

PERAC ANNUAL PORT OF THE PROPERTY OF THE PROPE

SEPTEMBER 2020

COMMONWEALTH OF MASSACHUSETTS PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION COMMISSION



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Commission Members



Philip Y. Brown, Esq.

Vice Chair

Chairman



The Honorable Suzanne M. Bump

Auditor of the Commonwealth



Kathleen M. FallonPractice Area Director,
Public Consulting Group



Kate Fitzpatrick Town Manager, Town of Needham



James M. Machado Sergeant, Fall River Police Department



Robert B. McCarthy President Emeritus Professional Fire Fighters of Massachusetts



Jennifer F. SullivanGovernor's Appointee,
Investment Professional

Mission Statement

PERAC's mission is to provide regulatory

oversight and guidance for the effective,

equitable, and ethical operation of the

Commonwealth of Massachusetts'

public pension systems.





Joseph I. Martin

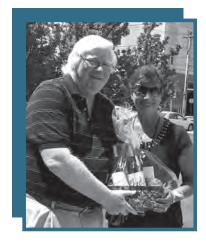
This Annual Report is dedicated to Deputy Executive Director **Joe Martin**, who retired on June 30, 2020. Joe's retirement marks the end of a remarkable 41-year career of public service in which he leaves an indelible footprint at PERAC and the pension community at large.

Joe began his career in the State Senate as a legislative aide to former Senator Jack Brennan. From there, Joe worked at the PRIM Board as General Counsel and eventually became Deputy Director at PERA, the predecessor to PERAC. In 1987, Joe became the PERA designee to the Contributory Retirement Appeal Board, or CRAB, where he served as one of three designees for the past 33 years, rendering thousands of decisions shaping pension law and policy.

In Joe's 30 plus years at PERA and PERAC, he has been intricately involved in the establishment and shaping of pension policy in the Commonwealth. Joe's extensive

legal and legislative skills are evident in each significant change in Chapter 32, where he was instrumental in protecting first and foremost the contributions and benefits of public employees. While always mindful of the autonomy of retirement boards and the role of the investment community, Joe's analysis began and ended with the protection of the employees' rights and the systems' assets. Joe's self-taught knowledge of the complicated investment world, and his uncanny ability to identify vulnerabilities in an investment arrangement, have no doubt saved our retirement systems millions of dollars.

At PERAC, Joe has been a trusted and dependable colleague and dear friend. We will greatly miss his knowledge, wisdom, friendship, and great sense of humor. On behalf of the PERAC Commission, staff, and the pension community at large, we say congratulations, thank you, and sincere wishes of good health and happiness to Joe and his family.









Letter From Chairman Philip Y. Brown

The investment returns from 2019 were exceptional. Even more important, the sound, informed and prudent investment practices that led to these strong performances helped retirement systems withstand the unforeseen and unprecedented health and financial crisis we continue to endure."

hroughout 2019 and into 2020, PERAC and the Massachusetts retirement systems have responded positively to challenging situations with continued dedicated service to the members of the systems.

The investment returns from 2019 were exceptional. Even more important, the sound, informed and prudent investment practices that led to those strong performances helped retirement systems withstand the unforeseen and unprecedented health and financial crisis we continue to endure.

One of PERAC's strengths is that it has been able to develop strong leaders. In 2019, Executive Director John Parsons promoted Caroline Carcia to Deputy Director, Judith Corrigan to General Counsel, and John Boorack to Actuary. Their promotions are well-deserved and, together, they are a strong team to guide PERAC through the challenges of 2020.

In order to help with the disruptions caused by the pandemic, Deputy Executive Director Joe Martin delayed his retirement to the end of June, which was in keeping with his dedication to the public retirement system. Joe gave the Commonwealth 41 years of exemplary public service, including the last 33 with PERAC and its predecessor PERA. Joe always put the interests of the members first as he helped shape pension legislation and investment practices with the goal of ensuring the pension system is administered fairly and ethically. His knowledge, integrity, tenacity and good humor were appreciated and well-known both within PERAC and within the retirement community as a whole. Thank you, Joe, for your years of service and for all you have done for the Massachusetts public pension system.

I am pleased that Commissioners James Machado and Kate Fitzpatrick were both reappointed to another term. Both Jim and Kate bring a wealth of experience, perspective and passion to the Commission and I am proud to call them

both colleagues and friends. Commissioner Machado, appointed by Governor Charles Baker, is a Sergeant with the Fall River Police and Commissioner Fitzpatrick, appointed by State Auditor Suzanne Bump, is Town Manager of Needham.

The investment performance of the systems detailed in this report averaged 16.9%. Once again, we are pleased to note that PERAC's analysis of funding levels and investment performance meant no board would be required to transfer its assets to the Pension Reserves Investment Trust Fund. Retirement board members, through education, experience, and dedication, have adopted and put into

practice the principles modern investment of management either directly or through investing in the Pension Reserves Investment Trust Fund (PRIT). Although our retirement systems face many challenges, this record of prudent management has served the interests of system members and taxpayers very well.

We continue to expand our educational activities by holding sessions for board administrators across the state. We are most excited about our recent expansion of web-based and online offerings. This should make meeting the statutory requirements less burdensome for those seeking to meet (or exceed) their mandated requirements and has provided much-needed flexibility in these trying times.

Thank you to all of the board members, board staff and PERAC staff for all you have done, and continue to do, to protect and enhance the well-earned retirement benefits of the members in a fair, efficient, and customer-focused

"Thank you to all of the board members, board staff and PERAC staff for all you have done, and continue to do, to protect and enhance the well-earned retirement benefits of the members in a fair, efficient, and customer-focused manner. These have been trying times and, based on past performance and your character, it is no surprise that you all have risen to the occasion. You make me extremely proud to serve this Commission as Chairman."

In keeping with national trends in the audit field, PERAC has adopted the practice of tailoring its audits by considering the risk level of the system to be audited. A key aspect of this new approach is the review and, when warranted, acceptance of audits performed by private firms in lieu of segments of the PERAC audit. Although this acceptance has been incorporated into law and regulation for several years, it has not attained widespread use. The Audit Unit hosted an Auditors' Roundtable with private sector auditing firms to launch this initiative, which was well attended and well received. A significant benefit of this approach is that the PERAC audit will be less intrusive and more timely for retirement boards.

PERAC's PROSPER system continues to enhance the user experience and improve the effectiveness and efficiency of various processes. Use of the Disability Application, which has largely eliminated the sending of, and waiting for, paperwork of cases in the pipeline, has reduced the time to process applications from 96 days in June 2017 to 14 days in August 2019. PROSPER's value was highlighted even more as it helped allow remote working as the pandemic hit. The PERAC IT unit continues its great work improving PROSPER and adding more functionality; look for more PROSPER tools in the coming year.

manner. These have been trying times and, based on past performance and your character, it is no surprise that you all have risen to the occasion. You make me extremely proud to serve this Commission as Chairman.

Sincerely,

Philip Y. Brown Chairman



Letter From the Executive Director

I first want to acknowledge and commend the dedication, resilience, and performance of retirement board members, board administrators, staff, other members of the retirement community, and of course the PERAC staff in the face of unprecedented crisis.

he Commission and staff are pleased to release this Annual Report on the Massachusetts Public Retirement Systems for 2019.

As we release our calendar year 2019 report, it would be impossible to ignore the happenings of the first half of 2020. I first want to acknowledge and commend the dedication, resilience, and performance of retirement board members, board administrators, staff, other members of the retirement community, and of course the PERAC staff in the face of unprecedented crisis. The members of the state's 104 retirement systems have been well served by your rising to the cause, ensuring that pension checks are received, investment funds are safeguarded, and member services are carried out.

While Retirement Board investment performance bounced back significantly in 2019 from 2018, as general market conditions improved, early 2020 saw

steep declines due to the pandemic. While some of those losses were rapidly regained, there is still a way to go. These fluctuations in performance underscore the importance of a steady and consistent approach to investment of assets and system funding. Over the course of the last 20 years, we have experienced two major market downturns followed by a steady recovery over several years. These past experiences underscore the wisdom of PERAC's measured approach to investment return assumptions used in actuarial valuations as well as the balanced approach to asset allocation adopted by the PRIM Board and local retirement systems.

Investment returns in 2019 reached levels that have not been seen in many years. In general, the correlation between asset class performance and investment return is largely a product of general market conditions. The steady trend of tempering expectations by

lowering the investment assumption recognizes the changing nature of market conditions and the need to anticipate the impact of the present and future market environment on pension fund fiscal stability. The steady reduction in the investment return assumption is the centerpiece of this proactive approach. As recently as 2003, the investment return assumption for 30 of our plans was 8.50%. Today, no plan is using that assumption. In 2003, all assumptions were 7.50% or greater with only 3 between that level and 7.90%; 52 at 8.00%; 20 between 8.10% and 8.25% and, as noted, 30 used an assumption of 8.50%. Today, 46 plans use an assumption of 7.25% or below and 86 use an assumption of 7.50% or below. All plans use an assumption less than 8.00%, however 13 plans use an assumption of 7.75% or above. PERAC established a return assumption of 7.15% for the State Employees' and Teachers' Retirement Systems for calendar year 2020.

Investment Returns

As disclosed in PERAC's 2019 Investment Report, board returns for the year averaged a stellar 16.9%, with a range of 11.2% to 24.5%.

Based on analysis of system-funded status and investment performance in accordance with Chapter 68 of the Acts of 2007, PERAC determined that no retirement board will be ordered to transfer its assets to the Pension Reserves Investment Trust Fund (PRIT) based on 2019 results.

While the pandemic caused steep declines in the markets in late winter and early spring, they had regained much of their losses as of this writing. The PRIM Board reported that for the first six months of calendar year 2020, the PRIT Fund was down 3.4%, which in context of the market crash shows

both resiliency and hope that investment returns for the full year could be better than initially feared at the outset of the pandemic.



Commission/ Staff Update

We are pleased to note that Commissioners Jim Machado and

Kate Fitzpatrick have both been appointed to another term on the Commission. Governor Charlie Baker reappointed Jim to the Public Safety Position and State Auditor Suzanne Bump reappointed Kate to the MMA position. On behalf of all PERAC staff we look forward to working with Jim and Kate in the years ahead.

Bill Keefe has joined PERAC as Assistant Deputy Director of Research, Planning and Public Affairs. Bill's focus will be external affairs, legislation and internal processes. Prior to coming to PERAC he served as Director of Planning in the Office of the State Auditor Suzanne Bump.

Changes in the Audit Unit include Walter Kloc moving on from PERAC and the addition of Michelle Lastra, Alice Munafo, and Ernie Calavritinos as Auditors. It is anticipated that with this staffing we will be able to fully implement our new audit protocols and expedite the completion and processing of audit reports.

Fee Report

In 2019, PERAC again published a compilation of the fees paid by the pension systems to investment vendors. The report is based on the Schedule 7 filed by each Board as part of its Annual Statement of Financial Condition. Studies such as this provide retirement board members, public officials, and taxpayers with a critical tool with which to assess investment performance. With the fee report, board members are able to gauge their costs against those of their peers, public officials are able to analyze the management of the pension funds, and taxpayers can gain insight into the level of expenditure involved in this task. PERAC's effort in this area reflects its commitment to bring transparency to all aspects of retirement system management.

Retirement boards paid a total of \$469.8 million to investment service providers in 2018. For the State and Teachers' funds, which are invested by the Pension Reserves Investment Management Board (PRIM), \$295.5 million in fees were incurred. Local retirement boards paid \$174.3 million to money managers, banks and investment consultants, as well as PRIM. In 2018 the Expense Ratio for systems ranged from a high of .99% to .29%. The level of cost in and of itself is neither a positive or negative but must be assessed in the context of returns as performance may justify cost.

It should also be emphasized that retirement boards must conduct their own analysis of the fees paid or expected to be paid in connection with investment activities. Over the last few years our analysis has found that service providers often are unclear about not only the costs to the system but also the manner in which payment is assessed.

Strategic Plan

In November 2019, the Commission met to begin the development of a Strategic Plan for the next five years. Commissioners and staff identified critical issues and potential strategies to address those issues.

One outcome of this process was the revisiting of PERAC's Mission Statement by an ad hoc group led by Commissioners Tim Dooling and Kathy Fallon. The recommendation of that group was reviewed and approved by the Commission. The revised mission statement below appears elsewhere in this publication as well as on the PERAC website.

Revised PERAC Mission Statement

"To provide regulatory oversight and guidance for the effective, equitable, and ethical operation of the Commonwealth of Massachusetts' public pension systems."

Four main areas were identified in the Strategic Plan: Communications/Governmental, Audit Process, Actuarial/Investment, and Technology.

In Communications/Governmental, the focus was on providing clear, effective, timely and, when possible, proactive information to retirement board members, public officials, administrators, and the general public. Initiatives to achieve this goal seek to leverage technology to maximize impact. Special emphasis will focus on new board member outreach and expanding the use of PERAC data to inform policy and enhance transparency.

Building on progress made in 2019, the Strategic Plan calls for prioritizing the use of up-to-date technology, including a new audit software program, data interaction with the retirement board through electronic means, and collaboration with private auditors. In addition, proposals for enhancing the ability of the Commission to recruit and retain Audit Unit personnel are being reviewed and implemented.

Consistent with the overall emphasis on increasing our use of internally available data, the Strategic Plan calls for broadening our data analysis capabilities. The goal is not only to expand our reporting, but also to present the data in an understandable and helpful manner.

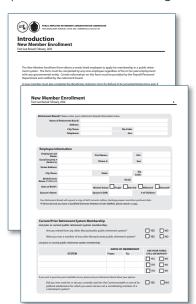
The Strategic Plan emphasizes the need to continue our risk analysis presently incorporated into Actuarial Valuations, ensure that objective criteria are applied, and use the data to be proactive.

Any modern enterprise must avail itself of the latest in technology. It's unsurprising that the Strategic Plan has as a key component the area of Technology. As noted above, data analytics is an essential tool for the meeting of PERAC's statutory mandates. Under the Plan we will conduct an extensive review of existing resources, software and hardware infrastructure, and internal processes for managing and analyzing data. Also, in the Technology component of the Plan, we will enhance and improve PROSPER. Initially we expect that the use of PROSPER will expand to include calculations, investment data submissions, and added filings by retirement board members. This initiative will also focus on security matters.

The development of the Strategic Plan has provided us with a blueprint for the years ahead and we are confident that after full implementation, the Commission will be able to perform its responsibilities more efficiently. Certainly in early 2020, PROSPER and PERAC's technological and communicative abilities were tested and the preparation, work and investments put into these areas paid off while also showing areas where continued investment and enhancement are needed.

Forms Project

Often what appear to be minor modifications in administrative practices can have a major impact on the efficiency and transparency with which an agency operates. I am pleased to note that changes in the text and processing of



the many PERAC forms related retirement to related actions will have such a result. These updated forms regarding membership, beneficiaries and disability have been revised through close consultation and collaboration between retirement boards and PERAC. Fields have been updated to eliminate outdated references and strengthen accuracy and efficiency.

Litigation

In 2019, PERAC's Legal Unit represented the Commission at all levels, including the Supreme Judicial Court.

In a December decision affecting those members who served as reserve, permanent-intermittent or call firefighters or reserve or permanent-intermittent police officers prior to becoming members of a system, the Supreme Judicial Court determined that individuals who are to be credited with service pursuant to G.L. c. 32, § 4(2)(b) must pay for such service.

The ruling in Plymouth Retirement Board v. CRAB, and PERAC, followed the SJC's 2013 MacAloney decision and brought closure to the long-running Gomes case.

Massachusetts General Laws, Chapter 32, Section 4(2)(b) allows up to five full years of pre-membership credit to certain members of systems who served in the past as a reserve or permanent-intermittent police officer or a reserve, permanent-intermittent or call firefighter. The question presented to the SJC in Plymouth Retirement Board v. CRAB, and PERAC, was whether a member had to pay for such service. The SJC answered that question in the affirmative.

PERAC, and PERA before it, had long instructed the retirement boards that service to which a member was entitled pursuant to Section 4(2)(b) should be credited without cost to the member, based upon the wording of the statute. This remained the position of PERAC until CRAB issued the MacAloney decision in 2013, determining that although Westminster Fire Chief Brenton MacAloney was entitled to be credited for his previous service as a call firefighter in that town, he would have to pay for it. In the wake of the MacAloney decision, PERAC issued Memo 11 of 2020 to the retirement boards instructing them to require payment for such Section 4(2)(b) service.

Acknowledging that Section 4(2)(b) is silent on payment for creditable service, the SJC concludes that this section is intended only as a "measurement scheme," and reading the statute as a whole, the requirement for payment is found in Section 4(2)(c). The SJC finds that "each subsection of G.L. c. 32 § 4(2) has a clear, connected role." The SJC states that its reading of Section 4(2) "conforms to the backbone of a contributory retirement system: employees investing a portion of their earnings towards a future pension."

The SJC's decision breaks new ground in determining that the "Under \$5,000 Rule" will also be applied to Section 4(2)(b) service. Since the "Under \$5,000 Rule" was enacted in 2009, Retirement Boards and PERAC have not applied the rule to Section 4(2)(b) service. The SJC now requires that to happen.

PERAC issued Memo 11 of 2020 to provide guidance on this decision.

Auditing

As noted in last year's annual report, the Commission approved a new and more efficient approach to the auditing of retirement systems. The focus of audits will be based on an assessment of a system's risk profile. We are also working with private auditors to expand PERAC's review and acceptance of private audits of systems as outlined in statute and regulation.

In order to maximize benefits from this new approach, PERAC hosted an Auditors' Roundtable in October, 2019. Representatives from all the firms presently serving the retirement boards attended. In general, the attendees endorsed the changes adopted by the Commission and pledged to cooperate fully as implementation continues. It is expected that these sessions will become annual events in order to maintain the momentum created by this meeting.

As a result of these approaches, PERAC issued 29 audits in 2019 compared to 20 in 2018 and 17 audit follow-ups in 2019 after completing 14 in 2018.

Another important component was staff stability. Whether through retirement or attrition, the auditing unit had often been working with a depleted staff. We reviewed and amended job descriptions, refocused our recruiting efforts, and took proactive steps to increasing retention around training and reimbursements for tuition and certifications. These steps led to a full complement of staff working with renewed approaches to auditing resulting in solid performance.

Emerging Issues Forum

PERAC held its 15th Emerging Issues Forum at the College of the Holy Cross in September 2019. In spite of inclement weather and last-minute parking issues due to on-campus construction, nearly 230 people participated. Board members attending received three educational credits.

In the keynote address, attorney Thomas Spahn of McGuire-Woods provided eye-opening tales in a presentation entitled "The Ethics of Email and Social Media." One commenter stated that Attorney Spahn was "...energetic [and] made a lot of good points in an informative way with a twist of humor."



Emerging Issues keynote speaker Thomas Spahn of McGuire Woods gives an energetic presentation on The Ethics of Email and Social Media

PERAC Actuary John Boorack provided an overview of pension funding and actuarial issues with "Pension Funding: Past, Present and Future." John was able to connect with the audience in a down to earth way that led to greater understanding of a complex subject.

Jean-Pierre Aubry, Associate Director of State and Local Research at the Center for Retirement Research (CRR) at Boston College, provided insight into the research the CRR has done across the United States in "The Cost Burden of Pension and OPEB Plans." Although Massachusetts was not part of that study, the concerns regarding risk and fiscal uncertainty outlined by Mr. Aubry struck a sobering note for all attendees.



Emerging Issues Forum speaker Jean-Pierre Aubry of the Center for Retirement Research at Boston College

As has now become a tradition, the centerpiece of the Forum once again was the Retirement System Best Practices panel moderated by PERAC Chairman Phil Brown. The Panel featured four executive directors who delved into the nuts and bolts of running a retirement system. Gary Brenner of the Lynn Retirement Board focused on "How to Run a Retirement Workshop." James Lovotti of the West Springfield Retirement Board walked attendees through the "Benefit Calculation Process." Berkshire County Retirement Board's Sheila LaBarbera discussed "Good Governance." Elaborating on issues raised by the keynote speaker, Erika Glaster of the Teachers' Retirement Board emphasized "Cybersecurity Challenges."



Emerging Issues Forum Retirement System Best Practices presenters (I-r): Gary Brenner (Lynn); James Lovotti (W. Springfield); Sheila LaBarbera (Berkshire County); Erika Glaster (MTRS)

Unfortunately, the 2020 Emerging
Issues Forum has been canceled due to
public health concerns. PERAC is
planning a shorter virtual event
with the keynote speaker
and a presentation by staff.

Education

PERAC continued its comprehensive education program for retirement board members in 2019. This was the eighth year of the program and included courses on "Beneficiaries by the Numbers," the ever popular "Cases of Interest," "Audit Process Revisions, Common Audit Findings and Accounting Filings with PERAC," and "Post Retirement Earnings."

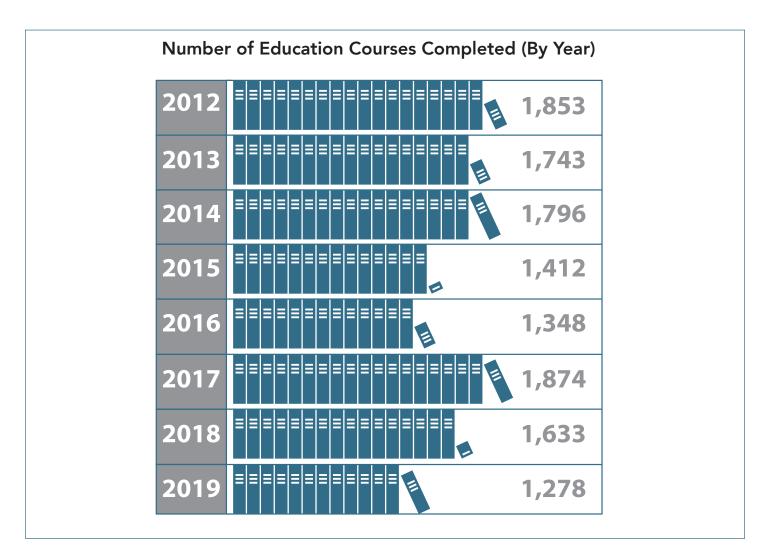
Webinar courses were expanded as many of those courses cited above took place both in person and via webinar. Expanding webinar sessions on the PERAC website provided added value, safety and convenience for board members to access and receive credit during the pandemic.

In addition, non-PERAC webinars were offered for credit including the Inspector General's "How to be An Effective Board and Commission Member," the Ethics Commission's "Conflict of Interest," and the CFA Institute's "Ethical Decision Making for Pension Plan Trustees."

Continuing our program of one-day Board Administrator Trainings in 2019, sessions were held in Northampton, Danvers, and Westborough. Sessions were very well Members of the Actuarial, Compliance, Disability, Fraud Prevention and Legal Units at PERAC served as presenters. Many topics were covered in the course of each session. Attendees learned about:

- Alternative Investment Accounting
- The 91A Process
- Veterans Benefits
- 12 (2)(b) Dependent Allowances
- Ordinary Disabilities
- Chapter 32 In A Nutshell
- Special Legislation

Each day of training concluded with the awarding of certificates to all attendees. Board members who attended received three educational credits.



Legislation

Following adoption by the Commission and presentation of their recommendation to the Joint Committees of Ways & Means at the Consensus Revenue Hearing, the Governor submitted a new funding schedule to address the liabilities of the State Employees' Retirement System, the Teachers' Retirement System, the state obligation regarding Boston Teachers and the state obligation regarding local COLA's as part of his Fiscal 2021 budget recommendations in January, 2020. Due to the impact of the pandemic, the Legislature has delayed adoption of a formal FY21 budget until at least October, 2020, while revenue shortfalls are measured and supplemental federal assistance is awaited. For the next three years, the adopted, scheduled pension appropriation is:

Fiscal Year	Amount
2021	\$3,115,163,858
2022	\$3,415,154,137
2023	\$3,744,033,480

PERAC filed six legislative proposals in the 2019 – 2020 session. The Joint Committee on Public Service adopted a Favorable Report for each of these bills. Formal sessions of the Legislature had been scheduled to end July 31, 2020, but an order passed to extend the ability to meet formally for the remainder of 2020. PERAC will continue to advocate for, and monitor the progress of, these bills. The bills are as follows:

- 1. H 4143 An Act Relative to the Veterans' Buyback: Extends the time period in which veterans may purchase up to four years of creditable service as a result of their military service. If adopted, the buyback may be initiated within one year of vesting rather than within 180 days from hiring. House Chairman Jerald Parisella added a provision to the bill that would create a one-time, one-year window for such purchases for those members who may have missed their initial opportunity.
- 2. H 21 An Act Relative to Pension Forfeiture:
 Amends the pension forfeiture provisions of Chapter 32 in light of the Supreme Judicial Court decision in the *Bettencourt* case which determined that the existing statute may violate the 8th Amendment of the U.S. Constitution in some cases.

- 3. H 23 An Act Relative to the Recovery of Overearnings: clarifies the amount that may be recovered in an instance where a retired member has exceeded earning limits.
- 4. H 24 An Act Relative to Wages: Includes sick and vacation leave taken in conjunction with workers' compensation as part of regular compensation for retirement purposes.
- 5. H 25 An Act Relative to Modification of Retirement Allowances: Streamlines the process for modification of retirement allowances in an instance where a disabled retiree has exceeded earnings limits.
- **6.** H 26 An Act Relative to Accidental Disability and Group 1 Emotional Distress: Allows a Group 1 member to cite employer incident reports to satisfy the injury report requirement when filing for disability based on an emotional injury.

PERAC regularly reviewed legislation by legislative request for matters of equity, consistency, and technicality. Additionally, PERAC regularly responded to legislative requests regarding retirement-related issues for constituents.

Conclusion

I assumed the position of PERAC Executive Director a little over a year ago and never could have imagined what this first year would lead into in year two. A key initiative for this period was to undertake nearly 50 personal visits to the retirement boards, with the balance planned for this current year, prior to the shutdown.

These visits helped develop, foster and maintain personal relationships and lines of communication with board members and staff that proved invaluable as an unforeseen, once-in-a-lifetime emergency hit. The dedication, collaboration and cooperation that all of those involved in the Massachusetts public pension community have shown in serving the needs of members and their beneficiaries during these most challenging times has been most impressive. With that as our backdrop, I know that together we can meet any challenge and our future will be bright.

Sincerely,

John W. Parsons, Esq. Executive Director



PERAC By the Numbers

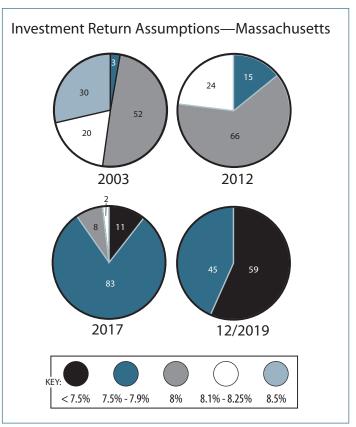
Actuarial Unit

As always, actuarial information details the fiscal condition of the systems, which can play a direct role in state and local budgets. The funded ratio indicates the extent to which assets cover system liabilities. When the system will pay off its unfunded liability and what type of funding technique is being used are also noted. PERAC has consistently urged boards to conduct actuarial valuations in order to provide an up-to-date assessment of the fiscal condition of the system.

In the actuarial area, PERAC approved 36 revised funding schedules and completed 17 actuarial valuations in 2019. The valuations complemented the 22 valuations performed by private actuaries. The Actuarial Unit also completed the annual actuarial valuation of the Commonwealth's pension liability. Throughout the year, PERAC responded to legislative and gubernatorial requests for analysis of legislation and made presentations at several forums.

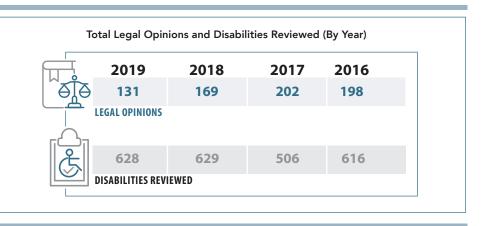
The Massachusetts Investment Return Assumptions from 2003 to present:

ctuarial V	ctuarial Valuations and Funding Schedules (By Year				
YEAR	PERAC VALUATIONS	PRIVATE VALUATIONS	FUNDING SCHEDULES		
2019	17	22	36		
2018	19	44	63		
2017	22	24	46		
2016	21	50	62		
2015	24	24	40		
2014	27	49	78		



Legal Unit

PERAC's Legal Unit, in addition to representing the Commission at all levels, including the Supreme Judicial Court, issued 131 Legal Opinions, reviewed 628 disabilities and remanded 28 in 2019.



Medical Panels/Post-Retirement Earnings

As always, PERAC was busy assisting the boards in numerous other areas. In 2019, the Disability Unit processed 768 medical panel requests and conducted 1,424 in-house case reviews. This work resulted in the approval of 628 disability applications and 23 accidental death claims.

PERAC is responsible for the postretirement monitoring of disabled retirees. One aspect of that task is enforcing the earnings limits set forth in Chapter 32. In 2019, PERAC analyzed 12,859 earnings reports, 3,473 retirees reported earnings and 87 earned in excess of the statutory limits. An additional 92 retirees failed to comply with the reporting requirement. This resulted in the identification of \$1,222,947 in excess earnings and \$2,401,351 for non-compliance. In addition, 23 retirees waived their allowance, saving \$356,167. ■

	Medical Panels (By Year)					
YEAR	MEDICAL PANEL REQUESTS	IN-HOUSE CME REVIEWS	DISABILITY APPROVALS	DEATH APPROVALS		
2019	768	1,424	628	23		
2018	641	1,312	616	9		
2017	523	1,315	456	53		
2016	659	1,356	499	76		
2015	648	1,398	543	66		
2014	669	1,302	573	24		

"No members' retirement benefits were modified under the Commission's Modification Policy in 2019. This review to date has resulted in the modification of 15 member retirement allowances. Savings due to that action total \$299,967 annually."

YEAR	EARNINGS REPORTS ANALYZED	REPORT EARNIN		NUMBER OF EXCESS EARNERS	NON- COMPLIANT	WAIVED
2019	12,859	3,47	3	87	92	23
2018	12,773	3,55	7	62	73	21
2017	15,576	3,72	0	59	135	21
2016	15,895	3,84	9	54	101	37
2015	15,887	3,84	5	146	84	36
2014	15,699	3,79	2	125	91	38
		\$,				
YEAR	EXCESS EARNINGS AMOUNT		N	ON-COMPLIANC AMOUNT		VAIVED MOUNT
2019	\$1,222,947		\$	2,401,35	1 \$35	56,167
2018	\$933,422		\$	1,572,72	9 \$35	52,691
2017	\$858,781		\$	4,418,86	7 \$40	00,867
2016	\$839,9	102	-	2,606,47	1 650	02,028

\$2,176,174

\$1,334,305

\$556,935

\$512,247

\$1,459,550

\$1,167,922

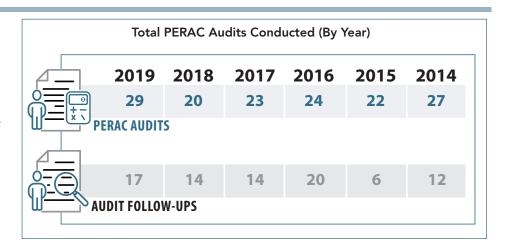
2015

2014

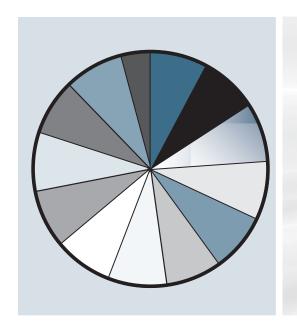
Post-Retirement Earnings (By Year)

Audits

In 2019, PERAC published 29 audits of retirement systems. In addition, 17 follow-up audits were issued. As always, PERAC audit staff conducted annual seminars on the preparation of the Annual Statement, and provided technical assistance to dozens of boards.







Massachusetts Contributory Retirement Board Profiles

Introduction

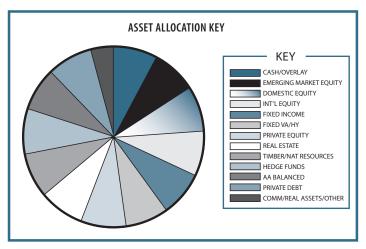
The Board Profile section of the PERAC Annual Report provides a detailed assessment of some of the important indicators relative to the financial health of the retirement systems. The information provided in this report can enable board members to provide factual comment and advice to policymakers as various proposals relative to the retirement law are assessed. Through this and other studies, the Commission seeks to provide objective, comprehensive, and accurate data for use by all interested parties.

A Word on Portfolio Valuations

In assessing investment performance, PERAC relies on the retirement boards to submit accurate and complete information about investment activity. PERAC numbers might differ from those provided to a board by its consultant because PERAC measures all assets, including monies not committed to investment management.

Asset allocation is presented in graph form. The way a board allocates its assets among the various investment classes available to it has long been recognized as the prime determining factor in the generation of returns. Allocation information reported by the investment consultants advising the retirement boards, or PRIM, forms the basis of these graphs. PERAC has not independently confirmed the accuracy of this data.

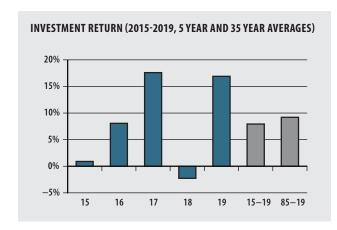
The key used for the Asset Allocation graphs:



DISCLAIMER: In publishing this information PERAC makes no comment regarding any retirement board's asset allocation, investment strategy, or manager/fund commitments.

COMPOSITE INVESTMENT PROFILE

- Commonwealth of Massachusetts
- Public Employee Retirement Systems and Pension Reserves Investment Trust



INVESTMENT

90%
4.9 B
95%
22%

After publishing the 2019 Investment Report, adjustments made to a few boards impacted the composite performance returns.

Adams

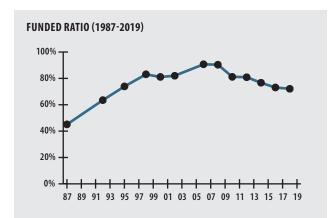
Adams Visitor Center 3 Hoosac Street, 2nd Floor Adams, MA 01220 Phone: 413-743-5575 Fax: 413-743-2815

Board Members

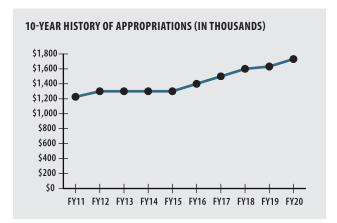
Mary Beverly*, Patricia Wol, Holli Havens-Jayko, George Haddad, Beth Matson *indicates Chairperson **Board Administrator** Cheryl DeMarsico

Board Meeting

4th Monday of the month at 4:00 pm



15% 16 17 18 19 15–19 85–19

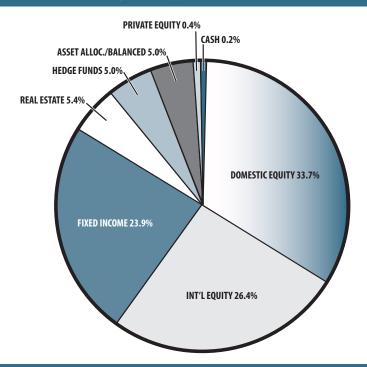


INVESTMENT RETURN	NVESTMENT RETURN HISTORY				
35 years 2019 7.76%	34 years 2018 7.47%	33 years 2017 7.87%			
<u>10 years 2019</u> 6.59%	10 years 2018 6.56%	10 years 2017 4.53%			
<u>5 years 2019</u> 5.91%	<u>5 years 2018</u> 2.60%	<u>5 years 2017</u> 6.86%			

ACTUARIAL

► Funded Ratio		72.1%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		6.85%
► Funding Schedule		6.1% Total Increasing
▶ Year Fully Funded		2035
Unfunded Liability		\$13.6 M
► Total Pension Appropriation (Fiscal 2020)		\$1.7 M
	ACTIVE	RETIRED
Number of Members	184	147
► Total Payroll/Benefit	\$6.3 M	\$2.7 M
Average Salary/Benefit	\$34,200	\$18,100
► Average Age	48	73
► Average Service	11.4 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	6
► Number Who Reported Earnings	3
Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	18.46%
▶ 2019 Market Value	\$36.5 M
▶ 2015-2019 (Annualized)	5.91%
▶ 1985-2019 (Annualized)	7.76%

Amesbury

Town Hall 62 Friend Street Amesbury, MA 01913-2825 Phone: 978-388-8131 Fax: 978-388-6727

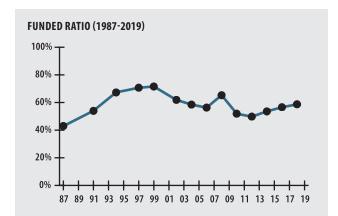
Board Members

Angel Wills, Craig Bailey, Donna Cornoni*, Bonnijo Kitchin, David Van Dam *indicates Chairperson

Board Administrator

Kevin Caira **Board Meeting**

Board MeetingLast Thursday of the month at 1:30 pm

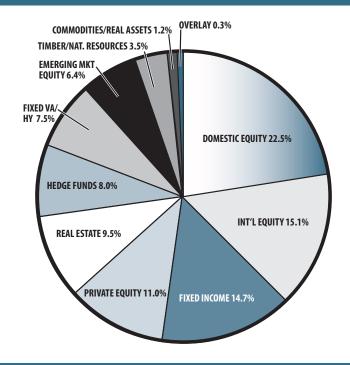


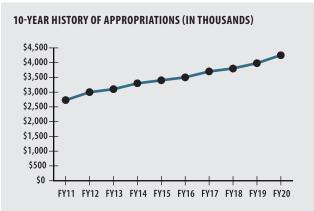
ACTUARIAL

▶ Funded Ratio		58.7%
▶ Date of Last Valuation		1/1/18
► Actuary		Sherman
► Assumed Rate of Return		7.75%
▶ Funding Schedule		4.0% Increasing
Year Fully Funded		2035
Unfunded Liability		\$39.2 M
► Total Pension Appropriation (Fiscal 2020)		\$4.2 M
	ACTIVE	RETIRED
Number of Members	279	244
► Total Payroll/Benefit	\$14.3 M	\$6.2 M
Average Salary/Benefit	\$51,200	\$25,400
► Average Age	NA	73
Average Service	NA	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019	34 years 2018	33 years 2017
8.13%	7.90%	8.20%
10 years 2019	10 years 2018	10 years 2017
8.99%	9.12%	5.63%
5 years 2019 8.03%	5 years 2018 6.45%	5 years 2017 9.85%

10
6
0
\$0.00

▶ 2019 Return	16.40%
▶ 2019 Market Value	\$61.8 M
▶ 2015-2019 (Annualized)	8.03%
▶ 1985-2019 (Annualized)	8.13%

Andover

Town Offices 36 Bartlet Street Andover, MA 01810 Phone: 978-623-8540 Fax: 978-623-8594

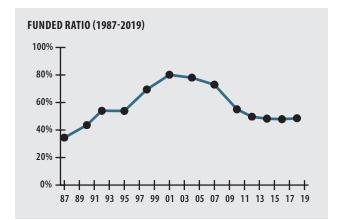
Board Members

Hayley Green*, Thomas Hartwell, Elena Kothman, James Cuticchia, Gary Coon *indicates Chairperson

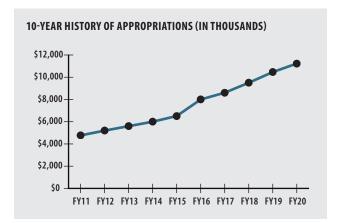
Board Administrator

Elena Kothman **Board Meeting**

Fourth Thursday of each month at 8:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 15 16 17 18 19 15-19 85-19

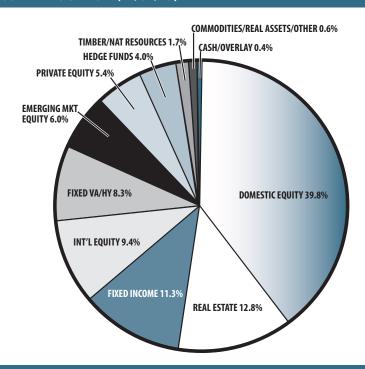


INVESTMENT RETURN HISTORY			
35 years 2019	34 years 2018	33 years 2017	
8.47%	8.18%	8.56%	
<u>10 years 2019</u> 9.10%	10 years 2018 9.01%	10 years 2017 5.66%	
<u>5 years 2019</u> 8.13%	<u>5 years 2018</u> 6.13%	5 years 2017 9.97%	

ACTUARIAL

► Funded Ratio		48.6%
▶ Date of Last Valuation		1/1/18
► Actuary		Segal
Assumed Rate of Return		7.00%
▶ Funding Schedule		7.2% Total Increasing
▶ Year Fully Funded		2035
▶ Unfunded Liability		\$145.1 M
► Total Pension Appropriation (Fiscal 2020)		\$11.2 M
	ACTIVE	RETIRED
Number of Members	728	470
► Total Payroll/Benefit	\$40.5 M	\$14.2 M
Average Salary/Benefit	\$55,700	\$30,200
► Average Age	49	NA
► Average Service	12.6 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	35
► Number Who Reported Earnings	9
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	18.72%
▶ 2019 Market Value	\$162.3 M
▶ 2015-2019 (Annualized)	8.13%
▶ 1985-2019 (Annualized)	8.47%

Arlington

27 Maple Street Suite G-11 Arlington, MA 02476 Phone: 781-316-3370

Fax: 781-316-3379

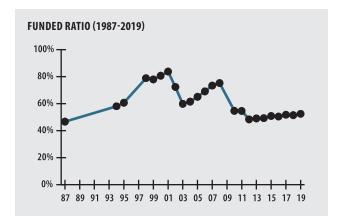
Board Members

Ida Cody, Richard Keshian, Robert Jefferson, Kenneth Hughes*, Ken Steele *indicates Chairperson

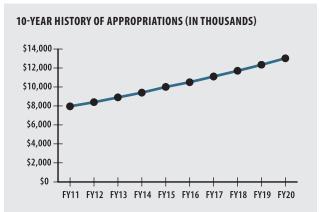
Board Administrator

Richard Greco **Board Meeting**

Last Thursday of the month at 4:30 pm







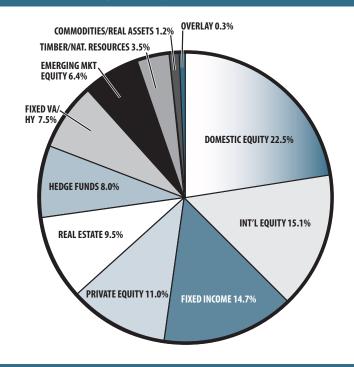
INVESTMENT RETURN HISTORY			
35 years 2019	34 years 2018	33 years 2017	
8.44%	8.22%	8.53%	
10 years 2019	10 years 2018	10 years 2017	
8.83%	8.70%	4.90%	
<u>5 years 2019</u> 7.76%	<u>5 years 2018</u> 6.22%	5 years 2017 9.53%	

INVECTMENT DETIIDN HICTORY

ACTUARIAL

► Funded Ratio		52.5%
▶ Date of Last Valuation		1/1/19
► Actuary		Stone
► Assumed Rate of Return		7.00%
▶ Funding Schedule		6.0% Total Increasing
▶ Year Fully Funded		2035
▶ Unfunded Liability		\$142.6 M
► Total Pension Appropriation (Fiscal 2020)		\$13.0 M
	ACTIVE	RETIRED
Number of Members	773	607
► Total Payroll/Benefit	\$40.1 M	\$18.2 M
Average Salary/Benefit	\$51,900	\$29,900
► Average Age	47	75
► Average Service	10 years	NA

ASSET ALLOCATION (12/31/19)



75
20
1
\$4,022.80

▶ 2019 Return	16.27%
▶ 2019 Market Value	\$173.6 M
▶ 2015-2019 (Annualized)	7.76%
▶ 1985-2019 (Annualized)	8.44%

Attleboro

77 Park Street Attleboro, MA 02703

Phone: 508-223-2222, Ext. 3201 Fax: 508-223-2063

Board Members

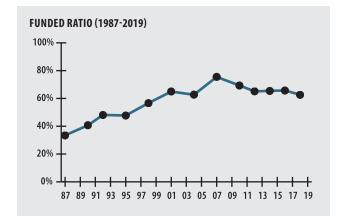
Deborah Gould, Barry Lacasse, Scott Charette, Bruce Tondreau*,

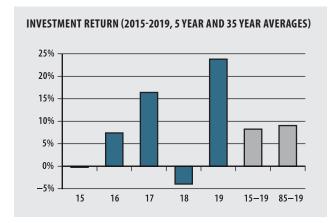
Richard Boucher *indicates Chairperson

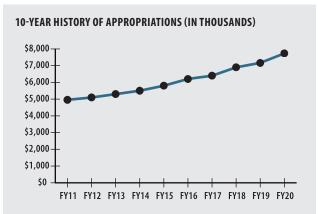
Board Administrator

Leslie Ring **Board Meeting**

Usually the last week of the month





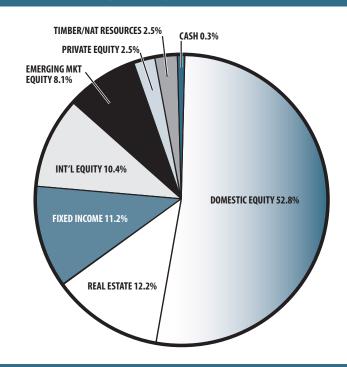


INVESTMENT RETURN HISTORY		
35 years 2019 9.05%	34 years 2018 8.64%	33 years 2017 9.04%
10 years 2019 9.74%	10 years 2018 9.44%	10 years 2017 6.40%
5 years 2019 8.24%	<u>5 years 2018</u> 4.99%	5 years 2017 9.88%

ACTUARIAL

► Funded Ratio		62.6%
Date of Last Valuation		1/1/18
► Actuary		Stone
► Assumed Rate of Return		7.50%
▶ Funding Schedule		4.0% Increasing Phase-In
Year Fully Funded		2035
▶ Unfunded Liability		\$86.0 M
► Total Pension Appropriation (Fiscal 2020)		\$7.7 M
	ACTIVE	RETIRED
Number of Members	647	435
► Total Payroll/Benefit	\$34.3 M	\$12.4 M
Average Salary/Benefit	\$53,000	\$28,500
► Average Age	47	72
► Average Service	12.5 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	42
▶ Number Who Reported Earnings	12
► Number of Excess Earners	1
▶ Total Amount of Refund Due	\$125.44

▶ 2019 Return	23.83%
▶ 2019 Market Value	\$167.7 M
▶ 2015-2019 (Annualized)	8.24%
▶ 1985-2019 (Annualized)	9.05%

Barnstable County

750 Attucks Lane Hyannis, MA 02601 Phone: 508-775-1110 Fax: 508-775-1344

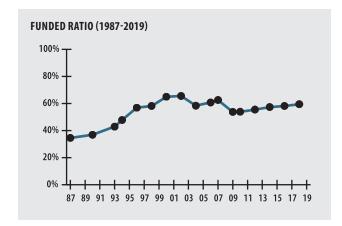
Board Members

Robert Lawton, Jr.*, Ronald Bergstrom, Robert Rolanti, Harold Brunelle, Judith Sprague *indicates Chairperson

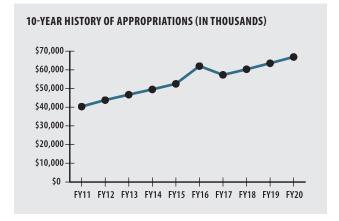
Board Administrator

Christine Tetreault **Board Meeting**

Fourth Tuesday of each month at 9:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 16% 14% 12% 10% 8% 6% 4% 2% 15 17 15-19 85-19

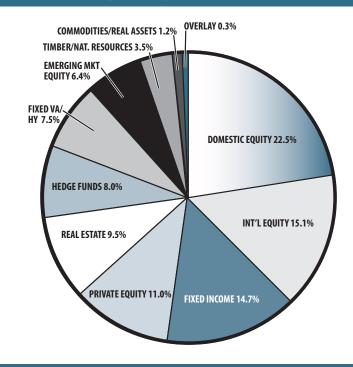


INVESTMENT RETURN HISTORY		
35 years 2019	34 years 2018	33 years 2017
7.69%	7.42%	7.71%
<u>10 years 2019</u>	<u>10 years 2018</u>	10 years 2017
9.16%	9.11%	5.61%
<u>5 years 2019</u>	<u>5 years 2018</u>	5 years 2017
8.21%	6.50%	9.96%

ACTUARIAL

	59.5%
	1/1/18
	Segal
	7.38%
	5.28% Total Increasing
	2035
	\$722.4 M
	\$66.9 M
ACTIVE	RETIRED
4,633	3,117
\$271.5 M	\$85.8 M
\$58,600	\$27,500
48	71
12 years	NA
	4,633 \$271.5 M \$58,600 48

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	342
▶ Number Who Reported Earnings	133
▶ Number of Excess Earners	3
▶ Total Amount of Refund Due	\$80,972.04

▶ 2019 Return	17.26 %
▶ 2019 Market Value	\$1.2 B
▶ 2015-2019 (Annualized)	8.21%
▶ 1985-2019 (Annualized)	7.69%

Belmont

90 Concord Avenue 3rd Floor, Suite 3 Belmont, MA 02478-0900 Phone: 617-993-2792 Fax: 617-993-2793

Board Members

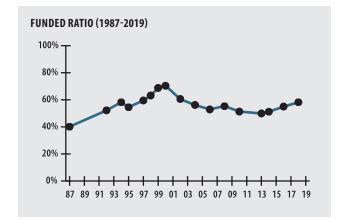
Chitra Subramanian, Floyd Carman, Ross Vona, Walter Wellman, Thomas Gibson* *indicates Chairperson

Board Administrator

Robert Soohoo

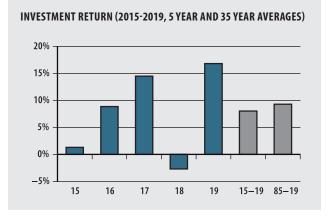
Board Meeting

Usually 3rd or 4th Monday of the month at 8:15 am

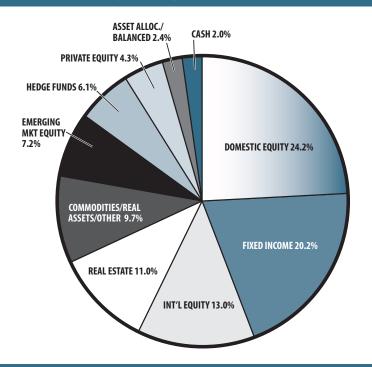


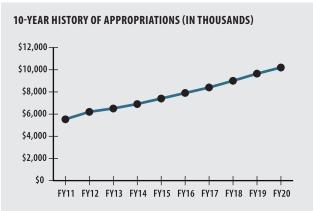
ACTUARIAL

▶ Funded Ratio		58.2%
▶ Date of Last Valuation		1/1/18
► Actuary		Segal
► Assumed Rate of Return		7.40%
► Funding Schedule		5.75% Total Increasing
▶ Year Fully Funded		2029
Unfunded Liability		\$76.6 M
▶ Total Pension Appropriation (Fiscal 2020)		\$10.2 M
	ACTIVE	RETIRED
Number of Members	467	354
► Total Payroll/Benefit	\$26.4 M	\$11.1 M
Average Salary/Benefit	\$56,500	\$31,200
▶ Average Age	47	74
► Average Service	11.4 years	NA



ASSET ALLOCATION (12/31/19)





EARNED INCOME OF DISABILITY RETIREES (2018)

12
0
\$0.00

35 years 2019 9.32%	34 years 2018 9.11%	33 years 2017 9.49%	
10 years 2019 8.99%	10 years 2018 9.83%	10 years 2017 7.35%	
5 years 2019 7.51%	<u>5 years 2018</u> 5.57%	5 years 2017 9.55%	

▶ 2019 Return	16.85%
▶ 2019 Market Value	\$119.0 M
▶ 2015-2019 (Annualized)	7.51%
▶ 1985-2019 (Annualized)	9.32%

INVESTMENT RETURN HISTORY

Berkshire County

29 Dunham Mall Pittsfield, MA 01201 Phone: 413-499-1981 Fax: 413-445-7990

Board Members

ACTUARIAL

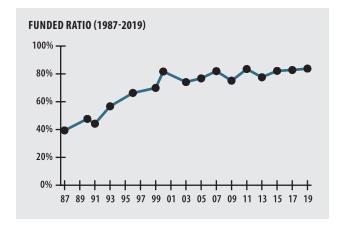
Paul Lisi, Michael Ovitt*, Mark Bashara, Karen Williams *indicates Chairperson

Board Administrator

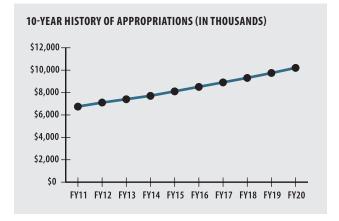
Sheila LaBarbera **Board Meeting**

Last Wednesday of the month at 9:00 am

\$10.2 M



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 17 16 18 15-19 85-19



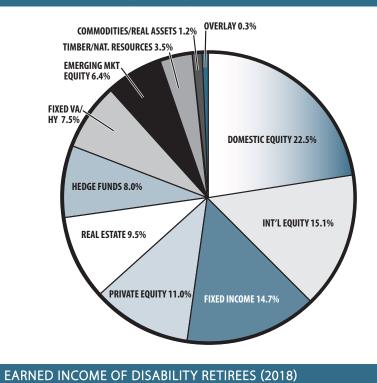
INVESTMENT RETURN HISTORY		
35 years 2019 9.05%	34 years 2018 8.84%	33 years 2017 9.18%
10 years 2019 9.01%	10 years 2018 9.12%	10 years 2017 5.62%
<u>5 years 2019</u> 8.06%	<u>5 years 2018</u> 6.47%	5 years 2017 9.89%

▶ Funded Ratio 83.8% ▶ Date of Last Valuation 1/1/19 ▶ Actuary **PERAC** ▶ Assumed Rate of Return 7.00% ▶ Funding Schedule 7.01% Total Increasing ▶ Year Fully Funded 2028 ▶ Unfunded Liability \$47.3 M

	ACTIVE	RETIRED
Number of Members	1,151	816
► Total Payroll/Benefit	\$47.2 M	\$14.8 M
Average Salary/Benefit	\$41,000	\$18,200
► Average Age	50	74
Average Service	11 years	NA

ASSET ALLOCATION (12/31/19)

▶ Total Pension Appropriation (Fiscal 2020)



► Number of Disability Retirees	23
▶ Number Who Reported Earnings	6
► Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.48%
▶ 2019 Market Value	\$269.2 M
▶ 2015-2019 (Annualized)	8.06%
▶ 1985-2019 (Annualized)	9.05%

Beverly

City Hall 191 Cabot Street Beverly, MA 01915 Phone: 978-605-2370 Fax: 978-921-8582

Board Members

Carol Augulewicz, Bryant Ayles, Richard Pierce*, Kevin Smith, **Charles Kostro** *indicates Chairperson

Board Administrator

Barbara Wells **Board Meeting**

Usually the last Thursday of each month at 6:00 pm



ACTUARIAL ▶ Date of Last Valuation ▶ Actuary ▶ Assumed Rate of Return ▶ Funding Schedule



▶ Year Fully Funded

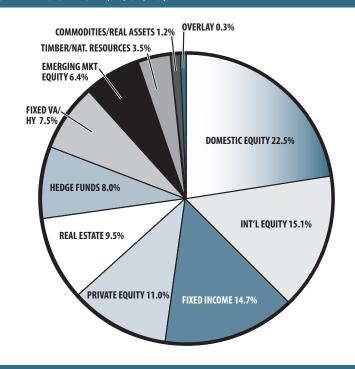
57.3% 1/1/18 **PERAC** 7.35% 4.45% Total Increasing 2033

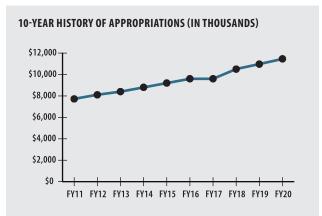
▶ Unfunded Liability \$91.7 M ▶ Total Pension Appropriation (Fiscal 2020) \$11.5 M

	ACTIVE	RETIRED
Number of Members	603	453
► Total Payroll/Benefit	\$29.6 M	\$12.9 M
Average Salary/Benefit	\$49,000	\$28,600
► Average Age	48	74
► Average Service	11.2 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019	34 years 2018	33 years 2017
8.66%	8.44%	8.76%
10 years 2019 9.16%	10 years 2018 9.26%	10 years 2017 5.71%
<u>5 years 2019</u>	<u>5 years 2018</u>	5 years 2017
8.10%	6.48%	9.98%

► Number of Disability Retirees	43
► Number Who Reported Earnings	13
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.71%
▶ 2019 Market Value	\$141.3 M
▶ 2015-2019 (Annualized)	8.10%
▶ 1985-2019 (Annualized)	8.66%

Blue Hills Regional Vocational School

800 Randolph Street Canton, MA 02021 Phone: 781-828-5800 Fax: 781-828-0794

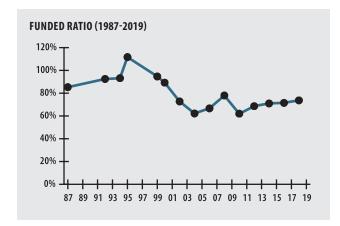
Board Members

Charles Gisondi*, Steven Moore, Patricia Brooks, Kathleen Manning, Lisa Maloney *indicates Chairperson

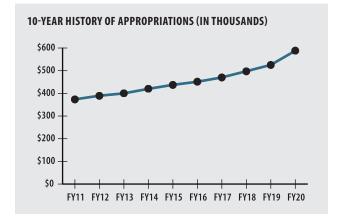
Board Administrator

David Sullivan **Board Meeting**

Last Tuesday of the month at 3:30 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 16 17 18 19 15-19 85-19



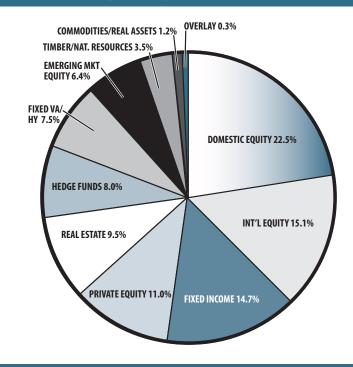
INVESTMENT KETOKN HISTORY				
35 years 2019 8.74%	34 years 2018 8.52%	33 years 2017 8.85%		
10 years 2019 9.01%	10 years 2018 9.11%	10 years 2017 5.74%		
<u>5 years 2019</u> 8.00%	<u>5 years 2018</u> 6.41%	<u>5 years 2017</u> 9.87%		

INVECTMENT DETIIDN HICTORY

ACTUARIAL

► Funded Ratio		73.7%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.35%
► Funding Schedule		7.10% Total Increasing
Year Fully Funded		2032
► Unfunded Liability		\$3.9 M
► Total Pension Appropriation (Fiscal 2020)		\$558 K
	ACTIVE	RETIRED
Number of Members	55	50
► Total Payroll/Benefit	\$2.6 M	\$980 K
Average Salary/Benefit	\$46,400	\$19,600
► Average Age	50	78
Average Service	9.4 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	0
▶ Number Who Reported Earnings	0
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.48%
▶ 2019 Market Value	\$12.4 M
▶ 2015-2019 (Annualized)	8.00%
▶ 1985-2019 (Annualized)	8.74%

Boston (City)

City Hall, Room 816 Boston, MA 02201 Phone: 617-635-4305 Fax: 617-635-4318

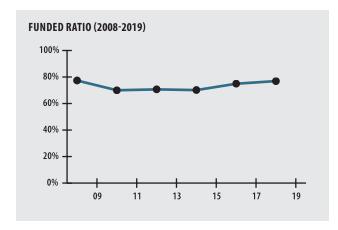
Board Members

Maureen Joyce, Daniel Greene*, Michael O'Reilly, Michael McLaughlin, Thomas Jackson *indicates Chairperson

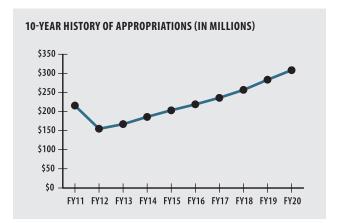
Board Administrator

Timothy Smyth **Board Meeting**

3rd Wednesday of every month at 10:00 am



INVESTM	ENT RE	TURN (20	15-201	9, 5 YEAF	R AND 35	YEAR AV	ERAGES)
^{20%} T							
15%			-				
10%			+		_		
5%			4		_		-
0%							
-5%					•		
_10% _							
1070	15	16	17	18	19	15-19	85-19

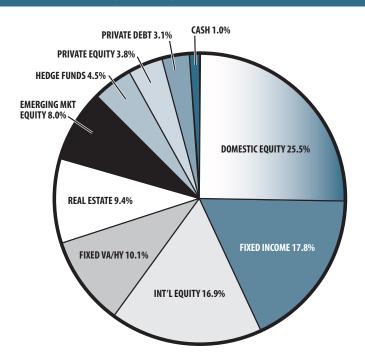


INVESTMENT RETURN HISTORY			
35 years 2019	34 years 2018	33 years 2017	
8.84%	8.61%	9.06%	
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>	
8.11%	8.36%	5.97%	
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>	
6.85%	4.57%	8.75%	

ACTUARIAL

► Funded Ratio		76.9%
▶ Date of Last Valuation		1/1/18
► Actuary		Segal
► Assumed Rate of Return		7.50%
► Funding Schedule		8.85% Total Increasing
Year Fully Funded		2025
Unfunded Liability		\$1.5 B
► Total Pension Appropriation (Fiscal 2020)		\$308.3 M
	ACTIVE	RETIRED
Number of Members	14,445	9,721
► Total Payroll/Benefit	\$978.1 M	\$344.3 M
Average Salary/Benefit	\$67,700	\$35,400
► Average Age	46	74
► Average Service	13.7 years	NA

ASSET ALLOCATION (12/31/19)



Number of Disability Retirees	1,538
Number Who Reported Earnings	290
► Number of Excess Earners	12
► Total Amount of Refund Due	\$190,896.42

▶ 2019 Return	16.90%
▶ 2019 Market Value	\$5.6 B
▶ 2015-2019 (Annualized)	6.85%
▶ 1985-2019 (Annualized)	8.84%

Boston Teachers

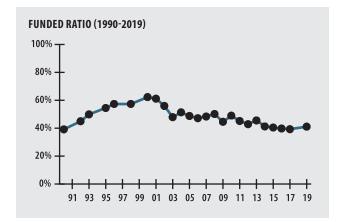
City Hall, Room 816 Boston, MA 02201 Phone: 617-635-4305 Fax: 617-635-4318

Board Members

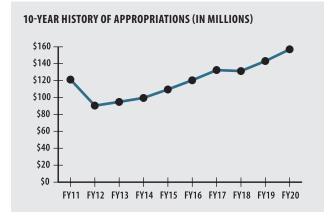
Maureen Joyce, Daniel Greene*, Michael O'Reilly, Michael McLaughlin, Thomas Jackson *indicates Chairperson

Board Administrator

Timothy Smyth



INVESTMENT RETURN (2015-2019 AND 5 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 16 17 18 19 14-19



NOTES: BOSTON (CITY) & BOSTON (TEACHERS)

The results for Boston Teachers and non-teachers (City) are separated in this report. The liability for Boston Teachers has always been the responsibility of the Commonwealth. In 2010, legislation was enacted that allocated assets to Boston Teachers and separate accounts have been maintained since that date. The actuarial information for the City now solely reflects liability that is the responsibility of the City. The Funded Ratio and History of Appropriations charts for the City and the History of Appropriations chart for the Boston Teachers reflect information available since that allocation.

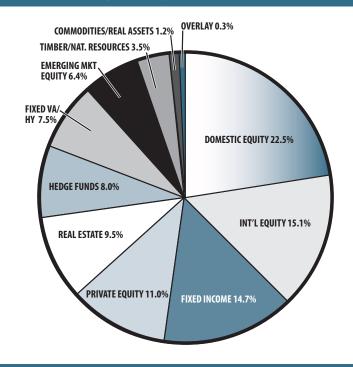
Please note the following when reviewing the charts on these pages:

- Boston Teachers' assets prior to 2010 were estimated as approximately 30% of Boston (System) total assets.
- The information with respect to Disability Retirees on the City Board Profile page reflects the entire system, including Boston Teachers.
- The information with respect to Investment Return History for the City reflects actual returns for Boston (City) for 2015-2019 and total returns for the Boston System prior to 2011.

ACTUARIAL

► Funded Ratio		41.1%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
► Assumed Rate of Return		7.25%
► Funding Schedule		8.94% Total Increasing
▶ Year Fully Funded		2036
▶ Unfunded Liability		\$2.4 B
► Total Pension Appropriation (Fiscal 2020)		\$157.0 M
	ACTIVE	RETIRED
Number of Members	6,358	4,790
► Total Payroll/Benefit	\$565.0 M	\$254.4 M
Average Salary/Benefit	\$88,900	\$53,100
► Average Age	42	73
► Average Service	10.5 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	NA
▶ Number Who Reported Earnings	NA
▶ Number of Excess Earners	NA
▶ Total Amount of Refund Due	NA

▶ 2019 Return	16.44%
▶ 2019 Market Value	\$1.9 B
▶ 2015-2019 (Annualized)	8.06%

Braintree

74 Pond Street, 2nd Floor Braintree, MA 02184 Phone: 781-794-8210 Fax: 781-794-8407

Board Members

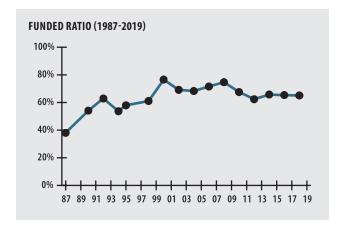
Edward Spellman, Joseph Driscoll, Frederick Viola, Gerald Kenny*, David DelGallo *indicates Chairperson

Board Administrator

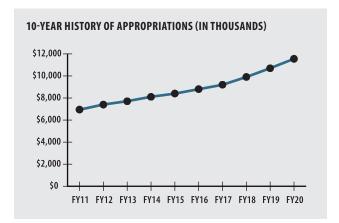
Dennis Gallagher

Board Meeting

Fourth Thursday of each month at 4:00 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% 16 17 18 19 15-19 85-19

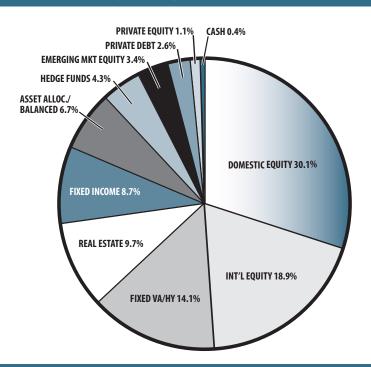


INVESIMENT RETURN HISTORY			
35 years 2019	34 years 2018	33 years 2017	
8.66%	8.38%	8.79%	
10 years 2019	10 years 2018	10 years 2017	
8.05%	8.23%	6.12%	
5 years 2019	<u>5 years 2018</u>	<u>5 years 2017</u>	
7.28%	4.89%	8.54%	

ACTUARIAL

► Funded Ratio		65.1%
▶ Date of Last Valuation		1/1/18
► Actuary		KMS
► Assumed Rate of Return		7.65%
▶ Funding Schedule		4.0% Increasing Phase-In
Year Fully Funded		2033
Unfunded Liability		\$105.8 M
► Total Pension Appropriation (Fiscal 2020)		\$11.5 M
	ACTIVE	RETIRED
Number of Members	803	504
► Total Payroll/Benefit	\$48.0 M	\$16.0 M
Average Salary/Benefit	\$59,800	\$31,700
► Average Age	50	75
► Average Service	13.1 years	NA

ASSET ALLOCATION (12/31/19)



EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	57
► Number Who Reported Earnings	17
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	18.55%
▶ 2019 Market Value	\$225.0 M
▶ 2015-2019 (Annualized)	7.28%
▶ 1985-2019 (Annualized)	8.66%

INVECTMENT DETIIDN HICTORY

Bristol County

County Crossing 645 County Street Taunton, MA 02780 Phone: 508-824-4029

Fax: 508-880-8749

Board Members

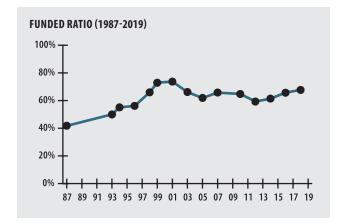
Christopher Saunders*, John Saunders, William Downey, Stephen Rivard, **Christine DeFontes** *indicates Chairperson

Board Administrator

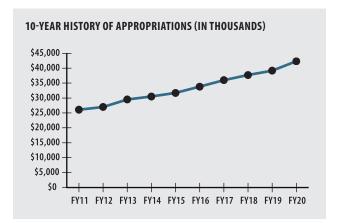
Roxanne Donovan

Board Meeting

4th Wednesday of the month at 9:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% 15 16 17 18 19 15-19 85-19

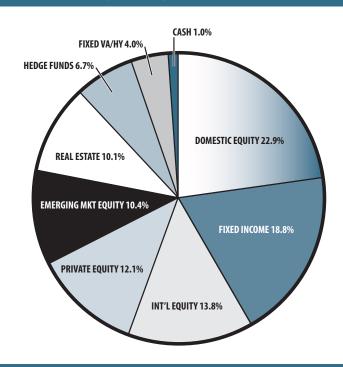


INVESTMENT RETURN HISTORY		
35 years 2019	34 years 2018	33 years 2017
8.90%	8.64%	9.01%
<u>10 years 2019</u>	<u>10 years 2018</u>	10 years 2017
8.86%	9.24%	6.28%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
7.57%	5.16%	9.42%

ACTUARIAL

	67.7%
	1/1/18
	Sherman
	7.75%
	4.5% Increasing Phase-In
	2028
	\$320.5 M
	\$42.3 M
ACTIVE	RETIRED
3,220	2,500
\$164.5 M	\$61.0 M
\$51,100	\$24,400
NA	72
NA	NA
	3,220 \$164.5 M \$51,100 NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	225
▶ Number Who Reported Earnings	75
► Number of Excess Earners	3
► Total Amount of Refund Due	\$18,268.86

▶ 2019 Return	18.16%
▶ 2019 Market Value	\$746.3 M
▶ 2015-2019 (Annualized)	7.57%
▶ 1985-2019 (Annualized)	8.90%

Brockton

1322 Belmont Street, Suite 101 Brockton, MA 02301 Phone: 508-580-7847 Fax: 508-559-0559

Board Members

MaryLynn Peters-Chu, John Condon, Archie Gormley, Scott Albanese, William Farmer* *indicates Chairperson

Board Administrator

Jeanne Martineau

Board Meeting

Typically one day within the last week of month at 1:00 pm

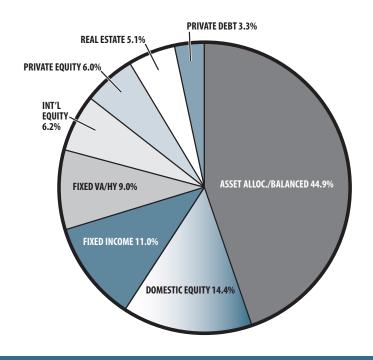


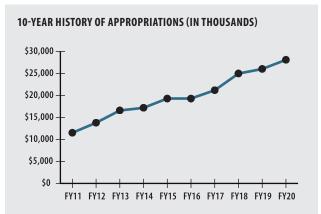
ACTUARIAL

► Funded Ratio		62.4%
▶ Date of Last Valuation		1/1/18
► Actuary		KMS
► Assumed Rate of Return		7.75%
▶ Funding Schedule		4.0% Increasing Phase-In
▶ Year Fully Funded		2032
▶ Unfunded Liability		\$247.6 M
► Total Pension Appropriation (Fiscal 2020)		\$28.1 M
	ACTIVE	RETIRED
Number of Members	1,731	1,284
► Total Payroll/Benefit	\$96.1 M	\$40.9 M
Average Salary/Benefit	\$55,500	\$31,800
► Average Age	47	74
► Average Service	11.9 years	NA



ASSET ALLOCATION (12/31/19)





35 years 2019 8.62% 10 years 2019 7.67%

34 years 2018 8.39%	33 years 2017 8.83%
10 years 2018 8.29%	10 years 2017 5.17%
5 years 2018 4.59%	<u>5 years 2017</u> 8.22%

EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	146
► Number Who Reported Earnings	38
► Number of Excess Earners	1
► Total Amount of Refund Due	\$66,444.12

▶ 2019 Return	16.65%
▶ 2019 Market Value	\$437.6 M
▶ 2015-2019 (Annualized)	6.59%
▶ 1985-2019 (Annualized)	8.62%

5 years 2019 6.59%

INVESTMENT RETURN HISTORY

Brookline

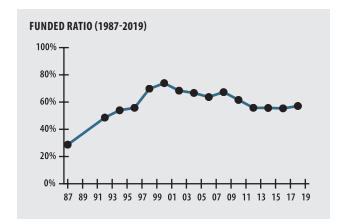
Public Health Bldg., Ground Floor 11 Pierce Street Brookline, MA 02445 Phone: 617-730-2028 Fax: 617-730-2298

Board Members

Michael DiPietro, Jeana Franconi, John Canney, Robert Ward, Gary Altman* *indicates Chairperson **Board Administrator** Frank Zecha

Board Meeting

Varies

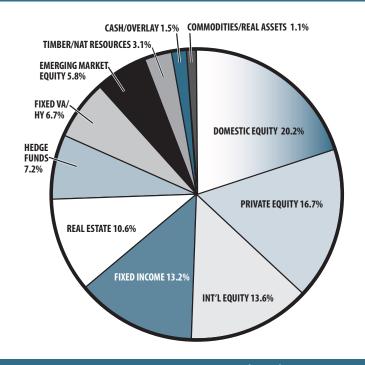


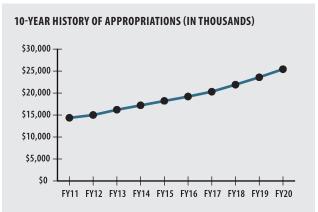
ACTUARIAL

► Funded Ratio		57.1%
▶ Date of Last Valuation		1/1/18
► Actuary		Segal
► Assumed Rate of Return		7.20%
▶ Funding Schedule		7.85% Total Increasing
▶ Year Fully Funded		2030
▶ Unfunded Liability		\$227.5 M
► Total Pension Appropriation (Fiscal 2020)		\$25.4 M
	ACTIVE	RETIRED
Number of Members	1,411	911
► Total Payroll/Benefit	\$77.7 M	\$30.3 M
Average Salary/Benefit	\$55,100	\$33,300
► Average Age	43	74
► Average Service	9.8 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY 35 years 2019 34 years 2018 33 years 2017 8.65% 8.45% 8.77% 10 years 2019 10 years 2017 10 years 2018 8.04% 8.67% 5.35% 5 years 2019 5 years 2018 5 years 2017 7.57% 5.85% 8.69%

► Number of Disability Retirees	153
▶ Number Who Reported Earnings	37
► Number of Excess Earners	1
► Total Amount of Refund Due	\$21,367.56

15.95%
\$343.8 M
7.57%
8.65%

Cambridge

100 Cambridge Park Drive Suite 101 Cambridge, MA 02140-2369 Phone: 617-868-3401 Fax: 617-868-3477

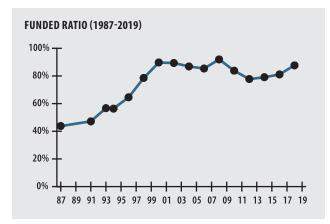
Board Members

James Monagle, Michael Gardner, Francis Murphy*, John Shinkwin, Nadia Chamblin-Foster *indicates Chairperson

Board Administrator

Ellen Philbin **Board Meeting**

First Monday of the month at 5:00 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5%

18

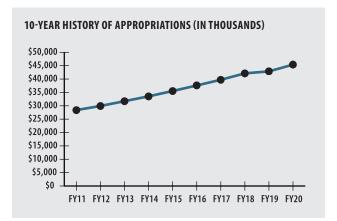
19

15-19 85-19

15

16

17

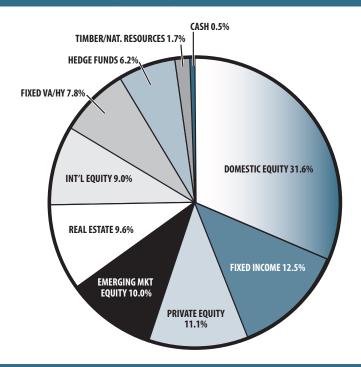


INVESTMENT RETURN	HISTORY	
35 years 2019 9.27%	34 years 2018 9.06%	33 years 2017 9.45%
10 years 2019	10 years 2018 9.65%	10 years 2017
9.31% 5 years 2019	9.65% 5 years 2018	6.35% 5 years 2017
7.58%	5.67%	10.39%

ACTUARIAL

► Funded Ratio		87.7%
Date of Last Valuation		1/1/18
► Actuary		Segal
► Assumed Rate of Return		7.50%
▶ Funding Schedule		Varies Total Increasing
Year Fully Funded		2026
Unfunded Liability		\$187.6 M
▶ Total Pension Appropriation (Fiscal 2020)		\$45.4 M
	ACTIVE	RETIRED
Number of Members	2,991	2,149
► Total Payroll/Benefit	\$222.0 M	\$77.8 M
Average Salary/Benefit	\$74,200	\$36,200
► Average Age	48	72
▶ Average Service	14.4 years	NA

ASSET ALLOCATION (12/31/19)



EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	230
▶ Number Who Reported Earnings	58
► Number of Excess Earners	1
▶ Total Amount of Refund Due	\$5,068.40

16.72%
\$1.5 B
7.58%
9.27%

INVECTMENT DETIIDN HICTORY

Chelsea

City Hall, Room 214 500 Broadway Chelsea, MA 02150 Phone: 617-466-4230 Fax: 617-466-4234

Board Members

Edward Dunn, Cheryl Watson Fisher, Richard Carroccino, Joseph Siewko*, Carolyn Russo *indicates Chairperson

Board Administrator Barbara O'Brien

Board Meeting Generally the third Thursday

of the month at 9:00 am

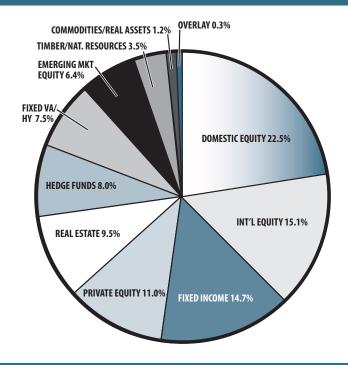


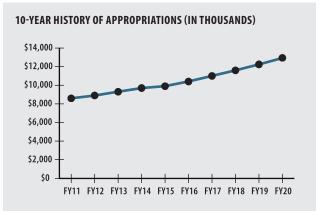
ACTUARIAL

	69.6%
	1/1/19
	PERAC
	7.25%
	5.7% Total Increasing
	2029
	\$74.5 M
	\$12.9 M
ACTIVE	RETIRED
715	395
\$39.7 M	\$11.6 M
\$55,600	\$29,400
45	73
12.1 years	NA
	715 \$39.7 M \$55,600 45



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN	I HISTORY	
35 years 2019	<u>34 years 2018</u>	<u>33 years 2017</u>
8.10%	7.86%	8.17%
<u>10 years 2019</u>	10 years 2018	<u>10 years 2017</u>
9.06%	9.17%	5.66%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
8.12%	6.51%	9.96%

► Number of Disability Retirees	60
▶ Number Who Reported Earnings	21
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return *	16.65%
▶ 2019 Market Value	\$196.4 M
▶ 2015-2019 (Annualized)	8.12%
▶ 1985-2019 (Annualized)	8.10%

^{*} After publishing the 2019 Investment Report, new information regarding market value was reviewed resulting in an adjustment to the peformance return.

Chicopee

274 Front Street City Hall, Market Square Chicopee, MA 01013-2685 Phone: 413-594-1542 Fax: 413-594-1544

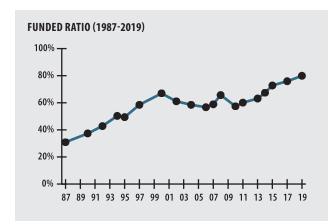
Board Members

Sharyn Riley, Debra Boronski, Timothy O'Shea*, Paul Mailhott, **David Ference** *indicates Chairperson

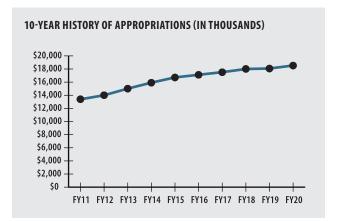
Board Administrator Anna Maria Hamblin

Board Meeting

Fourth Thursday of the month at 8:30 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% 15 16 17 18 19 15-19 85-18

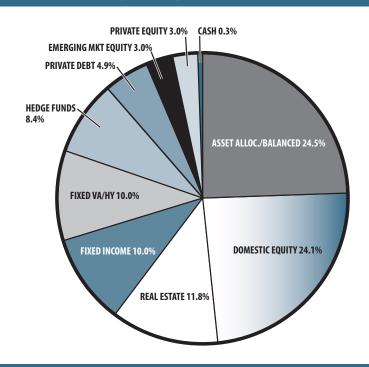


INVESTMENT RETURN HISTORY 35 years 2019 34 years 2018 33 years 2017 8.70% 8.47% 8.85% 10 years 2019 10 years 2017 10 years 2018 9.60% 10.73% 7.25% 5 years 2019 5 years 2018 5 years 2017 7.75% 5.95% 10.11%

ACTUARIAL

79.9%
, , , , , 0
1/1/19
Stone
7.25%
al Increasing
2027
\$82.9 M
\$18.5 M
RETIRED
845
\$22.1 M
\$26,100
72
NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	95
▶ Number Who Reported Earnings	25
▶ Number of Excess Earners	1
► Total Amount of Refund Due	\$12,347.74

▶ 2019 Return	16.81%
▶ 2019 Market Value	\$360.5 M
▶ 2015-2019 (Annualized)	7.75%
▶ 1985-2019 (Annualized)	8.70%

Clinton

242 Church Street Clinton, MA 01510 Phone: 978-365-4118 Fax: 978-612-0215

Board Members

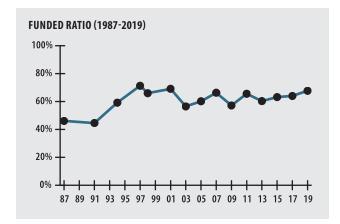
Diane Magliozzi, David Baird, Joseph Casasanto, Paul Cherubini* *indicates Chairperson

Board Administrator

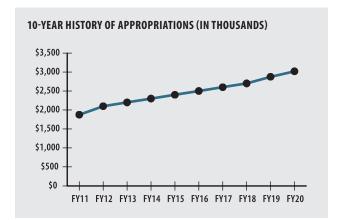
Patricia Hazel

Board Meeting

Last Tuesday of each month at 3:00 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 18 19 15-19 85-19 16 17



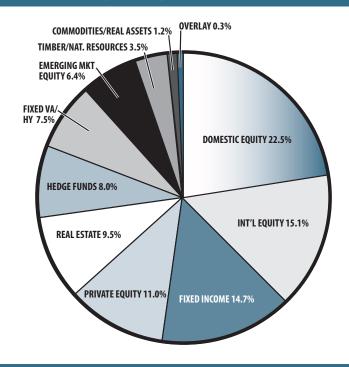
INVESTMENT RETURN DISTORT			
35 years 2019	34 years 2018	33 years 2017	
7.88%	7.63%	7.93%	
10 years 2019	10 years 2018	10 years 2017	
8.94%	9.12%	5.18%	
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>	
8.13%	6.56%	9.93%	

INVECTMENT DETIIDN HICTORY

ACTUARIAL

► Funded Ratio		67.7%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
► Assumed Rate of Return		7.25%
▶ Funding Schedule		5.58% Total Increasing
▶ Year Fully Funded		2035
Unfunded Liability		\$24.1 M
► Total Pension Appropriation (Fiscal 2020)		\$3.0 M
	ACTIVE	RETIRED
Number of Members	248	132
► Total Payroll/Benefit	\$11.6 M	\$3.6 M
Average Salary/Benefit	\$46,600	\$27,000
► Average Age	48	73
► Average Service	12.2 years	NA

ASSET ALLOCATION (12/31/19)



12
4
0
\$0.00

▶ 2019 Return	16.54%
▶ 2019 Market Value	\$56.9 M
▶ 2015-2019 (Annualized)	8.13%
▶ 1985-2019 (Annualized)	7.88 %

Concord

55 Church Street West Concord, MA 01742 Phone: 978-318-3068 Fax: 978-318-3093

Board Members

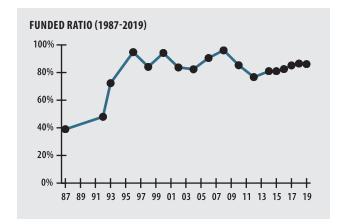
Mary Barrett, Kerry Lafleur, Brian Whitney, Peter Fulton*, Arnold Roth *indicates Chairperson

Board Administrator

Linda Boucher

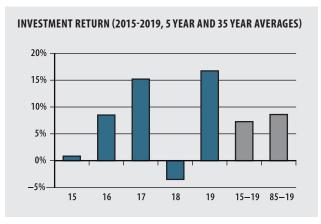
Board Meeting

Usually the last Tuesday of the month at 8:30 am

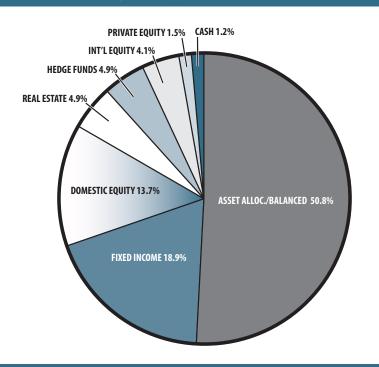


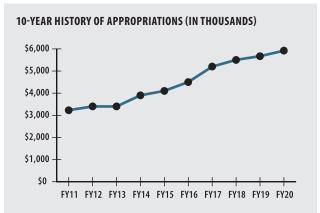
ACTUARIAL

	86.1%
	1/1/19
	Stone
	7.00%
	Level Dollar
	2030
	\$27.0 M
	\$5.9 M
ACTIVE	RETIRED
527	306
\$33.4 M	\$8.7 M
\$63,400	\$28,400
49	74
12 years	NA
	527 \$33.4 M \$63,400 49



ASSET ALLOCATION (12/31/19)





INVESTMENT RE	TIONN HISTORY	
35 years 20	19 34 years 2018	33 years 2017
8.61%	8.38%	8.76%
<u>10 years 20</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
8.88%	8.92%	6.36%
<u>5 years 201</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
7.27%	5.93%	9.80%

EARNED INCOME OF DISABILITY RETIREES (2018)

19
6
0
\$0.00

▶ 2019 Return	16.76%
▶ 2019 Market Value	\$185.0 M
▶ 2015-2019 (Annualized)	7.27%
▶ 1985-2019 (Annualized)	8.61%

INVECTMENT DETIIDN HICTORY

Danvers

Town Hall 1 Sylvan Street Danvers, MA 01923

Phone: 978-777-0001 Ext. 3044

Fax: 978-762-0264

Board Members

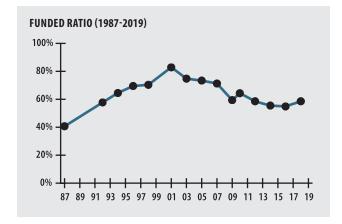
Corinna Grace, Wayne Marquis*, Dana Hagan, Joseph Collins, Stephen Swanson *indicates Chairperson

Board Administrator

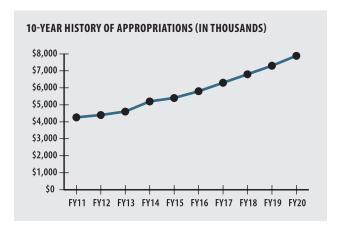
Susan Little

Board Meeting

Last Wednesday of the month at 3:00 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% -10% 15 15-19 85-19 16 17 18 19

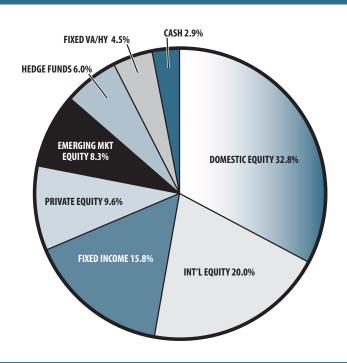


INVESTMENT RETURN HISTORY			
35 years 2019	34 years 2018	33 years 2017	
8.04%	7.76%	8.21%	
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>	
7.84%	8.54%	5.84%	
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>	
6.99%	4.01%	9.22%	

ACTUARIAL

▶ Funded Ratio		58.6%
▶ Date of Last Valuation		1/1/18
► Actuary		KMS
► Assumed Rate of Return		7.50%
▶ Funding Schedule		4.0% Increasing Phase-In
▶ Year Fully Funded		2035
Unfunded Liability		\$80.2 M
▶ Total Pension Appropriation (Fiscal 2020)		\$7.9 M
▶ Number of Members	ACTIVE 493	RETIRED 410
Total Payroll/Benefit	\$29.4 M	\$11.6 M
Average Salary/Benefit	\$59,600	\$28,400
► Average Age	47	75
► Average Service	12 years	NA

ASSET ALLOCATION (12/31/19)



24
8
0
\$0.00

▶ 2019 Return	18.21%
▶ 2019 Market Value	\$127.8 M
▶ 2015-2019 (Annualized)	6.99%
▶ 1985-2019 (Annualized)	8.04%

Dedham

202 Bussey St., Suite 101 Dedham, MA 02026 Phone: 781-326-7693 Fax: 781-329-4123

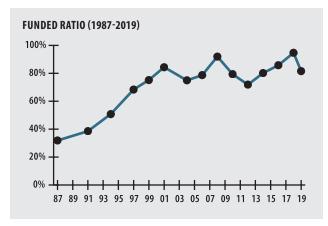
Board Members

Shannon MacKenzie, Michael Butler, Stephen MacDougall, John Maloney, Thomas Rorrie* *indicates Chairperson

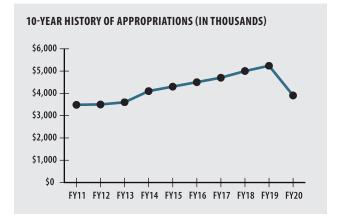
Board Administrator

Barbara Isberg **Board Meeting**

Third Wednesday of the month at 3:00 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 17 18 19 15-19 85-19 16

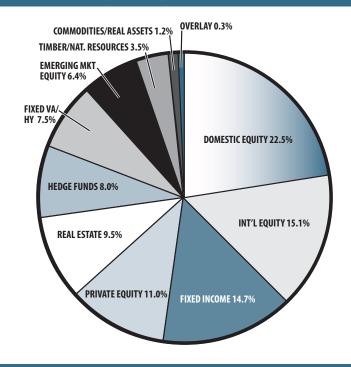


INVESTMENT RETURN HISTORY			
35 years 2019 9.53%	34 years 2018 9.33%	33 years 2017 9.68%	
10 years 2019 9.16%	10 years 2018 9.26%	10 years 2017 5.71%	
5 years 2019 8.15%	<u>5 years 2018</u> 6.54%	<u>5 years 2017</u> 10.04%	

ACTUARIAL

► Funded Ratio		81.6%
▶ Date of Last Valuation		1/1/19
► Actuary		Segal
Assumed Rate of Return		7.25%
▶ Funding Schedule		3.0% Increasing Phase-In
Year Fully Funded		2030
Unfunded Liability		\$32.3 M
► Total Pension Appropriation (Fiscal 2020)		\$3.9 M
	ACTIVE	RETIRED
Number of Members	453	328
► Total Payroll/Benefit	\$25.3 M	\$9.4 M
Average Salary/Benefit	\$55,800	\$28,800
► Average Age	47	74
► Average Service	11.3 years	NA

ASSET ALLOCATION (12/31/19)



EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	50
▶ Number Who Reported Earnings	8
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.70%
▶ 2019 Market Value	\$156.7 M
▶ 2015-2019 (Annualized)	8.15%
▶ 1985-2019 (Annualized)	9.53%

INVECTMENT DETIIDN HICTORY

Dukes County

5%

0%

15

16

17

18

19

15-19 85-19

9 Airport Road, Suite 1 Vineyard Haven, MA 02568 Phone: 508-696-3846 Fax: 508-696-3847

Board Members

Ann Metcalf*, Roger Wey, David Rossi, Jo Ann Murphy, Melanie Becker *indicates Chairperson

Board Administrator

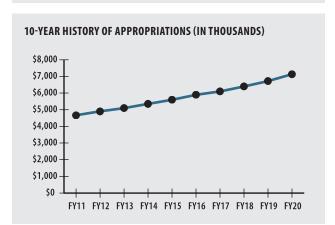
Kelly McCracken

Board Meeting

Last Wednesday of the month at 9:30 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 25% 20% 15% 10%

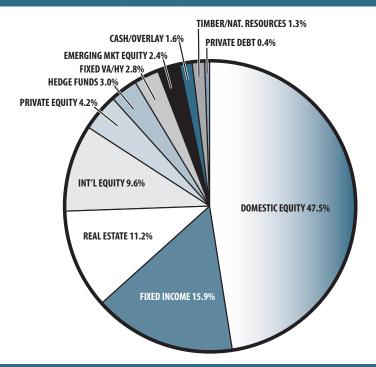


INVESTMENT RETURN HISTORY		
35 years 2019 8.16%	34 years 2018 7.79%	33 years 2017 8.05%
10 years 2019 10.38%	10 years 2018 9.85%	10 years 2017 6.95%
5 years 2019 9.90%	5 years 2018 7.52%	<u>5 years 2017</u> 11.08%

ACTUARIAL

► Funded Ratio		76.4%
▶ Date of Last Valuation		1/1/18
► Actuary		KMS
Assumed Rate of Return		7.50%
▶ Funding Schedule		6.1% Total Increasing
Year Fully Funded		2030
Unfunded Liability		\$45.7 M
► Total Pension Appropriation (Fiscal 2020)		\$7.1 M
	ACTIVE	RETIRED
Number of Members	666	319
► Total Payroll/Benefit	\$41.3 M	\$8.2 M
Average Salary/Benefit	\$62,000	\$25,600
► Average Age	49	71
► Average Service	10.9 years	NA

ASSET ALLOCATION (12/31/19)



27
11
1
\$10,561.25

21.55%
\$186.8 M
9.90%
8.16%

Easthampton

199 Northampton Street, Front Easthampton, MA 01027 Phone: 413-203-1307 Fax: 413-203-1308

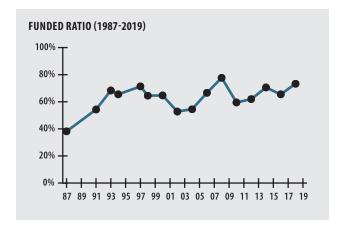
Board Members

Valerie Bernier, Jennifer Gallant, James Dunham*, Donald Emerson, Cornelius Sullivan *indicates Chairperson

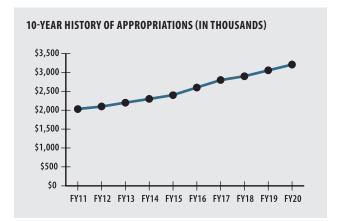
Board Administrator

Kymme Wood **Board Meeting**

Last Tuesday of the month at 2:30 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 15-19 85-19

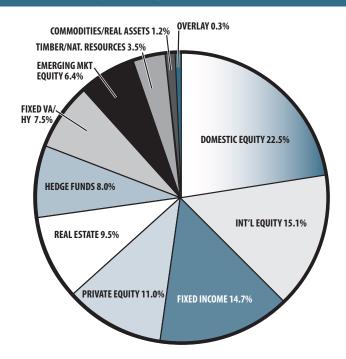


IVESTMENT RETURN HISTORY		
35 years 2019	34 years 2018	33 years 2017
8.38%	8.15%	8.47%
10 years 2019	<u>10 years 2018</u>	<u>10 years 2017</u>
9.06%	9.15%	5.61%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
8.07%	6.47%	9.93%

ACTUARIAL

► Funded Ratio		73.3%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.25%
▶ Funding Schedule		5.0% Total Increasing
▶ Year Fully Funded		2032
Unfunded Liability		\$19.6 M
▶ Total Pension Appropriation (Fiscal 2020)		\$3.2 M
	ACTIVE	RETIRED
Number of Members	235	177
► Total Payroll/Benefit	\$10.4 M	\$4.1 M
Average Salary/Benefit	\$44,200	\$22,900
► Average Age	46	72
▶ Average Service	11 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	21
► Number Who Reported Earnings	7
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

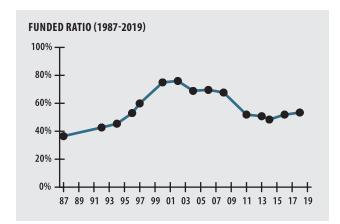
▶ 2019 Return	16.61%
▶ 2019 Market Value	\$59.6 M
▶ 2015-2019 (Annualized)	8.07%
▶ 1985-2019 (Annualized)	8.38%

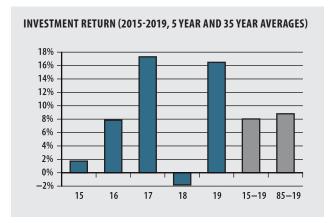
Essex Regional

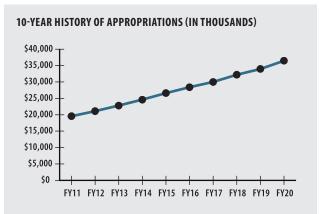
Building 200, Suite 202 491 Maple Street (Route 62) Danvers, MA 01923 Phone: 978-739-9151 Fax: 978-750-0745 Board Members
Alan Benson, Kevin Merz,
Susan Yaskell, H. Joseph Maney*,
Vincent Malgeri
*indicates Chairperson

Board Administrator Charles Kostro **Board Meeting**

Last Monday of every month at 8:30 am





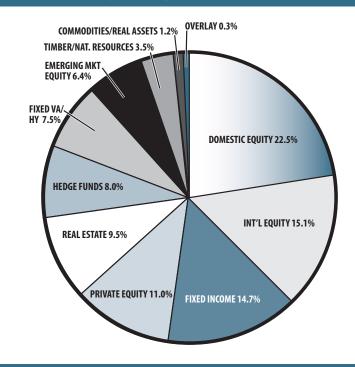


INVESTMENT RETURN HISTORY			
35 years 2019 8.81%	34 years 2018 8.59%	33 years 2017 8.92%	
10 years 2019 9.29%	10 years 2018 9.82%	10 years 2017 5.69%	
5 years 2019 8.05%	<u>5 years 2018</u> 6.69%	5 years 2017 10.10%	

ACTUARIAL

► Funded Ratio		53.4%
▶ Date of Last Valuation		1/1/18
► Actuary		Segal
► Assumed Rate of Return		7.50%
▶ Funding Schedule		Varies Increasing Phase-In
▶ Year Fully Funded		2035
Unfunded Liability		\$393.5 M
► Total Pension Appropriation (Fiscal 2020)		\$36.5 M
	ACTIVE	RETIRED
Number of Members	2,649	1,841
▶ Total Payroll/Benefit	\$130.8 M	\$44.2 M
Average Salary/Benefit	\$49,400	\$24,000
▶ Average Age	49	73
► Average Service	11.4 years	NA

ASSET ALLOCATION (12/31/19)



120
35
1
\$4,792.02

▶ 2019 Return*	16.49%
▶ 2019 Market Value	\$520.9 M
▶ 2015-2019 (Annualized)	8.05%
▶ 1985-2019 (Annualized)	8.81%

After publishing the 2019 Investment Report, new information regarding market value was reviewed resulting in an adjustment to the peformance return.

Everett

City Hall 484 Broadway, Room 30 Everett, MA 02149 Phone: 617-394-2310 Fax: 617-381-7016

Board Members

Eric Demas, Keith Slattery, Michael Matarazzo, William Pierce*, Peter Cocciardi *indicates Chairperson

Board Administrator

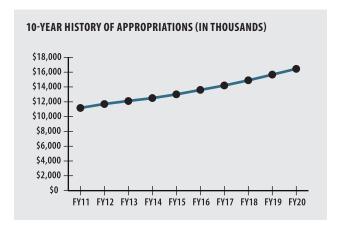
Robert Shaw

Board Meeting

Last Wednesday of the month at 9:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 16 17 18 19 15-19 85-19

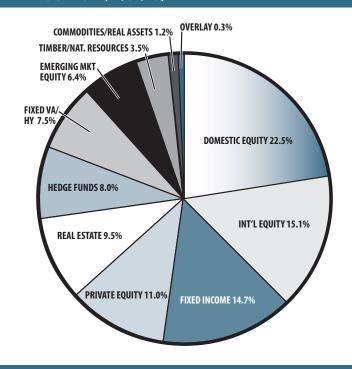


INVESTMENT KETOKN HISTOKY			
35 years 2019 8.56%	34 years 2018 8.33%	33 years 2017 8.65%	
10 years 2019 9.21%	10 years 2018 9.33%	10 years 2017 5.73%	
<u>5 years 2019</u> 8.19%	<u>5 years 2018</u> 6.55%	<u>5 years 2017</u> 10.06%	

ACTUARIAL

▶ Funded Ratio		57.3%
► Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.50%
► Funding Schedule		5.01% Total Increasing
▶ Year Fully Funded		2029
▶ Unfunded Liability		\$107.2 M
► Total Pension Appropriation (Fiscal 2020)		\$16.5 M
	ACTIVE	RETIRED
Number of Members	758	502
► Total Payroll/Benefit	\$45.1 M	\$12.9 M
Average Salary/Benefit	\$59,500	\$25,800
► Average Age	47	76
► Average Service	11 years	NA

ASSET ALLOCATION (12/31/19)



EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	70
▶ Number Who Reported Earnings	17
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.74%
▶ 2019 Market Value	\$185.7 M
▶ 2015-2019 (Annualized)	8.19%
▶ 1985-2019 (Annualized)	8.56%

INVECTMENT DETIIDN HICTORY

Fairhaven

Town Hall 40 Centre Street Fairhaven, MA 02719 Phone: 508-979-4020 Fax: 508-993-9486

Board Members

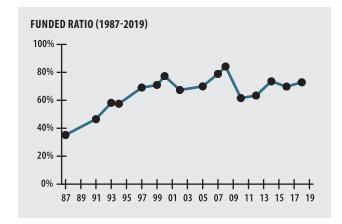
Anne Carreiro*, Mark Rees, Wally Therrien, Joyce Shepard, Alfred Robichaud *indicates Chairperson

Board Administrator

Mary Sturgeon

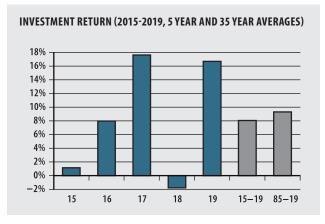
Board Meeting

Last Monday or Tuesday of the month at 8:30 or 9:00 am

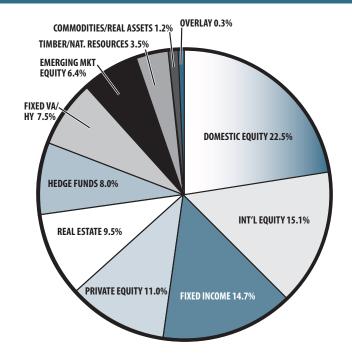


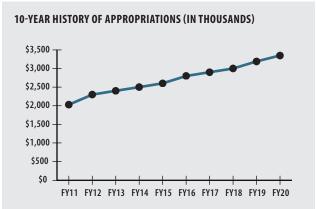
ACTUARIAL

	72.9%
	1/1/18
	PERAC
	7.25%
	5.0% Total Increasing
	2031
	\$21.9 M
	\$3.3 M
ACTIVE	RETIRED
251	185
\$11.8 M	\$4.1 M
\$46,900	\$22,400
48	73
13.2 years	NA
	251 \$11.8 M \$46,900 48



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019 9.33%	34 years 2018 9.12%	33 years 2017 9.46%
<u>10 years 2019</u> 9.06%	10 years 2018 9.15%	10 years 2017 5.61%
5 years 2019 8.06%	5 years 2018 6.44%	<u>5 years 2017</u> 9.91%

22
11
0
\$0.00

▶ 2019 Return	16.70%
▶ 2019 Market Value	\$70.7 M
▶ 2015-2019 (Annualized)	8.06%
▶ 1985-2019 (Annualized)	9.33%

Fall River

21 Father DeValles Boulevard Suite GR101, Box 14 Fall River, MA 02723 Phone: 508-646-9120

Fax: 508-646-9123

Board Members

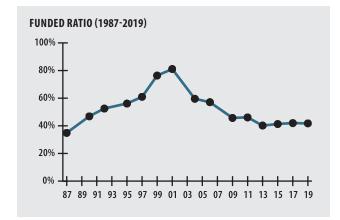
Jennifer Argo, Mark Nassiff, Robert Camara, David Machado, Arthur Viana* *indicates Chairperson

Board Administrator

Michael Pasternak

Board Meeting

Either the 3rd or 4th Wednesday of the month at 8:30 am

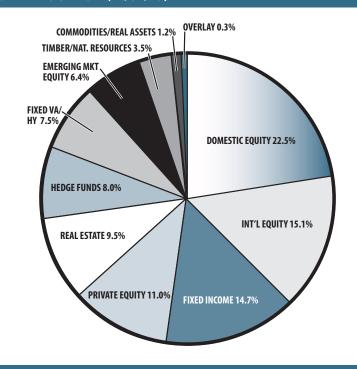


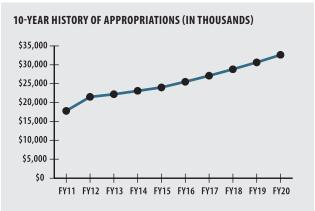
ACTUARIAL

▶ Funded Ratio		41.8%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
► Assumed Rate of Return		7.25%
▶ Funding Schedule		7.5% Total Increasing
▶ Year Fully Funded		2035
Unfunded Liability		\$388.8 M
► Total Pension Appropriation (Fiscal 2020)		\$32.6 M
	ACTIVE	RETIRED
Number of Members	1,544	1,539
► Total Payroll/Benefit	\$77.6 M	\$40.3 M
Average Salary/Benefit	\$50,200	\$26,200
► Average Age	46	73
► Average Service	12.9 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

10 years 2018	<u>10 years 2017</u>
8.97%	5.70%
5 years 2018	<u>5 years 2017</u> 9.71%
	5 years 2018 6.33%

► Number of Disability Retirees	208
▶ Number Who Reported Earnings	60
► Number of Excess Earners	3
► Total Amount of Refund Due	\$113,893.61

▶ 2019 Return	15.86%
▶ 2019 Market Value	\$293.1 M
▶ 2015-2019 (Annualized)	7.81%
▶ 1985-2019 (Annualized)	8.44%

Falmouth

80 Davis Straits, Suite 102 Falmouth, MA 02540 Phone: 508-457-0578 Fax: 508-540-9962

Board Members

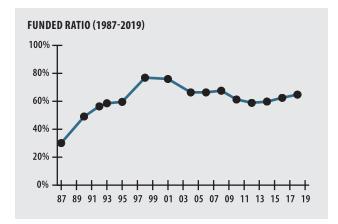
Jennifer Mullen, Paul Slivinski, Russell Ferreira*, Craig O'Malley, Ellen Philbin *indicates Chairperson

Board Administrator

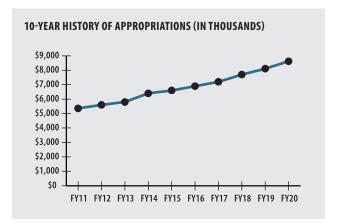
Francis St. Germaine

Board Meeting

Third Thursday of the month at 2:00 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% -10% 15 16 17 18 19 15-19 85-19

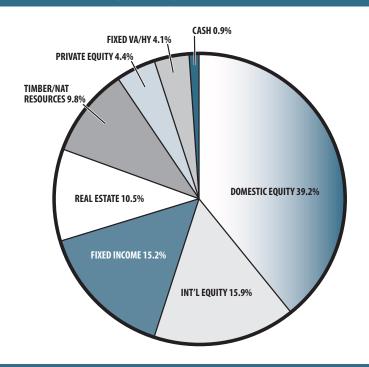


INVESTMENT RETURN HISTORY			
35 years 2019	<u>34 years 2018</u>	33 years 2017	
8.95%	8.69%	9.16%	
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>	
9.10%	8.70%	6.31%	
<u>5 years 2019</u>	<u>5 years 2018</u>	5 years 2017	
7.32%	5.17%	10.33%	

ACTUARIAL

► Funded Ratio		64.8%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.25%
▶ Funding Schedule		6.31% Total Increasing
▶ Year Fully Funded		2033
▶ Unfunded Liability		\$75.1 M
► Total Pension Appropriation (Fiscal 2020)		\$8.6 M
	ACTIVE	RETIRED
Number of Members	571	397
► Total Payroll/Benefit	\$30.0 M	\$11.5 M
Average Salary/Benefit	\$52,500	\$28,900
► Average Age	49	72
► Average Service	12.2 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	37
► Number Who Reported Earnings	17
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	18.36%
▶ 2019 Market Value	\$156.7 M
▶ 2015-2019 (Annualized)	7.32%
▶ 1985-2019 (Annualized)	8.95%

Fitchburg

166 Boulder Drive, Suite 108 Fitchburg, MA 01420 Phone: 978-829-1843 Fax: 978-345-9698

Board Members

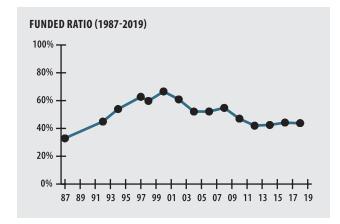
Calvin Brooks*, Ellen Jerszyk, John Curran, Thomas Dateo, Norman LeBlanc *indicates Chairperson

Board Administrator

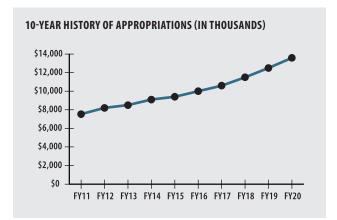
Tina Schneider

Board Meeting

4th Tuesday of the month at 10:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% 15 16 19 15-19 85-19

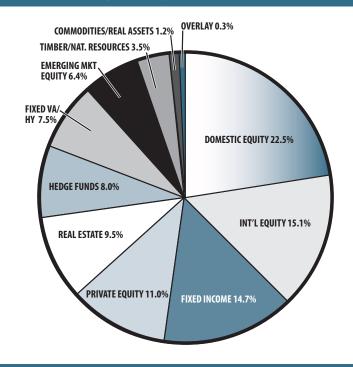


35 years 2019 7.80%	34 years 2018 7.54%	33 years 2017 7.84%
10 years 2019	10 years 2018	10 years 2017
8.79%	8.57%	5.39%
5 years 2019	5 years 2018	5 years 2017
8.05%	6.34%	9.70%

ACTUARIAL

► Funded Ratio		43.8%
▶ Date of Last Valuation		1/1/18
► Actuary		Stone
► Assumed Rate of Return		7.25%
▶ Funding Schedule		Varies Total Increasing
▶ Year Fully Funded		2033
Unfunded Liability		\$147.1 M
▶ Total Pension Appropriation (Fiscal 2020)		\$13.6 M
	ACTIVE	RETIRED
Number of Members	665	587
► Total Payroll/Benefit	\$32.6 M	\$15.5 M
Average Salary/Benefit	\$49,000	\$26,500
► Average Age	46	73
► Average Service	11.4 years	NA

ASSET ALLOCATION (12/31/19)



EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	50
► Number Who Reported Earnings	14
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	17.09%
▶ 2019 Market Value	\$134.0 M
▶ 2015-2019 (Annualized)	8.05%
▶ 1985-2019 (Annualized)	7.80%

INVESTMENT RETURN HISTORY

Framingham

Memorial Bldg, Room B-31 150 Concord Street Framingham, MA 01702 Phone: 508-532-5465 Fax: 508-532-5757

Board Members

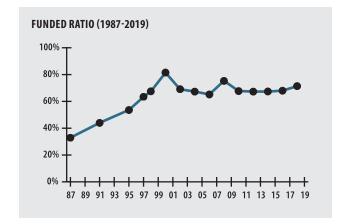
Richard Howarth*, Mary Ellen Kelley, Joseph Fonseca, Peter Rovinelli, John White *indicates Chairperson

Board Administrator

Laurie Lizak

Board Meeting

3rd or 4th Tuesday of the month at 10:00 am

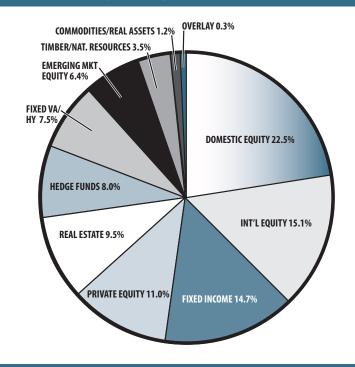


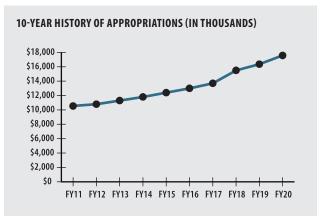
ACTUARIAL

► Funded Ratio		71.4%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.35%
► Funding Schedule		5.5% Total Increasing
► Year Fully Funded		2030
Unfunded Liability		\$121.0 M
▶ Total Pension Appropriation (Fiscal 2020)		\$17.6 M
	ACTIVE	RETIRED
► Number of Members	1,195	836
► Total Payroll/Benefit	\$66.3 M	\$23.5 M
Average Salary/Benefit	\$55,500	\$28,100
▶ Average Age	47	74
► Average Service	11.8 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019	34 years 2018	33 years 2017
9.30%	9.09%	9.44%
10 years 2019	10 years 2018	10 years 2017
9.05%	9.16%	5.62%
5 years 2019	5 years 2018	<u>5 years 2017</u>
8.04%	6.48%	9.92%

► Number of Disability Retirees	65
▶ Number Who Reported Earnings	19
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.39%
▶ 2019 Market Value	\$355.2 M
▶ 2015-2019 (Annualized)	8.04%
▶ 1985-2019 (Annualized)	9.30%

Franklin Regional

278 Main Street, Suite 311 Greenfield, MA 01301 Phone: 413-774-4837 Fax: 413-774-5677

Board Members

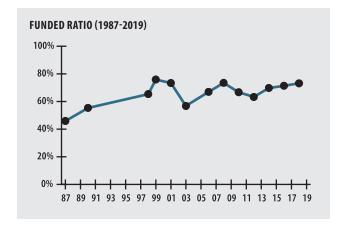
Sandra Hanks*, Angel Bragdon, Gabriele Voelker, Mary Stokarski, Paul Mokrzecki *indicates Chairperson

Board Administrator

Dale Kowacki

Board Meeting

Last Wednesday of the month at 8:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% 15 16 17 19 15-19 85-19

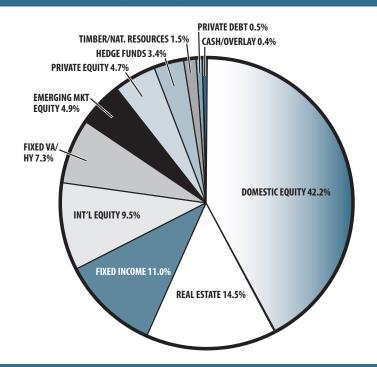
10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS) \$7,000 \$6,000 \$5,000 \$4,000 \$3,000 \$2,000 \$1,000 FY11 FY12 FY13 FY14 FY15 FY16 FY17 FY18 FY19 FY20

INVESTMENT RETURN	I HISTORY	
35 years 2019 8.47%	34 years 2018 8.21%	33 years 2017 8.57%
10 years 2019 9.57%	10 years 2018 9.60%	10 years 2017 6.57%
<u>5 years 2019</u> 7.79%	5 years 2018 5.99%	<u>5 years 2017</u> 10.59%

ACTUARIAL

► Funded Ratio		73.2%
▶ Date of Last Valuation		1/1/18
► Actuary		KMS
► Assumed Rate of Return		7.75%
▶ Funding Schedule		5.75% Total Increasing
▶ Year Fully Funded		2034
Unfunded Liability		\$50.8 M
► Total Pension Appropriation (Fiscal 2020)		\$7.0 M
	ACTIVE	RETIRED
Number of Members	968	603
► Total Payroll/Benefit	\$36.4 M	\$10.1 M
Average Salary/Benefit	\$37,700	\$16,800
► Average Age	48	72
► Average Service	10.1 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	24
► Number Who Reported Earnings	4
► Number of Excess Earners	1
► Total Amount of Refund Due	\$7,319.23

▶ 2019 Return	17.92%
▶ 2019 Market Value	\$160.2 M
▶ 2015-2019 (Annualized)	7.79%
▶ 1985-2019 (Annualized)	8.47%

Gardner

City Hall, Room 17 95 Pleasant Street Gardner, MA 01440 Phone: 978-630-4006 Fax: 978-630-4012

Board Members

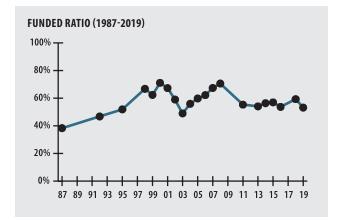
John Richard, Kevin McInerney, Robert Newton, Denise Merriam*, **Neil Janssens** *indicates Chairperson

Board Administrator

Cheryl Bosse

Board Meeting

Generally the last Tuesday or Thursday of the month at 3:30 pm

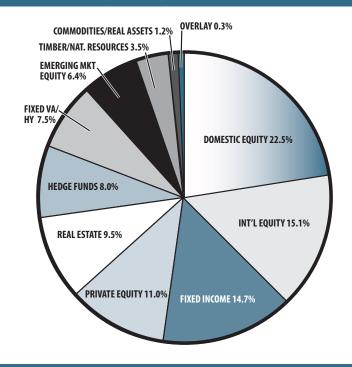


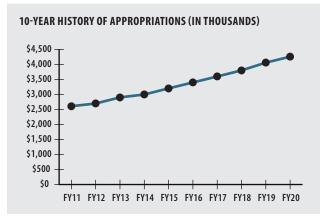
ACTUARIAL

▶ Funded Ratio		53.2%
▶ Date of Last Valuation		1/1/19
► Actuary		Stone
Assumed Rate of Return		7.25%
▶ Funding Schedule		8.44% Total Increasing
▶ Year Fully Funded		2032
▶ Unfunded Liability		\$46.9 M
▶ Total Pension Appropriation (Fiscal 2020)		\$4.3 M
	ACTIVE	RETIRED
Number of Members	296	254
► Total Payroll/Benefit	\$13.3 M	\$6.3 M
Average Salary/Benefit	\$45,100	\$24,600
▶ Average Age	46	72
► Average Service	10.9 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019	34 years 2018	33 years 2017
9.41%	9.21%	9.56%
10 years 2019	10 years 2018	10 years 2017
9.06%	9.16%	5.60%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>

19
4
0
\$0.00

▶ 2019 Return	16.51%
▶ 2019 Market Value	\$60.5 M
▶ 2015-2019 (Annualized)	8.07%
▶ 1985-2019 (Annualized)	9.41%

Gloucester

127 Eastern Avenue P.O. Box 114 Gloucester, MA 01931 Phone: 978-281-9744 Fax: 978-281-9817

Board Members

Kenny Costa, Donna Leete, Douglas MacArthur*, Kathleen Auld, Juanita Escobar *indicates Chairperson

Board Administrator

Patricia Ivas **Board Meeting**

Last Wednesday of the month at 3:00 pm

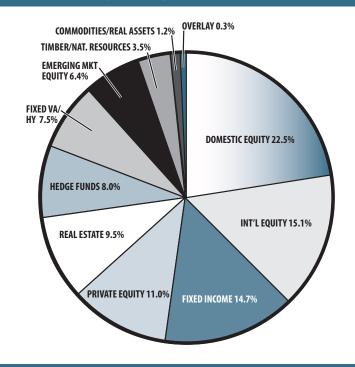


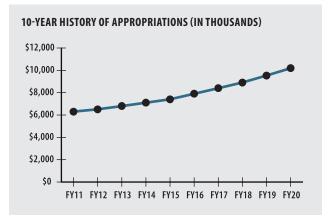
ACTUARIAL

	46.8%
	1/1/18
	Segal
	7.50%
	7.0% Total Increasing
	2034
	\$116.4 M
	\$10.2 M
ACTIVE	RETIRED
554	471
\$29.7 M	\$12.8 M
\$53,600	\$27,200
50	73
11.8 years	NA
	554 \$29.7 M \$53,600 50



ASSET ALLOCATION (12/31/19)





35 years 2019	<u>34 years 2018</u>	33 years 2017
8.92%	8.71%	9.04%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
9.08%	9.17%	5.65%
5 years 2019	5 years 2018	<u>5 years 2017</u>

6.53%

9.95%

		RETIREES (20	
	4 7 1 10 7 A 1 P 1 1 H 1 H 1 H 1		///

35
11
0
\$0.00

	44 550/
▶ 2019 Return	16.57%
▶ 2019 Market Value	\$120.0 M
▶ 2015-2019 (Annualized)	8.13%
▶ 1985-2019 (Annualized)	8.92%

INVESTMENT RETURN HISTORY

8.13%

Greater Lawrence Sanitary District Employees

240 Charles Street P.O. Box 187 North Andover, MA 01845 Phone: 978-689-9464 Fax: 978-685-7790

Board Members

Joseph Quartarone, Laurie Elliott*, Sandra Grenier, Karen Driggers, Ronald Pollone *indicates Chairperson

Board Administrator

Vincent Malgeri

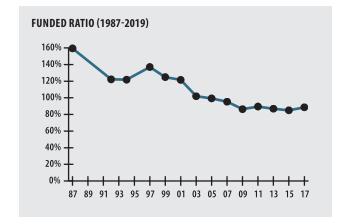
Board Meeting

Generally meets the last Wednesday of each month at 4:00 pm

\$29,100

72

NA



ACTUARIAL

► Funded Ratio		88.6%
▶ Date of Last Valuation		1/1/17
► Actuary		PERAC
► Assumed Rate of Return		7.00%
► Funding Schedule		8.0% Total Increasing
► Year Fully Funded		2034
► Unfunded Liability		\$2.1 M
► Total Pension Appropriation (Fiscal 2020)		\$357 K
	ACTIVE	RETIRED
Number of Members	38	26
► Total Payroll/Benefit	\$2.5 M	\$757 K

\$67,000

18.9 years

52

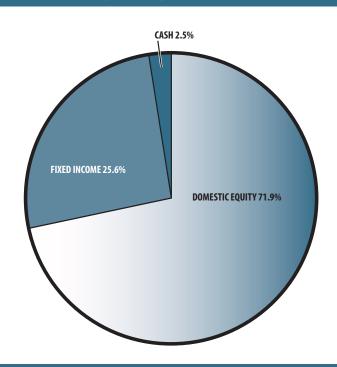


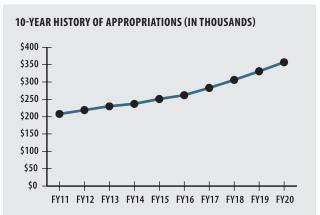
ASSET ALLOCATION (12/31/19)

▶ Average Salary/Benefit

► Average Age

▶ Average Service





EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	1
► Number Who Reported Earnings	1
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

35 years 2019	34 years 2018	33 years 2017
8.00%	7.54%	7.84%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
9.74%	9.81%	7.56%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
9.78%	6.20%	10.65%

INVESTMENT RETURN HISTORY

▶ 2019 Return	24.56%
▶ 2019 Market Value	\$21.6 M
▶ 2015-2019 (Annualized)	9.78%
▶ 1985-2019 (Annualized)	8.00%

Greenfield

Town Hall 14 Court Square Greenfield, MA 01301 Phone: 413-772-1503 Fax: 413-772-1582

Board Members

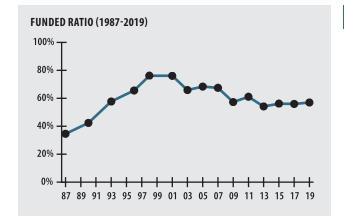
Angelica Desroches, Betty Rice, William Devino*, Marilyn Matysiewicz, Frances Stotz *indicates Chairperson

Board Administrator

Shari Hildreth

Board Meeting

Generally the 4th Tuesday of the month at 10:00 am

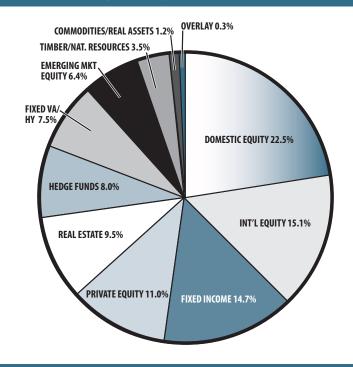


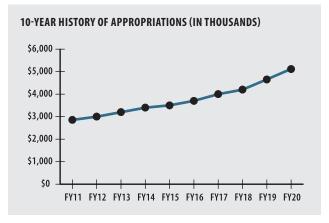
ACTUARIAL

► Funded Ratio		57.0%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
► Assumed Rate of Return		7.25%
► Funding Schedule		Varies Total Increasing
▶ Year Fully Funded		2035
▶ Unfunded Liability		\$53.3 M
► Total Pension Appropriation (Fiscal 2020)		\$5.1 M
	ACTIVE	RETIRED
▶ Number of Members	442	295
▶ Total Payroll/Benefit	\$18.5 M	\$7.2 M
Average Salary/Benefit	\$41,700	\$24,300
► Average Age	46	71
► Average Service	9 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019 8.60%	34 years 2018 8.37%	33 years 2017 8.69%
10 years 2019	10 years 2018	10 years 2017
9.19%	9.35%	5.99%
5 years 2019	<u>5 years 2018</u>	<u>5 years 2017</u>
8.17%	6.55%	10.01%

18
7
0
\$0.00

▶ 2019 Return	16.72%
▶ 2019 Market Value	\$77.2 M
▶ 2015-2019 (Annualized)	8.17%
▶ 1985-2019 (Annualized)	8.60%

Hampden County

Agawam Corporate Center 67 Hunt Street, Suite 116 Agawam, MA 01001 Phone: 413-737-1344 Fax: 413-732-7999

Board Members

Richard Theroux*, Laurel Placzek, Karl Schmaelzle, Patricia Donovan, Patrick O'Neil *indicates Chairperson

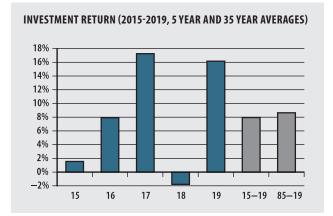
Board AdministratorJulianne Bartley

Board Meeting
The next to last business day
of every month at 10:00 am

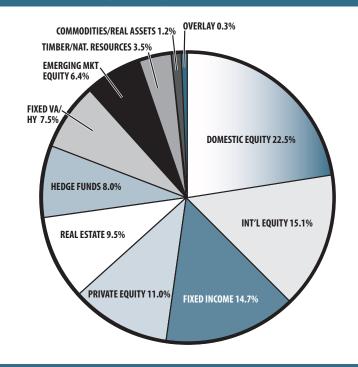


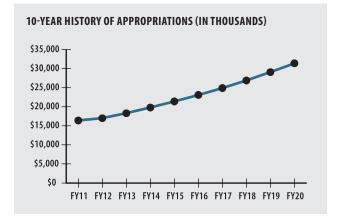
ACTUARIAL

▶ Funded Ratio		49.1%
▶ Date of Last Valuation		1/1/18
P Date of Last valuation		
► Actuary		Segal
Assumed Rate of Return		7.50%
► Funding Schedule		4.0% Increasing Phase-In
Year Fully Funded		2036
Unfunded Liability		\$370.6 M
► Total Pension Appropriation (Fiscal 2020)		\$31.4 M
	ACTIVE	RETIRED
Number of Members	2,687	1,711
► Total Payroll/Benefit	\$109.7 M	\$37.2 M
Average Salary/Benefit	\$40,800	\$21,700
► Average Age	48	74
► Average Service	11.5 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019	34 years 2018	33 years 2017
8.66%	8.45%	8.77%
10 years 2019	10 years 2018	10 years 2017
8.90%	8.80%	5.89%
5 years 2019 7.96%	<u>5 years 2018</u> 6.46%	5 years 2017 9.78%

► Number of Disability Retirees	104
► Number Who Reported Earnings	34
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00
F Total Amount of neruna bac	70.00

▶ 2019 Return	16.18%
▶ 2019 Market Value	\$409.5 M
▶ 2015-2019 (Annualized)	7.96%
▶ 1985-2019 (Annualized)	8.66%

Hampshire County

99 Industrial Drive, Suite 2 Northampton, MA 01060-2326 Phone: 413-584-9100 Fax: 413-587-9396

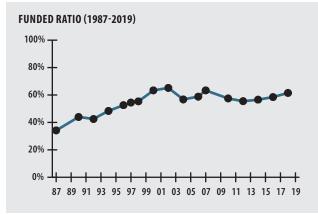
Board Members

Patrick Brock*, Jane Wolfe, Joseph Wilhelm, Elizabeth Sugrue, Joyce Karpinski *indicates Chairperson

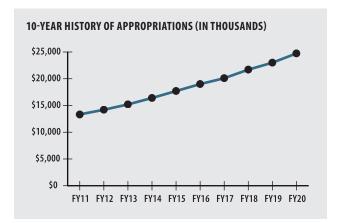
Board Administrator

Mary Baronas **Board Meeting**

Generally the second Wednesday of the month at 9:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% 15 18 19 15-19 85-19 16 17

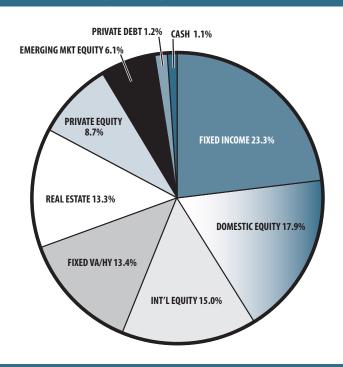


INVESTMENT RETURN HISTORY		
35 years 2019 8.35%	34 years 2018 8.11%	33 years 2017 8.44%
10 years 2019 8.41%	10 years 2018 8.71%	10 years 2017 6.05%
5 years 2019 7.69%	5 years 2018 5.53%	5 years 2017 8.43%

ACTUARIAL

► Funded Ratio		61.5%
Date of Last Valuation		1/1/18
► Actuary		KMS
► Assumed Rate of Return		7.45%
▶ Funding Schedule		4.0% Increasing Phase-In
Year Fully Funded		2033
Unfunded Liability		\$194.0 M
► Total Pension Appropriation (Fiscal 2020)		\$24.7 M
	ACTIVE	RETIRED
Number of Members	1,912	1,284
► Total Payroll/Benefit	\$84.2 M	\$27.2 M
Average Salary/Benefit	\$44,000	\$21,200
► Average Age	48	72
▶ Average Service	11.4 years	NA

ASSET ALLOCATION (12/31/19)



73
32
1
\$9,373.00

▶ 2019 Return	16.88%
▶ 2019 Market Value	\$358.4 M
▶ 2015-2019 (Annualized)	7.69%
▶ 1985-2019 (Annualized)	8.35%

Haverhill

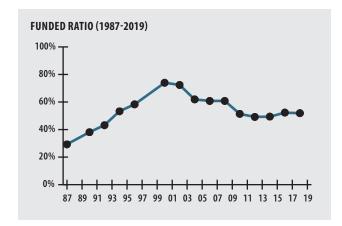
4 Summer Street, Room 303 Haverhill, MA 01830-5843 Phone: 978-374-2358 Fax: 978-374-2353

Board Members

Charles Benevento, Richard MacDonald, Lewis Poore, William Klueber*, James Cleary *indicates Chairperson

Board AdministratorDavid Van Dam

Board Meeting 2nd Tuesday of the month at 9:00 am

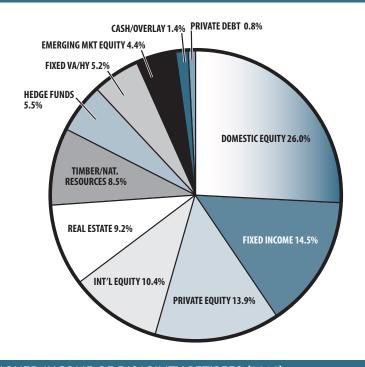


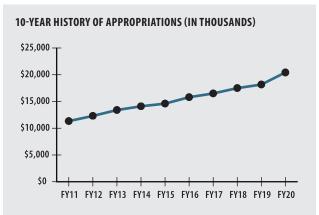
ACTUARIAL

► Funded Ratio		51.9%
▶ Date of Last Valuation		1/1/18
► Actuary		Stone
► Assumed Rate of Return		7.25%
▶ Funding Schedule		3.8% Increasing
Year Fully Funded		2032
Unfunded Liability		\$180.6 M
► Total Pension Appropriation (Fiscal 2020)		\$20.4 M
	ACTIVE	RETIRED
Number of Members	939	1,086
► Total Payroll/Benefit	\$42.2 M	\$24.9 M
Average Salary/Benefit	\$44,900	\$22,900
► Average Age	47	73
► Average Service	11.9 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY			
35 years 2019 9.84%	34 years 2018 9.68%	33 years 2017 10.05%	
10 years 2019 8.72%	10 years 2018 9.14%	10 years 2017 6.06%	
<u>5 years 2019</u> 7.27%	5 years 2018 5.91%	5 years 2017 9.53%	

68
16
0
\$0.00

▶ 2019 Return*	15.30%
▶ 2019 Market Value	\$218.2 M
▶ 2015-2019 (Annualized)	7.27%
▶ 1985-2019 (Annualized)	9.84%

After publishing the 2019 Investment Report, new information regarding market value and accrued income was reviewed resulting in an adjustment to the peformance return.

Hingham

210 Central Street Hingham, MA 02043-2758 Phone: 781-804-2478 Fax: 781-804-2444

Board Members

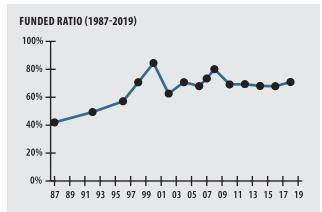
Susan Nickerson*, Eileen McCracken, David Jones, Jean Montgomery, Charles Cristello *indicates Chairperson

Board Administrator

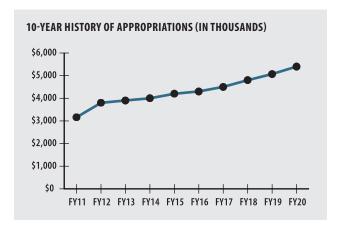
Antonetta Fopiano

Board Meeting

4th Tuesday of every month at 10:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% 15 16 17 18 19 15-19 85-19

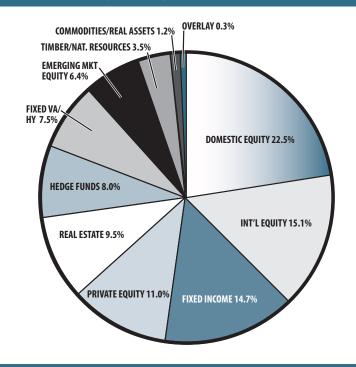


INVESTMENT RETURN HISTORY			
35 years 2019 9.14%	34 years 2018 8.92%	33 years 2017 9.26%	
<u>10 years 2019</u> 8.54%	10 years 2018 8.63%	10 years 2017 5.11%	
5 years 2019 7.92%	<u>5 years 2018</u> 6.10%	5 years 2017 9.00%	

ACTUARIAL

► Funded Ratio		70.9%
▶ Date of Last Valuation		1/1/18
► Actuary		KMS
► Assumed Rate of Return		7.50%
► Funding Schedule		4.0% Increasing Phase-In
▶ Year Fully Funded		2035
► Unfunded Liability		\$47.1 M
▶ Total Pension Appropriation (Fiscal 2020)		\$5.4 M
	ACTIVE	RETIRED
Number of Members	627	318
► Total Payroll/Benefit	\$32.3 M	\$8.2 M
Average Salary/Benefit	\$51,500	\$25,900
► Average Age	48	74
► Average Service	10.2 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	10
▶ Number Who Reported Earnings	2
► Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.73%
▶ 2019 Market Value	\$132.1 M
▶ 2015-2019 (Annualized)	7.92%
▶ 1985-2019 (Annualized)	9.14%

Holyoke

20 Korean Veterans Plaza Room 207 Holyoke, MA 01040-5044 Phone: 413-322-5590 Fax: 413-322-5591

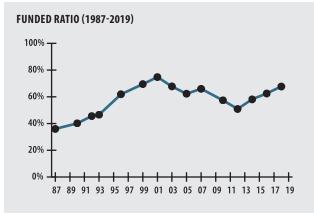
Board Members

Tanya Wdowiak, Bellamy Schmidt, John McCarthy*, Anthony Dulude, Michele Aubrey *indicates Chairperson

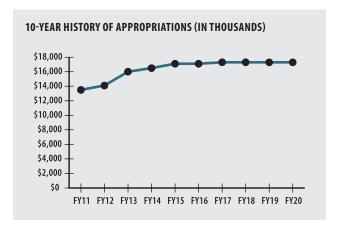
Board Administrator

Cheryl Dugre **Board Meeting**

Last Wednesday of the month at 9:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 25% 20% 15% 10% 5% 0% 15 17 18 15-19 85-19

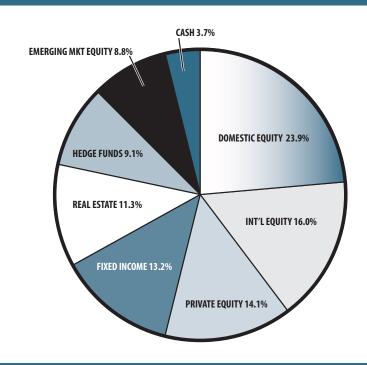


VESTMENT RETURN	HISTORY	
35 years 2019	34 years 2018	33 years 2017
9.44%	9.14%	9.58%
10 years 2019	10 years 2018	10 years 2017
10.30%	10.93%	7.14%
5 years 2019 8.68%	5 years 2018	<u>5 years 2017</u>

ACTUARIAL

► Funded Ratio		67.7%
Date of Last Valuation		1/1/18
► Actuary		Segal
► Assumed Rate of Return		7.50%
▶ Funding Schedule		3.31% Total Increasing
Year Fully Funded		2032
Unfunded Liability		\$135.1 M
► Total Pension Appropriation (Fiscal 2020)		\$17.3 M
	ACTIVE	RETIRED
Number of Members	1,131	935
► Total Payroll/Benefit	\$55.5 M	\$25.1 M
Average Salary/Benefit	\$49,000	\$26,800
► Average Age	46	72
► Average Service	12.5 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	77
► Number Who Reported Earnings	15
► Number of Excess Earners	1
► Total Amount of Refund Due	\$4,235.80

▶ 2019 Return	20.32%
▶ 2019 Market Value	\$318.2 M
▶ 2015-2019 (Annualized)	8.68%
▶ 1985-2019 (Annualized)	9.44%

Hull

253 Atlantic Avenue, 2nd Floor Hull, MA 02045

Phone: 781-925-2282 Fax: 781-925-8509

Board Members

J. Michael Buckley*, Eileen White, Brian Thompson, John King, Gregory Galvin *indicates Chairperson

Board Administrator

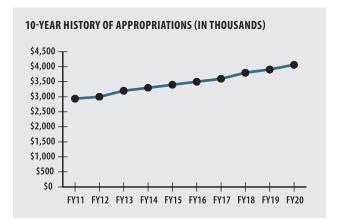
Lauren Durham

Board Meeting

Generally the last Tuesday of the month at 9:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 16 17 18 19 15-19 85-19

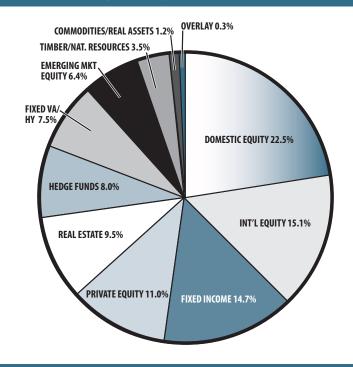


INVESIMENT RETURN HISTORY			
35 years 2019 8.06%	34 years 2018 7.82%	33 years 2017 8.12%	
10 years 2019 9.05%	10 years 2018 9.14%	10 years 2017 5.62%	
5 years 2019 8.15%	<u>5 years 2018</u> 6.53%	<u>5 years 2017</u> 9.95%	

ACTUARIAL

► Funded Ratio		63.9%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.40%
▶ Funding Schedule		4.0% Total Increasing
▶ Year Fully Funded		2031
Unfunded Liability		\$27.4 M
▶ Total Pension Appropriation (Fiscal 2020)		\$4.1 M
	ACTIVE	RETIRED
Number of Members	170	143
► Total Payroll/Benefit	\$10.1 M	\$4.4 M
Average Salary/Benefit	\$59,200	\$30,400
► Average Age	51	72
► Average Service	12.6 years	NA

ASSET ALLOCATION (12/31/19)



EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	17
► Number Who Reported Earnings	6
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.70%
▶ 2019 Market Value	\$55.3 M
▶ 2015-2019 (Annualized)	8.15%
▶ 1985-2019 (Annualized)	8.06%

INVECTMENT DETIIDN HICTORY

Lawrence

354 Merrimack Street Suite 302, Entry C Lawrence, MA 01843 Phone: 978-620-3570 Fax: 978-683-5894

Board Members

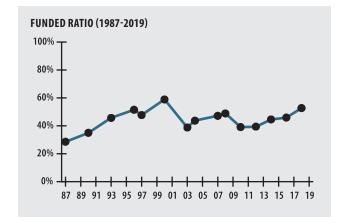
Ramona Ceballos, Thomas Cuddy, Kevin Loughlin, Gina Rizzo, William Bateman* *indicates Chairperson

Board Administrator

Diane Cockroft

Board Meeting

During the last week of the month at 8:30 am

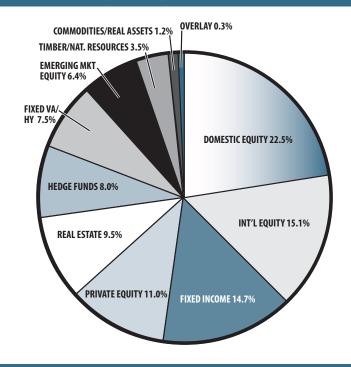


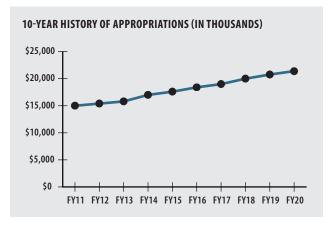
ACTUARIAL

► Funded Ratio		52.7%
▶ Date of Last Valuation		1/1/18
► Actuary		Stone
► Assumed Rate of Return		7.50%
▶ Funding Schedule		3.24% Increasing
► Year Fully Funded		2036
▶ Unfunded Liability		\$204.0 M
► Total Pension Appropriation (Fiscal 2020)		\$21.4 M
	ACTIVE	RETIRED
Number of Members	1,580	911
► Total Payroll/Benefit	\$71.5 M	\$24.8 M
Average Salary/Benefit	\$45,200	\$27,300
▶ Average Age	44	74
► Average Service	10.5 years	NA



ASSET ALLOCATION (12/31/19)





		1
35 years 2019	34 years 2018	33 years 2017
7.95%	7.70%	8.00%
10 years 2019	<u>10 years 2018</u>	<u>10 years 2017</u>

INVESTMENT RETURN HISTORY

9.05% 9.15% 5.63% 5 years 2019 5 years 2018 5 years 2017 8.09% 6.46% 9.88%

► Number of Disability Retirees	110
▶ Number Who Reported Earnings	26
▶ Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return*	16.69%
▶ 2019 Market Value	\$256.1 M
▶ 2015-2019 (Annualized)	8.09%
▶ 1985-2019 (Annualized)	7.95%

^{*} After publishing the 2019 Investment Report, a calculation error was found and corrected. PERAC staff regrets the error.

Leominster

City Hall, Room 15 25 West Street Leominster, MA 01453 Phone: 978-534-7507 Ext. 246 Fax: 978-534-7508

Board Members

John Richard*, David LaPlante, Jonathan Campagna, John Perry, **Douglas Farwell** *indicates Chairperson

Board Administrator

Erin Kelley **Board Meeting**

Last Tuesday of the month at 10:00 am

FUNDED RATIO (1987-2019) 100% 80% 60% 40% 20%

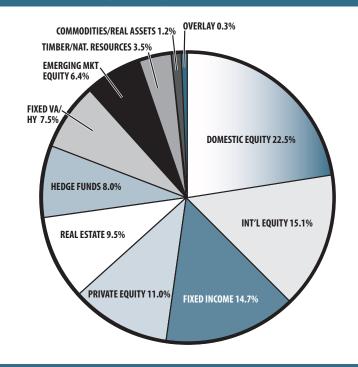
> 87 89 91 93 95 97 99 01 03 05 07 09 11 13 15 17 19

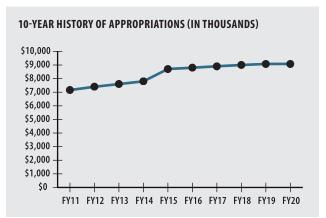
ACTUARIAL

Average Service	9.9 years	NA
Average Age	44	73
 Average Salary/Benefit 	\$46,300	\$25,100
Total Payroll/Benefit	\$30.1 M	\$10.6 M
Number of Members	ACTIVE 650	RETIRED 422
Total Pension Appropriation (Fiscal 2020)		\$9.1 M
Unfunded Liability		\$21.0 M
Year Fully Funded		2023
Funding Schedule		Level
Assumed Rate of Return		5.50%
Actuary		Stone
Date of Last Valuation		1/1/19
Funded Ratio		90.4%



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019 8.65%	34 years 2018 8.41%	33 years 2017 8.83%
10 years 2019 9.26%	10 years 2018 9.59%	10 years 2017 6.42%
<u>5 years 2019</u> 7.91%	5 years 2018 5.99%	<u>5 years 2017</u> 11.32%

► Number of Disability Retirees	36
▶ Number Who Reported Earnings	20
► Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2019 Return	17.26%
▶ 2019 Market Value	\$222.5 M
▶ 2015-2019 (Annualized)	7.91%
▶ 1985-2019 (Annualized)	8.65%

Lexington

1625 Massachusetts Avenue Lexington, MA 02420 Phone: 781-861-2720 Fax: 781-861-2794

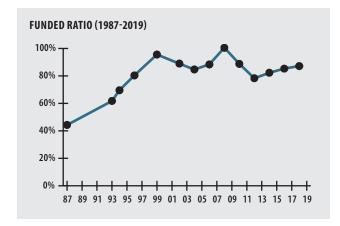
Board Members

Carolyn Kosnoff, Frederick Weiss, Robert Cunha*, Joseph Foley, Alan Fields *indicates Chairperson

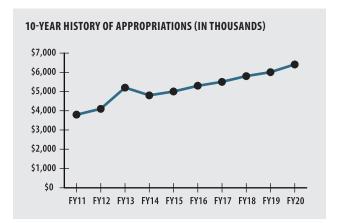
Board Administrator

Marguerite Oliva **Board Meeting**

Last Thursday of each month at 8:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% 15 16 17 18 19 15-19 85-19



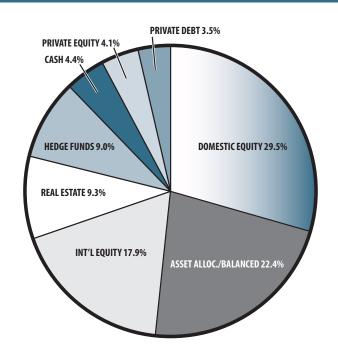
INVESTMENT KETUKN	NAFZIWENI KETOKN HIZIOKA		
35 years 2019	34 years 2018	33 years 2017	
8.86%	8.55%	8.96%	
10 years 2019	10 years 2018	10 years 2017	
8.38%	8.86%	5.04%	
5 years 2019 8.19%	<u>5 years 2018</u> 5.77%	5 years 2017 9.43%	

INVECTMENT DETIIDN HICTORY

ACTUARIAL

► Funded Ratio		87.2%
▶ Date of Last Valuation		1/1/18
► Actuary		Sherman
► Assumed Rate of Return		7.50%
▶ Funding Schedule		Varies Total Increasing
► Year Fully Funded		2024
Unfunded Liability		\$24.2 M
► Total Pension Appropriation (Fiscal 2020)		\$6.4 M
	ACTIVE	RETIRED
Number of Members	706	437
► Total Payroll/Benefit	\$38.6 M	\$11.7 M
Average Salary/Benefit	\$54,700	\$26,700
► Average Age	NA	74
► Average Service	NA	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	23
► Number Who Reported Earnings	10
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

19.79%
\$184.6 M
8.19%
8.86%

Lowell

City Hall, Room 3 375 Merrimack Street Lowell, MA 01852-5998 Phone: 978-674-4094 Fax: 978-446-7019

Board Members

Tina Masiello, David Keene, William Desrosiers, Joseph Mahoney*, Michael Brennan *indicates Chairperson

Board Administrator

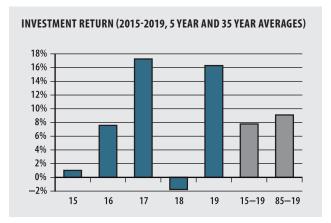
Shannon Dowd **Board Meeting**

Usually the last Thursday of the month at 1:00 pm

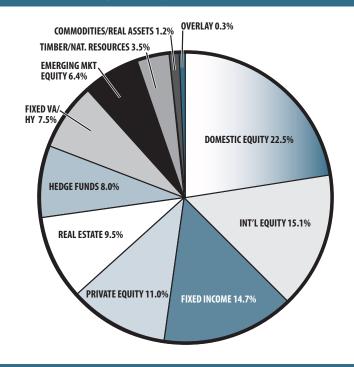


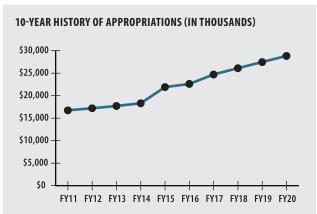
ACTUARIAL

▶ Funded Ratio		58.2%
, i and a matio		
▶ Date of Last Valuation		1/1/19
► Actuary		KMS
Assumed Rate of Return		7.65%
► Funding Schedule		4.0% Increasing Phase-In
Year Fully Funded		2036
Unfunded Liability		\$277.4 M
► Total Pension Appropriation (Fiscal 2020)		\$28.8 M
	ACTIVE	RETIRED
Number of Members	1,746	1,255
► Total Payroll/Benefit	\$98.5 M	\$39.0 M
Average Salary/Benefit	\$56,400	\$31,100
► Average Age	46	72
► Average Service	12.6 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019 9.10%	34 years 2018 8.90%	33 years 2017 9.24%
10 years 2019 8.85%	10 years 2018 8.88%	10 years 2017 5.36%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u> 9.65%

► Number of Disability Retirees	169
► Number Who Reported Earnings	58
Number of Excess Earners	2
► Total Amount of Refund Due	\$9,281.74

16.31%
\$421.4 M
7.81%
9.10%

Lynn

3 City Hall Square City Hall, Room 106 Lynn, MA 01901 Phone: 781-586-6897 Fax: 781-595-9101

Board Members

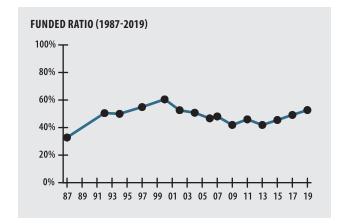
Stephen Spencer, Frank Valeri, Richard Biagiotti, Gordon Barton, Michael Marks* *indicates Chairperson

Board Administrator

Gary Brenner

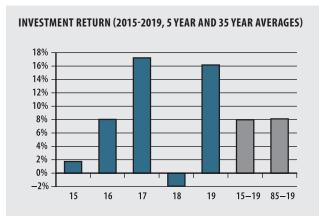
Board Meeting

Usually the last Tuesday of the month at 9:30 am

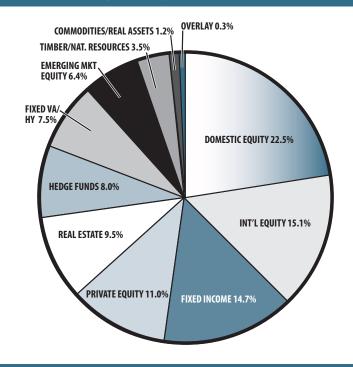


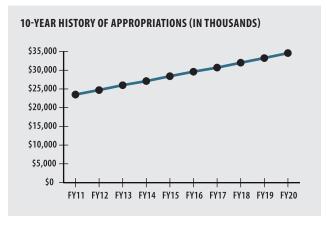
ACTUARIAL

	52.7%
	1/1/19
	PERAC
	7.25%
	Varies Total Increasing
	2034
	\$326.1 M
	\$34.6 M
ACTIVE	RETIRED
1,317	1,190
\$77.1 M	\$39.5 M
\$58,500	\$33,200
49	74
14.5 years	NA
	1,317 \$77.1 M \$58,500 49



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY		
35 years 2019 8.13%	34 years 2018 7.90%	33 years 2017 8.21%
10 years 2019 9.02%	10 years 2018 8.51%	10 years 2017 5.34%
<u>5 years 2019</u> 7.98%	5 years 2018 6.51%	5 years 2017 9.97%

► Number of Disability Retirees	155
▶ Number Who Reported Earnings	41
▶ Number of Excess Earners	2
► Total Amount of Refund Due	\$9,352.06

▶ 2019 Return *	16.16%
▶ 2019 Market Value	\$404.7 M
▶ 2015-2019 (Annualized)	7.98%
▶ 1985-2019 (Annualized)	8.13%

Malden

17 Pleasant Street, 2nd Floor Malden, MA 02148 Phone: 781-397-7086 Fax: 781-397-7358

Board Members

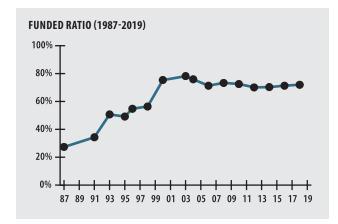
Charles Ranaghan, Domenic Fermano, Douglas Eisnor, Warren Atkinson*, Scott Lucey *indicates Chairperson

Board Administrator James Ryan

Board Meeting

3rd Wednesday of each month at 8:30 am

NA



ACTUARIAL

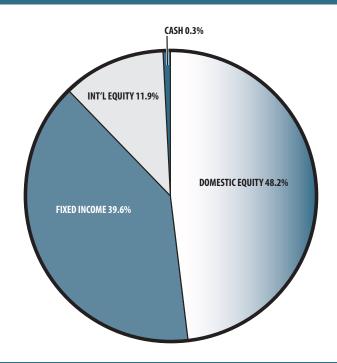
► Funded Ratio		72.0%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.35%
▶ Funding Schedule		7.5% Total Increasing
▶ Year Fully Funded		2030
▶ Unfunded Liability		\$96.1 M
► Total Pension Appropriation (Fiscal 2020)		\$13.0 M
	ACTIVE	RETIRED
Number of Members	780	677
► Total Payroll/Benefit	\$42.3 M	\$20.1 M
Average Salary/Benefit	\$54,200	\$29,700
► Average Age	48	74

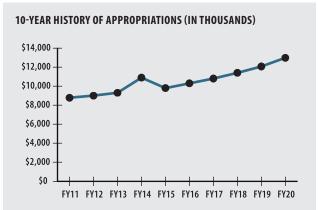
12.9 years



ASSET ALLOCATION (12/31/19)

▶ Average Service





INVESTMENT RETURN HISTORY		
35 years 2019	34 years 2018	33 years 2017
9.59%	9.53%	9.68%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
8.94%	9.41%	6.44%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
6.74%	6.84%	9.21%

► Number of Disability Retirees	85
► Number Who Reported Earnings	26
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	11.76%
▶ 2019 Market Value	\$282.5 M
▶ 2015-2019 (Annualized)	6.74%
▶ 1985-2019 (Annualized)	9.59%

Marblehead

Mary Alley Building 7 Widger Road Marblehead, MA 01945 Phone: 781-639-3418 Fax: 781-631-2617

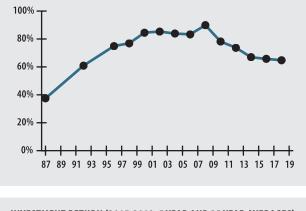
Board Members

Alison Nieto, Charles Gessner, Paul Jalbert, Jason Gilliland, Robert Peck* *indicates Chairperson

Board Administrator Linda Gifford **Board Meeting**

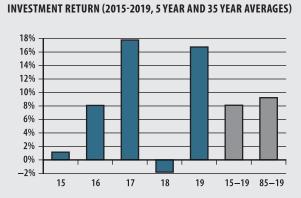
Varies



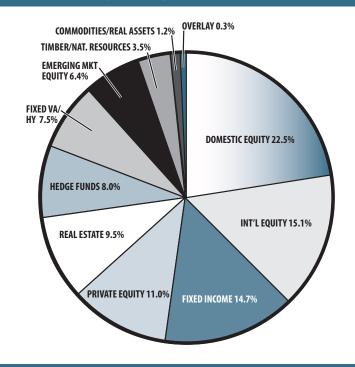


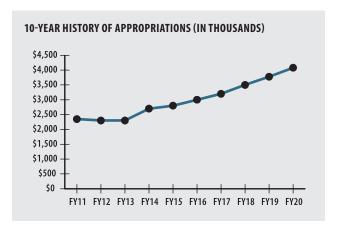
ACTUARIAL

► Funded Ratio		64.8%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.35%
▶ Funding Schedule		8.0% Total Increasing
▶ Year Fully Funded		2039
▶ Unfunded Liability		\$52.4 M
► Total Pension Appropriation (Fiscal 2020)		\$4.1 M
	ACTIVE	RETIRED
Number of Members	430	355
► Total Payroll/Benefit	\$21.3 M	\$8.9 M
Average Salary/Benefit	\$49,600	\$25,200
► Average Age	48	74
► Average Service	10.5 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019	34 years 2018	33 years 2017
9.25%	9.04%	9.39%
10 years 2019	10 years 2018	10 years 2017
9.10%	9.20%	5.65%
5 years 2019	5 years 2018	5 years 2017
8.11%	6.49%	9.96%

► Number of Disability Retirees	19
► Number Who Reported Earnings	7
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.75%
▶ 2019 Market Value	\$106.1 M
▶ 2015-2019 (Annualized)	8.11%
▶ 1985-2019 (Annualized)	9.25%

Marlborough

289 Elm Street Suite 111

Marlborough, MA 01752-3812 Phone: 508-460-3760

Fax: 508-481-7814

Board Members

Diane Smith, Daniel Stanhope, Gregory Brewster*, William Taylor, David Keene

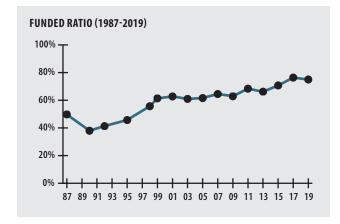
*indicates Chairperson

Board Administrator

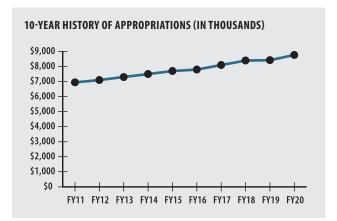
Margaret Shea

Board Meeting

Last Tuesday of each month at 8:15 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 15 17 18 15-19 85-19

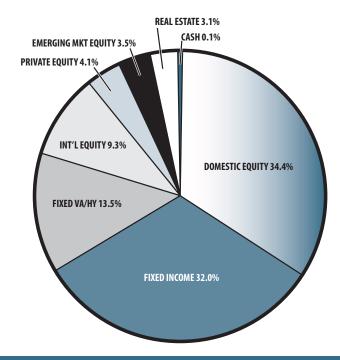


INVESTMENT RETURN HISTORY		
35 years 2019	34 years 2018	33 years 2017
8.33%	8.06%	8.47%
<u>10 years 2019</u>	<u>10 years 2018</u>	10 years 2017
7.85%	7.78%	5.81%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
6.63%	4.42%	8.18%

ACTUARIAL

► Funded Ratio		75.0%
Date of Last Valuation		1/1/19
► Actuary		Sherman
► Assumed Rate of Return		7.50%
▶ Funding Schedule		4.0% Increasing
Year Fully Funded		2028
Unfunded Liability		\$58.4 M
► Total Pension Appropriation (Fiscal 2020)		\$8.8 M
	ACTIVE	RETIRED
Number of Members	644	434
► Total Payroll/Benefit	\$36.0 M	\$13.3 M
Average Salary/Benefit	\$55,800	\$30,700
► Average Age	NA	72
► Average Service	NA	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	28
► Number Who Reported Earnings	9
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	17.79%
▶ 2019 Market Value	\$187.6 M
▶ 2015-2019 (Annualized)	6.63%
▶ 1985-2019 (Annualized)	8.33%

MHFA

(Mass. Housing Finance Agency)

One Beacon Street Boston, MA 02108 Phone: 617-854-1871 Fax: 617-854-1027

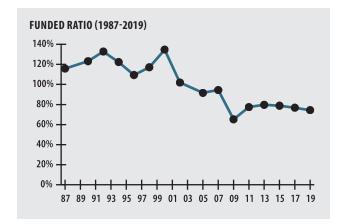
Board Members

Andris Silins*, Ping Yin Chai, Antonio Torres, Michael Fitzmaurice, **Paul Hynes** *indicates Chairperson

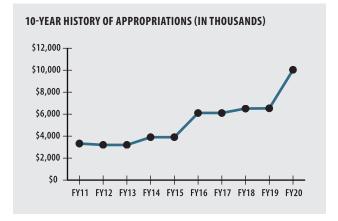
Board Administrator Joseph Petty

Board Meeting

2nd Tuesday of the month at 1:30 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% 15 16 17 18 19 15-19 85-19

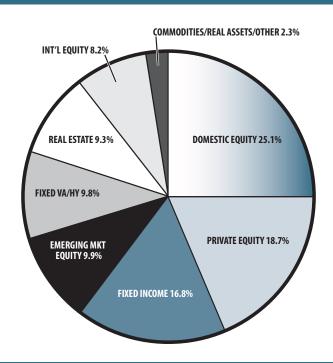


INVESTMENT RETURN HISTORY		
35 years 2019	34 years 2018	33 years 2017
7.59%	7.26%	7.59%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
7.99%	7.86%	5.19%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
7.36%	4.58%	7.54%

ACTUARIAL

► Funded Ratio		74.4%
Date of Last Valuation		1/1/19
► Actuary		Stone
Assumed Rate of Return		7.25%
▶ Funding Schedule		Level
Year Fully Funded		2026
Unfunded Liability		\$50.3 M
▶ Total Pension Appropriation (Fiscal 2020)		\$10.0 M
	ACTIVE	RETIRED
Number of Members	323	168
► Total Payroll/Benefit	\$33.0 M	\$7.9 M
Average Salary/Benefit	\$102,200	\$46,800
► Average Age	51	71
► Average Service	15.5 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	1
► Number Who Reported Earnings	0
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	19.31%
▶ 2019 Market Value	\$178.6 M
▶ 2015-2019 (Annualized)	7.36%
▶ 1985-2019 (Annualized)	7.59%

Massport

One Harborside Drive Suite 200S East Boston, MA 02128 Phone: 617-568-3951 Fax: 617-568-3957

Board Members

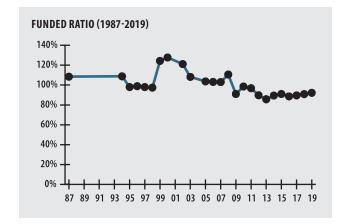
John Pranckevicius, Michael Grieco, Michael O'Brien, Betsy Taylor, James Hoyte* *indicates Chairperson

Board Administrator

Irene Moran

Board Meeting

Last Thursday of every month at 9:00 am



ACTUARIAL

▶ Funded Ratio		92.2%
▶ Date of Last Valuation		1/1/19
► Actuary		Stone
► Assumed Rate of Return		7.25%
► Funding Schedule		Frozen Entry Age
► Year Fully Funded		NA
▶ Unfunded Liability		\$54.9 M
► Total Pension Appropriation (Fiscal 2020)		\$12.0 M
	ACTIVE	RETIRED
► Number of Members	1,304	858
► Total Payroll/Benefit	\$114.0 M	\$34.9 M
► Average Salary/Benefit	\$87,400	\$40,600
► Average Age	47	70

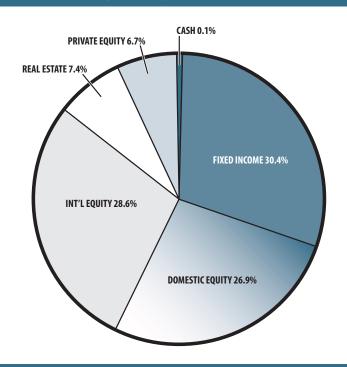
12.8 years

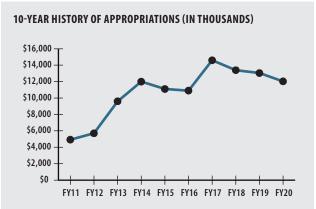
NA



ASSET ALLOCATION (12/31/19)

▶ Average Service





INVESTMENT RETURN HISTORY

35 years 2019 9.03%	34 years 2018 8.72%	33 years 2017 9.15%
10 years 2019	10 years 2018	10 years 2017
8.68%	8.95%	6.13%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
7.72%	5.22%	9.25%

► Number of Disability Retirees	50
► Number Who Reported Earnings	12
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	20.11%
▶ 2019 Market Value	\$715.0 M
▶ 2015-2019 (Annualized)	7.72%
▶ 1985-2019 (Annualized)	9.03%

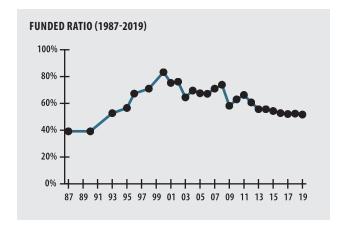
MTRS

(Mass. Teachers' Retirement System) 500 Rutherford Avenue, Suite 210 Charlestown, MA 02129 Phone: 617-679-6877 Fax: 617-679-1661

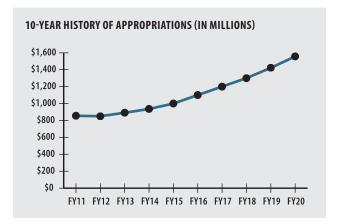
Board Members

Ventura Rodriguez (Chairperson), State Treasurer Deborah B. Goldberg (Nicola Favorito designee) State Auditor Suzanne Bump (Michael Ruane designee), Anne Wass, Dennis Naughton, Jacqueline Gorrie, Richard Liston **Board Administrator** Erika Glaster **Board Meeting** Typically the last Friday

of the month at 9:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 17 18 15-19 85-19



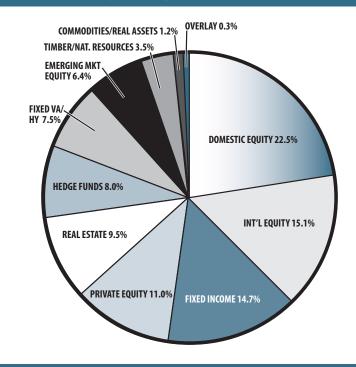
INVESTMENT RETURN HISTORY		
35 years 2019	34 years 2018	33 years 2017
9.47%	9.27%	9.62%
10 years 2019 9.13%	10 years 2018 9.25%	10 years 2017 5.68%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
8.11%	6.51%	10.01%

INVECTMENT DETIIDN HICTORY

ACTUARIAL

▶ Funded Ratio		51.7%
▶ Date of Last Valuation		1/1/19
		PERAC
Actuary		. =
► Assumed Rate of Return		7.25%
► Funding Schedule		8.94% Total Increasing
Year Fully Funded		2036
Unfunded Liability		\$26.0 B
► Total Pension Appropriation (Fiscal 2020)		\$1.6 B
	ACTIVE	RETIRED
Number of Members	94,103	67,110
► Total Payroll/Benefit	\$7.1 B	\$3.0 B
Average Salary/Benefit	\$75,200	\$45,100
► Average Age	44	73
Average Service	13.2 years	NA

ASSET ALLOCATION (12/31/19)



Number of Disability Retirees	552
Number Who Reported Earnings	126
► Number of Excess Earners	1
▶ Total Amount of Refund Due	\$12,575.64

▶ 2019 Return	16.62%
▶ 2019 Market Value	\$30.6 B
▶ 2015-2019 (Annualized)	8.11%
▶ 1985-2019 (Annualized)	9.47%

MWRA

(Mass. Water Resources Authority) Two Griffin Way Chelsea, MA 02150 Phone: 617-305-5595 Fax: 617-371-1616

Board Members

Andrew Pappastergion, Thomas Durkin, James Fleming*, Kevin McKenna, Frank Zecha

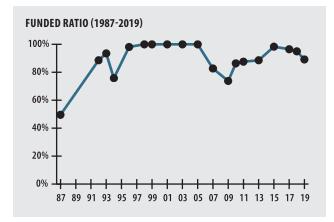
*indicates Chairperson

Board Administrator

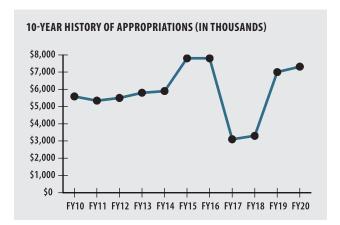
Carolyn Russo

Board Meeting

Generally the last Thursday of the month at 10:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 34 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 16 17 18 19 15-19 86-19

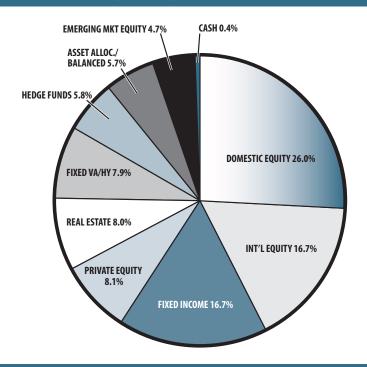


INVESTMENT RETURN HISTORY *		
34 years 2019	33 years 2018	32 years 2017
8.19%	7.95%	8.27%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
8.48%	9.07%	6.54%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
7.06%	4.91%	8.61%

ACTUARIAL

► Funded Ratio		89.2%
▶ Date of Last Valuation		1/1/19
► Actuary		Segal
► Assumed Rate of Return		7.25%
▶ Funding Schedule		5.0% Total Increasing
▶ Year Fully Funded		2030
Unfunded Liability		\$65.6 M
► Total Pension Appropriation (Fiscal 2020)		\$7.3 M
	ACTIVE	RETIRED
Number of Members	1,109	625
► Total Payroll/Benefit	\$95.8 M	\$23.0 M
Average Salary/Benefit	\$86,400	\$36,900
► Average Age	51	70
► Average Service	17.6 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	71
► Number Who Reported Earnings	15
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.15%
▶ 2019 Market Value	\$580.1 M
▶ 2015-2019 (Annualized)	7.06%
▶ 1986-2019 (Annualized)	8.19%

^{*} Based on 34-year return

Maynard

195 Main Street Maynard, MA 01754 Phone: 978-897-1820 Fax: 978-897-1013

Board Members

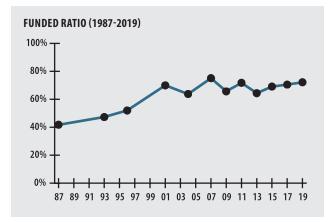
Michael Guzzo, Kevin Petersen, Patrick Hakey, Clifford Wilson, Christopher Connolly* *indicates Chairperson

Board Administrator

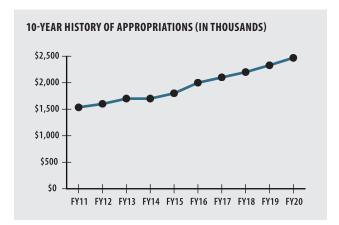
Kenneth DeMars

Board Meeting

The last Thursday of the month at 12:15 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% -10% 15 16 17 18 19 15-19 85-19



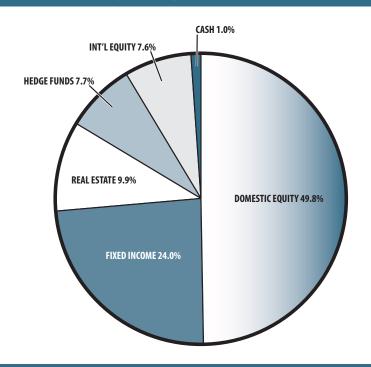
INVESTMENT KETOKN HISTORY		
35 years 2019 7.96%	34 years 2018 7.67%	33 years 2017 8.15%
10 years 2019 8.83%	10 years 2018 8.74%	10 years 2017 6.14%
5 years 2019 7.04%	5 years 2018 5.51%	5 years 2017 10.72%

INVECTMENT DETIIDN HICTORY

ACTUARIAL

► Funded Ratio		72.2%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
Assumed Rate of Return		6.75%
► Funding Schedule		6.0% Total Increasing
Year Fully Funded		2035
Unfunded Liability		\$17.4 M
► Total Pension Appropriation (Fiscal 2020)		\$2.5 M
	ACTIVE	RETIRED
Number of Members	212	117
► Total Payroll/Benefit	\$10.0 M	\$3.1 M
Average Salary/Benefit	\$47,400	\$26,600
► Average Age	46	73
► Average Service	10.1 years	NA

ASSET ALLOCATION (12/31/19)



6
4
0
\$0.00

▶ 2019 Return	18.11%
▶ 2019 Market Value	\$49.4 M
▶ 2015-2019 (Annualized)	7.04%
▶ 1985-2019 (Annualized)	7.96%

Medford

City Hall, Room 215 85 George P. Hassett Drive Medford, MA 02155 Phone: 781-393-2517 Fax: 781-393-2522

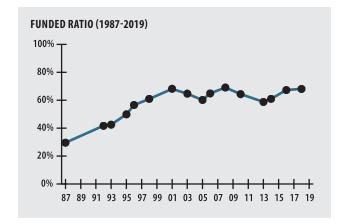
Board Members

Aleesha Nunley-Benjamin, Robert Maiocco, Rick Jordan*, Patrick Ripley, James Vieira *indicates Chairperson

Board Administrator

Mark Minervini **Board Meeting**

Typically the last week of the month at 9:30 am

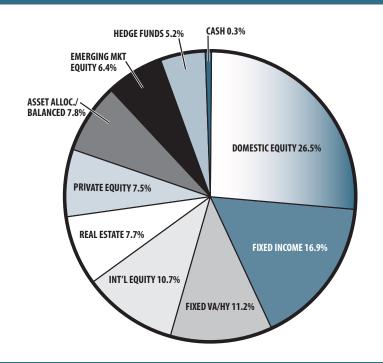


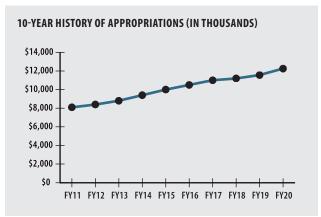
ACTUARIAL

► Funded Ratio		68.1%
▶ Date of Last Valuation		1/1/18
► Actuary		Sherman
► Assumed Rate of Return		7.50%
▶ Funding Schedule		4.0% Increasing Phase-In
▶ Year Fully Funded		2031
Unfunded Liability		\$91.6 M
► Total Pension Appropriation (Fiscal 2020)		\$12.3 M
	ACTIVE	RETIRED
Number of Members	733	594
► Total Payroll/Benefit	\$41.0 M	\$19.0 M
Average Salary/Benefit	\$56,000	\$31,900
► Average Age	NA	75
► Average Service	NA	NA



ASSET ALLOCATION (12/31/19)





EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	98
▶ Number Who Reported Earnings	21
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

35 years 2019	34 years 2018	33 years 2017
8.67%	8.47%	8.84%
10 years 2019	10 years 2018	10 years 2017
7.48%	8.04%	5.65%
5 years 2019 6.24%	<u>5 years 2018</u> 4.40%	5 years 2017 7.33%

▶ 2019 Return	15.83%
▶ 2019 Market Value	\$206.8 M
▶ 2015-2019 (Annualized)	6.24%
▶ 1985-2019 (Annualized)	8.67%

INVESTMENT RETURN HISTORY

Melrose

City Hall 562 Main Street Melrose, MA 02176 Phone: 781-979-4151 Fax: 781-979-4206

Board Members

Patrick Dello Russo*, Kelly Cogavin, Scott Colborne, Michael Lyle, John McLaughlin *indicates Chairperson

Board Administrator

Adam Travinski

Board Meeting

The last Wednesday of each month at 9:00 am

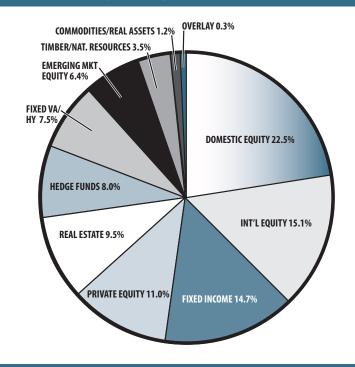


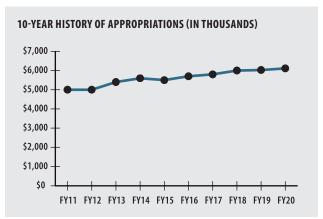
ACTUARIAL

▶ Funded Ratio		58.3%
Date of Last Valuation		1/1/19
► Actuary		Stone
► Assumed Rate of Return		7.50%
▶ Funding Schedule		4.0% Increasing
▶ Year Fully Funded		2037
Unfunded Liability		\$63.4 M
► Total Pension Appropriation (Fiscal 2020)		\$6.1 M
	ACTIVE	RETIRED
Number of Members	426	398
► Total Payroll/Benefit	\$21.6 M	\$9.5 M
Average Salary/Benefit	\$50,600	\$24,000
► Average Age	46	74
► Average Service	10 years	NA



ASSET ALLOCATION (12/31/19)





VESTMENT RETURN	HISTORY	
35 years 2019	34 years 2018	33 years 2017
8.44%	8.23%	8.54%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
8.66%	8.50%	5.34%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
7.61%	6.12%	9.41%

► Number of Disability Retirees	27
▶ Number Who Reported Earnings	6
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	15.95%
▶ 2019 Market Value	\$95.2 M
▶ 2015-2019 (Annualized)	7.61%
▶ 1985-2019 (Annualized)	8.44%

Methuen

41 Pleasant Street, Suite 303 Methuen, MA 01844 Phone: 978-983-8620 Fax: 978-983-8972

Board Members

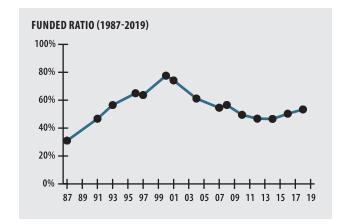
Louise Moss, John Sheehy, Albert Trott, Michael Hennessy*, **Robert Sheehan** *indicates Chairperson

Board Administrator

Kaitlyn Doucette

Board Meeting

The last Thursday of the month at 9:30 am

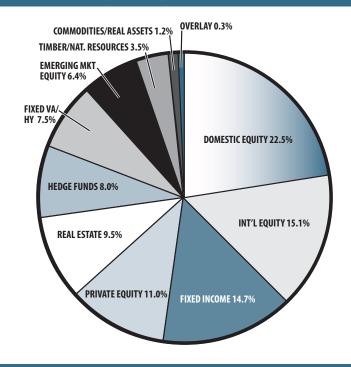


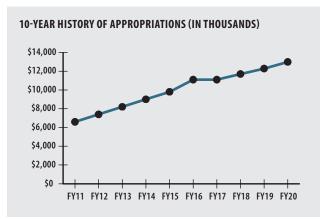
ACTUARIAL

► Funded Ratio		53.4%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.35%
▶ Funding Schedule		Varies Total Increasing
Year Fully Funded		2035
Unfunded Liability		\$125.5 M
► Total Pension Appropriation (Fiscal 2020)		\$13.0 M
	ACTIVE	RETIRED
Number of Members	651	449
► Total Payroll/Benefit	\$36.4 M	\$13.7 M
Average Salary/Benefit	\$55,900	\$30,500
► Average Age	47	72
► Average Service	13.5 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019 8.15%	34 years 2018 7.91%	33 years 2017 8.22%
10 years 2019 9.61%	10 years 2018 9.10%	10 years 2017 6.02%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
8.44%	6.90%	10.43%

53
16
0
\$0.00

▶ 2019 Return *	16.74%
▶ 2019 Market Value	\$175.4 M
▶ 2015-2019 (Annualized)	8.44%
▶ 1985-2019 (Annualized)	8.15%

After publishing the 2019 Investment Report, new information regarding market value was reviewed resulting in an adjustment to the peformance return.

Middlesex County

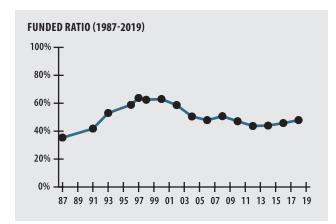
25 Linnell Circle P.O. Box 160 Billerica, MA 01865 Phone: 978-439-3000 Fax: 978-439-3050

Board Members

Thomas Gibson*, Brian Curtin, John Brown, Joseph Kearns, Robert Healy *indicates Chairperson

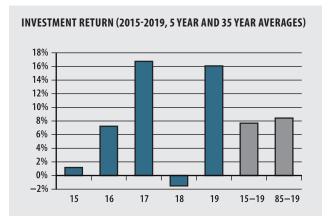
Board Administrator Lisa Maloney

Board Meeting Varies

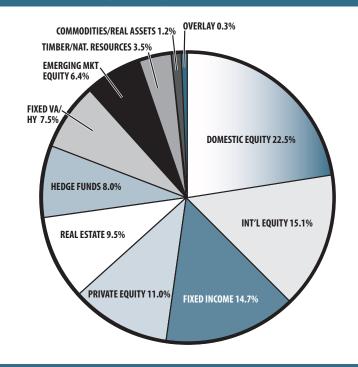


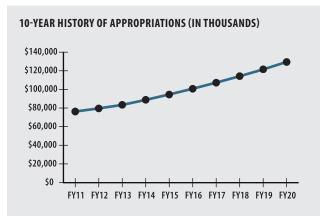
ACTUARIAL

▶ Funded Ratio		47.9%
▶ Date of Last Valuation		1/1/18
► Actuary		Segal
► Assumed Rate of Return		7.50%
▶ Funding Schedule		4.0% Increasing Phase-In
▶ Year Fully Funded		2035
▶ Unfunded Liability		\$1.5 B
► Total Pension Appropriation (Fiscal 2020)		\$129.4 M
	ACTIVE	RETIRED
Number of Members	9,168	5,531
► Total Payroll/Benefit	\$478.7 M	\$142.2 M
Average Salary/Benefit	\$52,200	\$25,700
► Average Age	48	73
► Average Service	11.5 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019 8.45%	34 years 2018 8.24%	33 years 2017 8.55%
<u>10 years 2019</u> 8.76%	<u>10 years 2018</u> 8.45%	10 years 2017 5.61%
5 years 2019 7.69%	<u>5 years 2018</u> 6.14%	5 years 2017 9.42%

► Number of Disability Retirees	357
► Number Who Reported Earnings	117
► Number of Excess Earners	1
► Total Amount of Refund Due	\$25,050.41

▶ 2019 Return	16.09%
▶ 2019 Market Value	\$1.6 B
▶ 2015-2019 (Annualized)	7.69%
▶ 1985-2019 (Annualized)	8.45%

Milford

Town Hall, Room 17 52 Main Street Milford, MA 01757 Phone: 508-634-2321 Fax: 508-634-0902

Board Members

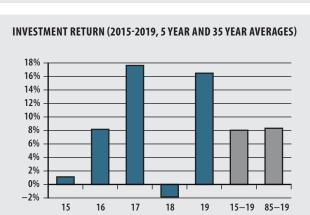
Zachary Taylor*, Christopher Pilla, Gerald Moody, Richard Villani *indicates Chairperson

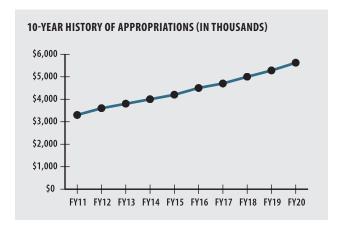
Board Administrator

Alberta Farley **Board Meeting**

3rd Tuesday of the month at 1:00 pm





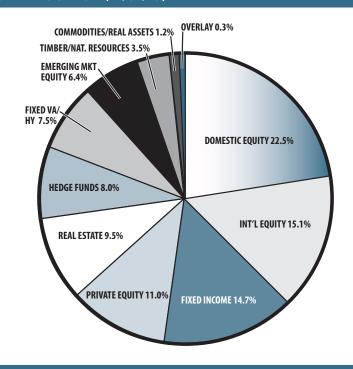


NVESTMENT RETURN	HISTORY	
35 years 2019	34 years 2018	33 years 2017
8.32%	8.09%	8.40%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
8.92%	8.99%	5.09%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
8.04%	6.47%	9.86%

ACTUARIAL

► Funded Ratio		61.3%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
► Assumed Rate of Return		7.25%
► Funding Schedule		7.0% Total Increasing
▶ Year Fully Funded		2036
▶ Unfunded Liability		\$60.2 M
▶ Total Pension Appropriation (Fiscal 2020)		\$5.6 M
	ACTIVE	RETIRED
Number of Members	489	304
► Total Payroll/Benefit	\$22.6 M	\$8.2 M
Average Salary/Benefit	\$46,300	\$26,900
► Average Age	49	73
► Average Service	12 years	NA

ASSET ALLOCATION (12/31/19)



29
11
0
\$0.00

▶ 2019 Return*	16.48%
▶ 2019 Market Value	\$106.3 M
▶ 2015-2019 (Annualized)	8.04%
▶ 1985-2019 (Annualized)	8.32%

^{*} After publishing the 2019 Investment Report, new information regarding accrued income was reviewed resulting in an adjustment to the peformance return.

Milton

40 Willard Street Suite G102 Quincy, MA 02169 Phone: 617-770-5970

Board Members

Amy Dexter, Paige Eppolito*, William Murphy, Jr., Thomas Cicerone, Richard Madigan *indicates Chairperson

Board Administrator

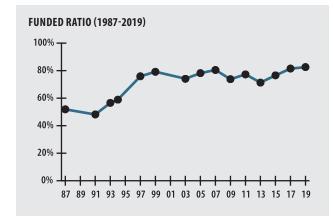
Jeanne Darcy

Last Thursday of the month at 3:30 pm

NA

Board Meeting

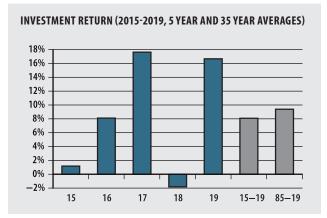
Fax: 617-770-5971



ACTUARIAL

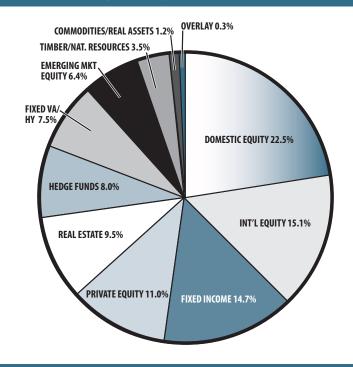
► Funded Ratio		82.6%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
► Assumed Rate of Return		7.25%
▶ Funding Schedule		6.0% Total Increasing
▶ Year Fully Funded		2027
Unfunded Liability		\$28.6 M
▶ Total Pension Appropriation (Fiscal 2020)		\$6.7 M
	ACTIVE	RETIRED
Number of Members	404	274
► Total Payroll/Benefit	\$23.8 M	\$8.8 M
Average Salary/Benefit	\$58,900	\$32,200
► Average Age	46	75

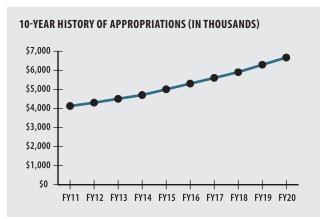
11.8 years



ASSET ALLOCATION (12/31/19)

▶ Average Service





INVESTMENT RETURN HISTORY

35 years 2019	34 years 2018	33 years 2017
9.39%	9.18%	9.53%
10 years 2019	10 years 2018	<u>10 years 2017</u>
9.09%	9.19%	5.67%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
8.08%	6.45%	9.93%

► Number of Disability Retirees	30
▶ Number Who Reported Earnings	7
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.68%
▶ 2019 Market Value	\$152.3 M
▶ 2015-2019 (Annualized)	8.08%
▶ 1985-2019 (Annualized)	9.39%

Minuteman Regional School District

758 Marrett Road Lexington, MA 02421 Phone: 781-861-6500 Fax: 781-863-1747

Board Members

Laurie Elliott, Kevin Mahoney*, Maria Oliveira, Cheryl Mixon, Norman Cohen *indicates Chairperson

Board Administrator

Sandor Zapolin

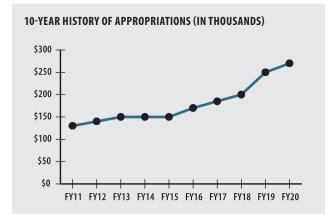
Board Meeting

Generally the last Thursday of each month at 4:30 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18%

16% 14% 12% 10% 8% 6% 4% 2% 0% 15 15-19 85-19

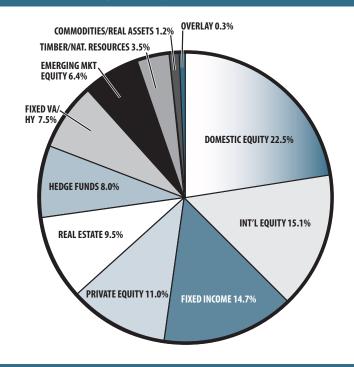


INVESTMENT RETURN HISTORY			
35 years 2019 9.44%	34 years 2018 9.24%	33 years 2017 9.59%	
10 years 2019 8.86%	<u>10 years 2018</u> 9.00%	10 years 2017 5.41%	
5 years 2019 7.85%	5 years 2018 6.27%	<u>5 years 2017</u> 9.60%	

ACTUARIAL

► Funded Ratio		88.3%
▶ Date of Last Valuation		1/1/17
► Actuary		PERAC
► Assumed Rate of Return		7.40%
► Funding Schedule		8.0% Total Increasing
► Year Fully Funded		2035
Unfunded Liability		\$1.8 M
► Total Pension Appropriation (Fiscal 2020)		\$270 K
	ACTIVE	RETIRED
Number of Members	47	42
► Total Payroll/Benefit	\$2.2 M	\$1.0 M
Average Salary/Benefit	\$47,000	\$24,900
► Average Age	48	74
► Average Service	8.6 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	1
► Number Who Reported Earnings	0
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.22%
▶ 2019 Market Value	\$14.7 M
▶ 2015-2019 (Annualized)	7.85%
▶ 1985-2019 (Annualized)	9.44%

Montague

One Avenue A Turners Falls, MA 01376 Phone: 413-863-3200 Fax: 413-863-3224

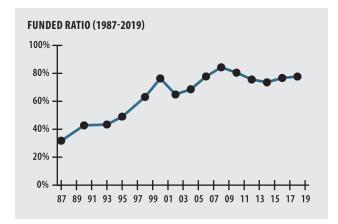
Board Members

Carolyn Olsen, Steven Ellis, David Dion, Cheryl Clark*, Marianne Fiske *indicates Chairperson

Board Administrator

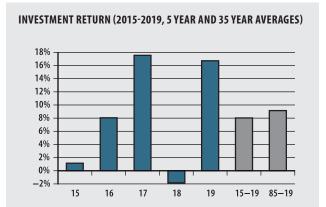
Debra Underhill **Board Meeting**

4th Tuesday of the month at 9:30 am

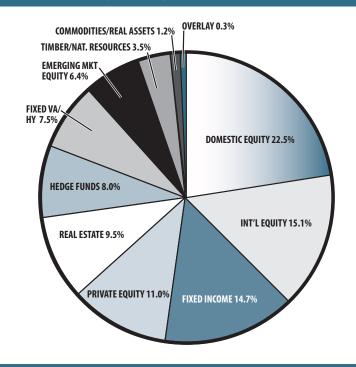


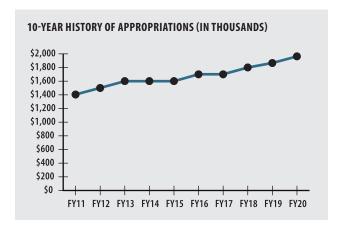
ACTUARIAL

► Funded Ratio		77.7%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.25%
▶ Funding Schedule		5.2% Total Increasing
Year Fully Funded		2032
Unfunded Liability		\$11.7 M
► Total Pension Appropriation (Fiscal 2020)		\$2.0 M
	ACTIVE	RETIRED
Number of Members	196	134
► Total Payroll/Benefit	\$7.4 M	\$2.8 M
Average Salary/Benefit	\$37,600	\$20,500
► Average Age	49	72
► Average Service	10.6 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019 9.16%	34 years 2018 8.94%	33 years 2017 9.29%
10 years 2019 9.05%	10 years 2018 9.12%	10 years 2017 5.59%
5 years 2019 8.04%	<u>5 years 2018</u> 6.41%	5 years 2017 9.89%

11
1
0
\$0.00

▶ 2019 Return	16.72%
▶ 2019 Market Value	\$47.2 M
▶ 2015-2019 (Annualized)	8.04%
▶ 1985-2019 (Annualized)	9.16%

Natick

13 East Central Street Natick, MA 01760 Phone: 508-647-6440 Fax: 508-647-6443

Board Members

Arti Mehta, Eliot Lurier, Nicholas Mabardy, Michael Melchiorri*, B. Michael Reardon

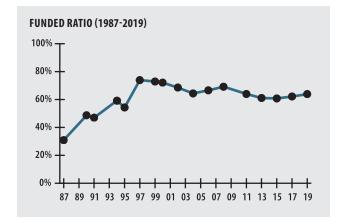
*indicates Chairperson

Board Administrator

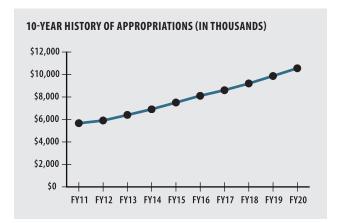
Kathleen Bacon

Board Meeting

Generally the last Wednesday of the month at 4:00 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% 15 17 18 19 15-19 85-19 16

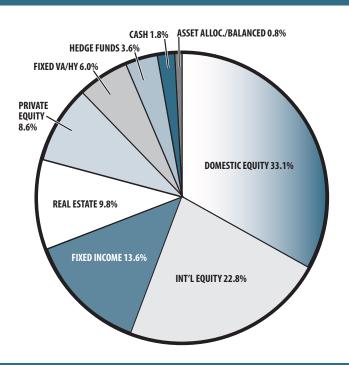


VESTMENT RETURN	HISTORY	
35 years 2019	34 years 2018	33 years 2017
8.24%	7.94%	8.30%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
9.48%	9.47%	5.70%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
8.02%	5.96%	10.48%

ACTUARIAL

► Funded Ratio		63.9%
▶ Date of Last Valuation		1/1/19
► Actuary		Segal
Assumed Rate of Return		7.25%
▶ Funding Schedule		8.0% Total Increasing
▶ Year Fully Funded		2030
Unfunded Liability		\$85.4 M
► Total Pension Appropriation (Fiscal 2020)		\$10.6 M
	ACTIVE	RETIRED
Number of Members	651	419
► Total Payroll/Benefit	\$37.3 M	\$12.4 M
Average Salary/Benefit	\$57,300	\$29,700
► Average Age	46	74
► Average Service	11.2 years	NA

ASSET ALLOCATION (12/31/19)



15
6
0
\$0.00

▶ 2019 Return	18.95%
▶ 2019 Market Value	\$163.1 M
▶ 2015-2019 (Annualized)	8.02%
▶ 1985-2019 (Annualized)	8.24%

Needham

Town Hall 1471 Highland Ave. Needham, MA 02492 Phone: 781-455-7500 Ext. 231 Fax: 781-449-4569

Board Members

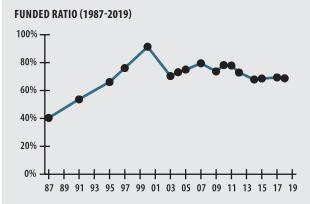
Evelyn Poness*, Sandra Cincotta, John Krawiecki, Robert Mearls *indicates Chairperson

Board Administrator

Jacob Cole

Board Meeting

2nd Wednesday of every month at 9:30 am

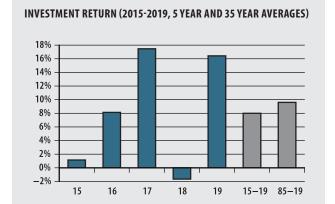


ACTUARIAL

▶ Funded Ratio		68.8%
▶ Date of Last Valuation		1/1/18
► Actuary		Segal
► Assumed Rate of Return		7.25%
► Funding Schedule		4.5% Increasing Phase-In
▶ Year Fully Funded		2030
Unfunded Liability		\$71.7 M
► Total Pension Appropriation (Fiscal 2020)		\$8.7 M
	ACTIVE	RETIRED
▶ Number of Members	692	459
▶ Total Payroll/Benefit	\$37.7 M	\$12.1 M
Average Salary/Benefit	\$54,400	\$26,400
▶ Average Age	48	76

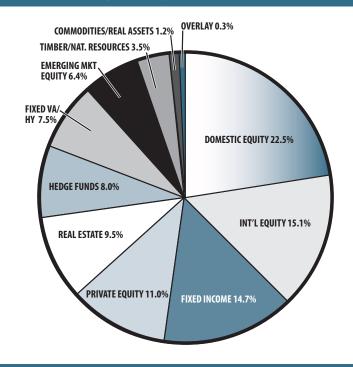
11.2 years

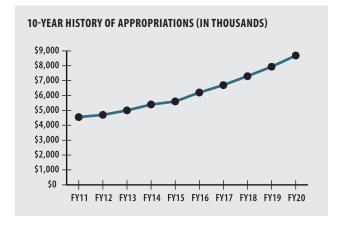
NA



ASSET ALLOCATION (12/31/19)

▶ Average Service





35 years 2019	34 years 2018	33 years 2017
9.62%	9.43%	9.79%
10 years 2019	10 years 2018	10 years 2017
8.96%	9.02%	5.54%
5 years 2019	<u>5 years 2018</u>	5 years 2017

6.44%

9.82%

INVESTMENT RETURN HISTORY

8.02%

► Number of Disability Retirees	29
► Number Who Reported Earnings	7
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.43%
▶ 2019 Market Value	\$182.9 M
▶ 2015-2019 (Annualized)	8.02%
▶ 1985-2019 (Annualized)	9.62%

New Bedford

651 Orchard Street, #203A New Bedford, MA 02744-1008 Phone: 508-979-1538

Fax: 508-979-1799

Board Members

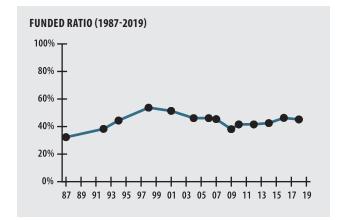
Robert Ekstrom, Angela Natho, Leonard Baillargeon, James Allen*, Susan Thompson *indicates Chairperson

Board Administrator

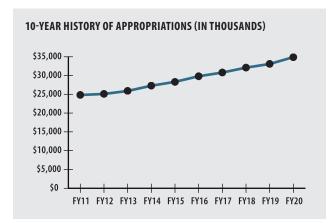
Eric Cohen

Board Meeting

Last Thursday of the month at 9:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% 15 19 15-19 85-19 16 17 18

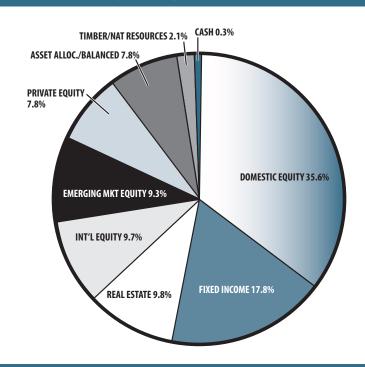


INVESTMENT RETURN HISTORY			
35 years 2019	34 years 2018	33 years 2017	
8.23%	7.91%	8.30%	
10 years 2019 9.00%	10 years 2018 9.03%	10 years 2017 6.12%	
<u>5 years 2019</u> 8.26%	5 years 2018 5.78%	<u>5 years 2017</u> 10.13%	

ACTUARIAL

► Funded Ratio		45.2%
▶ Date of Last Valuation		1/1/18
► Actuary		KMS
► Assumed Rate of Return		7.50%
▶ Funding Schedule		5.4% Total Increasing
▶ Year Fully Funded		2035
▶ Unfunded Liability		\$389.6 M
► Total Pension Appropriation (Fiscal 2020)		\$34.9 M
	ACTIVE	RETIRED
► Number of Members	2,007	1,879
► Total Payroll/Benefit	\$96.0 M	\$46.4 M
Average Salary/Benefit	\$47,800	\$24,700
► Average Age	46	73
► Average Service	11.9 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	269
► Number Who Reported Earnings	72
► Number of Excess Earners	1
► Total Amount of Refund Due	\$14,977.49

▶ 2019 Return	19.73%
▶ 2019 Market Value	\$363.9 M
▶ 2015-2019 (Annualized)	8.26%
▶ 1985-2019 (Annualized)	8.23%

Newburyport

16 Unicorn Street Newburyport, MA 01950 Phone: 978-465-6619 Fax: 978-462-4042

Board Members

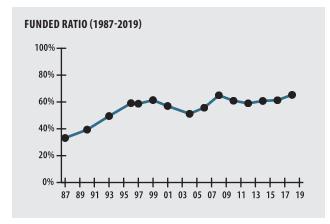
Ethan Manning, John Moak, Joseph Spaulding*, Jeffrey Cutter, Alexander Kravchuk *indicates Chairperson

Board Administrator

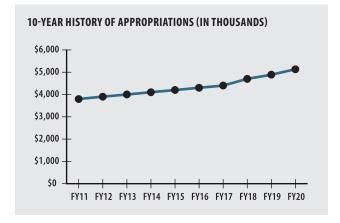
Laurie Burton

Board Meeting

Last Wednesday or Thursday of the month at 9:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 16 17 18 19 15-19 85-19



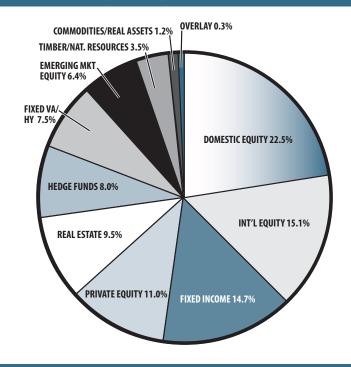
INVESTMENT RETURN HISTORY			
35 years 2019	34 years 2018	33 years 2017	
8.31%	8.08%	8.39%	
10 years 2019 8.93%	10 years 2018 9.01%	10 years 2017 5.50%	
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>	
7.89%	6.27%	9.71%	

INVECTMENT DETIIDN HICTORY

ACTUARIAL

► Funded Ratio		65.3%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.50%
▶ Funding Schedule		5.0% Total Increasing
Year Fully Funded		2035
Unfunded Liability		\$41.9 M
► Total Pension Appropriation (Fiscal 2020)		\$5.1 M
	ACTIVE	RETIRED
Number of Members	386	231
► Total Payroll/Benefit	\$18.8 M	\$6.6 M
Average Salary/Benefit	\$48,700	\$28,500
► Average Age	49	73
► Average Service	11.3 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	24
► Number Who Reported Earnings	8
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.65%
▶ 2019 Market Value	\$93.2 M
▶ 2015-2019 (Annualized)	7.89%
▶ 1985-2019 (Annualized)	8.31%

Newton

City Hall 1000 Commonwealth Avenue Newton Centre, MA 02459-1449 Phone: 617-796-1095 Fax: 617-796-1098

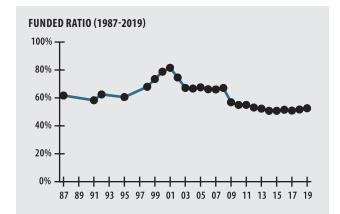
Board Members

Susan Dzikowski, Anthony Logalbo, Paul Bianchi, Thomas Lopez*, Kimberly Fletcher *indicates Chairperson

Board Administrator

at 3:00 pm

Kelly Byrne **Board Meeting** 3rd or 4th Wednesday of the month



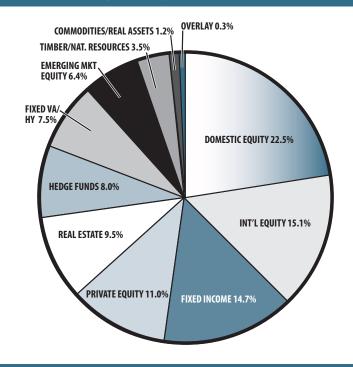
ACTUARIAL

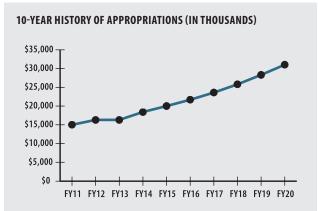
Funded Katio	52.6%
Date of Last Valuation	1/1/19
Actuary	Segal
Assumed Rate of Return	7.25%
Funding Schedule	9.6% Total Increasing
Year Fully Funded	2031
 Unfunded Liability 	\$322.1 M
Total Pension Appropriation (Fiscal 2020)	\$31.0 M

	ACTIVE	RETIRED
Number of Members	1,605	1,332
► Total Payroll/Benefit	\$100.6 M	\$38.7 M
► Average Salary/Benefit	\$62,700	\$29,100
► Average Age	46	75
Average Service	11.8 years	NA



ASSET ALLOCATION (12/31/19)





35 years 2019	<u>34 years 2018</u>	33 years 2017
8.69%	8.47%	8.79%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
10 years 2019 8.95%	10 years 2018 8.94%	10 years 2017 5.61%

6.48%

9.75%

		(
EADNEN	NCOME OF DISABILITY RETI	DEEC (ON19)

► Number of Disability Retirees	130
▶ Number Who Reported Earnings	28
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.19%
▶ 2019 Market Value	\$394.5 M
▶ 2015-2019 (Annualized)	8.02%
▶ 1985-2019 (Annualized)	8.69%

INVESTMENT RETURN HISTORY

8.02%

Norfolk County

480 Neponset Street, Bldg. 15 Canton, MA 02021 Phone: 781-821-0664 Fax: 781-821-0981

Board Members

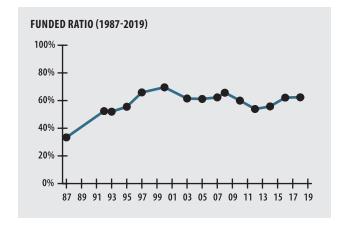
James Timilty*, Paul Connors, Josephine Shea, Edwin Little, Karen Jelloe *indicates Chairperson

Board Administrator

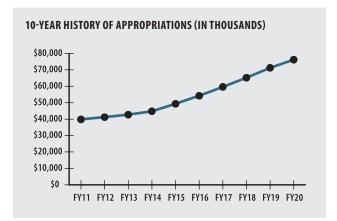
Kathleen Kiely-Becchetti

Board Meeting

Last Wednesday of every month at 8:30 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% 15 19 15-19 85-19 16 17 18



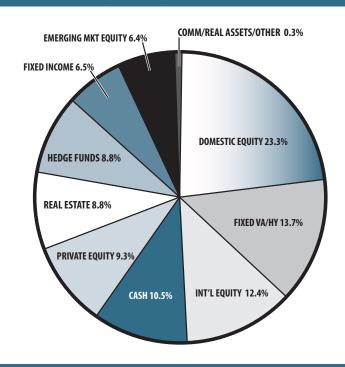
INVESTMENT RETURN HISTORY			
35 years 2019 8.59%	34 years 2018 8.35%	33 years 2017 8.76%	
10 years 2019 8.59%	10 years 2018 8.86%	10 years 2017 5.73%	
5 years 2019 7.08%	5 years 2018 4.83%	5 years 2017 9.32%	

INVECTMENT DETIIDN HICTORY

ACTUARIAL

► Funded Ratio		62.4%
▶ Date of Last Valuation		1/1/18
► Actuary		Sherman
► Assumed Rate of Return		7.75%
▶ Funding Schedule		4.0% Increasing Phase-In
▶ Year Fully Funded		2029
Unfunded Liability		\$570.5 M
► Total Pension Appropriation (Fiscal 2020)		\$76.2 M
	ACTIVE	RETIRED
Number of Members	5,406	3,329
► Total Payroll/Benefit	\$289.1 M	\$87.9 M
Average Salary/Benefit	\$53,500	\$26,400
► Average Age	NA	73
► Average Service	NA	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	289
► Number Who Reported Earnings	93
► Number of Excess Earners	5
► Total Amount of Refund Due	\$34,225.84

▶ 2019 Return	17.32%
▶ 2019 Market Value	\$1.1 B
▶ 2015-2019 (Annualized)	7.08%
▶ 1985-2019 (Annualized)	8.59%

North Adams

61 Main Street, Suite 247 North Adams, MA 01247 Phone: 413-663-5185 Fax: 413-664-9412

Board Members

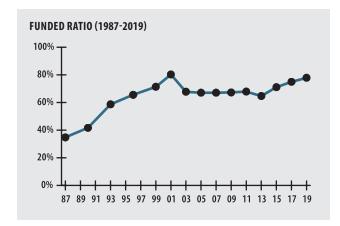
Alan Marden, Kathleen Wall, Matthew LaBonte, Lawrence O'Brien*, Fred Thompson *indicates Chairperson

Board Administrator

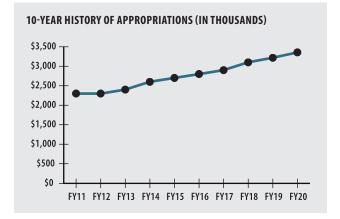
Beth Matson

Board Meeting

3rd Tuesday of the month at 10:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% 16 17 15-19 85-19

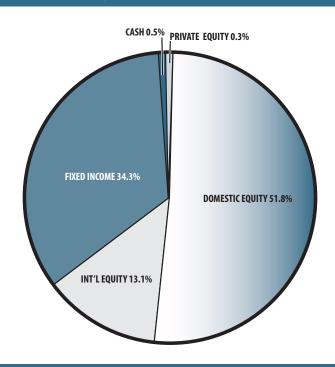


INVESTMENT RETURN HISTORY				
35 years 2019	34 years 2018	33 years 2017		
9.56%	9.50%	9.64%		
10 years 2019 9.43%	10 years 2018	10 years 2017 6.90%		
<u>5 years 2019</u>	5 years 2018	5 years 2017		
7.08%	7.18%	9.94%		

ACTUARIAL

) F		77.00/
► Funded Ratio		77.9%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
Assumed Rate of Return		7.25%
► Funding Schedule		4.9% Total Increasing
Year Fully Funded		2029
Unfunded Liability		\$18.5 M
► Total Pension Appropriation (Fiscal 2020)		\$3.4 M
	ACTIVE	RETIRED
Number of Members	337	233
► Total Payroll/Benefit	\$11.9 M	\$4.8 M
Average Salary/Benefit	\$35,400	\$20,700
► Average Age	47	74
Average Service	10.7 years	NA

ASSET ALLOCATION (12/31/19)



EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	31
▶ Number Who Reported Earnings	15
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	11.77%
▶ 2019 Market Value	\$72.6 M
▶ 2015-2019 (Annualized)	7.08%
▶ 1985-2019 (Annualized)	9.56%

INVECTMENT DETIIDN HICTORY

North Attleboro

500 East Washington Street, 2nd Floor North Attleboro, MA 02760 Phone: 508-699-0119 Fax: 508-699-0127

Board Members

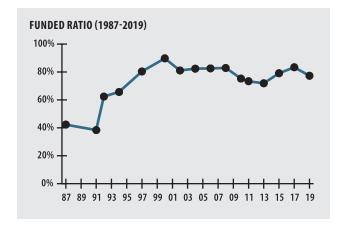
Linda Catanzariti, Michael Cornetta, Brian Brousseau, Craig Chapman*, Lynn Carley *indicates Chairperson

Board Administrator

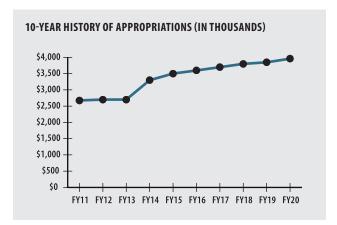
Sharon Sullivan

Board Meeting

4th Thursday of the month at 4:30 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% 15 16 17 18 15-19 85-19

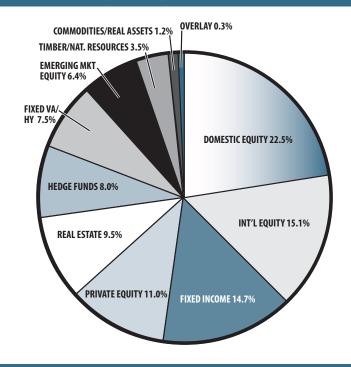


INVESTMENT RETURN HISTORY			
35 years 2019	34 years 2018	33 years 2017	
8.77%	8.41%	8.79%	
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>	
9.80%	9.57%	6.95%	
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>	
8.47%	5.90%	10.56%	

ACTUARIAL

► Funded Ratio		77.3%
▶ Date of Last Valuation	1/1/19	
► Actuary	Sherman	
► Assumed Rate of Return	7.50%	
► Funding Schedule	Approximately 5.6% Total Increasing	
► Year Fully Funded	2032	
▶ Unfunded Liability	\$34.7 M	
▶ Total Pension Appropriation (Fiscal 2020)		\$4.0 M
	ACTIVE	RETIRED
Number of Members	496	290
▶ Total Payroll/Benefit	\$25.2 M	\$7.7 M
Average Salary/Benefit	\$50,700	\$26,600
▶ Average Age	NA	71
► Average Service	NA	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	25
▶ Number Who Reported Earnings	11
► Number of Excess Earners	1
► Total Amount of Refund Due	\$422.03

21.77%
\$132.9 M
8.47%
8.77%

Northampton

240 Main Street, First Floor Northampton, MA 01060 Phone: 413-587-1211 Fax: 413-587-1278

Board Members

Joyce Karpinski*, Susan Wright, Michael Lyons, Thomas Sullivan *indicates Chairperson

Board Administrator

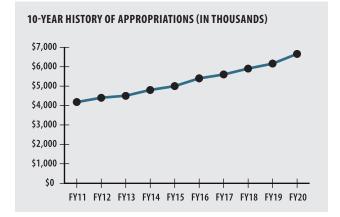
David Shipka

Board Meeting

Last Tuesday or Thursday of each month at 1:30 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 25% 20% 15% 10% 5% 0% -5% 15 16 17 18 19 15-19 85-19

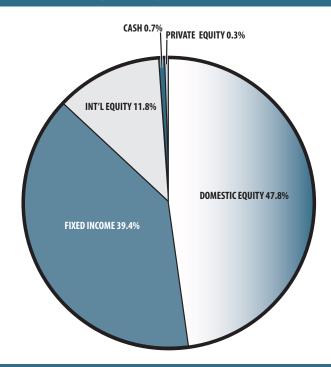


INVESTMENT RETURN HISTORY			
35 years 2019 9.39%	34 years 2018 9.32%	33 years 2017 9.47%	
10 years 2019	10 years 2018	10 years 2017	
9.31% 5 years 2019	9.82% <u>5 years 2018</u>	7.01% <u>5 years 2017</u>	
7.10%	7.35%	10.02%	

ACTUARIAL

► Funded Ratio		68.7%
▶ Date of Last Valuation		1/1/18
► Actuary		Stone
► Assumed Rate of Return		7.35%
▶ Funding Schedule		3.43% Increasing
▶ Year Fully Funded		2035
Unfunded Liability		\$55.9 M
► Total Pension Appropriation (Fiscal 2020)		\$6.7 M
	ACTIVE	RETIRED
▶ Number of Members	619	431
► Total Payroll/Benefit	\$27.7 M	\$10.3 M
Average Salary/Benefit	\$44,700	\$23,800
► Average Age	46	71
► Average Service	10.4 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	30
► Number Who Reported Earnings	13
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	11.61%
▶ 2019 Market Value	\$142.5 M
▶ 2015-2019 (Annualized)	7.10%
▶ 1985-2019 (Annualized)	9.39%

Northbridge

7 Main Street, Town Hall Whitinsville, MA 01588 Phone: 508-234-0820 Fax: 508-234-5834

Board Members

Neil Vaidya, Sharon Susienka, George Murray, John Meagher*, Thomas Frieswyk *indicates Chairperson

Board Administrator

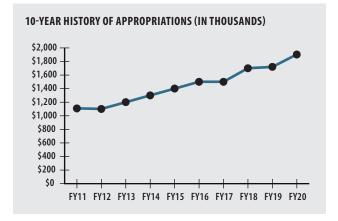
Scott McGrath

Board Meeting

Usually third Wednesday of the month at 2:30 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 18 15-19 85-19

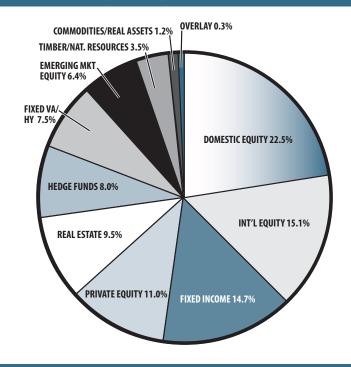


INVESTMENT RETURN HISTORY			
35 years 2019	34 years 2018	33 years 2017	
9.37%	9.16%	9.51%	
<u>10 years 2019</u>	<u>10 years 2018</u>	10 years 2017	
9.16%	9.24%	5.67%	
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>	
8.16%	6.52%	9.98%	

ACTUARIAL

► Funded Ratio		69.1%
▶ Date of Last Valuation		1/1/18
► Actuary		Stone
► Assumed Rate of Return		7.35%
▶ Funding Schedule		4.0% Increasing
Year Fully Funded		2035
Unfunded Liability		\$15.4 M
► Total Pension Appropriation (Fiscal 2020)		\$1.9 M
	ACTIVE	RETIRED
Number of Members	206	114
► Total Payroll/Benefit	\$8.8 M	\$2.5 M
Average Salary/Benefit	\$42,500	\$22,300
► Average Age	47	74
► Average Service	10.2 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	10
► Number Who Reported Earnings	4
▶ Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00
► Number of Excess Earners	0 \$0.00

▶ 2019 Return	16.78%
▶ 2019 Market Value	\$40.3 M
▶ 2015-2019 (Annualized)	8.16%
▶ 1985-2019 (Annualized)	9.37%

Norwood

566 Washington Street Norwood, MA 02062 Phone: 781-762-1240 Ext. 157

Fax: 781-278-3024

Board Members Thomas McQuaid, Edmund Mulvehill*,

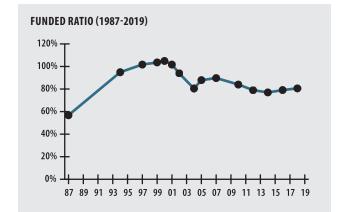
Eileen Hickey, Thomas O'Toole, Thomas Rorrie

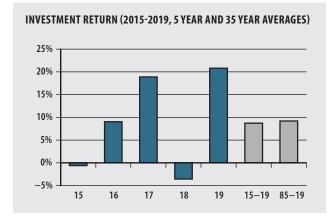
*indicates Chairperson

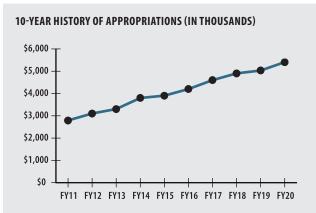
Board Administrator

Debra Wilkes **Board Meeting**

Third Wednesday of the month at 9:00 am





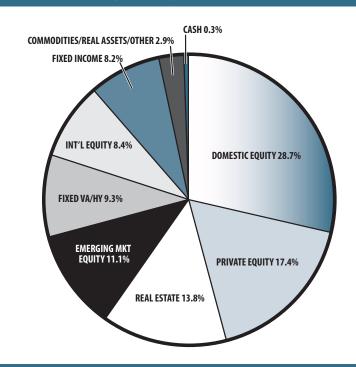


INVESTMENT RETURN HISTORY			
35 years 2019	34 years 2018	33 years 2017	
9.20%	8.88%	9.28%	
10 years 2019	10 years 2018	10 years 2017	
8.86%	9.10%	7.01%	
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>	
8.74%	5.90%	9.85%	

ACTUARIAL

► Funded Ratio		80.6%
▶ Date of Last Valuation		1/1/18
► Actuary		Sherman
Assumed Rate of Return		7.75%
▶ Funding Schedule		3.5% Increasing
▶ Year Fully Funded		2029
▶ Unfunded Liability		\$38.0 M
► Total Pension Appropriation (Fiscal 2020)		\$5.4 M
	ACTIVE	RETIRED
Number of Members	571	389
► Total Payroll/Benefit	\$32.6 M	\$11.8 M
Average Salary/Benefit	\$57,000	\$30,300
► Average Age	NA	73
► Average Service	NA	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	35
▶ Number Who Reported Earnings	14
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2019 Return	20.82%
▶ 2019 Market Value	\$179.7 M
▶ 2015-2019 (Annualized)	8.74%
▶ 1985-2019 (Annualized)	9.20%

Peabody

City Hall 24 Lowell Street Peabody, MA 01960 Phone: 978-538-5911 Fax: 978-538-5989

Board Members

Michael Gingras, Edward Lomasney, Joseph DiFranco, Linda Cavallon, Richard Yagjian* *indicates Chairperson

Board Administrator

at 7:00 am

James Freeman **Board Meeting** Generally a Tuesday or Wednesday

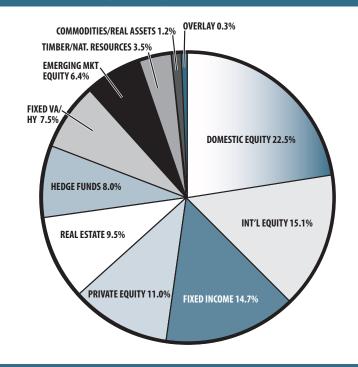


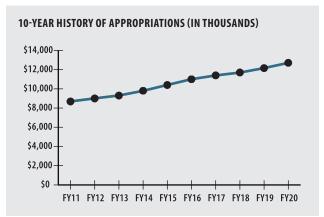
ACTUARIAL

▶ Funded Ratio		52.3%
▶ Date of Last Valuation		1/1/18
Actuary		Sherman
Actuary Actuary Assumed Rate of Return		7.75%
, , , , , , , , , , , , , , , , , , ,		
► Funding Schedule		4.0% Increasing
Year Fully Funded		2036
Unfunded Liability		\$138.1 M
► Total Pension Appropriation (Fiscal 2020)		\$12.7 M
	ACTIVE	RETIRED
Number of Members	853	783
► Total Payroll/Benefit	\$46.8 M	\$19.1 M
► Average Salary/Benefit	\$54,800	\$24,400
► Average Age	NA	76
► Average Service	NA	NA



ASSET ALLOCATION (12/31/19)





35 years 2019 34 years 2018

INVESTMENT RETURN HISTORY

8.71%

10 years 2019 10 years 2017 10 years 2018 9.11% 9.20% 5.65% 5 years 2019 5 years 2018 5 years 2017 8.09% 6.47% 9.95%

8.48%

33 years 2017

8.81%

► Number of Disability Retirees	48
▶ Number Who Reported Earnings	13
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.72%
▶ 2019 Market Value	\$165.0 M
▶ 2015-2019 (Annualized)	8.09%
▶ 1985-2019 (Annualized)	8.71%

Pittsfield

114 Fenn Street Pittsfield, MA 01201 Phone: 413-499-9468 Fax: 413-499-9328

Board Members

Matthew Kerwood*, Timothy Bartini, Timothy Hannigan, William Flynn *indicates Chairperson

Board Administrator

Karen Lancto

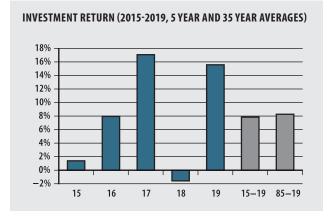
Board Meeting

Third or fourth Thursday of the month at 10:00 am

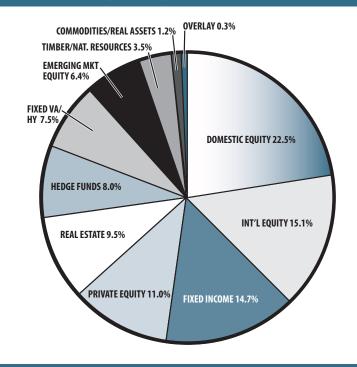


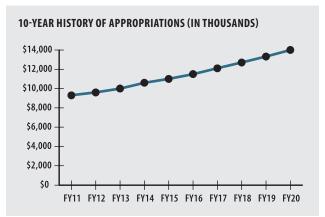
ACTUARIAL

▶ Funded Ratio		49.3%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
Assumed Rate of Return		7.25%
▶ Funding Schedule		5.2% Total Increasing
▶ Year Fully Funded		2037
Unfunded Liability		\$145.1 M
► Total Pension Appropriation (Fiscal 2020)		\$14.0 M
	ACTIVE	RETIRED
Number of Members	917	797
► Total Payroll/Benefit	\$35.7 M	\$18.4 M
Average Salary/Benefit	\$38,900	\$23,000
► Average Age	48	75
► Average Service	11 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT	RETURN	HISTORY

35 years 2019	34 years 2018	33 years 2017
8.28%	8.07%	8.37%
10 years 2019	10 years 2018	10 years 2017
9.00%	8.86%	5.58%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
7.84%	6.41%	9.75%

► Number of Disability Retirees	65
► Number Who Reported Earnings	20
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	15.58%
▶ 2019 Market Value	\$154.1 M
▶ 2015-2019 (Annualized)	7.84%
▶ 1985-2019 (Annualized)	8.28%

Plymouth

212 South Meadow Road Unit #3 Plymouth, MA 02360

Phone: 508-830-4170 Fax: 508-830-4019

Board Members

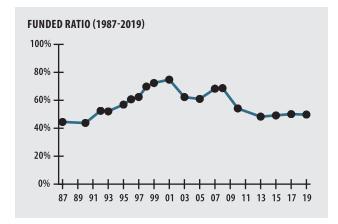
*indicates Chairperson

Lynne Barrett, Gerald Coughlin, Dale Webber, Thomas Kelley*, **Robert Ness**

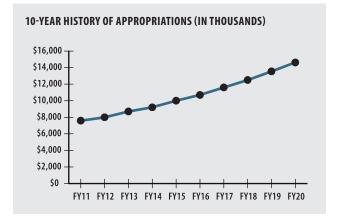
Board Administrator

Wendy Cherry **Board Meeting**

4th Friday of each month at 8:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 15% 10% 5% 17 15-19 85-19

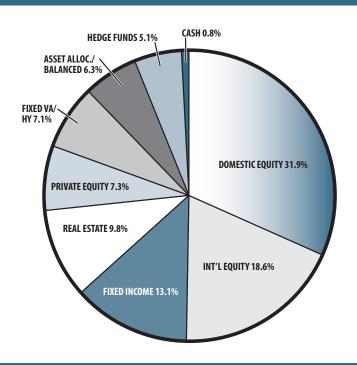


INVESTMENT RETURN HISTORY			
35 years 2019 8.90%	34 years 2018 8.61%	33 years 2017 8.99%	
10 years 2019 9.41%	10 years 2018 9.71%	10 years 2017 6.52%	
<u>5 years 2019</u> 8.50%	5 years 2018 5.99%	5 years 2017 10.61%	

ACTUARIAL

► Funded Ratio		49.8%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
► Assumed Rate of Return		7.00%
▶ Funding Schedule		8.14% Total Increasing
Year Fully Funded		2035
Unfunded Liability		\$176.8 M
► Total Pension Appropriation (Fiscal 2020)		\$14.6 M
	ACTIVE	RETIRED
Number of Members	880	755
► Total Payroll/Benefit	\$45.2 M	\$19.0 M
Average Salary/Benefit	\$51,400	\$25,200
► Average Age	48	71
► Average Service	12.1 years	NA
	,	

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	80
▶ Number Who Reported Earnings	24
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00
Fiolal Amount of Refund Due)(

▶ 2019 Return	19.16%
▶ 2019 Market Value	\$198.3 M
▶ 2015-2019 (Annualized)	8.50%
▶ 1985-2019 (Annualized)	8.90%

Plymouth County

10 Cordage Park Circle Suite 234

Plymouth, MA 02360 Phone: 508-830-1803 Fax: 508-830-1875

Board Members

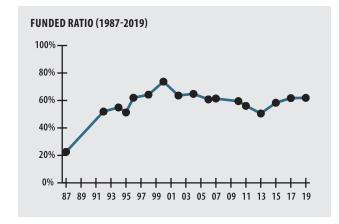
Thomas O'Brien*, James Harrington, Joseph McDonough, John Sciara, Mary Beth Carter *indicates Chairperson

Board Administrator

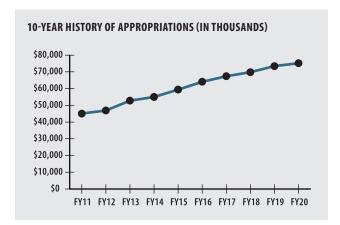
David Sullivan

Board Meeting

Generally the last Wednesday of the month at 9:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% -5% 15 16 17 18 19 15-19 85-19

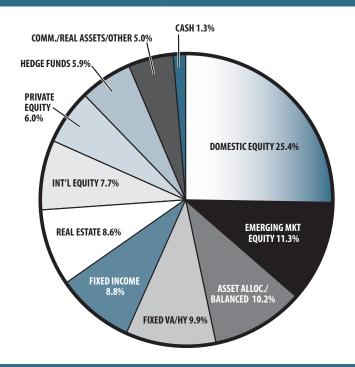


INVESTMENT RETURN HISTORY		
35 years 2019 9.01%	34 years 2018 8.75%	33 years 2017 9.25%
10 years 2019 8.50%	10 years 2018 8.70%	10 years 2017 5.74%
5 years 2019 6.99%	<u>5 years 2018</u> 4.49%	<u>5 years 2017</u> 9.38%

ACTUARIAL

► Funded Ratio		61.9%
Date of Last Valuation		1/1/19
► Actuary		Sherman
Assumed Rate of Return		7.88%
▶ Funding Schedule		Varies Total Increasing
Year Fully Funded		2029
► Unfunded Liability		\$635.8 M
► Total Pension Appropriation (Fiscal 2020)		\$75.2 M
	ACTIVE	RETIRED
Number of Members	5,669	4,169
► Total Payroll/Benefit	\$281.7 M	\$104.2 M
Average Salary/Benefit	\$49,700	\$25,000
► Average Age	NA	73
► Average Service	NA	NA

ASSET ALLOCATION (12/31/19)



EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	314
▶ Number Who Reported Earnings	106
► Number of Excess Earners	5
► Total Amount of Refund Due	\$69,991.68

▶ 2019 Return	18.20%
▶ 2019 Market Value	\$1.1 B
▶ 2015-2019 (Annualized)	6.99%
▶ 1985-2019 (Annualized)	9.01%

INVESTMENT DETUDN HISTORY

Quincy

1245 Hancock Street Suite 39 Quincy, MA 02169 Phone: 617-376-1075 Fax: 617-376-1149

Board Members

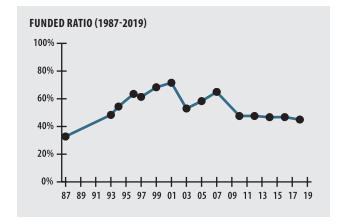
Susan O'Connor*, Michael McFarland, Ernest Arienti, Leo Coppens, Richard Fitzpatrick *indicates Chairperson

Board Administrator

Lisa McBirney

Board Meeting

Generally the fourth Thursday of the month at 9:00 am

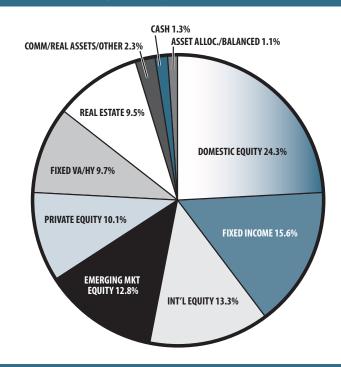


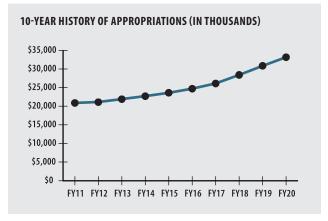
ACTUARIAL

► Funded Ratio		45.0%
▶ Date of Last Valuation		1/1/18
► Actuary		Stone
► Assumed Rate of Return		7.50%
▶ Funding Schedule		Varies Total Increasing
▶ Year Fully Funded		2037
Unfunded Liability		\$403.4 M
► Total Pension Appropriation (Fiscal 2020)		\$33.2 M
	ACTIVE	RETIRED
Number of Members	1,494	1,524
► Total Payroll/Benefit	\$94.7 M	\$45.3 M
Average Salary/Benefit	\$63,400	\$29,700
► Average Age	49	75
► Average Service	12.6 years	NA



ASSET ALLOCATION (12/31/19)





35 years 2019	34 years 2018	33 years 2017
8.23%	7.98%	8.31%
10 years 2019	10 years 2018	10 years 2017
7.96%	8.06%	5.30%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
7.22%	4.99%	8.08%

INVESTMENT RETURN HISTORY

131
29
0
\$0.00

▶ 2019 Return	17.12%
▶ 2019 Market Value	\$373.1 M
▶ 2015-2019 (Annualized)	7.22%
▶ 1985-2019 (Annualized)	8.23%

Reading

2 Haven Street, Unit 307 Reading, MA 01867 Phone: 781-942-9007 Fax: 781-623-3053

Board Members

Sharon Angstrom, Carol Roberts, David Gentile, Joseph Coughlin, Thomas Clough* *indicates Chairperson

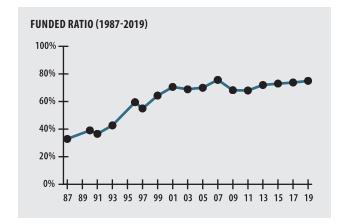
Board Administrator

Colleen Loughlin

Board Meeting

Generally the last Tuesday of the month at 5:00 pm

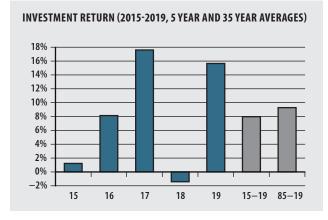
NA



ACTUARIAL

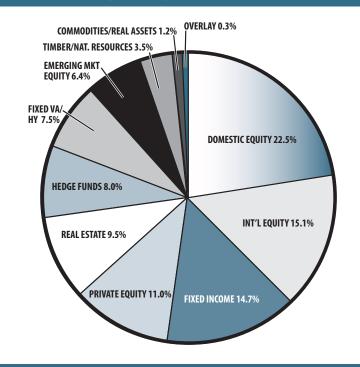
▶ Funded Ratio		75.0%
▶ Date of Last Valuation		1/1/19
► Actuary		KMS
► Assumed Rate of Return		7.50%
▶ Funding Schedule		Varies Total Increasing
▶ Year Fully Funded		2029
▶ Unfunded Liability		\$47.4 M
► Total Pension Appropriation (Fiscal 2020)		\$6.3 M
	ACTIVE	RETIRED
Number of Members	355	363
► Total Payroll/Benefit	\$27.4 M	\$11.6 M
Average Salary/Benefit	\$77,100	\$31,900
► Average Age	47	74

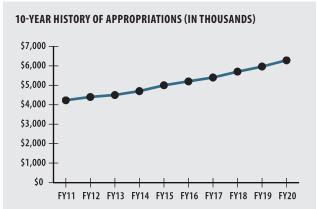
12.8 years



ASSET ALLOCATION (12/31/19)

▶ Average Service





INVESTMENT RETURN HISTORY

35 years 2019 9.28%	34 years 2018 9.10%	33 years 2017 9.43%
10 years 2019 9.06%	10 years 2018 9.26%	10 years 2017 5.67%
<u>5 years 2019</u> 7.98%	5 years 2018 6.57%	5 years 2017 9.94%

► Number of Disability Retirees	29
▶ Number Who Reported Earnings	8
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	15.66%
▶ 2019 Market Value	\$152.9 M
▶ 2015-2019 (Annualized)	7.98%
▶ 1985-2019 (Annualized)	9.28%

Revere

City Hall 281 Broadway Revere, MA 02151 Phone: 781-286-8173

Fax: 781-286-3316

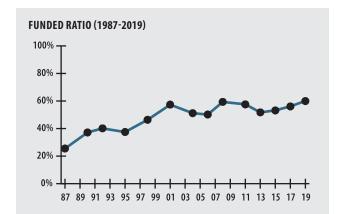
Board Members

Richard Viscay*, John Henry, James Cullen, Sean Manion, Gennaro Cataldo *indicates Chairperson

Board Administrator

Sandor Zapolin **Board Meeting**

Generally the third Wednesday of each month at 9:00 am



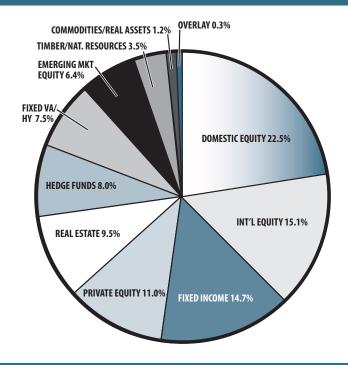
ACTUARIAL

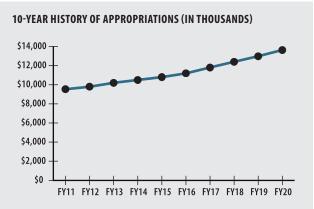
► Funded Ratio		60.0%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
▶ Assumed Rate of Return		7.25%
▶ Funding Schedule		5.0% Total Increasing
▶ Year Fully Funded		2033
▶ Unfunded Liability		\$108.6 M
▶ Total Pension Appropriation (Fiscal 2020)		\$13.6 M
	ACTIVE	RETIRED
▶ Number of Members	620	497

	ACTIVE	NLIINLD
Number of Members	620	497
► Total Payroll/Benefit	\$36.8 M	\$16.0 M
► Average Salary/Benefit	\$59,300	\$32,200
► Average Age	48	75
► Average Service	12.7 years	NA



ASSET ALLOCATION (12/31/19)





EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	90
► Number Who Reported Earnings	34
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.60%
▶ 2019 Market Value	\$183.4 M
▶ 2015-2019 (Annualized)	8.01%
▶ 1985-2019 (Annualized)	8.47%

INVESTMENT RETURN HISTORY 35 years 2019 34 years 2018 33 years 2017 8.47% 8.24% 8.56% 10 years 2019 10 years 2017 10 years 2018 8.89% 8.92% 5.53% 5 years 2019 5 years 2018 5 years 2017 8.01% 6.39% 9.81%

Salem

20 Central Street, Suite 110 Salem, MA 01970 Phone: 978-745-8983 Fax: 978-745-4216

Board Members

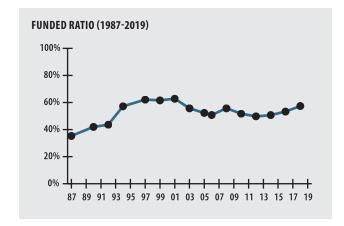
Laurie Giardella, Dominick Pangallo*, Sarah Hayes, Marcia Pelletier, **Robert Lutts** *indicates Chairperson

Board Administrator

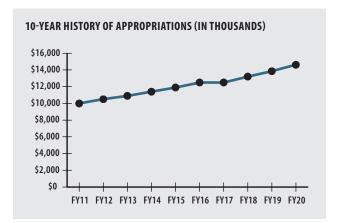
Paul Findlen

Board Meeting

Last Wednesday of the month at 12:00 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15

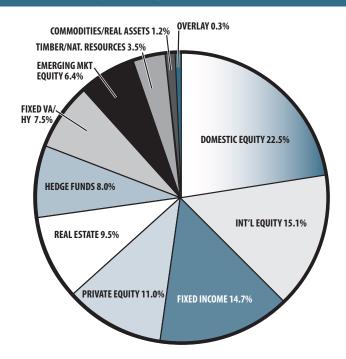


INVESTMENT RETURN	AVESTMENT RETURN HISTORY					
35 years 2019 8.23%	34 years 2018 7.99%	33 years 2017 8.30%				
10 years 2019 8.74%	10 years 2018 8.63%	10 years 2017 5.17%				
5 years 2019 7.92%	<u>5 years 2018</u> 6.28%	5 years 2017 9.63%				

ACTUARIAL

	57.4%
	1/1/18
	Segal
	7.38%
	5.55 % Total Increasing
	2031
	\$126.8 M
	\$14.6 M
ACTIVE	RETIRED
910	589
\$46.6 M	\$15.0 M
\$51,200	\$25,500
49	74
12 years	NA
	910 \$46.6 M \$51,200 49

ASSET ALLOCATION (12/31/19)



EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	44
► Number Who Reported Earnings	17
► Number of Excess Earners	1
► Total Amount of Refund Due	\$16,076.90

▶ 2019 Return	16.55%
▶ 2019 Market Value▶ 2015-2019 (Annualized)	\$205.0 M 7.92%
▶ 1985-2019 (Annualized)	8.23%

INVECTMENT DETIIDN HICTORY

Saugus

25R Main Street Town Hall Annex Saugus, MA 01906 Phone: 781-558-2903 Fax: 781-666-3218

Board Members

Donna Matarazzo, Eugene Decareau, Mark Gannon, William Cross*, Doreen DiBari *indicates Chairperson

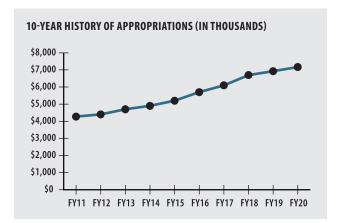
Board Administrator

Ann Quinlan **Board Meeting**

Last Tuesday of the month at 12:00 pm



INVESTM	ENT RI	ETURN	(2015-2	2019,	5 YE	AR A	ND 3	35 YI	EAR	AVI	ERAGES)	
18% —				_								
16%			-	\vdash		-						
14% —			-	\vdash								
12% —			-	\vdash								
10% —				\vdash							_	
8% +				\vdash								
6% +		-	-	\vdash				=				
4% —				\vdash				\dashv				
2% 🕂												
0% +						\top				_		
−2 % ⊥	15	16	17	,	18		19		15—1	9	85—19	



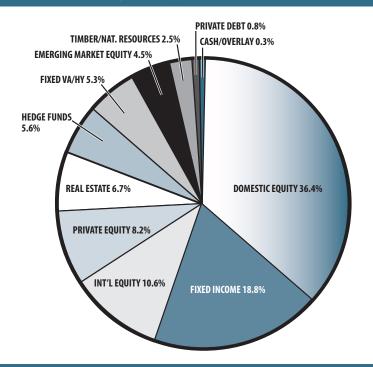
NVESIMENI KETUKN	I HISTORY	
35 years 2019	34 years 2018	33 years 2017
9.24%	9.03%	9.38%
10 years 2019	10 years 2018	10 years 2017
9.09%	9.20%	5.66%
5 years 2019	5 years 2018	5 years 2017
8.08%	6.49%	9.96%

INVECTMENT DETIIDN HICTORY

ACTUARIAL

▶ Funded Ratio		77.4%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
Assumed Rate of Return		7.25%
▶ Funding Schedule		5.2% Total Increasing
Year Fully Funded		2026
Unfunded Liability		\$31.2 M
► Total Pension Appropriation (Fiscal 2020)		\$7.2 M
	ACTIVE	RETIRED
Number of Members	347	293
► Total Payroll/Benefit	\$18.3 M	\$8.0 M
Average Salary/Benefit	\$52,900	\$27,200
► Average Age	47	74
Average Service	12.3 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	26
▶ Number Who Reported Earnings	3
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.49%
▶ 2019 Market Value	\$116.1 M
▶ 2015-2019 (Annualized)	8.08%
▶ 1985-2019 (Annualized)	9.24%

Shrewsbury

100 Maple Avenue Shrewsbury, MA 01545 Phone: 508-841-8510 Fax: 508-842-0587

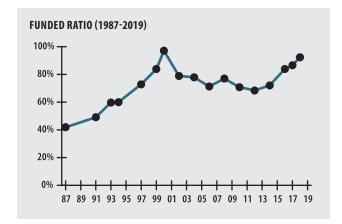
Board Members

Mary Thompson, Thomas Kennedy*, Ralph laccarino, David Hodgerney, Alice Ferro *indicates Chairperson

Board Administrator

Gregory Gatsogiannis Board Meeting

Varies - Generally a Wednesday morning at 7:30 am



ACTUARIAL

N Francis d Detic		03.40/
► Funded Ratio		92.4%
Date of Last Valuation		1/1/18
► Actuary		Sherman
► Assumed Rate of Return		7.50%
▶ Funding Schedule		Level Dollar
▶ Year Fully Funded		2020
Unfunded Liability		\$9.8 M
► Total Pension Appropriation (Fiscal 2020)		\$5.4 M
	ACTIVE	RETIRED
Number of Members	468	272
► Total Payroll/Benefit	\$25.2 M	\$7.5 M
Average Salary/Benefit	\$53,900	\$27,500
▶ Average Age	NA	73

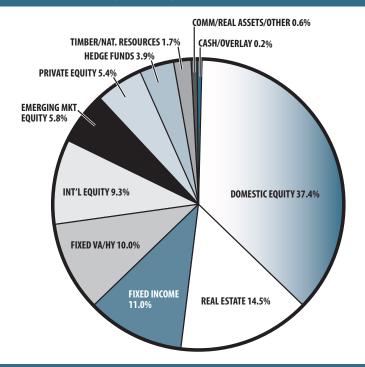
NA

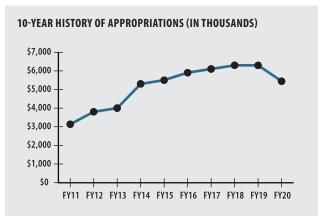
NA



ASSET ALLOCATION (12/31/19)

▶ Average Service





EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	20
▶ Number Who Reported Earnings	9
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

35 years 2019 9.21%	34 years 2018 8.93%	33 years 2017 9.30%
10 years 2019 9.72%	10 years 2018 9.81%	10 years 2017 6.59%
5 years 2019 8.37%	<u>5 years 2018</u> 6.59%	<u>5 years 2017</u> 10.83%

▶ 2019 Return	19.09%
▶ 2019 Market Value	\$143.6 M
▶ 2015-2019 (Annualized)	8.37%
▶ 1985-2019 (Annualized)	9.21%

INVESTMENT RETURN HISTORY

Somerville

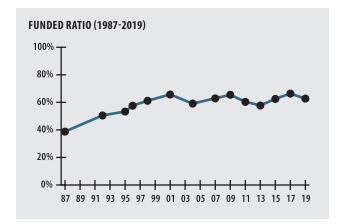
323 Broadway Somerville, MA 02145 Phone: 617-764-3811 Fax: 617-591-3211

Board Members

Edward Bean*, Michael Mastrobuoni, John Memory, Thomas Ross, **David Castellarin** *indicates Chairperson

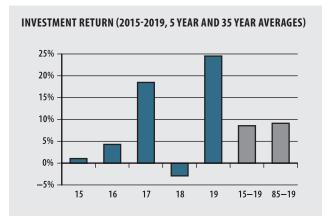
Board Administrator Michael Pasquariello

Board Meeting Varies

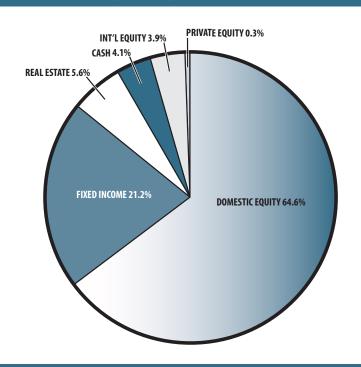


ACTUARIAL

► Funded Ratio		62.7%
▶ Date of Last Valuation		1/1/19
► Actuary		Sherman
► Assumed Rate of Return		7.75%
► Funding Schedule		Varies Total Increasing
► Year Fully Funded		2033
Unfunded Liability		\$167.4 M
► Total Pension Appropriation (Fiscal 2020)		\$15.2 M
	ACTIVE	RETIRED
Number of Members	1,186	927
► Total Payroll/Benefit	\$75.5 M	\$27.9 M
Average Salary/Benefit	\$63,700	\$30,100
► Average Age	NA	74
► Average Service	NA	NA



ASSET ALLOCATION (12/31/19)



10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)		
\$16,000 -		
\$14,000 -		
\$12,000 -		
\$10,000 -	-	
\$8,000 -	-	
\$6,000 -	-	
\$4,000 -	-	
\$2,000 -	-	
\$0 -		
	FY11 FY12 FY13 FY14 FY15 FY16 FY17 FY18 FY19 FY20	

35 years 2019	34 years 2018	33 years 2017
9.12%	8.70%	9.07%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
10.06%	9.89%	6.90%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>

5.22%

9.84%

INVESTMENT RETURN HISTORY

8.58%

EARNED INCOME OF DISABILITY RETIREES (2018)	
► Number of Disability Retirees	92
▶ Number Who Reported Earnings	28
► Number of Excess Earners	1
▶ Total Amount of Refund Due	\$2,663.08

24.52%
\$317.1 M
8.58%
9.12%

Southbridge

Town Hall 41 Elm Street Southbridge, MA 01550 Phone: 508-765-4903 Fax: 508-765-0902

Board Members

Karen Harnois, Wilfrid Cournoyer, Julie Pena*, James Philbrook, Pamela Leduc *indicates Chairperson

Board Administrator

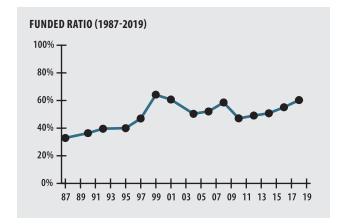
Heather Thibeault

Board Meeting

Last Thursday of the month at 9:00 am

73

NA

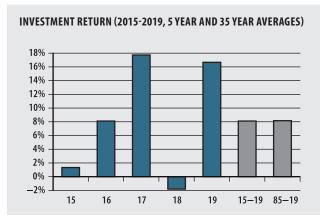


▶ Average Age ▶ Average Service

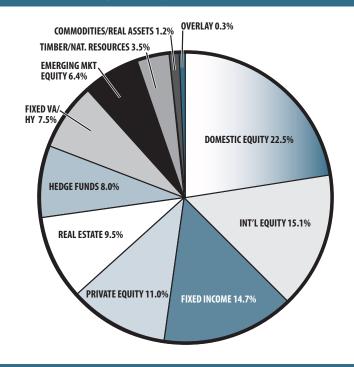
ACTUARIAL

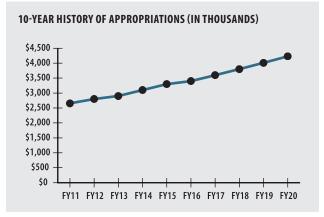
▶ Funded Ratio		60.3%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
Assumed Rate of Return		7.35%
▶ Funding Schedule		5.5% Total Increasing
▶ Year Fully Funded		2034
▶ Unfunded Liability		\$33.7 M
▶ Total Pension Appropriation (Fiscal 2020)		\$4.2 M
	ACTIVE	RETIRED
▶ Number of Members	356	180
▶ Total Payroll/Benefit	\$15.9 M	\$4.3 M
► Average Salary/Benefit	\$44,600	\$24,100

10.1 years



ASSET ALLOCATION (12/31/19)





EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	18
► Number Who Reported Earnings	7
▶ Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.69%
▶ 2019 Market Value	\$61.3 M
▶ 2015-2019 (Annualized)	8.13%
▶ 1985-2019 (Annualized)	8.17%

INVESTMENT RETURN HISTORY 35 years 2019 34 years 2018 33 years 2017 8.17% 7.93% 8.24% 10 years 2019 10 years 2018 10 years 2017 8.74% 8.47% 4.81% 5 years 2019 5 years 2018 5 years 2017 8.13% 6.51% 9.84%

Springfield

70 Tapley Street Springfield, MA 01104 Phone: 413-787-6090 Fax: 413-787-6046

Board Members

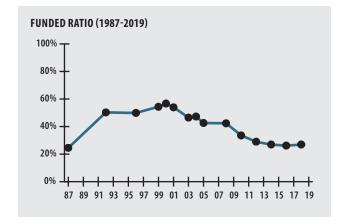
Patrick Burns, Haskell Kennedy, Thomas Scanlon, Robert Moynihan*, Philip Mantoni *indicates Chairperson

Board Administrator

Susana Baltazar

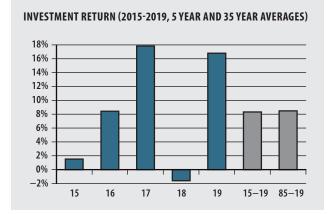
Board Meeting

Generally the first Wednesday of the month at 5:00 pm

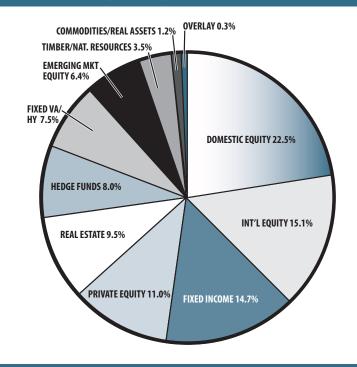


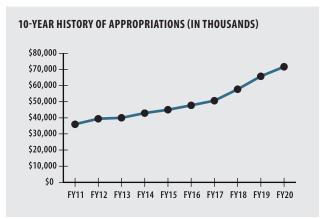
ACTUARIAL

N. Francisco Destin		27.00/
► Funded Ratio		27.0%
Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.40%
▶ Funding Schedule		9.0% Total Increasing
▶ Year Fully Funded		2033
▶ Unfunded Liability		\$883.2 M
► Total Pension Appropriation (Fiscal 2020)		\$71.6 M
	ACTIVE	RETIRED
Number of Members	3,188	2,802
► Total Payroll/Benefit	\$154.5 M	\$74.4 M
Average Salary/Benefit	\$48,500	\$26,600
▶ Average Age	46	73
► Average Service	12.3 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY				
35 years 2019	34 years 2018	33 years 2017		
8.50%	8.27%	8.58%		
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>		
9.20%	8.97%	5.53%		
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>		
8.32%	6.70%	10.16%		

389
130
3
\$51,419.87

▶ 2019 Return	16.80%
▶ 2019 Market Value	\$398.7 M
▶ 2015-2019 (Annualized)	8.32%
▶ 1985-2019 (Annualized)	8.50%

State

One Winter Street, 8th Floor Boston, MA 02108 Phone: 617-367-7770 Fax: 617-723-1438

Board Members

State Treasurer Deborah Goldberg*, Patricia Deal, Theresa McGoldrick, Frank Valeri, Archie Gormley *indicates Chairperson

Board Administrator

Nicola Favorito **Board Meeting**

Last Thursday of the month at 10:00 am

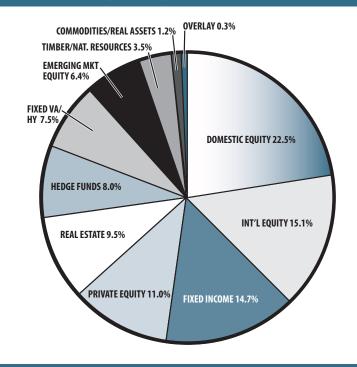


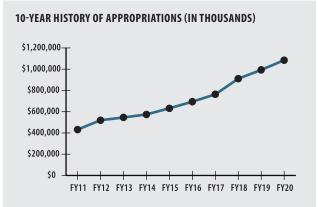
ACTUARIAL

► Funded Ratio		63.7%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
► Assumed Rate of Return		7.25%
► Funding Schedule		8.94% Total Increasing
Year Fully Funded		2036
▶ Unfunded Liability		\$15.5 B
► Total Pension Appropriation (Fiscal 2020)		\$1.1 B
	ACTIVE	RETIRED
Number of Members	87,969	64,758
► Total Payroll/Benefit	\$6.4 B	\$2.3 B
Average Salary/Benefit	\$72,200	\$36,100
► Average Age	47	72
► Average Service	12.5 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY				
35 years 2019	<u>34 years 2018</u>	33 years 2017		
9.47%	9.26%	9.61%		
<u>10 years 2019</u>	<u>10 years 2018</u>	10 years 2017		
9.15%	9.25%	5.68%		
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>		
8.14%	6.52%	10.01%		

► Number of Disability Retirees	3352
► Number Who Reported Earnings	972
► Number of Excess Earners	17
► Total Amount of Refund Due	\$186,202.09

▶ 2019 Return	16.79%
▶ 2019 Market Value	\$29.7 B
▶ 2015-2019 (Annualized)	8.14%
▶ 1985-2019 (Annualized)	9.47%

Stoneham

Town Hall 35 Central Street Stoneham, MA 02180 Phone: 781-279-2635 Fax: 781-438-6906

Board Members

David Castellarin, Kathleen Sullivan, John Scullin, Francis Gould, Janice Houghton* *indicates Chairperson

Board Administrator

Karen DeAngelis

Board Meeting

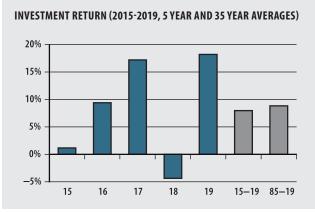
Typically the 4th Tuesday of the month at 2:00 pm



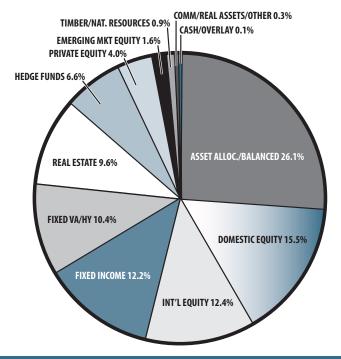
ACTUARIAL

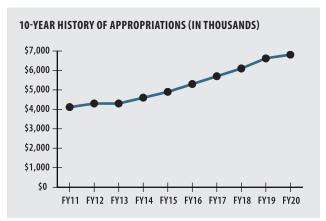
► Funded Ratio		74.7%
▶ Date of Last Valuation		1/1/18
► Actuary		Stone
► Assumed Rate of Return		7.25%
▶ Funding Schedule		3.46% Total Increasing
▶ Year Fully Funded		2024
Unfunded Liability		\$30.1 M
► Total Pension Appropriation (Fiscal 2020)		\$6.8 M
	ACTIVE	RETIRED
Number of Members	284	281
► Total Payroll/Benefit	\$14.6 M	\$7.5 M

	7141112	
Number of Members	284	281
► Total Payroll/Benefit	\$14.6 M	\$7.5 M
Average Salary/Benefit	\$51,600	\$26,800
► Average Age	49	76
► Average Service	12.6 years	NA
=		



ASSET ALLOCATION (12/31/19)





34 years 2018

33 years 2017

INVESTMENT RETURN HISTORY

35 years 2019

5
,
0
\$0.00

8.85%	8.59%	9.01%	► Total Amount of Refund Due	\$0.0
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>		
9.04%	8.99%	5.74%	▶ 2019 Return	18.21%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>	▶ 2019 Market Value	\$103.2 N
7.97%	6.09%	10.11%	▶ 2015-2019 (Annualized)	7.97%
			▶ 1985-2019 (Annualized)	8.85%

Swampscott

22 Monument Ave., Town Hall Swampscott, MA 01907 Phone: 781-596-8827 Fax: 781-596-8899

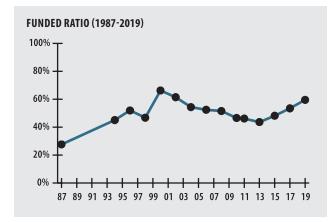
Board Members

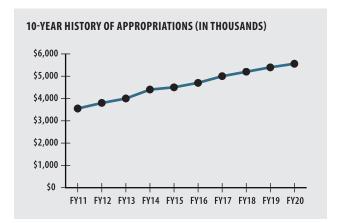
Amy Sarro, Thomas Driscoll*, John Behen, Kevin Breen, Robert Powell *indicates Chairperson

Board Administrator

Nancy Lord **Board Meeting**

Generally the last Tuesday of the month at 8:00 am



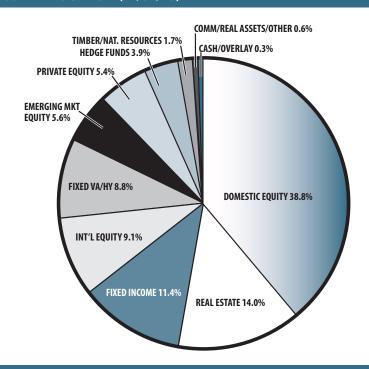


1		
35 years 2019	34 years 2018	33 years 2017
9.10%	8.83%	9.23%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
8.91%	8.42%	5.97%
<u>5 years 2019</u>	5 years 2018	<u>5 years 2017</u>
7.97%	6.22%	10.36%

ACTUARIAL

	59.6%
	1/1/19
	Segal
	7.38%
	3.0% Increasing
	2031
	\$40.5 M
	\$5.6 M
ACTIVE	RETIRED
252	214
\$13.4 M	\$5.8 M
\$53,000	\$27,000
49	75
12.6 years	NA
	252 \$13.4 M \$53,000 49

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	20
▶ Number Who Reported Earnings	4
► Number of Excess Earners	1
► Total Amount of Refund Due	\$30,983.58

▶ 2019 Return	18.52%
▶ 2019 Market Value	\$66.9 M
▶ 2015-2019 (Annualized)	7.97%
▶ 1985-2019 (Annualized)	9.10%

Taunton

104 Dean Street, Suite 203 Taunton, MA 02780 Phone: 508-821-1052 Fax: 508-821-1063

Board Members

Ann Marie Hebert*, Gill Enos, Dennis Smith, Thomas Bernier, **Barry Amaral** *indicates Chairperson

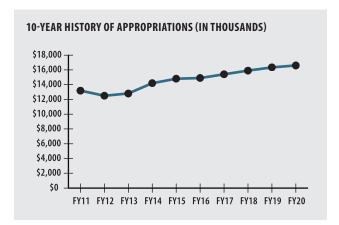
Board Administrator

Paul Slivinski **Board Meeting**

4th Wednesday of the month at 1:00 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 25% 20% 15% 10% 5% 0% -5% 15 17 18 19 15-19 85-19 16



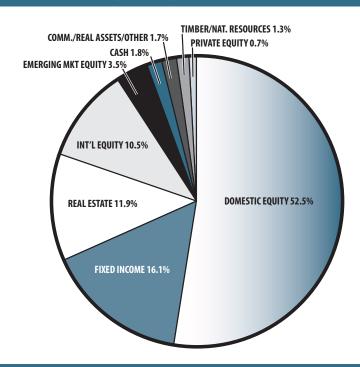
INVESTMENT RETURN HISTORY		
35 years 2019 9.61%	34 years 2018 9.28%	33 years 2017 9.71%
10 years 2019 9.39%	10 years 2018 9.27%	10 years 2017 6.71%
5 years 2019 8.01%	5 years 2018 5.47%	<u>5 years 2017</u> 10.11%

INVECTMENT DETIIDN HICTORY

ACTUARIAL

► Funded Ratio		79.6%
▶ Date of Last Valuation		1/1/18
► Actuary		Sherman
► Assumed Rate of Return		7.75%
▶ Funding Schedule		2.5% Increasing
Year Fully Funded		2026
Unfunded Liability		\$81.2 M
► Total Pension Appropriation (Fiscal 2020)		\$16.6 M
	ACTIVE	RETIRED
Number of Members	1,073	867
► Total Payroll/Benefit	\$62.8 M	\$25.1 M
Average Salary/Benefit	\$58,500	\$29,000
► Average Age	NA	73
► Average Service	NA	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	81
► Number Who Reported Earnings	18
► Number of Excess Earners	1
► Total Amount of Refund Due	\$1,355.66

▶ 2019 Return	21.45%
▶ 2019 Market Value	\$344.6 M
▶ 2015-2019 (Annualized)	8.01%
▶ 1985-2019 (Annualized)	9.61%
	3.3.7.0

Wakefield

1 Lafayette Street Wakefield, MA 01880 Phone: 781-246-6396 Fax: 781-246-2400

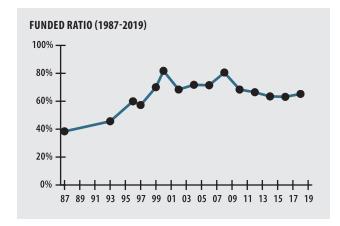
Board Members

Kevin Gill*, Sherri Dalton, Joseph Albert, Dennis Fazio, Daniel Sherman *indicates Chairperson

Board Administrator

Cathy Cheek Board Meeting

Third Thursday of the month at 8:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% -2% 15 15-19 85-19

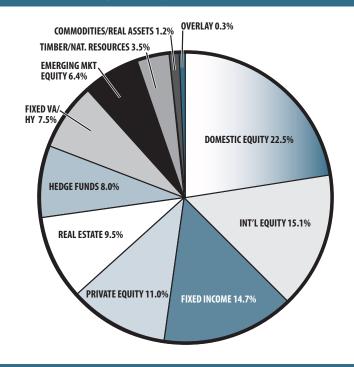
10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS) \$7,000 -\$6,000 \$5,000 \$4,000 \$3,000 \$2,000 \$1,000 FY11 FY12 FY13 FY14 FY15 FY16 FY17 FY18 FY19 FY20

INVESTMENT RETURN HISTORY		
35 years 2019	34 years 2018	33 years 2017
9.65%	9.45%	9.81%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
9.15%	9.24%	5.68%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
8.13%	6.50%	10.00%

ACTUARIAL

	65.3%
	1/1/18
	PERAC
	7.50%
	7.18% Total Increasing
	2036
	\$62.2 M
	\$6.4 M
ACTIVE	RETIRED
449	363
\$26.4 M	\$10.3 M
\$58,800	\$28,400
49	75
12.6 years	NA
	\$26.4 M \$58,800 49

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	29
► Number Who Reported Earnings	5
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.75%
▶ 2019 Market Value	\$134.2 M
▶ 2015-2019 (Annualized)	8.13%
▶ 1985-2019 (Annualized)	9.65%

Waltham

21-25 Lexington Street 2nd Floor Waltham, MA 02452 Phone: 781-314-3230 Fax: 781-314-3236

Board Members

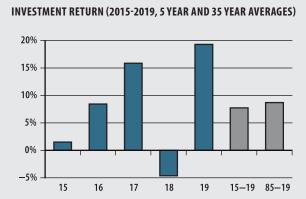
Paul Centofanti, Elizabeth Arnold, Scott Hovsepian, William MacDonald*, Mary Rosen *indicates Chairperson

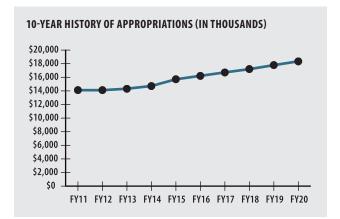
Board Administrator

Karen Doucet **Board Meeting**

3rd Wednesday of the month at 4:45 pm







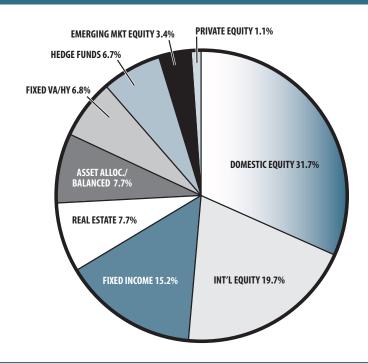
35 years 2019	34 years 2018	33 years 2017
8.70%	8.41%	8.83%
<u>10 years 2019</u>	10 years 2018	<u>10 years 2017</u>
9.24%	8.22%	5.70%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
7.75%	5.83%	9.99%

INVESTMENT RETURN HISTORY

ACTUARIAL

	56.8%
	1/1/19
	Sherman
	7.75%
	Varies Total Increasing
	2032
	\$191.4 M
	\$18.3 M
ACTIVE	RETIRED
937	777
\$66.3 M	\$25.8 M
\$70,800	\$33,200
NA	74
NA	NA
	937 \$66.3 M \$70,800 NA

ASSET ALLOCATION (12/31/19)



72
15
0
\$0.00

▶ 2019 Return	19.32%
▶ 2019 Market Value	\$274.2 M
▶ 2015-2019 (Annualized)	7.75%
▶ 1985-2019 (Annualized)	8.70%

Watertown

149 Main Street P.O. Box 199 Watertown, MA 02471-0199 Phone: 617-972-6456

Fax: 617-923-3531

Board Members

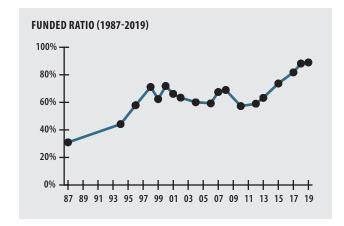
Thomas Tracy, John Loughran, Domenic Arone, Thomas Thibaut*, Kathleen Kiely-Becchetti *indicates Chairperson

Board Administrator

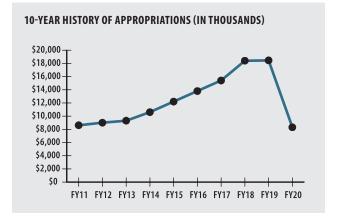
Barbara Sheehan

Board Meeting

3rd Tuesday of each month at 8:30 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 15 17 18 15-19 85-19

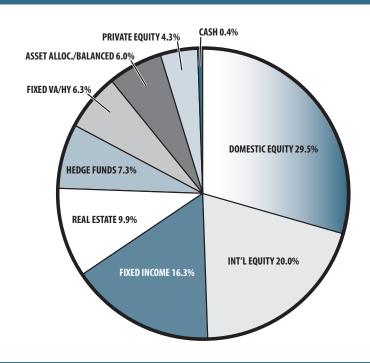


VESTMENT RETURN HISTORY		
35 years 2019	34 years 2018	33 years 2017
8.38%	8.06%	8.46%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
8.79%	8.53%	5.78%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
7.86%	5.47%	9.66%

ACTUARIAL

► Funded Ratio		89.0%
▶ Date of Last Valuation		1/1/19
► Actuary		Sherman
► Assumed Rate of Return		7.80%
▶ Funding Schedule		Varies Total Increasing
▶ Year Fully Funded		2021
Unfunded Liability		\$24.6 M
► Total Pension Appropriation (Fiscal 2020)		\$8.3 M
	ACTIVE	RETIRED
Number of Members	512	426
▶ Total Payroll/Benefit	\$33.9 M	\$13.8 M
Average Salary/Benefit	\$66,300	\$32,400
▶ Average Age	NA	75
▶ Average Service	NA	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	45
► Number Who Reported Earnings	10
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	19.85%
▶ 2019 Market Value	\$219.2 M
▶ 2015-2019 (Annualized)	7.86%
▶ 1985-2019 (Annualized)	8.38%

Webster

350 Main Street, Suite 5 Webster, MA 01570

Phone: 508-949-3800 Ext. 1022

Fax: 508-949-3826

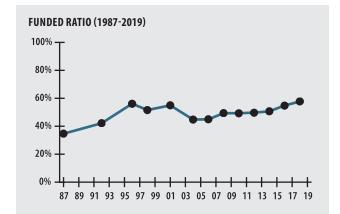
Board Members

Timothy Bell, Eleanor Doros, Robert Craver, James Hoover, Daniel Bonnette* *indicates Chairperson

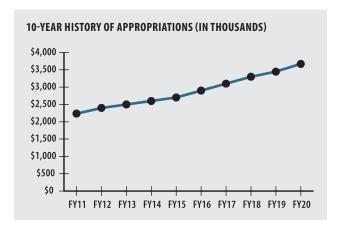
Board Administrator

Kristin LaPlante **Board Meeting**

3rd Wednesday of the month at 9:30 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% -10% 15 17 18 19 15-19 85-19 16



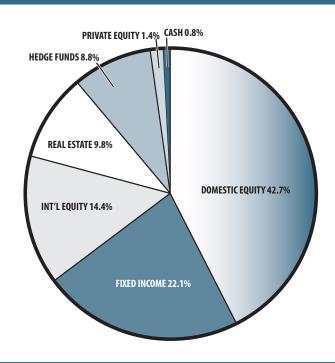
INVESTMENT RETURN HISTORY			
35 years 2019 8.19%	34 years 2018 7.89%	33 years 2017 8.31%	
10 years 2019	10 years 2018	10 years 2017	
8.96%	9.29%	6.45%	
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>	
7.39%	5.08%	9.85%	

INVECTMENT DETIIDN HICTORY

ACTUARIAL

► Funded Ratio		57.8%
▶ Date of Last Valuation		1/1/18
► Actuary		PERAC
► Assumed Rate of Return		7.35%
▶ Funding Schedule		6.5% Total Increasing
▶ Year Fully Funded		2031
▶ Unfunded Liability		\$27.9 M
► Total Pension Appropriation (Fiscal 2020)		\$3.7 M
	ACTIVE	RETIRED
Number of Members	269	146
▶ Total Payroll/Benefit	\$11.4 M	\$3.5 M
Average Salary/Benefit	\$42,500	\$24,100
▶ Average Age	45	73
► Average Service	10 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	7
► Number Who Reported Earnings	0
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	19.01%
▶ 2019 Market Value	\$44.9 M
▶ 2015-2019 (Annualized)	7.39%
▶ 1985-2019 (Annualized)	8.19%

Wellesley

Town Hall 525 Washington Street Wellesley, MA 02482 Phone: 781-431-1019 Fax: 781-239-1043

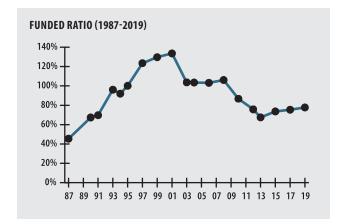
Board Members

Sheryl Strother, David Kornwitz*, Michael Leach, Timothy Barros, Charles Cahill *indicates Chairperson

Board Administrator

Lynn Whynot **Board Meeting**

Generally the last Tuesday of the month at 7:30 am

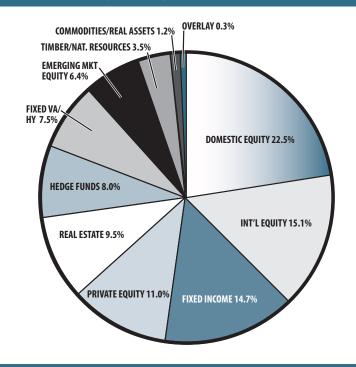


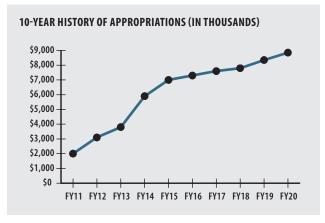
ACTUARIAL

► Funded Ratio		77.7%
▶ Date of Last Valuation		1/1/19
► Actuary		Segal
► Assumed Rate of Return		6.63%
▶ Funding Schedule		3.5% Increasing
▶ Year Fully Funded		2030
▶ Unfunded Liability		\$55.5 M
► Total Pension Appropriation (Fiscal 2020)		\$8.9 M
	ACTIVE	RETIRED
▶ Number of Members	703	418
► Total Payroll/Benefit	\$39.2 M	\$12.1 M
Average Salary/Benefit	\$55,700	\$28,900
► Average Age	46	74
► Average Service	10.6 years	NA



ASSET ALLOCATION (12/31/19)





INVESTMENT RETURN HISTORY

35 years 2019 9.92%	34 years 2018 9.72%	33 years 2017 10.09%
10 years 2019 9.12%	10 years 2018 9.22%	10 years 2017 5.69%
<u>5 years 2019</u> 8.10%	5 years 2018 6.49%	5 years 2017 9.99%

► Number of Disability Retirees	32
▶ Number Who Reported Earnings	10
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.72%
▶ 2019 Market Value	\$216.8 M
▶ 2015-2019 (Annualized)	8.10%
▶ 1985-2019 (Annualized)	9.92%

West Springfield

26 Central Street, Suite 26 West Springfield, MA 01089-2766 Phone: 413-495-1891 Ext. 1019 Fax: 413-263-3198

Board Members

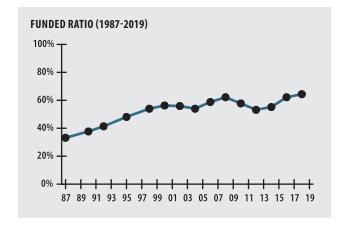
Sharon Wilcox*, Thomas Cummings, Gwen Keough, William Flaherty, Daniel Marini *indicates Chairperson

Board Administrator

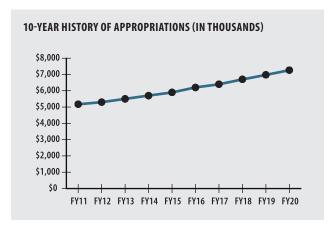
James Lovotti

Board Meeting

Generally the last Thursday of each month at 7:30 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 25% 20% 15% 10% 5% 0% -5% 15 16 17 18 19 15-19 85-19



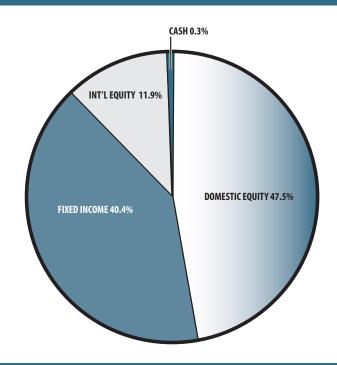
INVESTMENT RETURN	HISTORY	
35 years 2019 8.27%	34 years 2018 8.15%	33 years 2017 8.29%
10 years 2019 9.17%	10 years 2018 9.31%	10 years 2017 6.25%
5 years 2019 6.80%	<u>5 years 2018</u> 6.81%	5 years 2017 9.85%

^{*} After publishing the 2019 Investment Report, a calculation error was found and corrected. PERAC staff regrets the error.

ACTUARIAL

► Funded Ratio		64.4%
▶ Date of Last Valuation		1/1/18
► Actuary		Stone
Assumed Rate of Return		7.50%
▶ Funding Schedule		4.13% Total Increasing
Year Fully Funded		2034
Unfunded Liability		\$63.8 M
► Total Pension Appropriation (Fiscal 2020)		\$7.3 M
	ACTIVE	RETIRED
Number of Members	580	395
► Total Payroll/Benefit	\$25.8 M	\$9.2 M
Average Salary/Benefit	\$44,500	\$23,300
► Average Age	48	73
► Average Service	12.3 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	32
▶ Number Who Reported Earnings	11
► Number of Excess Earners	2
▶ Total Amount of Refund Due	\$51,808.10

▶ 2019 Return*	11.16%
▶ 2019 Market Value	\$132.3 M
▶ 2015-2019 (Annualized)	6.80%
▶ 1985-2019 (Annualized)	8.27%

Westfield

59 Court Street P.O. Box 106 Westfield, MA 01086-0106 Phone: 413-572-6239

Fax: 413-642-9410

Board Members

Xianhong Zheng, Edward Murphy, Christopher Kane, Mark Devine*, Michael Powers *indicates Chairperson

Board Administrator

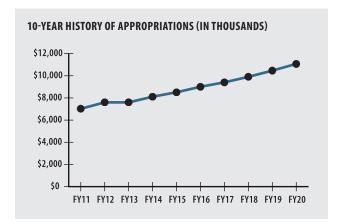
Liam Browne

Board Meeting

Third Thursday of the month at 3:00 pm



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5% 15 17 18 19 15-19 85-19 16

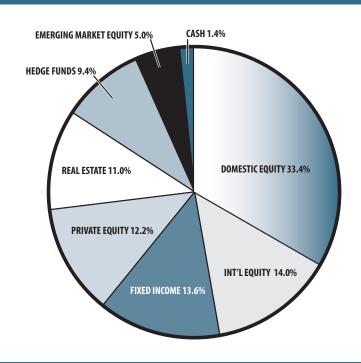


VESTMENT RETURN	HISTORY	
35 years 2019	34 years 2018	33 years 2017
8.86%	8.59%	9.02%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
9.68%	9.96%	7.36%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
8.30%	6.40%	11.47%

ACTUARIAL

► Funded Ratio		70.4%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
► Assumed Rate of Return		7.25%
▶ Funding Schedule		5.8% Total Increasing
▶ Year Fully Funded		2036
Unfunded Liability		\$97.2 M
▶ Total Pension Appropriation (Fiscal 2020)		\$11.1 M
	ACTIVE	RETIRED
Number of Members	879	687
► Total Payroll/Benefit	\$42.3 M	\$19.0 M
Average Salary/Benefit	\$48,100	\$27,600
► Average Age	48	72
► Average Service	12 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	49
► Number Who Reported Earnings	13
► Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	18.45%
▶ 2019 Market Value	\$255.6 M
▶ 2015-2019 (Annualized)	8.30%
▶ 1985-2019 (Annualized)	8.86%

Weymouth

807 Broad Street Weymouth, MA 02189 Phone: 781-331-8721 Fax: 781-331-3005

Board Members

Patrice Cook, Greg Hargadon, Joseph Davis*, Richard Hayes, Barbara Costa *indicates Chairperson

Board Administrator

Edward Masterson

Board Meeting

Generally the 3rd Monday of each month at 9:00 am

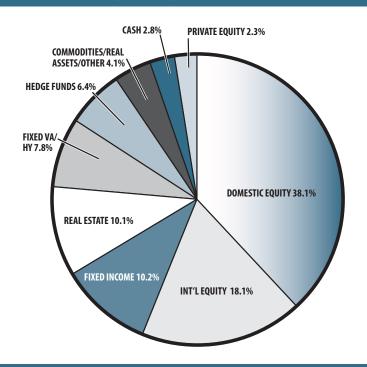


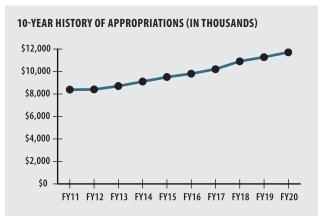
ACTUARIAL

	66.1%
	1/1/18
	Stone
	7.50%
	2.88% Increasing
	2035
	\$102.2 M
	\$11.7 M
ACTIVE	RETIRED
854	635
\$41.5 M	\$18.4 M
\$48,600	\$28,900
49	73
11.2 years	NA
	854 \$41.5 M \$48,600 49



ASSET ALLOCATION (12/31/19)





HISTORY	
34 years 2018	33 years 2017
9.49%	9.95%
<u>10 years 2018</u>	<u>10 years 2017</u>
9.13%	6.11%
<u>5 years 2018</u>	<u>5 years 2017</u>
5.12%	9.73%
	34 years 2018 9.49% 10 years 2018 9.13% 5 years 2018

78
24
0
\$0.00

▶ 2019 Return	17.99%
▶ 2019 Market Value	\$214.2 M
▶ 2015-2019 (Annualized)	7.36%
▶ 1985-2019 (Annualized)	9.73%

Winchester

71 Mount Vernon Street Winchester, MA 01890 Phone: 781-721-7127 Fax: 781-721-7156

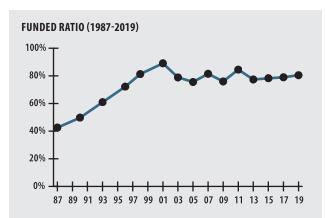
Board Members

Stacie Ward, William Zink, James Gray, Robert Frary, George Morrissey* *indicates Chairperson

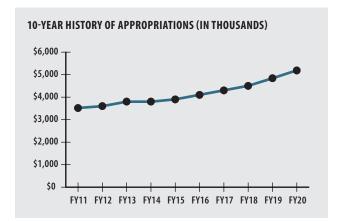
Board Administrator

Karen Manchuso **Board Meeting**

Last Tuesday of each month at 8:30 am



15% 15 16 17 18 19 15-19 85-19

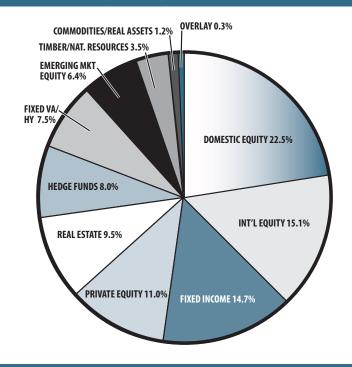


INVESTMENT RETURN HISTORY		
35 years 2019	<u>34 years 2018</u>	33 years 2017
8.96%	8.74%	9.10%
<u>10 years 2019</u>	<u>10 years 2018</u>	<u>10 years 2017</u>
7.65%	7.75%	4.87%
<u>5 years 2019</u>	<u>5 years 2018</u>	<u>5 years 2017</u>
7.06%	5.48%	8.58%

ACTUARIAL

► Funded Ratio		80.5%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
► Assumed Rate of Return		7.00%
▶ Funding Schedule		7.75% Total Increasing
▶ Year Fully Funded		2029
Unfunded Liability		\$30.1 M
► Total Pension Appropriation (Fiscal 2020)		\$5.2 M
	ACTIVE	RETIRED
Number of Members	364	274
▶ Total Payroll/Benefit	\$20.9 M	\$7.9 M
Average Salary/Benefit	\$57,400	\$28,800
► Average Age	49	76
► Average Service	13 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	18
▶ Number Who Reported Earnings	5
► Number of Excess Earners	2
► Total Amount of Refund Due	\$43,028.15

▶ 2019 Return	16.73%
▶ 2019 Market Value	\$134.9 M
▶ 2015-2019 (Annualized)	7.06%
▶ 1985-2019 (Annualized)	8.96%

Winthrop

Town Hall 1 Metcalf Square Winthrop, MA 02152 Phone: 617-539-5750

Board Members

Anna Freedman, Francis Carberry*, James Feeley, Stacy Calla, Karin Chavis *indicates Chairperson

Board Administrator

Michelle St. Jean **Board Meeting**

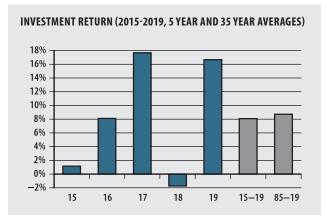
Last Tuesday of the month at 6:00 pm



ACTUARIAL

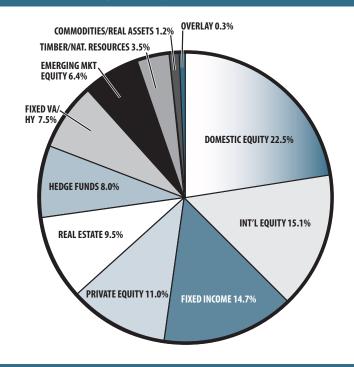
► Funded Ratio		83.2%
▶ Date of Last Valuation		1/1/19
► Actuary		PERAC
► Assumed Rate of Return		7.00%
▶ Funding Schedule		4.0% Total Increasing
Year Fully Funded		2030
► Unfunded Liability		\$14.3 M
► Total Pension Appropriation (Fiscal 2020)		\$3.7 M
	ACTIVE	RETIRED
Number of Members	260	196
► Total Payroll/Benefit	\$13.2 M	\$4.3 M
Average Salary/Benefit	\$50,800	\$22,000
► Average Age	49	75

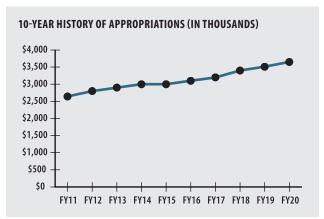
11.8 years



ASSET ALLOCATION (12/31/19)

▶ Average Service





INVESTMENT RETURN HISTORY

35 years 2019	34 years 2018	33 years 2017
8.73%	8.50%	8.83%
10 years 2019	10 years 2018	10 years 2017
8.85%	8.87%	5.53%
5 years 2019	<u>5 years 2018</u>	<u>5 years 2017</u>
8.10%	6.49%	9.83%

EARNED INCOME OF DISABILITY RETIREES (2018)

► Number of Disability Retirees	13
▶ Number Who Reported Earnings	2
▶ Number of Excess Earners	0
► Total Amount of Refund Due	\$0.00

▶ 2019 Return	16.68%
▶ 2019 Market Value	\$79.7 M
▶ 2015-2019 (Annualized)	8.10%
▶ 1985-2019 (Annualized)	8.73%

NA

Woburn

City Hall, 2nd Floor 10 Common Street Woburn, MA 01801-4139 Phone: 781-897-5820 Fax: 781-897-5824

Board Members

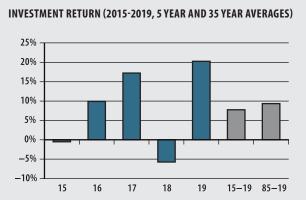
Charles Doherty, Gerald Surette, Denis Devine*, Marilou Lundin, Michael Gorman *indicates Chairperson

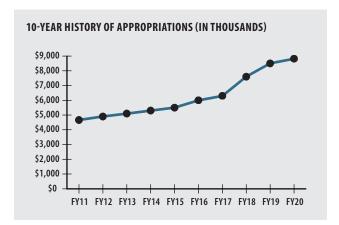
Board Administrator

Anne Speicher **Board Meeting**

Last Tuesday of each month at 8:30 am





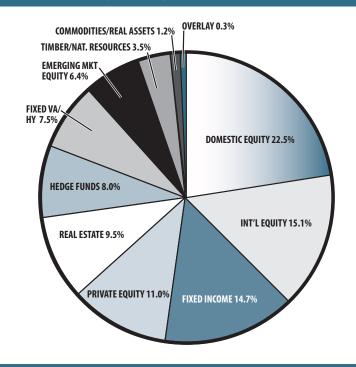


INVESTMENT RETURN HISTORY		
35 years 2019 9.36%	34 years 2018 9.06%	33 years 2017 9.54%
10 years 2019	10 years 2018	10 years 2017
9.21% <u>5 years 2019</u>	9.41% <u>5 years 2018</u>	6.70% <u>5 years 2017</u>
7.77%	5.28%	10.27%

ACTUARIAL

► Funded Ratio		63.4%
, I allaca itatio		
▶ Date of Last Valuation		1/1/18
► Actuary		Buck
► Assumed Rate of Return		7.50%
▶ Funding Schedule		4.0% Increasing Phase-In
Year Fully Funded		2035
Unfunded Liability		\$82.9 M
► Total Pension Appropriation (Fiscal 2020)		\$8.8 M
	ACTIVE	RETIRED
Number of Members	587	462
► Total Payroll/Benefit	\$30.9 M	\$12.4 M
Average Salary/Benefit	\$52,600	\$26,800
► Average Age	49	NA
► Average Service	12.8 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	26
► Number Who Reported Earnings	9
► Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2019 Return	20.24%
▶ 2019 Market Value	\$159.6 M
▶ 2015-2019 (Annualized)	7.77%
▶ 1985-2019 (Annualized)	9.36%

Worcester

City Hall, Room 103 455 Main Street Worcester, MA 01608 Phone: 508-799-1062 Fax: 508-799-1047

Board Members

Robert Stearns, Stephen Wentzell*, Elizabeth Early, John Mahan, Tamara Cullen *indicates Chairperson

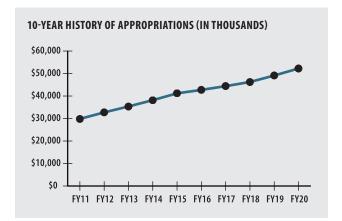
Board Administrator

Lisa Poske **Board Meeting**

Second Thursday of month at 8:30 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% -5%15 16 17 18 19 15-19 85-19

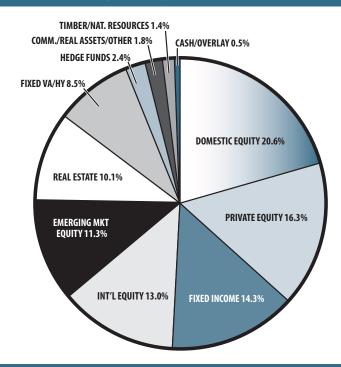


34 years 2018	33 years 2017
	33 ycui3 2017
8.56%	8.93%
<u>10 years 2018</u>	10 years 2017
8.44%	5.38%
<u>5 years 2018</u>	<u>5 years 2017</u>
5.03%	8.32%
	10 years 2018 8.44% 5 years 2018

ACTUARIAL

	63.2%
	1/1/19
	Segal
	6.90%
	6.33% Total Increasing
	2034
	\$554.0 M
	\$52.2 M
ACTIVE	RETIRED
3,393	2,717
\$189.5 M	\$73.1 M
\$55,900	\$26,900
46	74
12.8 years	NA
	3,393 \$189.5 M \$55,900 46

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	320
► Number Who Reported Earnings	72
► Number of Excess Earners	2
► Total Amount of Refund Due	\$26,066.09

▶ 2019 Return	17.66%
▶ 2019 Market Value	\$1.0 B
▶ 2015-2019 (Annualized)	7.44%
▶ 1985-2019 (Annualized)	8.81%

Worcester **Regional**

Midstate Office Park 23 Midstate Drive, Suite 106 Auburn, MA 01501 Phone: 508-832-6314

Fax: 508-832-6318

Board Members

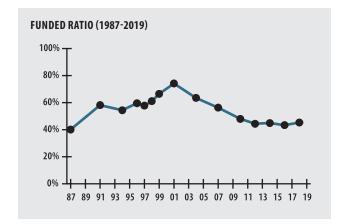
Kevin Blanchette*, Joanne Savignac, Pauline Lajoie, Michael Donoghue, Eugene Durgin *indicates Chairperson

Board Administrator

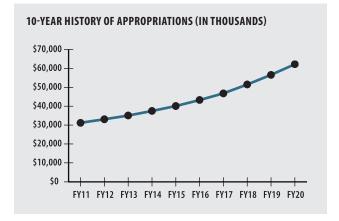
Colleen Canty

Board Meeting

Last Tuesday of every month at 8:00 am



INVESTMENT RETURN (2015-2019, 5 YEAR AND 35 YEAR AVERAGES) 20% 15% 10% 5% 0% 15 17 15-19 85-19 16 18 19

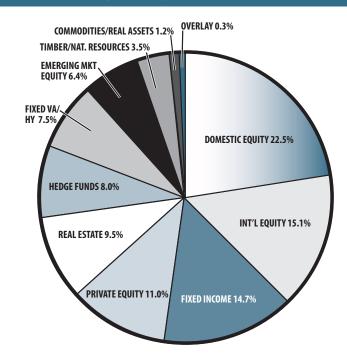


INVESTMENT RETURN HISTORY			
35 years 2019 8.28%	34 years 2018 8.04%	33 years 2017 8.36%	
10 years 2019 8.78%	10 years 2018 8.46%	10 years 2017 5.35%	
5 years 2019 7.90%	<u>5 years 2018</u>	5 years 2017 9.80%	
7.50/0	0.57/0	7.00 /0	

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► Funded Ratio		45.3%
▶ Date of Last Valuation		1/1/18
► Actuary		KMS
► Assumed Rate of Return		7.75%
► Funding Schedule		9.95% Total Increasing
Year Fully Funded		2035
Unfunded Liability		\$829.1 M
► Total Pension Appropriation (Fiscal 2020)		\$62.3 M
	ACTIVE	RETIRED
Number of Members	6,934	3,621
► Total Payroll/Benefit	\$304.3 M	\$76.1 M
Average Salary/Benefit	\$43,900	\$21,000
► Average Age	48	73
Average Service	10.1 years	NA

ASSET ALLOCATION (12/31/19)



► Number of Disability Retirees	243
► Number Who Reported Earnings	100
► Number of Excess Earners	2
► Total Amount of Refund Due	\$2,622.98

▶ 2019 Return	16.61%
▶ 2019 Market Value	\$805.6 M
▶ 2015-2019 (Annualized)	7.90%
▶ 1985-2019 (Annualized)	8.28%

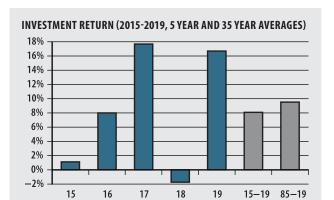
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84 State Street Suite 250 Boston, MA 02109 Phone 617-946-8401 Fax 617-946-8475

Board Members

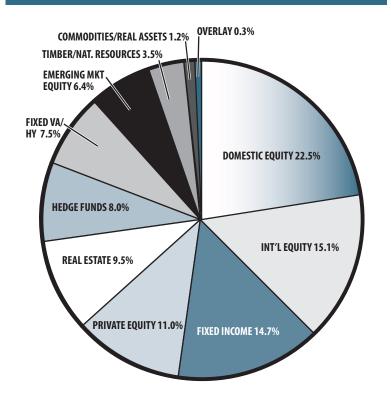
State Treasurer Deborah B. Goldberg (Chairperson), Robert L. Brousseau, Ruth Ellen Fitch, Esq., James B. G. Hearty, Theresa F. McGoldrick, Esq., Peter Monaco, Dennis J. Naughton, Carly Rose, Paul E. Shanley, Esq.

Board Administrator Michael G. Trotsky, CFA **Board Meeting** Quarterly





ASSET ALLOCATION (12/31/19)



▶ 2019 Return	16.71%
▶ 2019 Market Value	\$79.1B
▶ 2015-2019 (Annualized)	8.08%
▶ 1985-2019 (Annualized)	9.54%

DISABILITYRETIREMENT STATISTICS (as of 12/31/19)

DISABILITY RETREMENT APPROVALS MEDICAL PANEL REQUESTS

ACOUNTAL DEATH APPROVALS

CMERENEWS

CMF RE-EXAMS

	*	\setminus	%	$\overline{}$	· V	15	$\overline{}$	11/5	
RETIREMENT BOARDS WITH 40–399 ACTIVE MEMBERS									
Adams Retirement Board	1		0		0	0		0	
Amesbury Retirement Board	3		2		0	0		0	
Blue Hills Regional School District Retirement Board	0		0		0	0		0	
Clinton Retirement Board	1		0		0	2		0	
Easthampton Retirement Board	0		1		0	3		0	
Fairhaven Retirement Board	2		0		0	3		0	
Gardner Retirement Board	0		0		0	1		0	
Gr. Lawrence Sanitary District Retirement Board	0		0		0	1		0	
Hull Retirement Board	1		2		0	0		0	
Mass Housing Finance Agency Retirement Board	0		0		0	0		0	
Maynard Retirement Board	0		0		0	0		0	
Milton Retirement Board	0		1		0	2		0	
Minuteman Regional School District Retirement Board	0		0		0	0		0	
Montague Retirement Board	1		1		0	2		0	
Newburyport Retirement Board	1		2		0	1		0	
North Adams Retirement Board	1		2		0	2		0	
Northbridge Retirement Board	0		0		0	1		0	
Reading Retirement Board	2		2		0	4		0	
Saugus Retirement Board	1		8		0	3		0	
Southbridge Retirement Board	1		1		0	5		0	
Stoneham Retirement Board	1		2		0	2		0	
Webster Retirement Board	0		1		0	1		0	
Winthrop Retirement Board	1		1		0	3		0	
RETIREMENT BOARDS WITH 400–599 ACTIVE MEMBERS									
Belmont Retirement Board	1		0		0	8		0	
Concord Retirement Board	0		0		0	1		0	
Danvers Retirement Board	1		3		0	3		0	
Dedham Retirement Board	2		1		0	8		0	
Gloucester Retirement Board	2		4		1	2		0	
Greenfield Retirement Board	2		2		0	2		0	
Marblehead Retirement Board	3		1		0	3		0	
Melrose Retirement Board	3		1		1	1		0	
Milford Retirement Board	0		1		0	4		0	
Natick Retirement Board	1		1		0	2		0	
North Attleboro Retirement Board	3		2		1	10		0	
Norwood Retirement Board	4		1		0	4		0	
Revere Retirement Board	4		5		0	8		0	
Shrewsbury Retirement Board	1		2		0	1		0	
Swampscott Retirement Board	1		0		0	2		0	
Wakefield Retirement Board	5		0		0	2		0	
Winchester Retirement Board	0		0		0	0		0	



DISABILITY RETIREMENT APPROVALS

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	AL PANEL REQUESTS	OROVAIS NO PROVAIS	PROLL ME	RENEWS CARRE	9.
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RETIREMENT BOARDS WITH 600-899 ACTIVE MEMBERS					
Andover Retirement Board	2	2	0	4	0
Arlington Retirement Board	5	4	0	10	0
Attleboro Retirement Board	2	3	1	9	0
Beverly Retirement Board	8	2	0	4	0
Braintree Retirement Board	1	3	0	4	0
Chelsea Retirement Board	1	6	1	9	0
Dukes County Contributory Retirement System	5	1	0	3	0
Everett Retirement Board	18	2	1	2	0
Falmouth Retirement Board	0	0	0	1	0
Fitchburg Retirement Board	5	6	0	3	0
Hingham Retirement Board	0	0	0	1	0
Leominster Retirement Board	1	3	0	4	0
Lexington Retirement Board	1	0	0	4	0
Malden Retirement Board	4	5	1	8	0
Marlborough Retirement Board	3	1	0	4	0
Medford Retirement Board	3	4	2	8	1
Methuen Retirement Board	2	4	0	6	0
Needham Retirement Board	0	0	0	1	0
Northampton Retirement Board	2	2	0	0	0
Peabody Retirement Board	2	0	0	4	0
Watertown Retirement Board	1	4	0	7	0
Wellesley Retirement Board	0	0	0	5	0
West Springfield Retirement Board	3	3	0	6	0
Weymouth Retirement Board	5	1	0	11	0
Woburn Retirement Board	1	3	0	0	0
ETIREMENT BOARDS WITH 900-2,399 ACTIVE MEMBERS					
Berkshire County Retirement Board	0	0	0	6	0
Brockton Retirement Board	12	14	0	19	0
Brookline Retirement Board	2	7	0	15	0
Chicopee Retirement Board	3	3	0	17	1
Fall River Retirement Board	21	6	0	24	1
Framingham Retirement Board	2	1	0	9	0
Franklin County Retirement Board	0	0	0	5	0
Haverhill Retirement Board	1	2	1	8	0
Holyoke Retirement Board	0	1	0	14	0
Lawrence Retirement Board	2	1	0	12	1
Lowell Retirement Board	3	2	0	17	0
Lynn Retirement Board	2	5	0	16	0



DISABILITY RETREMENTAPPROVAL ACCOENTAL DEATH APPROVALS

	PANEL REQUESTS	TAI DEATHAPA	ROVA CME,	REVENS OF REVEN	Exa
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ETIREMENT BOARDS WITH 900-2,399 ACTIVE MEMBERS (CONT'D)					
Mass Port Authority Retirement Board	0	2	0	6	0
Mass Water Resource Authority Retirement Board	7	2	1	7	0
New Bedford Retirement Board	13	9	0	25	0
Newton Retirement Board	5	7	0	9	0
Pittsfield Retirement Board	5	4	0	6	0
Plymouth Retirement Board	0	2	0	9	0
Quincy Retirement Board	7	8	0	18	0
Salem Retirement Board	3	3	0	3	0
Somerville Retirement Board	10	9	0	8	0
Taunton Retirement Board	7	6	0	12	0
Waltham Retirement Board	5	2	0	8	0
Westfield Retirement Board	2	2	0	3	0
TIREMENT BOARDS WITH 2,400-10,000 ACTIVE MEMBERS					
Barnstable County Board of Retirement	17	16	0	45	0
Bristol County Board of Retirement	13	9	1	28	0
Cambridge Retirement Board	21	18	0	23	0
Essex Regional Retirement Board	4	5	0	14	0
Hampden County Regional Retirement Board	5	5	0	22	0
Hampshire County Regional Retirement Board	7	6	0	8	0
Middlesex County Retirement Board	40	26	1	29	0
Norfolk County Retirement Board	26	13	0	31	0
Plymouth County Retirement Board	13	14	0	50	0
Springfield Retirement Board	23	21	0	47	1
Worcester Regional Retirement Board	13	6	0	31	0
Worcester Retirement Board	26	17	3	21	0
TIREMENT BOARDS WITH 20,500-90,000 ACTIVE MEMBERS					
Boston Retirement Board	76	50	3	137	0
State Retirement Board	205	197	4	391	1
Teachers Retirement Board	42	18	0	56	0
TAL ALL RETIREMENT BOARDS:	768		23	1424	

INVESTMENT VENDORS

The following is a listing of the investment managers, custodians, and consultants that serve the Massachusetts public pension systems. The listing is based on information supplied by the retirement boards.

Consultant: Pickary investment Advisors (LT Consultant: Diable Associates RLINGTON Costodians: People's United Bank Consultant: Diable Associates RLINGTON Costodians: State Street Bank & Treat TITLEBORO Costodians: People's United Bank Consultant: Diable Associates Inc. - General Consultant: Diable Associates Inc. - General Consultant: Diable Associates Inc. - Graphiand Capital Management Conjugate Management - Fountier Capital Management Conjugate Management - Fountier Capital Management Conjugate - Fountier Capit	RETIREMENT BOARD	INVESTMENT VENDORS				
NOOVER Consultant: Dahah Associates RINGTON Custodians: Steet Plank & Trust TILEBORO Custodians: People's United Bank Consultant: Dahah Associates Inc. PRIT Custodian: People's United Bank Consultant: Nerp., LIC ARN Captial Management, LP Alkanta Capital Alkanta Capital Alkanta Capital Consultant: Nerp., LIC Carillon Tower Advisors PRIT Custodian: State Street Bank & Timust Consultant: Nerp., LIC ARV Captial Management, LP Alkertan Nr. LIC Aread Points List Entrol, LIC Aread Group Annosa Associates Inc. PRIT Custodian: State Street Bank & Timust Articulo Copial Management, LP Angola, Gordon & Co., LP Angola, Gordon & Co., LP Angola, Copial Associates Inc. Prince Research & Management, LP Angola, Copial Associates Inc. Prince Research & Management, LP Angola, Copial Associates Inc. Prince Research & Management, LP Angola, Copial Associates Inc. Prince Research & Management, LP Angola, Copial Associates Inc. Prince Research & Management Intercontinental Real Estate Corp. Prince Research & Management Intercontinental Real Estate Corp. Prince Research & Management Intercontinental Real Estate Corp. Prince Research & Management Intercontinental Research Estates Productional Captal Partners Consultant: Nerv. LIC Ancord Prince Language Princes Local Management Investment Management Intercontinental Research Estates Productional Captal Partners Local Management Investment Management Intercontinental Research Estates Prince	ADAMS • Custodian: People's United Bank • Consultant: Fiduciary Investment Advisors, LLC	• PRIT	RhumbLine Advisers			
Consultant: Dishab Associates RINGTON Custodians: State Street Bank & Trust TILEBORO - Amalgated Bank - Consultant: Duhab Associates Inc. - Conjeand Capital Management (a. LLC - Percipic Capital Management (b. LLC - Percipic Capital Management (b. LLC - Percipic Capital Management (b. LLC - ARNSTABLE COUNTY - PRIT - Custodians: People's United Bank - Consultant: NEPC, LLC - Carillon Tower Advisors - Carillon Tower Advisors - Carillon Tower Advisors - PRIT - Custodians: People's United Bank - Consultant: NEPC, LLC - Carillon Tower Advisors - PRIT - Custodians: People's United Bank - Consultant: NEPC, LLC - Carillon Tower Advisors - PRIT - Custodians: State Street Bank & Trust - Consultant: NEPC, LLC - ARNSTABLE COUNTY - PRIT - Custodians: State Street Bank & Trust - Consultant: NEPC, LLC - ARNSTABLE COUNTY - PRIT - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - PRIT - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - PRIT - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - PRIT - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - PRIT - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY - PRIT - Custodians: State Street Bank & Trust - ARNSTABLE COUNTY -	AMESBURY	• PRIT				
TILEBORO Amalgated Bank Outstediam: State Street Bank & Trust TILEBORO Amalgated Bank Onswittant: Debbe Associates Inc. Fidelity Institutional Asset Management Frontier Capital Management Co., LLC Peergrine Capital ARNSTABLE COUNTY PRIT ARW Capital Management, LP Additional Capital Management, LP Additional Capital Management Co., LLC Peergrine Capital Amagement Co., LLC Peergrine Capital Amagement Co., LLC Peergrine Capital ARNSTABLE COUNTY PRIT Custediam: Peeple's United Bank Consultant: NEPC, LLC Additional Capital Management, LP Additional Capital Management Inc. PRIT EVERLY LUE HILLS REGIONAL OSTON (CITY) Custediam: State-Street Bank & Trust ARW Capital Management, LP According Transes, LLC According Transes, LLC According Transes, LLC According Transes, LLC Assent Member Peeple's Indice depail Advisors Blackfook Advisors, LLC Assent Member Peeple's Linited Bank And Group Annow Advisors Blackfook Advisors, LLC Assent Member Peeple's United Bank Annow Advisors Blackfook Advisors, LLC Assent Member Peeple's United Bank Annow Advisors Blackfook Advisors, LLC Assent Member Peeple's United Bank Annow Advisors Blackfook Advisors, LLC Assent Member Peeple's United Bank Annow Advisors Blackfook Advisors, LLC Assent Member Peeple's United Bank Annow Advisors Blackfook Advisors, LLC Assent Member Peeple's United Bank Annow Advisors Blackfook Advisors, LLC	ANDOVER → Consultant: Dahab Associates	- PRIT	RhumbLine Advisers			
Custodian: People's United Bank Consultant: Dahab Associates Inc. Cospeland Capital Management Findelity institutional Asset Management Findelity institutional Asset Management Findelity institutional Asset Management Findelity institutional Asset Management Co. LLC Peregrinc Capital ARNSTABLE COUNTY EMMONT ARW Capital Management, LP Atlanta Capital Anangement, LP Atlanta Capital Anangement, LP Atlanta Capital Part PRIT PRIT Atlanta Capital Management, LP Atlanta Capital Part PRIT PRIT PRIT PRIT PRIT Lounsi, Sayles & Company LOCAMINICATION PRIT Federal Street Partners, LLC Acquillon Company Anangement Company, LLC ARW Capital Management, LP Alerted Asset Management, LP Alerted Asset Management, LP Alerted Asset Management, LP Alerted Asset Management, LP Angelo, Gordon & Go., LC Angelo Handle State Funds, LLC Ancent Venture Partners Bermott Capital Advisors Bilder briot Capital Advisors Bilder briot Capital Partners Bermott Capital Advisors Bilder Briot	ARLINGTON ► Custodian: State Street Bank & Trust	- PRIT	Wilshire Associates Inc.			
ELMONT Custodian: People's United Bank Consultant: NEPC, LLC Carillion Tower Advisors PRIT PRIT UE HILLS REGIONAL OSTON (CITY) Custodian: State Street Bank & Trust Consultant: NEPC, LLC AEV Capital Management, LP Are Are Management, LP Are Arisotole Capital Management, LP Arisotole Capital Management, LP Arisotole Capital Management, LLC Ascent Venture Partners Audax Group Aurora Management Partners Berroott Capital Advisors, LLC Backstone Alternative Asset Management Conference Asset Management Backstone Alternative Asset Management Incline Bevate Income Besearch & Management Intercontinental Real Estate Corp. Indicate Bevate Income Besearch & Management Intercontinental Real Estate Corp. Indicate Bevate Income Besearch & Management Intercontinental Real Estate Corp. Indicate Bevate Income Besearch & Management Intercontinental Real Estate Corp. In Mary And M	ATTLEBORO ▶ Custodian: People's United Bank ▶ Consultant: Dahab Associates Inc.	 BTG Pactual Timberland Investment Group Copeland Capital Management Fidelity Institutional Asset Management 	 Intercontinental Real Estate Corp. Invesco Core Real Estate USA, LP Invesco National Trust Company 	RhumbLine AdvisersState Street Global Advisors		
- Custodian: People's United Bank - Consultant: NEPC, LLC - Carillion Tower Advisors - Pacific Investment Management Company, LLC - Rothschild Asset Management Inc PRIT - Custodian: State Street Bank & Trust - Are Winghal Management, LP - Accent a NY, LLC - Aberdeen Asset Management - Angelo, Gordon & Co., LP - Archipht Capital Partners, LLC - Assent Renal Estate Investors - Angelo, Gordon & Co., LP - Archipht Capital Partners, LLC - Aristotle Capital Management, LLC - Assent Neture Partners - Audax Group - Auron Management Partners - Audax Group - Auron Management Partners - Benrott Capital Advisors - BlackRock Advisors, LLC - Blackstone Alternative Asset Management - Benrott Capital Advisors - BlackRock Advisors, LLC - Blackstone Alternative Asset Management - COMP Capital Partners - Blue Point Capital Partners - Brookfield Asset Management - Company, LC - Carlyle Realty Partners - Columbia Management - Company Inc Learn NY, LLC - Aberdeen Asset Management - Income Research & Management - In	BARNSTABLE COUNTY	• PRIT	UBS Realty Investors, LLC			
EVERLY LUE HILLS REGIONAL PRIT OSTON (CITY) Custodian: State Street Bank & Trust Alectra NY, LLC Aberdeen Asset Management, LP Aristotic Agaital Management Aristotic Agaital Management, LLC Aristotic Agaital Management Partners Audua Group Aurora Management Partners BlackRock Advisors, LLC Carlyle Realty Partners Columbia Management CCMP Capital Advisors, LLC Carlyle Realty Partners Columbia Management Investment Advisors, LLC Carlyle Realty Advisors Lexington Partners, LP Thomas H. Lee Partners, LP Thomas H. Lee Partners, LP Lexington Partners, LP Tiristan Capital Partners Vortobel Asset Management, LP Tiristan Capital Partners Vortobel Asset Management, LP West	BELMONT ➤ Custodian: People's United Bank ➤ Consultant: NEPC, LLC	Atlanta Capital	Loomis, Sayles & Company	RhumbLine Advisers		
LUE HILLS REGIONAL OSTON (CITY) Custodian: State Street Bank & Trust Alcentra NY, LLC Aberdeen Asset Management, LP Angelo, Gordon & Co., LP Ardight Capital Partners, LLC Aristotle Capital Management, LLC Aristotle Capital Management, LLC Aristotle Capital Management, LLC Aristotle Capital Management, LLC Arsenal Real Estate Funds, LLC Bernzott Capital Advisors Lober Backson Advisors, LLC Blackstone Alternative Asset Management Assoc. Blue Point Capital Partners Brookfield Asset Management Arrow Anderson Capital Advisors, LP Arsenal Real Estate Funds, LS Arsenal Real Estate Funds, LS Arright Capital Androisors, LP Arrow Anderson Capital Advisors, LP Arrow Anderson Capital A	BERKSHIRE COUNTY	• PRIT				
OSTON (CITY) Custodian: State Street Bank & Trust Consultant: NEPC, LLC ARCHTA NY, LLC Alcentra Street Clobal Advisors Incline Elevate Alcontra Hamilton Lace Alcentra NY, LLC Alcentra NY, LLC Alcentra NY, LLC Alcentra Street Clobal Advisors Incline Elevate Alcontra Hamilton Lacle Estate Lora, LP Indicine Elevate Alcentra Ny, LLC Alcentra	BEVERLY	• PRIT				
 Custodian: State Street Bank & Trust A Cleentra NY, LLC Angelo, Gordon & Co., LP Ardight Capital Partners, LLC Arristotle Capital Management, LLC Arristotle Capital Management, LLC Hamilton Lane Ascent Venture Partners Audax Group Autora Management Partners Hearthstone Inc. Scepall Bryant & Hamill Siguler Guff Advisers, LLC Schad Visiers, LLC Schad Private Equity Partners Lindine Elevate Sculptila Partners Income Research & Management State Street Global Advisors Insight Venture Management State Street Global Advisors Intercontinental Real Estate Corp. Invesco Gore Real Estate USA, LP Th Lee Partners, LP J.F. Lehman & Company, Inc. The Carly Realty Partners CCMP Capital Advisors, LLC Lazard Asset Management Carly Realty Partners Columbia Management Investment Advisors, LLC Lexington Partners, LP Lighthouse Investment Partners Loomis, Sayles & Company Wels Capital Partners Vontobel Asset Management, Lnc. Welsten Equity Partners Loomis, Sayles & Company Westfield Capital Management, Inc. Westfield Capital Management, Lnc. Westfield Capital Management, Lnc. 	BLUE HILLS REGIONAL	• PRIT				
 DRC Capital, LLP Dune Capital Management, LP Dune Capital Management, LP PanAgora Asset Management, Inc. Energy Spectrum Partners Perella Weinberg Partners Capital Management, LP Westport Capital Partners, LLC Z Capital Partners, LLC Zevenbergen Capital Investments, LLC 	BOSTON (CITY) • Custodian: State Street Bank & Trust • Consultant: NEPC, LLC	 AEW Capital Management, LP Alcentra NY, LLC Aberdeen Asset Management Angelo, Gordon & Co., LP Arclight Capital Partners, LLC Aristotle Capital Management, LLC Arsenal Real Estate Funds, LLC Ascent Venture Partners Audax Group Aurora Management Partners Bernzott Capital Advisors BlackRock Advisors, LLC Blackstone Alternative Asset Management Assoc. Blue Point Capital Partners, LLC Boston Millennia Partners Brookfield Asset Management CCMP Capital Advisors, LLC Carlyle Realty Partners Columbia Management Investment Advisors, LLC Crescent Capital Group, LP CVC Capital Partners DDJ Capital Management D.E. Shaw Investment Management, LLC DRC Capital, LLP Dune Capital Management, LP 	 Federal Street Partners, LLC GAM, US Goldentree Asset Management, LP Grosvenor Capital Management, LP Hamilton Lane HarbourVest Partners, LLC Hearthstone Inc. H.I.G. Capital Incline Elevate Income Research & Management Insight Venture Management Intercontinental Real Estate Corp. Invesco Core Real Estate USA, LP J.F. Lehman & Company, Inc. J.P. Morgan Investment Management Kayne Anderson Capital Advisors, LP Lazard Asset Management, LLC Lexington Partners, LP Lighthouse Investment Partners Loomis, Sayles & Company Mesirow Advanced Strategies, Inc. MPM Capital, LP NGP Energy Capital Management, LLC Oaktree Capital Management, Inc. 	 Prudential Capital Partners Prudential Real Estate Investors RhumbLine Advisers Roark Capital Partners Sanderling Ventures SCP Private Equity Partners Segall Bryant & Hamill Siguler Guff Advisers, LLC SL Capital Partners State Street Global Advisors Sterling Fund Management TA Realty TH Lee Putnam Ventures THL Credit Senior Loan Strategies, LLC Thomas H. Lee Partners, LP Thoma Bravo, LLC Todd Asset Management Tristan Capital Partners Vontobel Asset Management, Inc. W Capital Partners Wells Capital Management, Inc. Western Technology Westfield Capital Management Company, LP Westport Capital Partners, LLC Z Capital Partners, LLC 		
OSTON TEACHERS • PRIT	BOSTON TEACHERS	• PRIT				

RETIREMENT BOARD	INVESTMENT VENDORS					
BRAINTREE ► Custodian: SEI Private Trust Company	Lexington Partners, LP	• PRIT	SEI Investments Management Corporation			
BRISTOL COUNTY ➤ Custodian: People's United Bank ➤ Consultant: Segal Marco Advisors	 Aberdeen Asset Management Arrowstreet Capital, LP Ashmore Investment Advisors, Ltd. BlackRock Investment Management, LLC Brookfield Timberlands Management, LP Clearbridge Investments Columbia Management Investment Advisers, LLC DN Partners Dupont Capital Management Earnest Partners, LLC Fiera Capital Inc. 	 Fiduciary Trust International Frontier Capital Management Co., LLC GCM Customized Fund Investment Group Goldentree Asset Management, LP IFM Investors (US) Advisor Income Research & Management Intercontinental Real Estate Corp. Lazard Asset Management, LLC LSV Asset Management Lyrical Asset Management, LP 	Mesirow Financial Private Equity Advisors, Inc. Pacific Investment Management Company (PIMCO) Polaris Capital Management, LLC PRIT RBC Global Asset Management (U.S.), Inc. RREEF Management, LLC Stone Harbor Investment Partners TerraCap Management, LLC Timberland Investment Resources, LLC WL Ross & Co., LLC			
BROCKTON ► Custodian: SEI Private Trust Company ► Consultant: Fiduciary Investment Advisors, LLC	 Aberdeen Asset Management Arsenal Real Estate Partners Ascent Venture Partners HealthPoint, LLC 	 Invesco Private Capital Landmark Partners, LLC Mesirow Financial Investment Management , Inc. 	 Oppenheimer Alternative Investment Management SEI Investments Management Corp. Siguler Guff Advisers, LLC 			
BROOKLINE	Hancock Timber Resource Group, Inc. HarbourVest Partners, LLC	Invesco Private Capital, Inc. Lexington Partners, LP	PRIT Sustainable Woodlands Partners, LLC			
CAMBRIDGE Custodian: People's United Bank Consultant: Segal Marco Advisors	 Aberdeen Asset Management AEW Capital Management, LP Ascent Venture Partners BlackRock Investment Management, LLC Brandywine Global Investment Management, LLC Campbell Global LLC Fidelity Institutional Asset Management Hamilton Lane Hancock Natural Resource Group, Inc. IFM Investors (US) Advisor, LLC 	 Income Research & Management Intercontinental Real Estate Corp. J.P. Morgan Investment Management Landmark Partners, LLC Lazard Asset Management, LLC Lexington Partners, LP Loomis, Sayles & Co. Mellon Investments Corporation Penn Square Global Real Estate Group, LLC 	 PineBridge Investments, LLC Polaris Capital Management, LLC PRIT RBC Global Asset Management (U.S.), Inc. RhumbLine Advisers Rockwood Capital, LLC State Street Global Advisors UBS Realty Advisors, LLC Wellington Management Company 			
CHELSEA	• PRIT					
CHICOPEE ► Custodian: SEI Private Trust Company	• PRIT	SEI Investments Management Corp.				
CLINTON • Consultant: Trust Advisory Group, Ltd.	• PRIT					
CONCORD ➤ Custodian: Comerica Securities ➤ Consultant: Fiduciary Investment Advisors, LLC	Acadian Asset Management, LLC PRIT	Rhumbline Advisers Russell Investment Group	Wellington Management			
DANVERS ► Custodian: People's United Bank ► Consultant: Graystone Consulting	Barings, LLCBMO Asset Management CorporationEagle Capital Management, LLC	Gerber-Taylor Management CompanyPRITRhumbLine Advisers	TA RealtyTWIN Capital ManagementWestern Asset Management Co.			
DEDHAM	• PRIT					
DUKES COUNTY ► Custodian: People's United Bank ► Consultant: Dahab Associates, Inc.	Atlanta Capital Garcia Hamilton & Associates LP	Polen Capital Management, LLC PRIT	Rothschild Asset Management, Inc.			

RETIREMENT BOARD		INVESTMENT VENDORS	
ESSEX COUNTY	 Ascent Venture Partners BlackRock Investment Management, LLC Boston Millennia Partners 	 Intercontinental Real Estate Corp. Levine Leichtman Capital Partners, Inc 	Principal Real Estate Investors, LLC
EVERETT	• PRIT		
FAIRHAVEN	• PRIT		
FALL RIVER	• PRIT	SL Capital Partners, LLP	
FALMOUTH ► Custodian: People's United Bank ► Consultant: Wainwright Investment Counsel, LLC	 Aristotle Capital Management, LLC Dimensional Fund Advisors, LP Hamilton Lane HGK Asset Management, Inc. Lexington Partners, LP 	 LMCG Investments, LLC Lord Abbett & Co., LLC Mesirow Financial Private Equity Advisors, Inc. PRIT Principal Real Estate Investors, LLC 	 RhumbLine Advisers SEl Trust Company Siguler Guff Advisers, LLC State Street Global Advisors TerraCap Partners
FITCHBURG	• PRIT	TA Realty	
FRAMINGHAM	• PRIT		
FRANKLIN COUNTY ► Custodian: Comerica Bank ► Consultant: Dahab Associates, Inc.	Aberdeen Asset ManagementChartwell Investment PartnersFiera Capital Inc.	Loomis, Sayles & CompanyO'Shaughnessy Asset Management, LLC	Polen Capital Management, LLCPRIT
GARDNER	• PRIT		
GLOUCESTER	• PRIT		
GREATER LAWRENCE • Custodian: BNY Mellon Asset Servicing	Seaward Management		
GREENFIELD	• PRIT		
HAMPDEN COUNTY ► Consultant: Segal Marco Advisors	GCM Customized Fund Investment Group	Invesco Private Capital, Inc.	• PRIT
HAMPSHIRE COUNTY ► Consultant: NEPC, LLC	 Ascent Venture Partners Barings LLC Colchester Global Investors Glouston Capital Partners, LLC Lexington Partners, LP 	 Massachusetts Financial Services Company Perella Weinberg Partners Capital Management, LP Polaris Capital Management, LLC Portfolio Advisors, LLC 	 PRIT RBC Global Asset Management (U.S.) Inc. RhumbLine Advisers Shenkman Capital Management, Inc.
HAVERHILL ➤ Custodian: People's United Bank ➤ Consultant: Wainwright Investment Counsel, LLC	 Fisher Investments Global Forest Partners, LP Globespan Capital Management, Inc. GrandBanks Capital 	 Income Research & Management Mesirow Financial Institutional Real Estate Molpus Woodlands Group, LLC PRIT 	 Putnam Advisory Company, LLC Stafford Private Equity, Inc. TerraCap Management The DSF Group
HINGHAM • Consultant: Meketa Investment Group	• PRIT		
HOLYOKE ► Consultant: Segal Marco Advisors	 Aberdeen Asset Management Acadian Asset Management, LLC Aristotle Capital Management Constitution Capital Partners, LLC Fidelity Institutional Asset Management Industry Capital Advisors—Berkley Partners LMCG Investments Long Wharf Real Estate Partners, LLC 	 Loomis, Sayles & Company Mellon Investments Mesirow Financial Private Equity Advisors, Inc. Monroe Capital Oberweis Asset Management, Inc. Polaris Capital Management, LLC PRIT Putnam Investment Management, LLC 	 RBC Global Asset Management (U.S.) Inc. Seizert Capital Partners, LLC State Street Global Advisors TerraCap Management, LLC Wasatch Advisors, Inc. Wells Capital Management, Inc. Western Asset
HULL	• PRIT		
LAWRENCE	• PRIT		
LEOMINSTER ► Custodian: State Street Bank & Trust	• PRIT		

RETIREMENT BOARD	INVESTMENT VENDORS					
LEXINGTON ➤ Custodian: People's United Bank ➤ Consultant: Meketa Investment Group, Inc.	 Acadian Asset Management, LLC Angelo, Gordan & Co., LP Driehaus Capital Management, LLC Fidelity Investments Fiduciary Management, Inc. 	 Golub Capital Partners Kayne Anderson Rudnick Investment Management Matthews International Capital Management, LLC Monroe Capital 	 PRIT RhumbLine Advisers Wellington Management Company, LLP White Oak Global Advisors, LLC 			
LOWELL • Custodian: People's United Bank	Ascent Venture Partners	Boston Millennia Partners	• PRIT			
LYNN	Ascent Venture Partners BlackRock Investment Management, LLC	BlackRock Realty Advisors, Inc.	• PRIT			
MALDEN ▶ Custodian: State Street Bank & Trust	De Burlo Group, Inc.					
MARBLEHEAD	• PRIT					
MARLBOROUGH ➤ Custodian: Comerica Bank ➤ Consultant: Meketa Investment Group, Inc.	 Clarion Partners Colony Realty Partners Constitution Capital Partners, LLC Dimensional Fund Advisors LP Driehaus Capital Management, LLC 	 Fiduciary Management, Inc. Frontier Capital Management Co., LLC HarbourVest Partners, LLC Payden & Rygel RhumbLine Advisers 	 Rockwood Capital Shenkman Capital Management, Inc. SL Capital Partners, LLP State Street Global Advisors 			
MHFA ► Custodian: People's United Bank ► Consultant: Meketa Investment Group, Inc.	 Aberdeen Asset Management AEW Capital Management, LP Ascent Venture Partners Columbia Management Investment Advisers, LLC Constitution Capital Partners, LLC Dimensional Fund Advisors, LP 	GQC Partners, LLC Goldman Sachs Asset Management, LP HarbourVest Partners, LLC IFM Investors Advisor Intercontinental Real Estate Corporation LMCG Investments, LLC	 Longfellow Investment Management Lord Abbett & Co., LLC MetLife Investment Management State Street Global Advisors TA Realty 			
MASSPORT ► Custodian: People's United Bank ► Consultant: Wilshire Associates	Baillie Gifford Overseas LimitedPRIT	Pzena Investment Management, LLC State Street Global Advisors	Wellington Management Company, LLP			
MTRS (Mass Teachers' Retirement System)	• PRIT					
MWRA ► Custodian: People's United Bank ► Consultant: NEPC, LLC	 Alcentra NY, LLC Ascent Venture Partners Boston Company Asset Management, LLC Boston Partners CarVal Investors Castile Ventures Cerberus Capital Management, LP Coho Partners, Ltd. Constitution Capital Partners LLC Corbin Capital Partners LP Courtland Partners EnTrust Global Partners Foundry Group, LLP 	 Garcia Hamilton & Associates LP Invesco Private Capital, Inc. J.F. Lehman & Company Kayne Anderson Capital Advisors, LP Landmark Partners, LLC Lee Munder Capital Group, LLC Loomis, Sayles & Company Lord, Abbett & Co. LLC Morgan Stanley Octagon Credit Investors, LLC Pacific Investment Management Company, LLC Park Square Capital Pinebridge Investments, LLC 	 Polen Capital Management, LLC PRIT Private Advisors, LLC RhumbLine Advisers Schroders Investment Management North America, Inc. SEI Trust Corporation Select Equity Group, LP TA Realty TerraCap Management, LLC UBS Hedge Fund Solutions, LLC WL Ross & Co., LLC 			
MAYNARD • Custodian: People's United Bank	Boston Advisors, LLC	• PRIT				
MEDFORD ➤ Custodian: People's United Bank ➤ Consultant: NEPC, LLC	 Ashmore Investment Advisor Limited City of London Investment Management Garcia Hamilton & Associates LP Lazard Asset Management, LLC 	Loomis, Sayles & CompanyPRITRhumbLine Advisers	 Standard Life Investment Western Asset Management Company William Blair & Company, LLC 			
MELROSE	Ascent Venture Partners	Invesco Private Capital, Inc.	• PRIT			

RETIREMENT BOARD	INVESTMENT VENDORS				
METHUEN	BlackRock Investment Management, LLC	• PRIT			
MIDDLESEX COUNTY ➤ Custodian: State Street Bank & Trust	Ares Management, LLCAscent Venture PartnersAuda Private Equity, LLC	 Boston Millennia Partners Global Forest Partners, LP 	Globespan Capital Management, Inc. PRIT		
MILFORD	• PRIT				
MILTON	• PRIT				
MINUTEMAN REGIONAL	• PRIT				
MONTAGUE	• PRIT				
NATICK Custodian: People's United Bank Consultant: Fiduciary Investment Advisors, LLC	• PRIT	SEI Investments Management Corp.	SL Capital Partners, LLP		
NEEDHAM	• PRIT				
NEW BEDFORD Consultant: Segal Marco Advisors	 Aberdeen Asset Management, Inc. Acadian Asset Management, LLC Hamilton Lane Hancock Natural Resource Group, Inc. Intercontinental Real Estate Corp. Invesco Private Capital, Inc. Lexington Advisors, Inc. 	 Loomis, Sayles & Company Mellon Investments Mesirow Private Equity Advisors, Inc. Neuberger Berman Management Pacific Investment Management Company (PIMCO) SEI Trust Company 	 State Street Global Advisors Limited TA Realty UBS Realty Investors, LLC Wellington Management Company, LLP Westfield Capital Management Company, LP Wilton Asset Management, LLC 		
NEWBURYPORT	• PRIT				
NEWTON	• PRIT				
NORFOLK COUNTY Custodian: People's United Bank Consultant: Wainwright Investment Counsel, LLP	 Amundi Pioneer Institutional Asset Mgmt., Inc. ArcLight Capital Partners, LLC Aristotle Capital Management, LLC Ascend Ventures Group, LLC BNY Mellon Asset Management N.A. Boston Millennia Partners Cadence Capital Management, Inc. Constitution Capital Partners, LLC Corsair Capital LLC Dalton Greniere Asset Management, Inc. D.E. Shaw Investment Management, LLC DSF Group 	 EnTrust Partners, LLC Gamco Asset Management, Inc. Gerding Edlen Investment Management, LLC Globespan Capital Management, Inc. Goldentree Asset Management, LP Hamilton Lane HarbourVest Partners, LLC Income Research & Management Intercontinental Real Estate Corporation Invesco Private Capital, Inc. Lazard Asset Management, LLC LLM Capital Partners 	 LMCG Investments Loomis, Sayles & Company Mesirow Capital Partners IX, LP Mesirow Financial Institutional Real Estate MFS International Advisors, Inc. PRIT RhumbLine Advisers Seizert Capital Partners, LLC Siguler Guff Advisors, LLC TerraCap Management Wellington Management Company, LLP 		
NORTH ADAMS • Custodian: People's United Bank	De Burlo Group, Inc.	- PRIT			
NORTH ATTLEBORO Custodian: People's United Bank Consultant: Dahab Associates, Inc.	 AmSouth Bank Aristotle Capital Management, LLC Atlanta Capital Axiom International Investors, LLC Blackrock Realty Advisors, Inc. 	 Brandes Investment Partners, LP Chicago Equity Partners, LLC Davenport & Company, LLC Intercontinental Real Estate Corporation 	 Lazard Asset Management, LLC Loomis, Sayles & Company RhumbLine Advisers Vontobel Asset Management, Inc. 		
NORTHAMPTON • Custodian: People's United Bank	De Burlo Group, Inc.	• PRIT			

RETIREMENT BOARD		INVESTMENT VENDORS	
NORTHBRIDGE	• PRIT		
NORWOOD • Custodian: People's United Bank • Consultant: Meketa Investment Group, Inc.	 Aberdeen Asset Management, Inc. American Funds Aristotle Capital Management, LLC Atlanta Capital Boston Company Asset Management, LLC 	 Columbia Management Investment Advisors, LLC Constitution Capital Partners Dimensional Fund Advisors, LP HabourVest Partners, LLC IFM Investors Advisor 	 Landmark Partners, LLC PRIT RhumbLine Advisers State Street Global Advisors
PEABODY	• PRIT		
PITTSFIELD	• PRIT	SL Capital Partners, LLP	
PLYMOUTH Custodian: People's United Bank Consultant: Fiduciary Investment Advisors, LLC	 Acadian Asset Management Aristotle Capital Management, LLC Barings LLC BlackRock Advisors, LLC Boston Advisors, LLC 	Boston Trust Investment Management, Inc. Columbia Management Investment Advisers Invesco Trust Company PRIT Rhumbline Advisers	Robeco Institutional Asset Management Inc. Templeton Investment Counsel Wellington Management Company, LLP Westfield Capital Management Company, LP
PLYMOUTH COUNTY Custodian: State Street Bank & Trust Consultant: Meketa Investment Group	ABS Investment Management, LLC AEW Capital Management, LP Akina Limited Ascent Venture Partners Audax Management Company (NY), LLC Basalt Infrastructure Partners Boston Company Asset Management, LLC BTG Pactual Timberland Investment Group Carlyle Investment Management Charlesbank Capital Partners, LLC Constitution Capital Partners DN Partners Driehaus Capital Management, LLC DSF Group Eaton Vance Investment Counsel Entrust Global Partners Fisher Investments	First Eagle Investment Management Franklin Templeton Investment Management Freeman Spogoli Management Global Infrastructure Management, LLC Globespan Capital Management, Inc. HarborVest Partner HGK Asset Management, Inc. IFM Investors Advisor Income Research & Management Invesco Trust Company John Hancock Trust Company J.P. Morgan Investment Management, Inc. KBI Global Investors (North America Ltd.) Kopernik Global Investors Landmark Partners, LLC Leeds Equity Partner Lexington Partners, LP	 LLR Management LMCG Investments Lord, Abbett & Company Mesirow Financial Capital Partners X, LP Mesirow Financial Institutional Real Estate Prudential Real Estate Investors RhumbLine Advisers Ridgemont Equity Partners SEI Trust Company Siguler Guff Advisers, LLC Summit Partners, LP TA Realty THL Credit Advisors, LLC TimberVest, LLC Trilantic Capital Management L.P. Wellington Management Wellspring Capital Management, LLC
QUINCY • Custodian: People's United Bank • Consultant: Meketa Investment Group, Inc.	 Acadian Asset Management, LLC Adams Street Partners, LLC AEW Capital Management, LP Beach Point Capital Management, LP Brookfield Asset Management Brown Advisory, LLC Colony Realty Partners Columbia Management Investment Advisors, LLC Copper Rock Capital Partners, LLC Driehaus Capital Management, LLC Freeman Spogli Management Global Infrastructure Management 	 Goldman Sachs Asset Management, LP Hancock Timber Resource Group, Inc. HarborVest Partners IFM Investors Advisor J.P. Morgan Investment Management LLR Management Loomis, Sayles & Company Oppenheimer Alternative Investment Management PRIT RhumbLine Advisers 	 Ridgemont Equity Partners Rockwood Capital SL Capital Partners, LLP State Street Global Advisors Stone Harbor Investment Partners, LP TA Realty TerraCap Management, LLC Torchlight Investors, LLC Trilantic Capital Management L.P. UBS Realty Investors, LLC Wellspring Capital Management
READING • Custodian: Fiduciary Investment Advisors, LLC	• PRIT		
REVERE	• PRIT		
SALEM	Ascent Venture Partners	• PRIT	

RETIREMENT BOARD	INVESTMENT VENDORS				
SAUGUS Custodian: People's United Bank Consultant: Wainwright Investment Counsel, LLP	 Aristotle Capital Management, LLC Lord Abbett & Co., LLC LMCG Investment 	Massachusetts Financial Services Co.PRIT	RhumbLine AdvisersSEI Trust		
SHREWSBURY • Custodian: People's United Bank • Consultant: Dahab Associates, Inc.	Atlanta CapitalEarnest Partners	Fiera Capital Inc.	• PRIT		
SOMERVILLE • Custodian: Comerica Securities	Congress Asset Management Company, LLP Lazard Asset Management, LLC	Loomis, Sayles & Company PRIT	RhumbLine AdvisersUBS Realty Investors, LLC		
SOUTHBRIDGE	• PRIT				
SPRINGFIELD • Custodian: People's United Bank	Boston Millennia Partners	• PRIT			
STATE	• PRIT				
STONEHAM ➤ Custodian: SEI Private Trust Company ➤ Consultant: Fiduciary Investment Advisors, LLC	• PRIT	SEI Investments Management Corp.			
SWAMPSCOTT ► Custodian: People's United Bank ► Consultant: Dahab Associates	 Aristotle Capital Management, LLC Intercontinental Real Estate Corporation 	LMCG Investments, LLC North Sky Capital, LLC	• PRIT • TA Realty		
TAUNTON ➤ Custodian: People's United Bank ➤ Consultant: Dahab Associates, Inc.	 Aberdeen Asset Management BlackRock Investment Management, LLC Boston Millennia Partners Brandywine Global Investment Management, LLC Ceres Partners, LLC C.S. Mckee, LP Frontier Capital Management Co., LLC GAM International Management Limited 	 Glovista Investments, LLC Intercontinental Real Estate Corporation Invesco Core Real Estate USA, LP LMCG Investments, LLC Manulife Asset Management, LLC Molpus Woodlands Group, LLC Polen Capital Management, LLC PRIT 	 Quantitative Management Association Segall Bryant & Hamill State Street Global Advisors TimberVest, LLC Vontobel Asset Management, Inc. Weaver C. Barksdale & Associates Wells Capital Management, Inc. 		
WAKEFIELD	• PRIT				
WALTHAM ➤ Custodian: SEI Private Trust Company ➤ Consultant: Fiduciary Investment Advisors, LLC	Precision Capital Advisors, LLC	• PRIT	 RCP Advisors, LLC SEI Investments Management Corporation 		
 WATERTOWN Custodian: People's United Bank Consultant: Fiduciary Investment Advisors, LLC 	 Acadian Asset Management, LLC American Realty Advisors Arsenal Real Estate Funds, LLC Ascent Venture Partners Auda Private Equity, LLC Brandywine Global Investment Management, LLC Columbia Management Investment Advisors, LLC 	 Earnest Partners, LLC Eaton Vance Management Income Research & Management LMCG Investment Massachusetts Financial Services Company Pinebridge Investment, LLC 	 PRIT RCP Advisors, LLC SEI Trust Company TA Realty TerraCap Management, LLC Wellington Management Company, LLP 		
WEBSTER • Custodian: People's United Bank • Consultant: Wainwright Investment Counsel, LLC	 Aristotle Capital Management, LLC HGK Asset Management Inc. LMCG Investments 	Loomis, Sayles & Company PRIT	RhumbLine Advisers SEI Trust Company		
WELLESLEY	• PRIT				

RETIREMENT BOARD		INVESTMENT VENDORS	
WEST SPRINGFIELD • Custodian: Comerica	De Burlo Group, Inc.		
WESTFIELD ▶ Custodian: Fiduciary Investment Advisors, LLC	 Boston Company Asset Management, LLC Columbia Management Investment Advisers, LLC Constitution Capital Partners, LLC Fisher Investments Hamilton Lane Income Research & Management Intercontinental Real Estate Corporation 	 Lazard Asset Management, LLC LMCG Investments Long Wharf Real Estate Partners, LLC Loomis, Sayles & Company Polaris Capital Management, LLC PRIT 	 RBC Global Asset Management (U.S.), Inc. SEI Trust Company State Street Global Advisors TerraCap Management Wasatch Advisors, Inc. Wells Capital Management, Inc.
WEYMOUTH • Custodian: Comerica • Consultant: Fiduciary Investment Advisors, LLC	 Acadian Asset Management, LLC Adams Street Partners Amundi Pioneer Institutional Asset Mgmt., Inc. Ashmore Investment Advisors BlackRock Advisors, LLC Boston Company Asset Management, LLC Brandywine Global Investment Management, LLC Constitution Capital Partners, LLC 	 Harbor Capital Advisors Inc. HarbourVest Partners, LLC Invesco Private Capital, Inc. Landmark Partners, LLC Loomis, Sayles & Company OFI Global Institutional, Inc. Principal Global Investors LLC 	 PRIT RhumbLine Advisers Riverbridge Partners, LLC Sigular Guff Advisers, LLC Stockbridge Core and Value Advisors TerraCap Management, LLC Wasatch Advisors
WINCHESTER	• PRIT		
WINTHROP	• PRIT		
WOBURN • Custodian: People's United Bank • Consultant: Wainwright Investment Counsel, LLC	Charlesbank Capital Partners, LLC PRIT	Stafford Private Equity Inc.	Wilshire Associates, Inc.
WORCESTER ► Custodian: People's United Bank ► Consultant: Meketa Investment Group	 Acadian Asset Management, LLC AEW Capital Management, LP American Securities, LLC Ascent Venture Partners Boston Millenia Partners BTG Pactual Timberland Investment Group, LLC Capital International, Inc. Charlesbank Capital Partners, LLC Global Infrastructure Management, LLC 	 Hancock Natural Resource Group, Inc. Harvest Partners, LP IFM Investors (US) Advisor, LLC Income Research & Management Invesco Private Capital, Inc. Lazard Asset Management, LLC Lee Munder Capital Group, LLC Loomis, Sayles & Company Newstone Capital Partners, LLC 	 Northstar Company, LLC PRIT Ridgemont Equity Partners Riverside Company SL Capital Partners, LLP State Street Global Advisors TA Associates Management Vitruvian Partners, LLP White Deer Energy
WORCESTER REGIONAL	AEW Capital Management, LP Ascent Venture Partners	• PRIT	• SL Capital

PRIM INVESTMENT VENDORS (ORGANIZED BY SERVICE PROVIDER TYPE) **Custodian: Consultants:** BNY Mellon • NEPC, LLC - Asset Allocation Advisory Services • Aberdeen Asset Management - Portfolio Completion Strategies Advisory Services Callan Associates - Public Market Advisory Services NewAlpha Asset Management - Portfolio Completion Hamilton Lane - Private Equity Advisory Services Strategies Advisory Services • The Townsend Group - Real Estate Advisory Services DOMESTIC EQUITY MANAGERS · Acadian Asset Management, LLC · Frontier Capital Management · Riverbridge Partners Brandywine Global Investment Management · Goldman Sachs Investment Management · Summit Creek Advisors Driehaus Capital Management, LLC Lord, Abbett & Co., LLC State Street Global Advisors INTERNATIONAL EQUITY MANAGERS · Acadian Asset Management, LLC · LMCG Investment · State Street Global Advisors Strategic Global Advisors AQR Capital Marathon Asset Management Baillie Gifford · Mondrian Investment Partners Ltd. TimesSquare • Russell Implementation Services FIS Group, Inc. **EMERGING MARKET MANAGERS** · Acadian Asset Management, LLC · Driehaus Capital Management, LLC State Street Global Advisors AQR Capital T. Rowe Price Harding Loevner **Baillie Gifford** · Pzena Investment Management · Wasatch Advisors Inc. City of London Investment Management Co. **CORE FIXED INCOME MANAGERS** · Access Capital • Blackrock Financial Management, Inc. · Loomis, Sayles & Company · AFL-CIO Housing Investment Trust · Community Capital Management • Pacific Investment Management Co. (PIMCO) VALUE-ADDED CORE FIXED INCOME MANAGERS · 400 Capital Management • Eaton Vance Institutional Funds • Mudrick Capital Management, LP · Anchorage Capital, LLC · Fidelity Management Trust Company Pacific Investment Management Co. (PIMCO) · Ashmore Investment Management, Ltd. · LibreMax Capital • Shenkman Capital Management Voya Financial Berkshire Partners · Loomis, Sayles & Company ALTERNATIVE INVESTMENTS—REAL ESTATE MANAGERS · AEW Capital Management · CBRE Global Investors · Invesco Realty Advisors **Brookfield Investment Management** · CenterSquare Investment Management · LaSalle Investment Management DivcoWest · Canyon Johnson II · New Boston Urban Fund I · Carlyle Group Intercontinental IV Stockbridge ALTERNATIVE INVESTMENTS—TIMBERLAND Campbell Group, LLC · Forest Investment Associates ALTERNATIVE INVESTMENTS—PORTFOLIO COMPLETION STRATEGY MANAGERS • 400 Capital Management • Complus Asset Management Limited Mudrick Capital Management, LP · Advent Capital Management, LLC Contrarian Capital Management Mygale, LLP AgIS Capital, LLC · Davidson Kempner Advisors, Inc. • Pacific Alternative Asset Management Co. (PAAMCO) · Anchorage Capital, LLC · East Lodge Capital PGIM, Inc. · Arden Asset Management · Elliot Capital Advisors, LP · RV Capital Management Pvt., Ltd. Basswood Capital Management, LLC · Fir Tree Capital Management · Sightway Capital Blackrock Aviation · Global Sigma Group, LLC Silver Creek Advisory Partners, LLC Brigade Capital G.P., LLC • Goldman Sachs Asset Management Summit Partners Public Asset Management, LLC · Cantab Capital Partners, LP · Informed Portfolio Management Summit Ventures · Investcorp Investment Advisors, LLC · Canvas Capital · Tiber Capital, LLC · Capula Management Limited JEN Partners, LLC · Winton Capital Management · CKC Capital, LLC · Land and Buildings Investment Management CVC Capital

PRIM INVESTMENT VENDORS (Continued)

ALTERNATIVE INVESTMENTS—PRIVATE EQUITY AND DISTRESSED DEBT MANAGERS

ALILMMATIVE	IMENIO INIVAIL EQUIII AND DISINESS	LU DEDI MANAGENS
• Acon Investments	Ethos Private Equity	PAI Europe
Advent Capital Mgmt	Exponent Private Equity Partners	Permira Ventures
Advent International	First Reserve Corporation	Polaris Venture Partners
· Alchemy Partners	Flagship Ventures	Providence Equity Partners
Alta Communications	Freeman Spogli Equity Partners	Quad-C Management
American Securities Capital Partners	GENSTAR Capital	Quantum Energy Partners
Anchorage Capital, LLC	Gilde Buy Out Partner AG	Rembrandt Venture Partners
Angelo, Gordon & Co., LP	GSO Capital Partners	Rhone Group, LLC
APAX Partners & Co.	GTCR Golder Rauner	SAIF Partners
Apollo Management Co.	Hellman & Friedman Capital Partners	SCP Vitalife
Ascent Venture Partners	H.I.G. Capital Partners	Sherbrooke Capital
• Austin Ventures	Highland Capital Partners	Sofinnova Ventures, Inc.
Avenue Capital Group	Hony Capital	Spark Capital
Bain Capital	Index Ventures	Spectrum Equity
Battery Ventures	Insight Venture Partners	Summit Partners Public Asset Management, LLC
Berkshire Partners	Institutional Venture Partners	SV Life Sciences Advisors
Blackstone Capital Partners	InterWest Partners	TA Associates
Boston Ventures	Kainos Capital, LLC	Technology Crossover Ventures
Bridgepoint Capital Limited	Kelso & Company	Texas Pacific Group
Candover	Kepha Partners	The Gores Group
Carlyle Partners	Keytone Ventures	Thoma Bravo
Castille Ventures	Kohlberg Kravis Roberts and Co.	Thoma Cressey Partners
Catalyst Investors	KPS Capital Partners	Thomas H. Lee Equity Partners, LP
Centerbridge Capital	Landmark Equity Partners	Torquest Partners
Centerbridge Special Credit Partners	Lovell Minnick Partners	Towerbrook Capital Partners
Charlesbank Capital Partners	Madison Dearborn Capital Partners	Trident Capital
Charles River Ventures	M/C Venture Partners	Union Square Ventures
Charterhouse Group	Medicxi Ventures	VantagePoint Partners
Chequers	Menlo Ventures	Vestar Capital Partners
Code, Hennessey & Simmons	• Montagu	Vista Equity Partners
Commonwealth Capital Ventures	Montreux Equity Partners	Welsh, Carson, Anderson & Stowe
Crescent Capital Group	Nautic Partners	Weston Presidio Capital
Cypress Merchant Banking Partners	New Enterprise Associates	WestView Capital Partners
· CVC Capital	Nordic Capital	Whitney & Company
Denham Capital Management	Oaktree Capital Management	Willis Stein
DLJ Merchant Banking Partners	Odyssey Investment Partners	Xenon Private Equity, LTD
El Dorado Ventures	Olympus Advisors	• Trust Company of the West (TCW)
Equitable Capital Management Corporation	Onex Capital Partners	Wayzata Investment Partners

	OVERLAY MANAGERS (CASH)	
Ī		

• The Clifton Group

• Essex Woodlands Health Ventures

PERAC DIRECTORY | UNITS AND STAFF MEMBERS (AS OF 2019)

ADMINISTRATION				
John W. Parsons, Esq. Executive Director	Bill Keefe Assistant Deputy Director of	Kim Boisvert Senior Executive Assistant	Katie Bozzi Accounts Payable Specialist	Ellen Furtado Administrative Assistant
Caroline J. Carcia Deputy Executive Director of Administration	Research, Planning & Public Affairs	Virginia Barrows Chief Financial Manager	Tracey Legaski Administrative Assistant	Patricia Tanso Administrative Assistant
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James Lamenzo Actuarial Consultant				
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Scott Henderson Deputy Chief Auditor	Carol Poladian, CPA Auditor I	Richard Wrona, CPA Auditor I	Junior Yanga Auditor I	Ernie Calavritinos Auditor l
				Alice Munafo Auditor I
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FRAUD PREVENTION				
Sandra King Fraud Prevention Manager				
INFORMATION SYSTEM	AS			
Dan Boyle Director of Information Systems	K-Lone Steele Senior Systems Engineer	Irina M. Boukina Senior Programmer/Analyst	Charles Hoyt Senior Programmer/Analyst	Robert Perez Senior Systems Engineer
Anthony Tse Project Manager				
INVESTMENT/COMPLI	ANCE			
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LEGAL				
Judith Corrigan General Counsel	Kenneth Hill Senior Associate General	Patrick Charles Senior Associate General Counsel	Katie Brady Associate General Counsel	Doreen Duane Executive Assistant

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COMMONWEALTH OF MASSACHUSETTS PUBLIC EMPLOYEE RETIREMENT ADMINISTRATION COMMISSION

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TTY 617-591-8917 • WEB www.mass.gov/perac



