. equities	468,588,759	434,032,951	34,555,808	—
International equities	207,659,261	132,685,313	74,973,948	—
Fixed income:				
U.S. agencies	70,163,455	—	4,928,389	65,235,066
U.S. treasury notes and bonds	25,945,505	—	25,945,505	—
Domestic corporate	190,400,467	—	139,417,010	50,983,457
Asset backed:				
CMO	16,477,835	—	16,477,835	—
Mortgage-backed	17,829,008	—	17,829,008	—
Other asset backed	18,855,161	—	18,855,161	—
Total U.S. fixed income	339,671,431	—	223,452,908	116,218,523
International fixed income	5,320,012	—	5,320,012	—
Total investments by fair value level	1,082,551,155	568,774,348	397,558,284	116,218,523
Total investments measured at net asset value (NAV):				
Hedge fund of funds	132,138,477			
Private equity funds	150,915,544			
Private real estate funds	130,266,856			
Total investments measured at NAV	413,320,877			
Total investments at fair value	\$ 1,495,872,032			

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RETIREMENT FUND**

Notes to Financial Statements

December 31, 2016 and 2015

(5) Related-Party Transactions

The Fund invests certain cash in a money market fund, the State Street Bank and Trust Company Short Term Investment Fund, which is sponsored by the Fund's custodial bank. The total value of the funds held at December 31, 2016 and 2015 was \$47,019,024 and \$59,255,608, respectively.

The Fund invests in the AFL-CIO Housing Investment Trust and the AFL-CIO Building Investment Trust, two for-profit investment programs of the AFL-CIO. The total value of AFL-CIO Housing Investment Trust at December 31, 2016 and 2015 was \$50,241,098 and \$49,286,560, respectively. The total value of AFL-CIO Building Investment Trust at December 31, 2016 and 2015 was \$14,553,935 and \$13,625,681, respectively.

(6) Net Pension Liability

The components of the net pension liabilities of the MBTA Retirement Fund as of December 31, 2016 and 2015 are shown as follows (amounts in thousands):

	2016	2015
Total pension liability	\$ 2,632,255	2,512,085
Plan fiduciary net position	(1,485,606)	(1,497,848)
Fund's net pension liability	\$ 1,146,649	1,014,237
Plan fiduciary net position as a percentage of total pension liability	56.44%	59.63%

Actuarial Assumptions

The total pension liability was determined by an actuarial valuation as of December 31, 2016 and 2015, using the following actuarial assumptions:

- Projected salary increases of 4% per year including inflation
- Investment rate of return 8% per annum, compounded annually
- Inflation rate of 3%

For the actuarial valuations as of December 31, 2016 and 2015, the RP-2000 Blue Collar Mortality Tables with generational projection using Scale BB are used for all active participants. 97.2% of the RP-2000 Blue-Collar Tables for Healthy Males projected by Scale BB generationally are used for all retirees and deferred vested participants. 116.5% of the RP-2000 Blue-Collar Tables for Healthy Females projected by Scale BB generationally are used for all beneficiary participants. The RP-2000 Tables for Disabled Lives projected by Scale BB generationally are used for the period after disability retirement. Among pre-retirement deaths, 7.50% are assumed for accidental death benefits.

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Notes to Financial Statements

December 31, 2016 and 2015

The actuarial assumptions used in the December 31, 2016 and 2015 valuations were based on the results of an actuarial experience study for the period from January 1, 2010, through December 31, 2014. Actuarial valuations attempt to estimate costs associated with the pension fund based on a number of demographic, economic and retirement experience assumptions. Experience studies are required by statute to be conducted every five years to review experience in comparison to these assumptions and to provide recommended changes to assumptions.

The long-term expected rate of return on Fund investments was determined using best-estimate ranges of expected future nominal rates of return (expected returns, net of investment expense and inflation) developed for each major asset class using an econometric model that forecasts a variety of economic environments and then calculates asset class returns based on functional relationships between economic variables and the asset class. Best estimates of arithmetic real rates of return for each major asset class included in the target asset allocation as of December 31, are summarized in the following table:

<u>Asset class</u>	<u>Target asset allocation</u>		<u>Long-term expected real rate of return</u>	
	<u>2016</u>	<u>2015</u>	<u>2016</u>	<u>2015</u>
Equity	43 %	43 %	8.75 %	8.46 %
Fixed income	25	27	6.20	1.83
Alternatives	30	30	8.70	7.92
Cash	2	—	0.94	—

Nominal long-term expected rates of return for these asset classes are equal to the sum of the above expected long-term real rates and the expected long-term inflation rate of 3.0%

**MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
RETIREMENT FUND**

Notes to Financial Statements

December 31, 2016 and 2015

(a) Discount Rate

The discount rate used to measure the total pension liability at December 31, 2016 and 2015, was 8.00%. The projections of cash flows used to determine the discount rate assumed that contributions will continue to be made in accordance with the current funding policy. Based on those assumptions, the Fund's fiduciary net position was projected to be available to make all projected further benefit payments of current plan members. Therefore, the long-term expected rate of return on the plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

(b) Sensitivity of the Net Pension Liability to Changes in the Discount Rate

The following presents the net pension liability as of December 31, 2016 and 2015, calculated using the discount rate of 8.00%, as well as what the net pension liability would be if it were calculated using a discount rate that is one percentage point lower (7.00%) or one percentage point higher (9.00%) than the current rate (amounts in thousands):

	2016		
	1% Decrease (7.00%)	Current discount rate (8.00%)	1% Increase (9.00%)
Net pension liability	\$ 1,412,017	1,146,649	920,903
	2015		
	1% Decrease (7.00%)	Current discount rate (8.00%)	1% Increase (9.00%)
Net pension liability	\$ 1,269,791	1,014,237	796,832

REQUIRED SUPPLEMENTARY INFORMATION

(Unaudited)

**MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
RETIREMENT FUND**

Required Supplementary Information
Schedule of Changes in Net Pension Liability and Related Ratios
(Unaudited)

	<u>2016</u>	<u>2015</u>	<u>2014</u>
Total pension liability:			
Service cost	\$ 31,896,560	37,305,333	34,500,540
Interest	195,768,057	191,392,028	184,667,178
Differences between expected and actual experience	90,067,566	31,325,149	48,560,391
Changes of assumptions	—	(6,762,751)	—
Benefit Payments	<u>(197,561,539)</u>	<u>(188,906,232)</u>	<u>(184,130,187)</u>
Net change in total pension liability	120,170,644	64,353,527	83,597,922
Total pension liability-beginning of year	<u>2,512,084,594</u>	<u>2,447,731,057</u>	<u>2,364,133,135</u>
Total pension liability-ending (a)	<u>2,632,255,238</u>	<u>2,512,084,594</u>	<u>2,447,731,057</u>
Change in fiduciary net position:			
Contributions – employer	77,239,279	73,373,672	70,603,285
Contributions – employee	27,791,543	26,510,946	25,318,224
Net investment income	86,782,343	4,711,246	73,543,477
Benefit payments	(197,561,539)	(188,906,232)	(184,130,187)
Administrative expenses	<u>(6,493,777)</u>	<u>(5,808,086)</u>	<u>(4,052,664)</u>
Net change in fiduciary net position	(12,242,151)	(90,118,454)	(18,717,865)
Fund fiduciary net position-beginning of year	1,497,848,035	1,587,966,489	1,606,684,354
Fund fiduciary net position – end of year (b)	<u>1,485,605,884</u>	<u>1,497,848,035</u>	<u>1,587,966,489</u>
Fund's net pension liability-ending (a)-(b)	<u>\$ 1,146,649,354</u>	<u>1,014,236,559</u>	<u>859,764,568</u>
Fund fiduciary net position as a percentage of the total pension liability	56.44 %	59.63 %	64.88 %
Covered payroll as of December 31, 2016, 2015 and 2014 actuarial valuation	\$ 446,740,427	443,237,899	417,957,007
Net pension liability as a percentage of covered-employee payroll	256.67 %	228.82 %	205.71 %

This schedule is intended to present 10 years of data. Additional years will be presented when available.

See accompanying independent auditors' report.

**MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
RETIREMENT FUND**

Required Supplementary Information

Schedule of Investment Returns

(Unaudited)

	<u>2016</u>	<u>2015</u>	<u>2014</u>
Annual money-weighted rate of return, net of investment expense	5.88%	0.65%	4.80%

This schedule is intended to present 10 years of data. Additional years will be presented when available.

See accompanying independent auditors' report.

**MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
RETIREMENT FUND**

Required Supplementary Information

Schedule of Contributions

(Unaudited)

Year	Actuarially determined contribution	Actual contribution in relation to actuarially determined contribution	Percentage of actuarially required contributions	Covered- employee payroll	Contribution as a percentage of covered- employees
2016	\$ 77,239,279	\$ 77,239,279	100.00%	\$ 446,740,427	17.29%
2015	73,359,000	73,373,372	100.02	443,238,000	16.55
2014	77,594,000	70,603,285	90.99	417,957,000	16.89
2013	67,602,000	58,039,160	85.85	379,071,000	15.31
2012	66,035,000	54,968,325	83.24	370,873,000	14.82
2011	60,691,000	52,278,311	86.14	366,535,000	14.26
2010	60,252,000	49,006,722	81.34	356,608,000	13.74
2009	49,340,000	38,566,024	78.16	350,619,000	11.00
2008	39,761,000	35,420,770	89.08	377,795,000	9.38
2007	33,815,000	30,014,017	88.76	357,069,000	8.41
2006	33,327,000	34,485,593	103.48	320,648,000	10.76

See accompanying independent auditors' report.

**MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
RETIREMENT FUND**

Notes to Required Supplementary Information
(Unaudited)

Actuarial Assumption and Methods

Actuarially determined contributions are calculated as of the December 31 preceding by six months of the start of the fiscal year in which contributions are made. For example, the contribution calculated in the December 31, 2015 actuarial valuation was to be made during the period from July 1, 2016 through June 30, 2017.

Methods and assumptions used to determine the contributions for calendar 2017 and 2016 (based on 2014 and 2015 actuarial valuations).

- Actuarial cost method – Entry Age Normal
- Amortization method – Level Percentage of Pay
- Remaining amortization period – 23 years (2016 valuation), 24 years (2015 valuation)
- Asset Valuation method – Five year phase-in smoothing method
- Investment rate of return – 8% net of pension plan investment expense
- Retirement Age – Probabilities of retirement are based on table that reflects both age and service
- Mortality – For all active and retired participants, the RP-2000 Blue Collar Mortality Tables with generational projection using Scale BB are used for all active participants. 97.2% of the RP-2000 Blue-Collar Tables for Healthy Males projected by Scale BB generationally are used for all retirees and deferred vested participants. 116.5% of the RP-2000 Blue-Collar Tables for Healthy Females projected by Scale BB generationally are used for all beneficiary participants. The RP-2000 Tables for Disabled Lives projected by Scale BB generationally are used for the period after disability retirement. Among pre-retirement deaths, 7.50% are assumed for accidental death benefits.

Effective with the December 31, 2013 actuarial valuation, the actuarial asset valuation method utilized to compute the actuarial value of assets changed from the five-year moving average of market values method to the five-year phase-in smoothing method. This was done in an effort to further align the Fund's funding policies with those prevalent among the Commonwealth of Massachusetts' public retirement systems and to enhance the transparency of its actuarial calculations. With the implementation as of December 31, 2013, the Fund restarted its actuarial value of plan assets at market value and will gradually implement the phase-in smoothing method over four years.