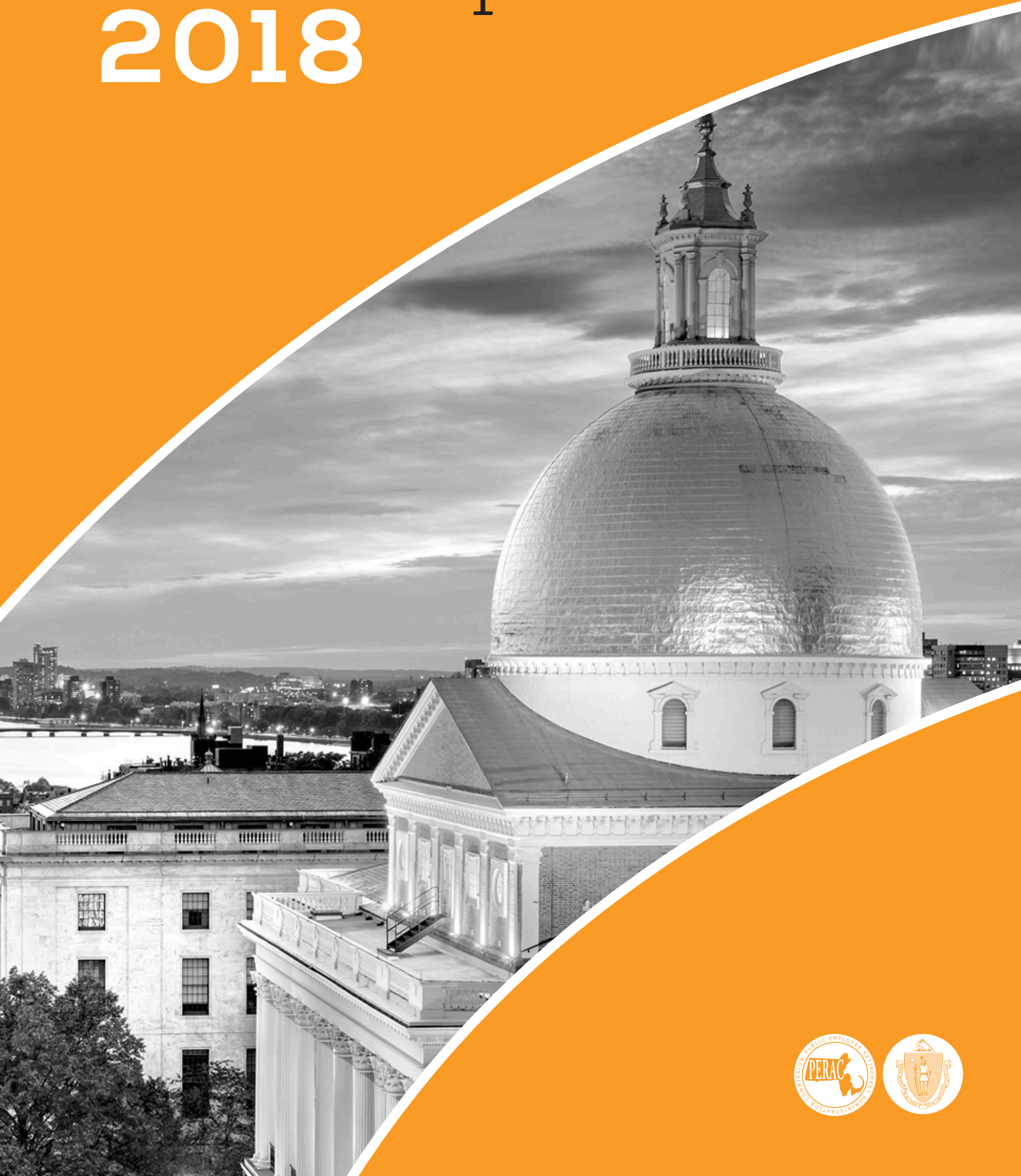


# Annual Report 2018



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# Commission Members



**Chairman**

**Philip Y. Brown, Esq.**

**Vice Chair**

**The Honorable Suzanne M. Bump**  
Auditor of the Commonwealth







**Kathleen M. Fallon**

Practice 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 of the Professional  
Fire Fighters of Massachusetts



**Jennifer F. Sullivan**

Undersecretary, Executive Office for  
Administration & Finance





# Mission Statement

The Public Employee Retirement Administration Commission (PERAC) was created for and is dedicated to the oversight, guidance, monitoring, and regulation of the Massachusetts Public Pension Systems. The professional, prudent, and efficient administration of these systems is the public trust of PERAC and each of the 104 public pension systems for the mutual benefit of the public employees, public employers, and citizens of Massachusetts. The stewardship of the Trust Funds for the sole purpose of providing the benefits guaranteed to the public employees qualifying under the plans is the fulfillment of the obligation of the people of the Commonwealth to those who have dedicated their professional careers to the service of the people of the Commonwealth. ■

# Dedication

As will be noted below, since our last Annual Report the Public Employee Retirement Administration Commission and, by extension, the Massachusetts public pension community, has experienced a year of remarkable transition. Two of the pillars of our pension system, **Joe Connarton** and **Jim Lamenzo**, have retired from their positions as PERAC Executive Director and Actuary respectively. In recognition of Joe and Jim's years of exemplary service, we at PERAC are proud to dedicate this Annual Report to them. Both played key roles in the development of PERAC and, most importantly, in assuring that various reform measures adopted during their tenure helped rather than harmed system members and their beneficiaries. Joe, whose dedicated and compassionate public service

spanned fifty years, stabilized the Commission after its first Executive Director abruptly resigned.

The pension arena may not seem as critical to the general public as other aspects of government, however, it is a lifeline for the public workforce and represents a solemn promise to those who provide important services that cannot otherwise be provided. Through the efforts of Joe Connarton and Jim Lamenzo, that promise has been made more secure in spite of public controversies, market crashes, and increased skepticism. Joe and Jim came into their roles in challenging times fraught with threats to the very existence of our defined benefit plan. Our plan has emerged stronger and in better fiscal health due to their leadership, steadiness, and intellect.

**And for that, we are all grateful.**



**Joe Connarton**

As Executive Director, Joe's intelligence, sobriety, and good humor enabled disparate and sometimes opposing viewpoints expressed by various Commissioners to be debated and considered thoughtfully and without rancor. As anyone who has been an observer of the pension scene over the last few decades can attest, that task was not a simple one. Joe carried it off with sensitivity and openness, corralling union and management members until a consensus was reached.



**Jim Lamenzo**

Jim is largely responsible for the fiscal stability of our retirement systems. His steady approach to actuarial analysis and pension funding enabled the systems to curtail overreaching when times were good and, most importantly, to restrain drastic action when times were bad. Jim worked with policy makers to gauge the overall fiscal impact of potential actions, but also cautioned those policy makers about the personal financial impact such actions might have on members and their beneficiaries.





## Letter From Chairman Philip Y. Brown

**“The Public Employee Retirement Administration Commission is pleased to release this 2018 Annual Report reviewing the status of Massachusetts’ public pension plans. The last year has seen major changes in the composition of the PERAC administration.”**

**A**fter decades of public service, most of which were devoted to the retirement system, Executive Director Joseph Connarton retired. His accomplishments and character are detailed elsewhere in this Report, but let me state that Joe’s tenure at PERAC represented the very best of service to the members and their beneficiaries, to the retirement community, and to the taxpayers of the Commonwealth and its cities and towns. Joe’s service is an exemplar to all.

Joining Joe in retirement is Actuary James Lamenzo. Jim’s service to the Commonwealth is incalculable. Working in tandem, Joe and Jim preserved the defined benefit plan on which so many rely for their post retirement sustenance. Jim’s measured approach to financial issues has been invaluable. The dedication of this Report to Joe and Jim bears testament to the high regard in which they are held by Commission members past and present, by colleagues, and by those involved with public pensions.

Although the process for filling these vacated positions was an arduous one, the Commission is confident that John Parsons will serve as PERAC’s new Executive Director with distinction. The Commission is confident that not only will he maintain the excellent record of past years, but that he will build upon that record to achieve future success. In addition, PERAC Deputy General Counsel and Managing Attorney Judith Corrigan was selected as PERAC General Counsel. Judith is one of the foremost Chapter 32 experts in the state and she will continue her role in shaping and implementing PERAC legal policy while taking on additional duties as General Counsel. Finally, John Boorack is an

experienced and knowledgeable successor to Jim as Actuary. John will assure continuity in the Actuarial Unit while making his own mark and the Commission is pleased that he has taken over this role.

Two Commissioners deserve congratulations as well. PERAC Commissioner Jennifer Sullivan was appointed Undersecretary for the Executive Office for Administration and Finance. Since February 2015 she had served as Assistant Secretary for Capital Finance. Congratulations to Jennifer on this well-deserved promotion.

I am also pleased to congratulate Commission member Kate Fitzpatrick on being a finalist for the inaugural “Leadership Trailblazer Award” from the League of Women in Government and National Research Center, in recognition of her as an accomplished leader in the local government profession who has championed and inspired other women to achieve as well.

The investment performance of the systems detailed in this Report generally tracked that of pension plans throughout the nation. Nationally, most systems’ year-end performance was adversely impacted by the substantial market downturn in December 2018. Although in 2018, Massachusetts’ returns ranged from negative 6.90% to a positive 4.95%, most systems achieved returns between negative 1.50% and negative 3.50%. Most importantly, long-range performance for nearly all systems exceeded 7.50% and, for 26 systems, equaled or exceeded 9.00%. Additionally, we are pleased to note that no system has been deemed to be “underperforming” as defined in Chapter 32.

The 2018 performance underscores the fact that the state of the capital markets in general largely determines the gains or losses realized by the retirement boards. This is a reflection of the professional manner in which these funds are invested. Retirement board members, through education, experience, and dedication, have adopted and put into practice the principles of modern investment management either directly or through investing in the Pension Reserves Investment Trust Fund (PRIT). It is clear that although our retirement systems face many challenges, this record of prudent management has served the interests of system members and taxpayers very well.

Over the course of my tenure as PERAC Chairman it has become increasingly clear to me that the role of the Actuary is crucial to the operation of our pensions systems. For that reason, I was heartened by the recent Actuarial Roundtable held at PERAC. This periodic meeting of the actuaries serving the Massachusetts retirement boards is an informal forum where current issues are discussed, trends reviewed, and ideas exchanged. A centerpiece of this year's discussion was the investment return assumption used in connection with actuarial valuations of a retirement system's funding status. The gathering concurred with the wisdom of PERAC reducing the return assumption for the Commonwealth valuation from 7.35% to 7.25%. This was a heartening vote of confidence for the Commission's efforts to reduce expectations in an orderly fashion. Beyond that topic, the Actuaries also reviewed mortality assumptions and agreed that all actuarial valuations performed in 2019 will include an analysis and discussion of various measures of plan risk. We believe that this cooperative effort between PERAC and actuarial service providers has strengthened the fiscal condition of our pension systems and laid the groundwork for future funding progress.

As Chairman of PERAC, it is with deep satisfaction that we have been able to fully implement the provisions of Chapter 176, which, at one point, were so controversial that some retirement board members considered resigning. Today, matters

that caused so much angst, such as filing Statements of Financial Interest, fulfilling educational requirements, and complying with procurement rules, are routine. Although the patient and considered process of enforcing the law is a role of PERAC, it must be noted that, after an initial period of concern, retirement board members and administrators have done their part in ensuring that the statute is followed.

In last year's report, I noted that the PROSPER System had been up and running for over a year and that the initial implementation of all phases had been completed. Since that time, we have continued to install minor adjustments to improve PROSPER's reliability, functionality, and ease of use. In some ways this will be an ongoing effort as PERAC's Units, retirement board members and administrators, and other users work with and through the system. To date, however, PROSPER has been a significant success. From disability applications to registration for educational sessions, tasks that at one time were time consuming and tedious have become streamlined and simple. PERAC has recognized that this new technology represents an unfamiliar challenge to some and, as a result, we have expanded our educational focus on PROSPER and maintained our Help Desk.

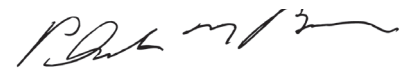
We continue to expand our educational activities by holding sessions for board administrators across the state. These marked the second year of the program and, in light of the attendance and enthusiasm that has greeted us, we intend on making this an annual part of our educational agenda. Beyond this, our educational efforts for retirement board members has maintained its pace. Now that our educational program has matured, retirement board members are benefiting from the review of a variety of relevant topics in forums scheduled in convenient locations across the state. We are most excited about our recent expansion of web based and online offerings, which has made meeting the statutory requirements less burdensome for those seeking to meet their mandated requirements.

The Commission has published this Report each year in the hope that it will provide an easy to use reference for those interested in the public pension systems in Massachusetts. Although this data merely introduces the reader to the status of each of the 104 retirement systems, we believe that the fiscal condition, investment practices, and administration of those systems is accurately portrayed. Most importantly, we believe that the condition of the public pension system at large, as well as that of individual retirement systems, is placed into context by this information.

PERAC's Annual Report details the impact of market bubbles, fiscal crises, and statutory reforms. These years have been marked by one constant, the commitment of those charged with managing the retirement system for the benefit of members and beneficiaries. In the face of challenges to the very existence of our defined benefit plan, the individual members and administrators of the retirement boards have persevered and earned the thanks of system members and beneficiaries.

On a personal note, I am so grateful and appreciative to be able to serve the Commission as Chairman. We have many challenges before us, some are familiar and some cannot be anticipated, but building on the record of achievement detailed in these pages, and through continued vigilance, we will meet those challenges and ensure that our pension system is there to meet the current and future needs of members and their beneficiaries.

Sincerely,



Philip Y. Brown  
Chairman





## Letter From the Executive Director

**“Investment returns in 2018 did not achieve the lofty levels of previous years. As must be expected, capital market performance fluctuates and is influenced by many diverse factors.”**

**T**he Commission and staff are pleased to release this Annual Report on the Massachusetts Public Retirement Systems for 2018. Retirement Board investment performance suffered from general market conditions but shared the same fate as most other investors. This experience supports the actions taken by the Commission in gradually reducing the investment return assumptions used in conducting actuarial valuations of the systems. 2018 also brought dramatic changes to the administration of PERAC as the long-time Executive Director, Joe Connarton, announced his retirement. Not only the public pension community, but public employees and their beneficiaries as well as taxpayers, owe thanks to Joe for his steady stewardship and clear-eyed leadership. PERAC's Mission Statement defines the “professional, prudent, and efficient administration” of the retirement systems as the Commission's “public trust”. That trust was epitomized by Joe's years of dedicated service.

Investment returns in 2018 did not achieve the lofty levels of previous years. As must be expected, capital market performance fluctuates and is influenced by many diverse factors. That performance in large part determines the return for our retirement systems. In light of that fact, PERAC has led the way in the detailed analysis of investment return projections and the application of those projections to the Massachusetts public pension plans. The steady trend of tempering expectations by lowering the investment assumption has positioned our system well for the present and future market environment. 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, 52 plans use an assumption under 7.50%; 102 use an assumption less than 8.00%; and only 2 use an assumption of 8.00%. No plan uses an assumption

greater than 8.00%. PERAC's evolutionary approach to addressing the investment return assumption has assured that funding progress continues while moderating the fiscal impact of pension costs on state and municipal budgets.

### Commission/Staff Update

Most of you are aware that 2018-2019 has been a period of transition at PERAC. Executive Director Joseph Connarton, Actuary James Lamenzo, Senior Investment Analyst Victoria Marcorelle and Director of Strategic Management/Legislative Affairs Michael DeVito all retired.

Following my appointment as Executive Director, I conducted a review of PERAC's organizational structure. That review has led to some modifications in job duties as well as Unit management. These changes reflect a determination that after over twenty years of existence some adjustments were necessary, and seek to maximize our administrative experience.

Caroline Garcia has been appointed as Deputy Executive Director of Administration. In many ways, this simply recognizes the role Caroline has played at PERAC for many years. Joseph Martin's position has been reclassified as Deputy Executive Director for Policy. In that role, Joe's oversight will expand to include several PERAC Units in addition to those that have been his responsibility. Judith Corrigan has been appointed to the position of General Counsel, filling the position vacated with my appointment as Executive Director. She will manage all aspects of PERAC's Legal Unit. Patrick Charles has been promoted to Senior Associate General Counsel. In addition to his legal duties Patrick is now PERAC's liaison to the Legislature.

In the Actuarial Unit, John Boorack has assumed the position of Actuary in the wake of the retirement of Jim Lamenzo. As you know, John has been a senior member of PERAC's Actuarial team for 20 years, and is a worthy successor to Jim.

Other organizational changes included the designation of Cheryl Johnson as Compliance/Investment Data Coordinator. Cheryl, in addition to her Compliance Unit assignments, will work with the Investment Unit in calculating the annual investment performance of the retirement systems.

A vacant position in the Audit Unit was filled with the hiring of Karen Casper. Karen previously worked at Crown Castle Fiber LLC as a Tax Analyst. Sarita Yee filled an open position in the Investment Unit as a Senior Investment Analyst. Sarita has extensive experience, having worked at Brown Brothers Harriman initially as a Supervisor of the Client Service Group and most recently as the Team Leader of that Group.

## Auditing

At its meetings of March 13, 2019 and April 10, 2019, the Commission discussed and ultimately approved a new and more efficient approach to the auditing of retirement systems by PERAC. The basis of that new approach is a risk-based model designed to fulfill the Commission's audit obligations in a timely, efficient and comprehensive manner. Each retirement system will be assessed and rated based on objective criteria to determine the areas of emphasis for an upcoming audit. In addition, the new approach will focus on working with private auditors who have conducted a review of systems to eliminate duplication and enhance focus.

In short, the risk-based approach will (1), target high risk areas; (2), avoid duplication with private audit work; and (3), produce more timely and substantive reports. The methodology will assess the following categories:

1. **Independent Audits** – Did the Board have an independent audit in each of the relevant years? If so, what were the issues/findings, if any?
2. **Stability/Staff Changes** – Length of tenure of the Administrator, staff, and Board. Has there been turnover in key positions during the audit period?
3. **Prior PERAC Audits** – What were the results of the previous audit, taking into account the number and significance of the issues found?
4. **Annual Statement Reviews** – What were the results of the PERAC review of the system's Annual Statement for each year of the audit period? Were the Annual Statements submitted timely or were extensions granted?
5. **Other PERAC Units** – Have activities/issues pertaining to the system been of concern to other PERAC Units?
6. **Management of Investments** – How is the Board managing its investments? Does the Board retain a consultant and multiple managers? Are assets invested partially or totally with PRIT? Did a prior audit finding pertain to investment activities?

Based on this analysis, the scope of the audit plan for the system will be developed.

## Litigation Matters

A CRAB decision issued in July 2018, *O'Leary v. Lexington Retirement Board and PERAC*, CR-15-30 ("O'Leary"), rejected PERAC Memorandum #39 of 2012, regarding "Regular Compensation Status of Payments Made in Lieu of Taking Vacation Leave." Both PERAC and the member involved, Joseph O'Leary, have filed appeals of the CRAB decision in Suffolk Superior Court, so the CRAB decision is not final. As a result, PERAC initially instructed retirement boards to continue to evaluate all existing vacation buyback plans pursuant to Memorandum #39 which outlined steps that a retirement board should take to determine if payments of unused vacation time could be includable in a member's regular compensation. Memorandum #39 utilized the new definition of regular compensation as inserted into Chapter 32 by Chapter 21 of the Acts of 2009. Focusing on that definition, the memorandum explained how a retirement board should analyze the regular compensation status of such a payment, focusing on the term "other base compensation" and whether this type of payment would have resulted in a service to the employer. CRAB has now explicitly rejected this approach.



Mr. O'Leary was a police officer in Lexington who had availed himself of a vacation buyback program. The Lexington Retirement Board declined to consider whether those payments were regular compensation. CRAB has now found that this sort of payment can never be regular compensation because, in its view, such payments are not base compensation, are not payments for a service to the employer, are not "pre-determined and non-discretionary," and are in the nature of a salary augmentation plan and overtime.

If CRAB's decision in O'Leary is ultimately upheld, it will mean that any payments made to a member in lieu of that member taking vacation leave should not be considered regular compensation, and that any payments made in lieu of vacation time would not be included in a member's retirement allowance. If these appeals are not successful, it is possible, depending upon the wording of the ultimate decision, that all payments made pursuant to such a buyback program would be excised from regular compensation retroactively, any deductions paid by the member returned to him/her, and any retirement allowances granted with the inclusion of such time would be recalculated.

Boards are reminded that payments for unused sick time have never been considered regular compensation, as memorialized in the recent CRAB decision of *Fair v. Middlesex County Retirement Board*, CR15-294 (2016).

In light of the consequences of immediate implementation of this decision and the implications of taking action relative to retroactive application of its directives, PERAC filed an Emergency Motion for Stay with CRAB, arguing that the potential for disruptive changes during the pendency of the appeal necessitated a stay of enforcement. Following its review of PERAC's Emergency Motion for Stay and the Lexington Retirement Board's opposition to PERAC's motion, CRAB issued an Order of Partial Stay dated November 6, 2018. In the Order, CRAB stated:

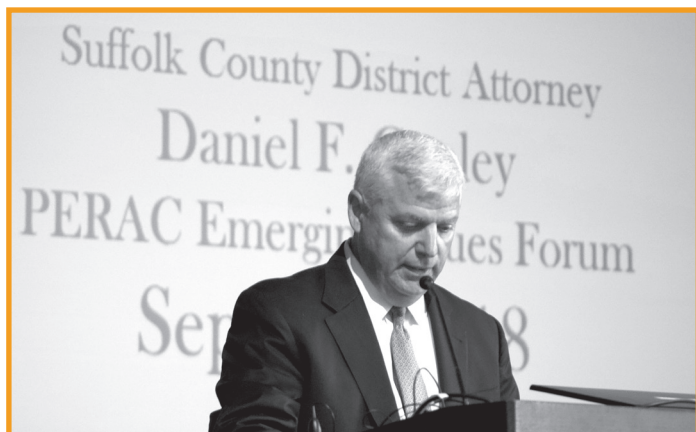
**“We consider the potential for disruptive administrative changes during the pendency of judicial review to be a serious matter. PERAC and the retirement boards rely on clear rules so that they may properly and expeditiously administer the collection of contributions and the payment of benefits in the correct amounts. Thus, to the extent that our decision may require correction of past actions by retirement systems, we agree that such correction may await the completion of judicial review. As to future actions, however, we consider it wiser to require retirement systems to comply with our decision, so as to avoid a compounding of errors.”**

Accordingly, pursuant to our authority under G.L. c. 30A, § 14(3), we issued a partial stay of enforcement of our decision in this matter, pending the completion of judicial review, and subject to any further order by the Superior Court or appellate court, as follows:

- 1. Retired Members.** Enforcement of our decision shall be stayed insofar as it would require recalculation of retirement benefits currently being paid to retired members, or refunding of past retirement contributions made by retired members. As to retirees, the status quo may remain in effect pending completion of judicial review.
- 2. Active Members.** Enforcement of our decision shall be stayed only insofar as it would require refunding of retirement contributions previously made by active members prior to retirement. No stay shall be in effect as to retirement contributions to be made in the future by active members. Going forward, no retirement contributions shall be collected on unused vacation pay.
- 3. Pre-Retirement Inactive Members.** Enforcement of our decision shall be stayed pending the completion of judicial review, insofar as it would require refunding of retirement contributions previously made by members inactive, prior to their retirement.
- 4. Future Retirees.** No stay shall be in effect as to the calculation of benefits to be paid to persons retiring in the future. Calculation of benefits to future retirees shall not include unused vacation pay, and any retirement contributions made on unused vacation pay shall be returned at the time of retirement.
- 5. Petitioner-Appellant.** No stay shall be in effect as to the Petitioner-Appellant Joseph O'Leary. O'Leary's retirement benefits have been calculated without the inclusion of unused vacation pay, and that calculation shall remain in place pending appeal.
- 6. Timing of Stay.** This stay shall be in effect until the completion of judicial review, unless modified by a court of competent jurisdiction.

## Emerging Issues Forum

PERAC held its Fourteenth Emerging Issues Forum at the College of the Holy Cross in September, 2018. Over 240 people participated and board members attending received three educational credits. In the keynote address, former Suffolk County District Attorney Dan Conley reflected on the changes to Boston's crime landscape during his fourteen years of service in that position. His perspective provided attendees with a thoughtful and informative review of that history as well as a summary of present challenges in the criminal justice area.



**Suffolk County District Attorney Daniel F. Conley was the keynote speaker at PERAC's 14th Emerging Issues Forum**

Larry Stone of Stone Consulting, Kathy Riley of Segal, and PERAC Actuary Jim Lamenzo, opened the proceedings with a presentation on Risk. Jim noted that actuarial best practices require that a review of the level of the various risks associated with pension management be part of actuarial valuations. These risks include obvious ones, such as the likelihood that the investment return assumption will not be met, to more subtle risks such as the possibility that the plan sponsor will not make the appropriations demanded by the funding schedule. Each panelist provided insight into the nature of these risks, how boards can assess that risk, and the impact of risk on funding.

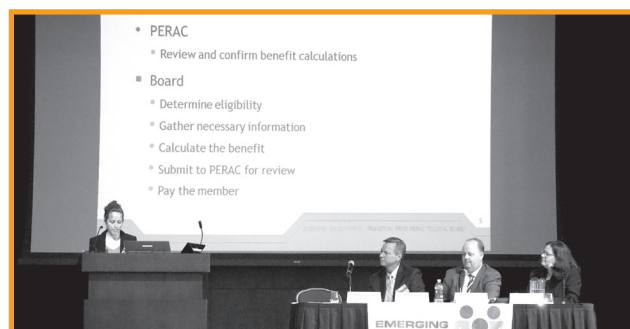


**Jim Lamenzo leads the Risk panel with Larry Stone and Kathy Riley at the Emerging Issues Forum.**

Attendees also heard a lively discussion of the Government Pension Offset (GPO) and the Windfall Elimination Provision (WEP), two provisions of federal law that impair the ability of public retirees to receive the full benefit of Social Security. Sean Neilon of the Teachers' Retirement System and Shawn Duhamel of the Mass Retirees gave an update on the efforts of those organizations to attain legislative relief at the federal level, while Steve Richardson of the Social Security Administration, detailed the background and history that led to the adoption of GPO and WEP.

O'Neill & Associates' Senior Vice President Andy Paven and Vice President Suzanne Morse presented "Communications Crash Course." Attendees were introduced to approaches on how to deal with the media and how to make sure that your message gets across.

A centerpiece of the Forum once again was the Retirement System Best Practices panel. The Panel featured four executive directors who delved into the nuts and bolts of running a retirement system. Kaitlyn Doucette, Director of the Methuen Retirement System, who had been employed previously at PERAC as an Actuarial Analyst, reflected on the differences between working for the regulator and then working for an entity regulated by her previous employer. Chuck Kostro, of the Essex Regional Retirement System, presented on how to use the administrative budget as a communications tool to increase transparency and gain public trust. Timothy Smyth, of the Boston Retirement System, discussed the Public Records Law as recently amended and suggested strategies for better compliance. Wrapping up, Lynn Whynot, Director of the Wellesley Retirement System focused on the need for attention to small details when running a local system. She provided several approaches that can be replicated throughout the systems to improve efficiency and reduce risk.



**Retirement System Best Practices segment of Emerging Issues, featuring Kaitlyn Doucette, Chuck Kostro, Tim Smyth, and Lynn Whynot**

A highlight of the program was the presentation by PERAC Chairman Phil Brown to Executive Director Joe Connarton commemorating his pending retirement.



## Legislation

On the legislative front, 2019 saw the adoption of legislation recommended by the Commission that addressed the application of the statutory education mandates in cases where a board member is unable to fulfill that requirement due to hardship. Chapter 439 of the Acts of 2018, "An Act Providing For Continuing Education Credits Flexibility," amended Chapter 32, Section 20(7) to enable a retirement board member to petition PERAC for a waiver of training restrictions due to extenuating circumstances. The Commission has implemented the statute and issued "An Application for a Waiver of Education Restrictions." Such circumstances must be unexpected, beyond the board member's control, and have a significant impact on the ability to complete the educational requirements. The Application for Waiver Form accompanied PERAC Memo #15-2019.

## Cash Book Submissions

840 CMR 4.00 establishes methods of accounting for retirement boards. PERAC has created the email address **percashbooks@per.state.ma.us** for the submission of monthly Cash Books. It is hoped that this formal submission process will create a more efficient method for the receipt and analysis of Cash Books.

Board members and Administrators are once again reminded that a complete Cash Book package must be provided to PERAC on a monthly basis. Each month, the Board Administrator must prepare a packet which consists of the items described below.

- ▶ Year-to-Date Trial Balance (TB)
- ▶ Monthly Cash Receipts (CR)
- ▶ Monthly Cash Disbursements (CD)
- ▶ Monthly Adjusting Journal Entries (AJE)
- ▶ Monthly General Ledger (GL)

Monthly Cash Books are due at PERAC within four (4) weeks of the close of the month.

Accounting standards require that transactions be accurately identified and properly classified. The parties to whom payments are made, or from whom payments are received, must be identified and all transactions must be classified in the proper account.

Consistent with the need to maintain accurate recordkeeping by retirement boards, several accounting procedures revisions came into effect in calendar year 2018. These include accounting for fees paid in conjunction with investment activity, as well as the tracking of "carried interest," "catch up payments," and "ancillary expenses" related to private equity, hedge fund, real estate, and similar investment vehicles.

## Education

PERAC continued its successful education program for retirement board members in 2018. This was the seventh year of the program and included courses on "Smoothing, Spiking and Other Actuarial Mysteries," the popular "Chapter 32 in a Nutshell," "PROSPER Update," and "Non-Investment Related Procurement."

We were particularly excited by the initiation of courses offered through webinar. This enables attendees to participate from their computer rather than traveling to a specific location. We are hoping to expand these opportunities in the years ahead.

Expanding our program of one day Board Administrator Trainings, in 2018 sessions were held in Northampton, Framingham, and Norwood. Sessions were very well attended. Members of the Actuarial, Compliance, 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," and "Special Legislation." Each day of training concluded with the awarding of certificates to all attendees. Board members who attended received three educational credits.

We are finalizing plans for similar events to be held prior to the end of this year.

## Conclusion

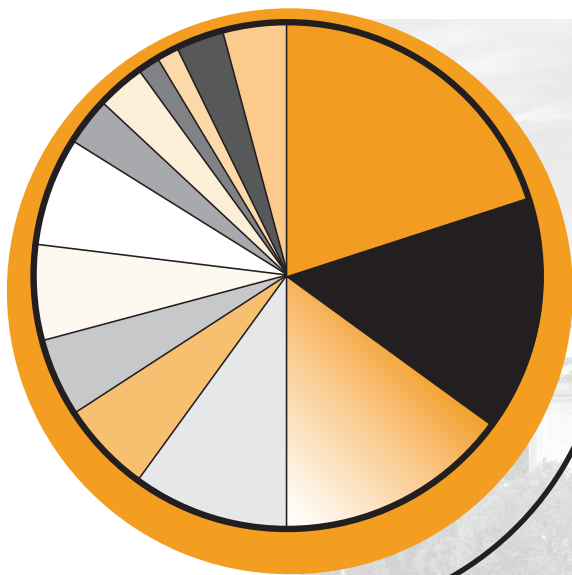
This year has been a year of transition at PERAC, a year of steady stewardship at the retirement boards, and a year of fiscal challenge for those responsible for funding pension costs. However, the steps taken to adjust investment assumptions, modernize the interaction between PERAC and the Boards, and to engage and inform decision makers about pension issues ensure that the future of our defined benefit plan will be bright.

With that record in mind, I would like to express my personal gratitude to retired Executive Director Joe Connarton for his leadership of PERAC as well as the example he has set for me as I assume my new duties. Joe is not one to seek or accept accolades, but it is not an exaggeration to say that the condition of the retirement systems and the ability of those systems to provide for retirees and beneficiaries have been greatly enhanced by his dedicated service.

Sincerely,



John W. Parsons, Esq.  
Executive Director



## Massachusetts Contributory Retirement Board Profiles

**“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.”**

### Introduction

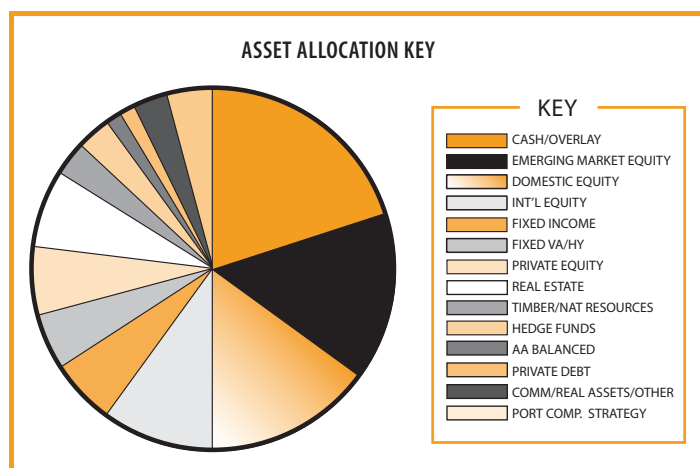
The Board Profile section of the PERAC Annual Report provides a detailed assessment of some of the important indicators relative to the financial health of the retirement systems. The information provided in this report can enable board members to provide factual comment and advice to policymakers as 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:



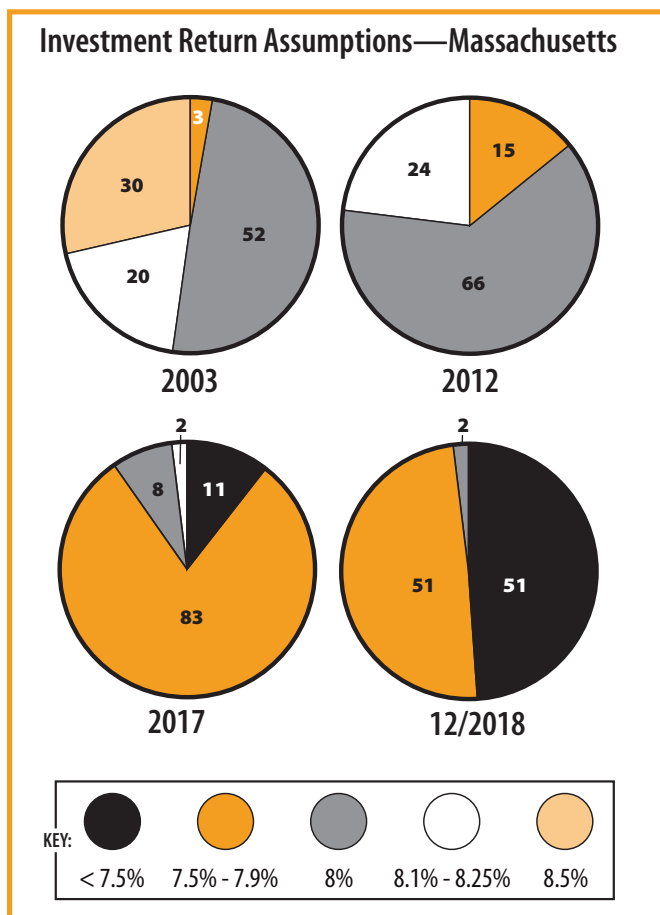
**DISCLAIMER:** In publishing this information PERAC makes no comment regarding any retirement board's asset allocation, investment strategy, or manager/fund commitments.

## Actuarial

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 63 revised funding schedules and completed 19 actuarial valuations in 2018. The valuations complemented the 44 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:



## Legal Unit

PERAC's Legal Unit, in addition to representing the Commission at all levels, including the Supreme Judicial Court, issued 169 Legal Opinions and reviewed 629 disabilities in 2018.

### Medical Panels/Post-Retirement Earnings

In addition, to the information detailed in the Profiles, PERAC, as always, has been busy assisting the boards in other areas. In 2018, 641 medical panel requests were processed and 1312 in-house case reviews were conducted. This led to the approval of 616 disability applications and 9 accidental death claims.

PERAC is responsible for the post-retirement monitoring of disabled retirees. One aspect of that task is enforcing the earnings limits set forth in Chapter 32. In 2018, PERAC analyzed 12,773 earnings reports, 3,557 retirees reported earnings and 62 earned

**“In 2018, PERAC analyzed 12,773 earnings reports, 3,557 retirees reported earnings and 62 earned in excess of the statutory limits. This resulted in the identification of \$933,422 in excess earnings and \$1,572,729 for non-compliance.”**

in excess of the statutory limits. An additional 73 retirees failed to comply with the reporting requirement. This resulted in the identification of \$933,422 in excess earnings and \$1,572,729 for non-compliance. In addition, 21 retirees waived their allowance, saving \$352,691.

No members' retirement benefits were modified under the Commission's Modification Policy in 2018. This review to date has resulted in the modification of 15 member retirement allowances. Savings due to that action total \$299,967 annually.

## Audits

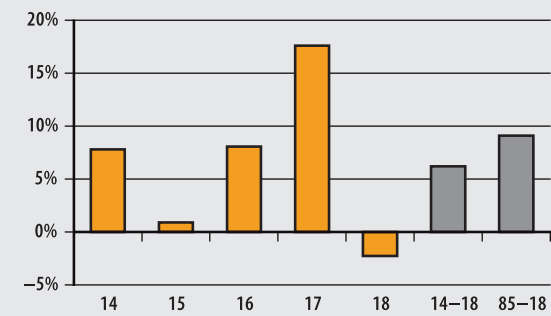
In 2018, PERAC published 20 audits of retirement systems. In addition, 14 follow-up audits were issued. As always, PERAC audit staff conducted annual seminars on the preparation of the Annual Statement, and provided technical assistance to dozens of boards.



COMPOSITE INVESTMENT PROFILE

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

INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



INVESTMENT

▶ 2018 Return	-2.25%
▶ 2018 Market Value	\$83.2 B
▶ 2014-2018 (Annualized)	6.22%
▶ 1985-2018 (Annualized)	9.00%

## 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,  
Allen Mendel\*, George Haddad,  
Beth Matson  
\*indicates Chairperson

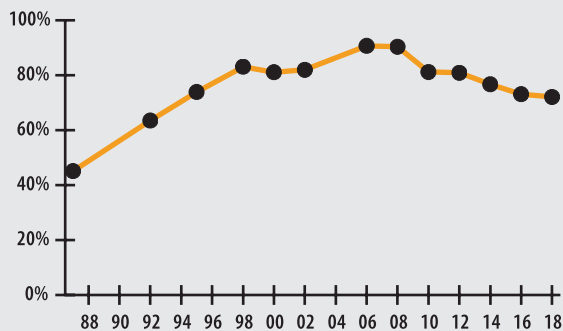
### Board Administrator

Cheryl DeMarsico

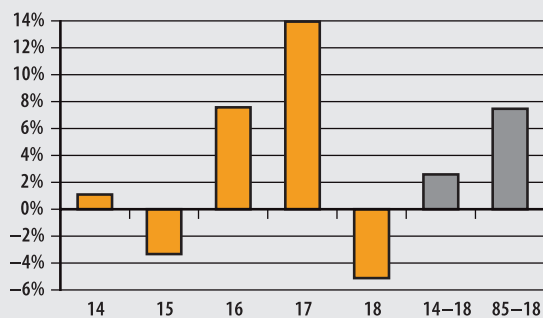
### Board Meeting

Fourth Monday of the month at 4:00 pm

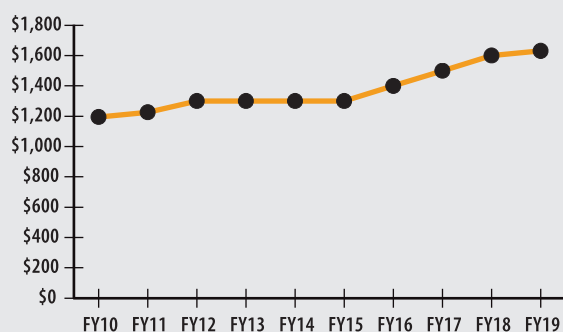
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

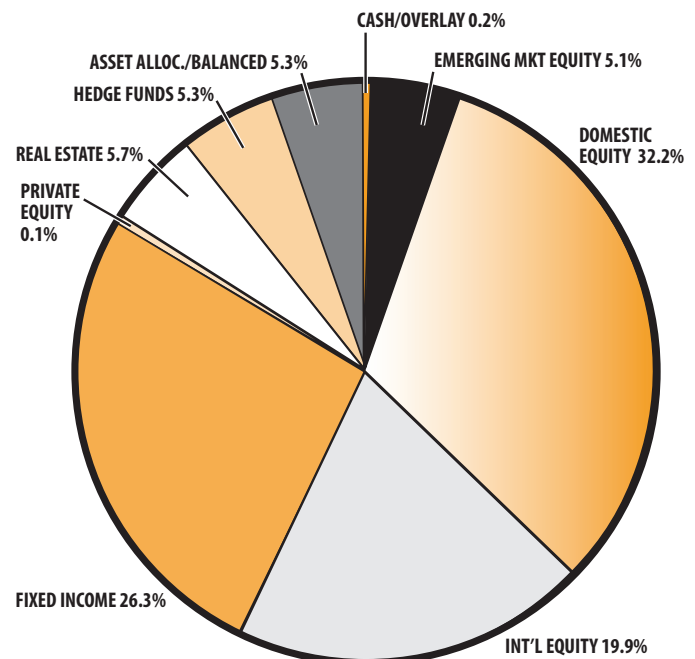
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
7.47%	7.87%	7.69%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
6.56%	4.53%	3.96%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
2.60%	6.86%	5.94%

## 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 2019)	\$1.6 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	6
▶ Number Who Reported Earnings	2
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-5.10%
▶ 2018 Market Value	\$32.4 M
▶ 2014-2018 (Annualized)	2.60%
▶ 1985-2018 (Annualized)	7.47%

## Amesbury

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

### Board Members

James Lynch, Michael Cronin,  
Bonnijo Kitchin, Donna Cornoni\*,  
David Van Dam  
\*indicates Chairperson

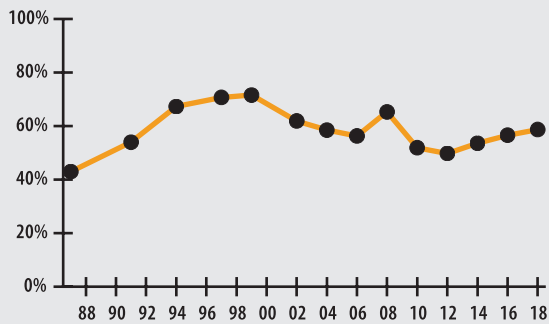
### Board Administrator

Kevin Caira

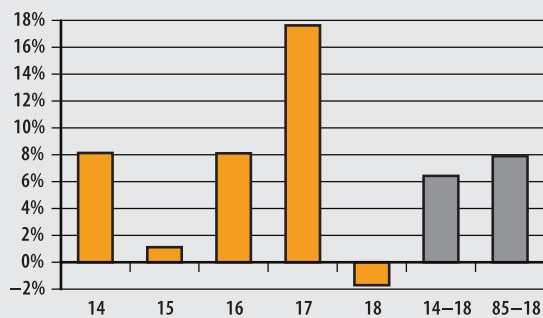
### Board Meeting

Last Thursday of the month at 1:30 pm

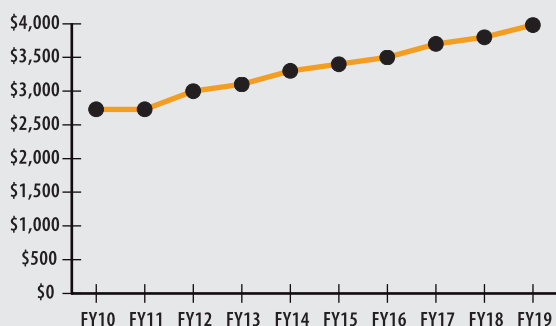
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

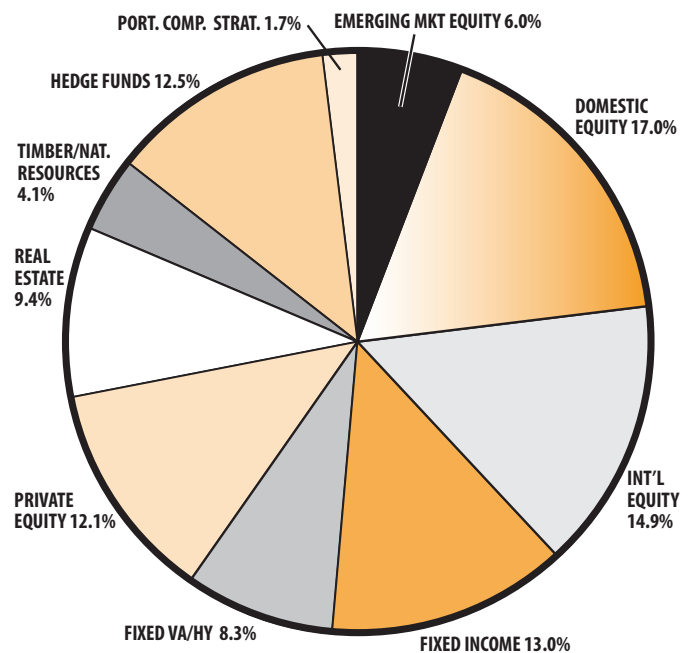
<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.90%	8.20%	7.92%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.12%	5.63%	4.84%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.45%	9.85%	9.14%

## 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 2019)	\$4.0 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	10
▶ Number Who Reported Earnings	5
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.70%
▶ 2018 Market Value	\$55.1 M
▶ 2014-2018 (Annualized)	6.45%
▶ 1985-2018 (Annualized)	7.90%



## 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

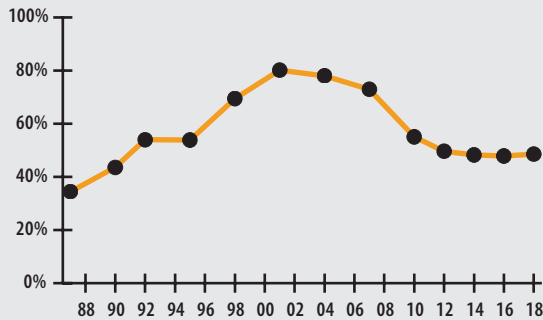
### Board Administrator

Elena Kothman

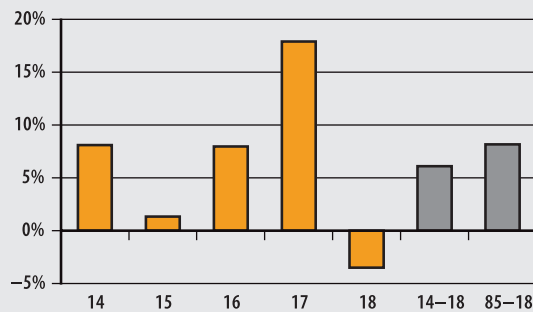
### Board Meeting

Fourth Thursday of each month at 8:00 am

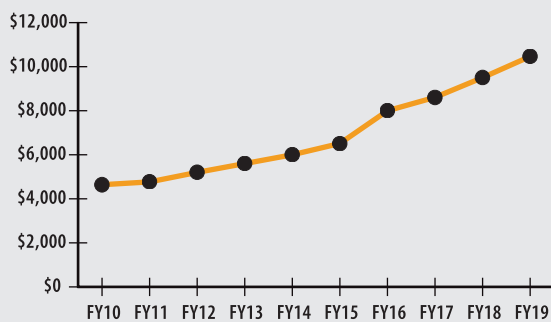
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

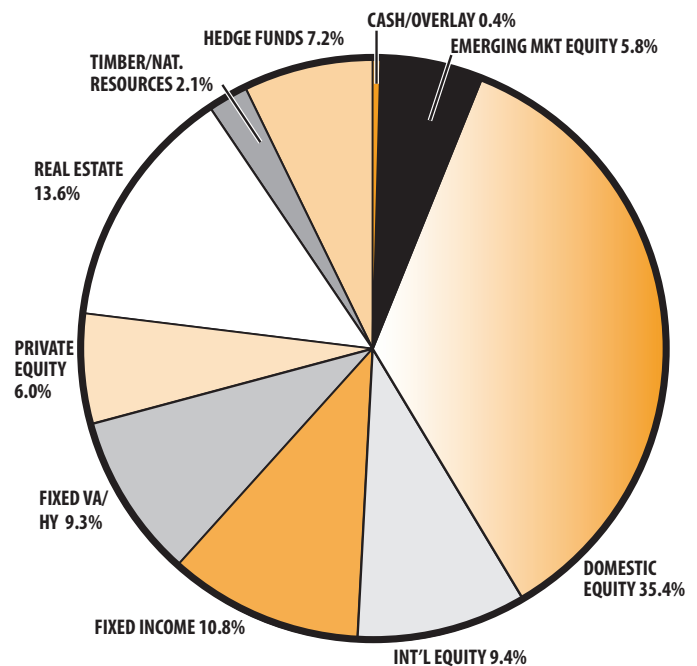
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.18%	8.56%	8.28%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.01%	5.66%	4.46%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.13%	9.97%	9.19%

## 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 2019)	\$10.5 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	33
▶ Number Who Reported Earnings	10
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-3.49%
▶ 2018 Market Value	\$137.5 M
▶ 2014-2018 (Annualized)	6.13%
▶ 1985-2018 (Annualized)	8.18%

## Arlington

27 Maple Street  
Suite G-11  
Arlington, MA 02476  
Phone 781-316-3370  
Fax 781-316-3379

### Board Members

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

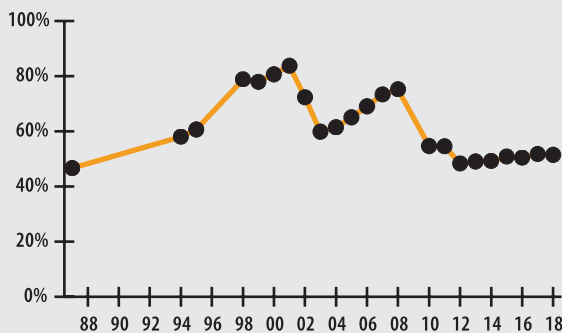
### Board Administrator

Richard Greco

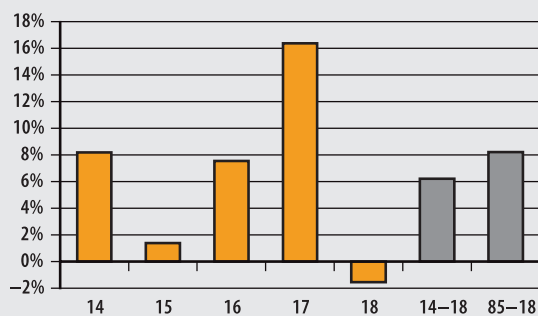
### Board Meeting

Last Thursday of the month at 4:30 pm

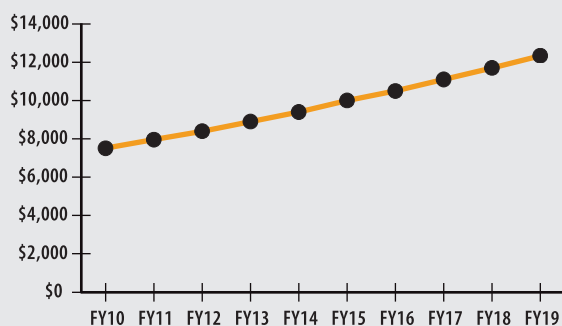
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

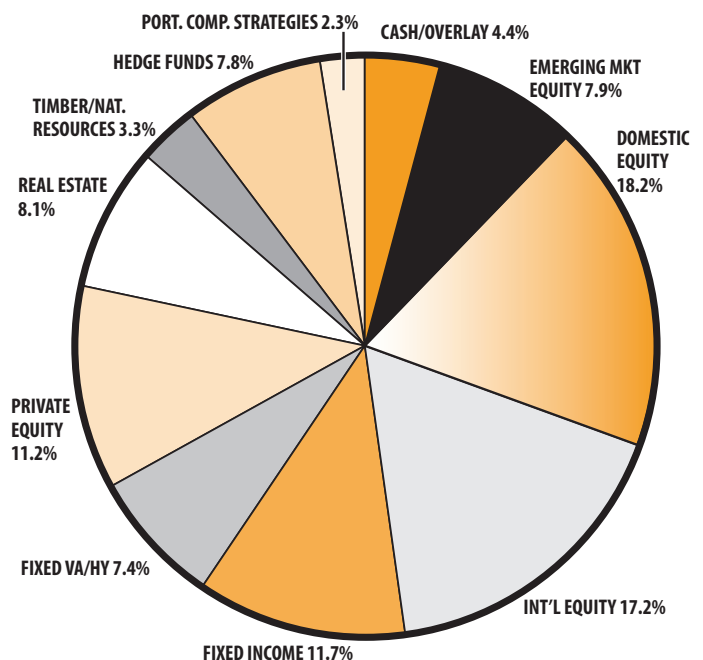
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.22%	8.53%	8.29%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.70%	4.90%	3.80%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.22%	9.53%	8.86%

## ACTUARIAL

▶ Funded Ratio	51.5%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Stone
▶ Assumed Rate of Return	7.00%
▶ Funding Schedule	5.5% Total Increasing
▶ Year Fully Funded	2035
▶ Unfunded Liability	\$142.7 M
▶ Total Pension Appropriation (Fiscal 2019)	\$12.3 M

	ACTIVE	RETIRED
▶ Number of Members	735	601
▶ Total Payroll/Benefit	\$38.2 M	\$17.8 M
▶ Average Salary/Benefit	\$52,000	\$29,500
▶ Average Age	47	75
▶ Average Service	10.5 years	NA

## ASSET ALLOCATION (12/31/18)

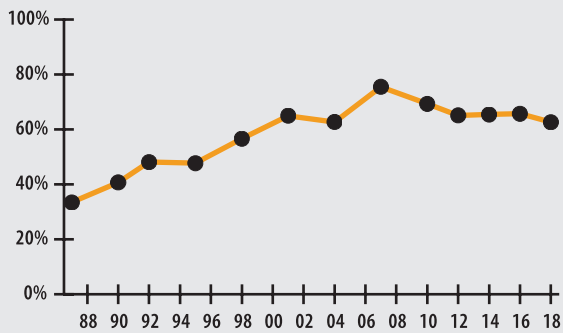


## EARNED INCOME OF DISABILITY RETIREES (2017)

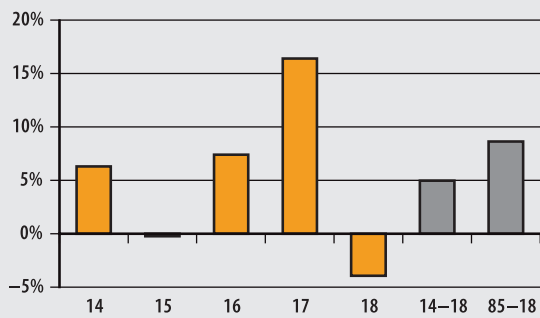
▶ Number of Disability Retirees	75
▶ Number Who Reported Earnings	18
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.53%
▶ 2018 Market Value	\$152.5 M
▶ 2014-2018 (Annualized)	6.22%
▶ 1985-2018 (Annualized)	8.22%

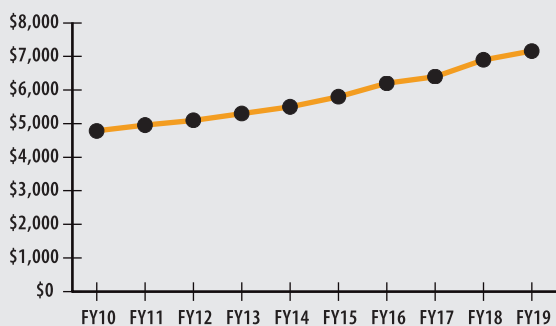
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



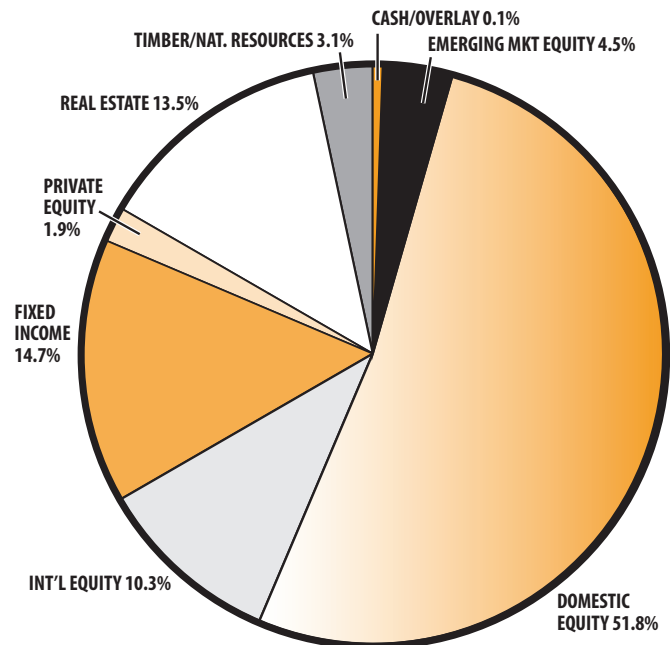
### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.64%	9.04%	8.82%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.44%	6.40%	5.64%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
4.99%	9.88%	9.40%

### 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 2019)		\$7.2 M
	<b>ACTIVE</b>	<b>RETIRED</b>
► 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 (12/31/18)



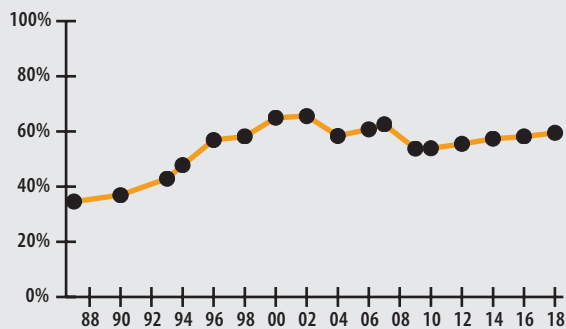
### EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	43
▶ Number Who Reported Earnings	10
▶ Number of Excess Earners	2
▶ Total Amount of Refund Due	\$24,247.34

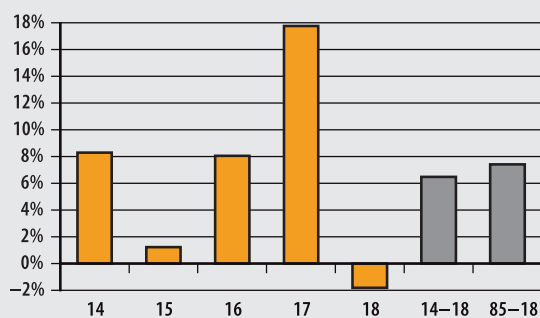
▶ 2018 Return	-3.83%
▶ 2018 Market Value	\$139.1 M
▶ 2014-2018 (Annualized)	4.99%
▶ 1985-2018 (Annualized)	8.64%



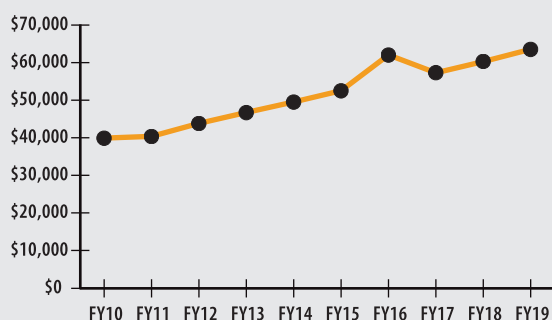
#### FUNDED RATIO (1987-2018)



#### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



#### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



#### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.42%	7.71%	7.41%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.11%	5.61%	4.82%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.50%	9.96%	9.23%

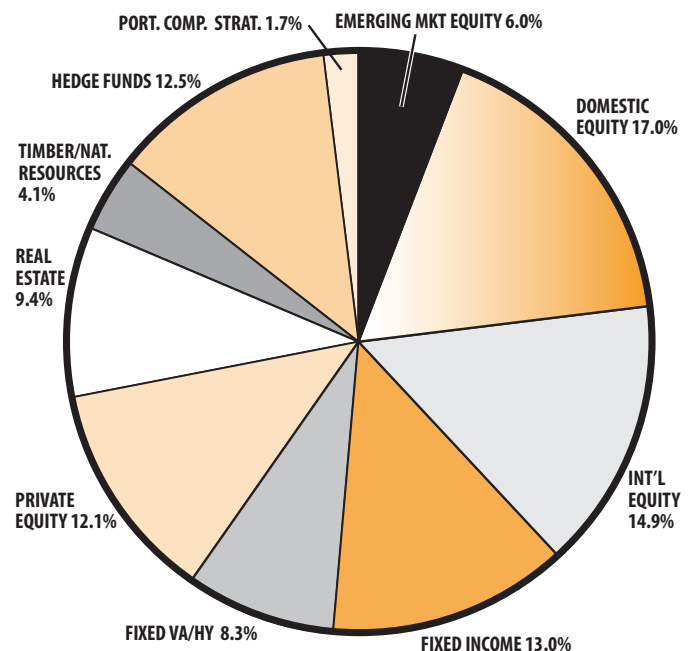
#### ACTUARIAL

▶ Funded Ratio	59.5%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Segal
▶ Assumed Rate of Return	7.38%
▶ Funding Schedule	5.28% Total Increasing
▶ Year Fully Funded	2035
▶ Unfunded Liability	\$722.4 M
▶ Total Pension Appropriation (Fiscal 2019)	\$63.5 M

	ACTIVE	RETIRED
▶ Number of Members	4,633	3,117
▶ Total Payroll/Benefit	\$271.5 M	\$85.8 M
▶ Average Salary/Benefit	\$58,600	\$27,500
▶ Average Age	48	71
▶ Average Service	12 years	NA

#### ASSET ALLOCATION (12/31/18)



#### EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	343
▶ Number Who Reported Earnings	124
▶ Number of Excess Earners	2
▶ Total Amount of Refund Due	\$27,786.30

▶ 2018 Return	-1.81%
▶ 2018 Market Value	\$1.1 B
▶ 2014-2018 (Annualized)	6.50%
▶ 1985-2018 (Annualized)	7.42%

## 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

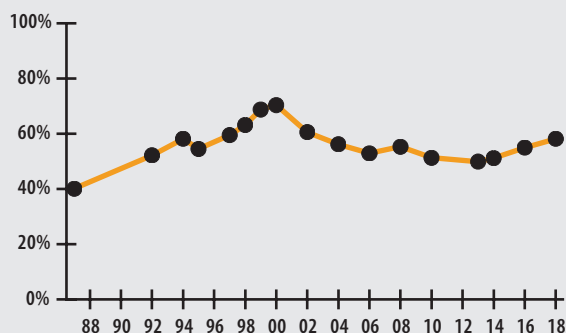
### Board Administrator

Robert Soohoo

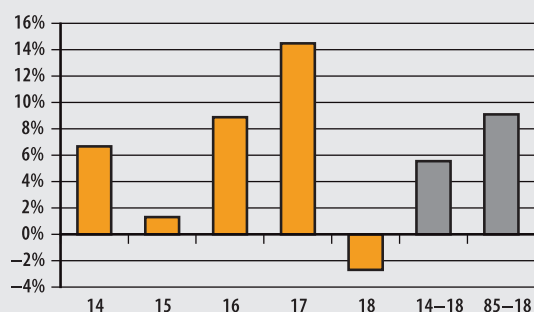
### Board Meeting

Usually Third or Fourth Monday  
of the month at 8:15 am

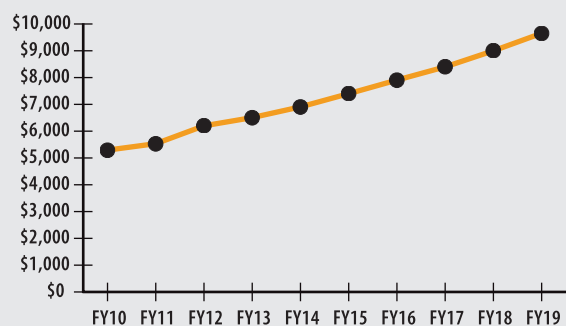
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

#### 34 years 2018

9.11%

#### 33 years 2017

9.49%

#### 32 years 2016

9.34%

#### 10 years 2018

9.83%

#### 10 years 2017

7.35%

#### 10 years 2016

6.99%

#### 5 years 2018

5.57%

#### 5 years 2017

9.55%

#### 5 years 2016

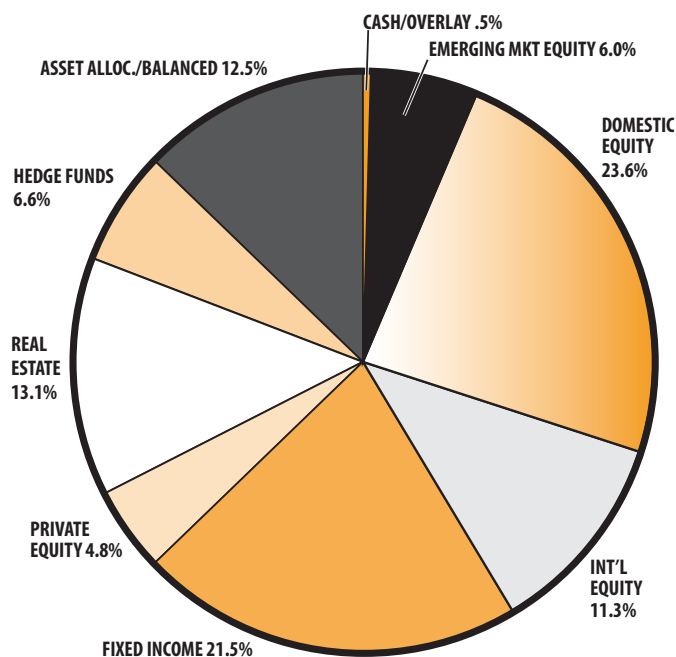
9.27%

## 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 2019)	\$9.6 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 (12/31/18)

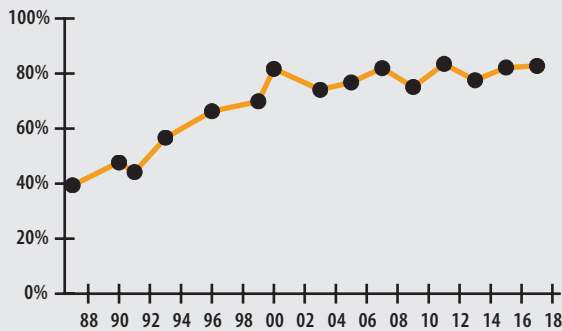


## EARNED INCOME OF DISABILITY RETIREES (2017)

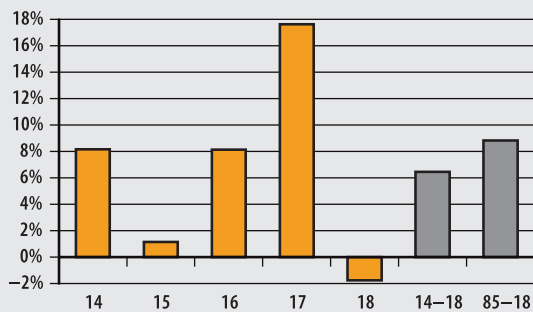
▶ Number of Disability Retirees	37
▶ Number Who Reported Earnings	13
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-2.69%
▶ 2018 Market Value	\$101.3 M
▶ 2014-2018 (Annualized)	5.57%
▶ 1985-2018 (Annualized)	9.11%

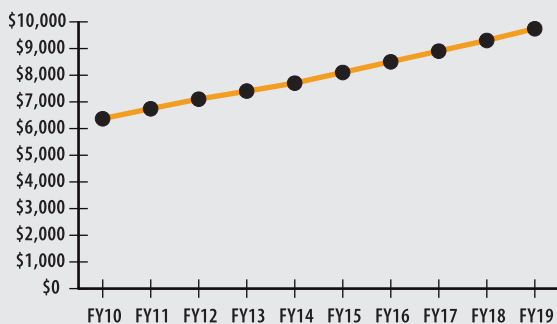
**FUNDED RATIO (1987-2018)**



**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**



**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**



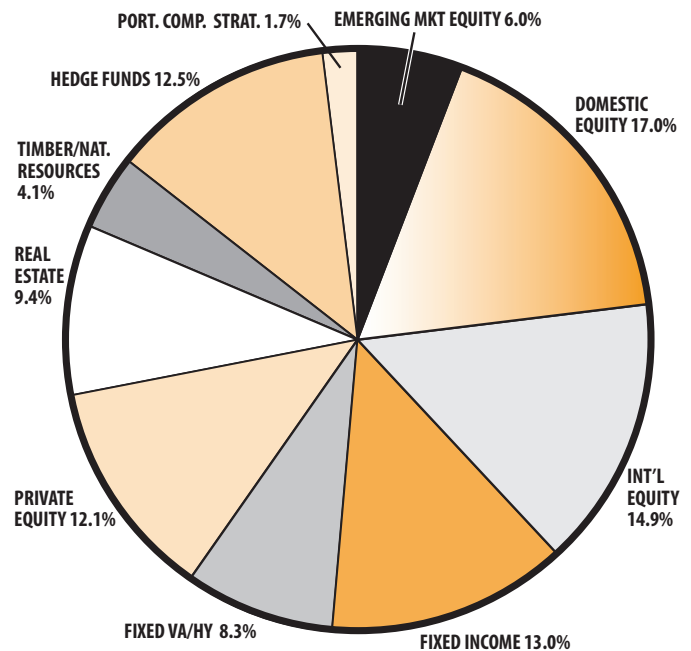
**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.84%	9.18%	8.92%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.12%	5.62%	5.10%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.47%	9.89%	9.13%

**ACTUARIAL**

▶ Funded Ratio		82.8%
▶ Date of Last Valuation		1/1/17
▶ Actuary		PERAC
▶ Assumed Rate of Return		7.25%
▶ Funding Schedule		4.7% Total Increasing
▶ Year Fully Funded		2028
▶ Unfunded Liability		\$44.5 M
▶ Total Pension Appropriation (Fiscal 2019)		\$9.7 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	1,142	778
▶ Total Payroll/Benefit	\$43.7 M	\$13.3 M
▶ Average Salary/Benefit	\$38,300	\$17,100
▶ Average Age	50	74
▶ Average Service	11.2 years	NA

**ASSET ALLOCATION (12/31/18)**



**EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	23
▶ Number Who Reported Earnings	5
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.75%
▶ 2018 Market Value	\$236.1 M
▶ 2014-2018 (Annualized)	6.47%
▶ 1985-2018 (Annualized)	8.84%



## Beverly

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

### Board Members

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

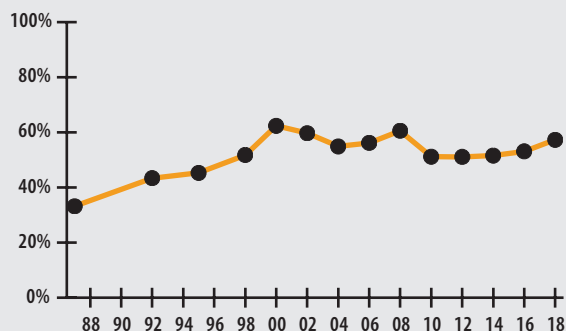
### Board Administrator

Barbara Wells

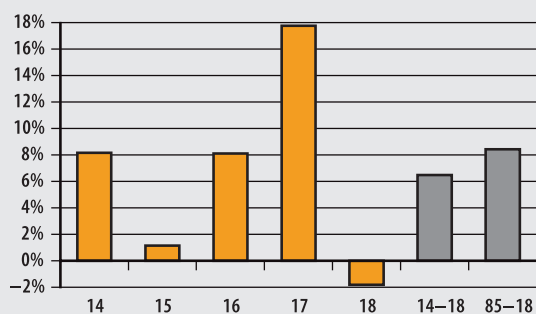
### Board Meeting

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

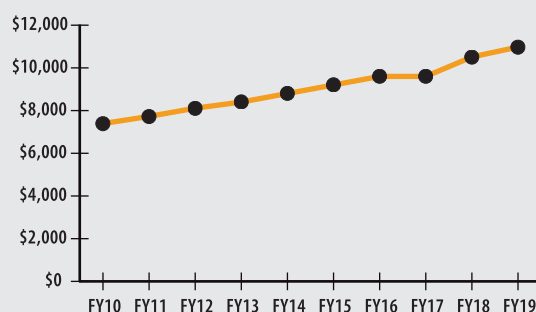
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

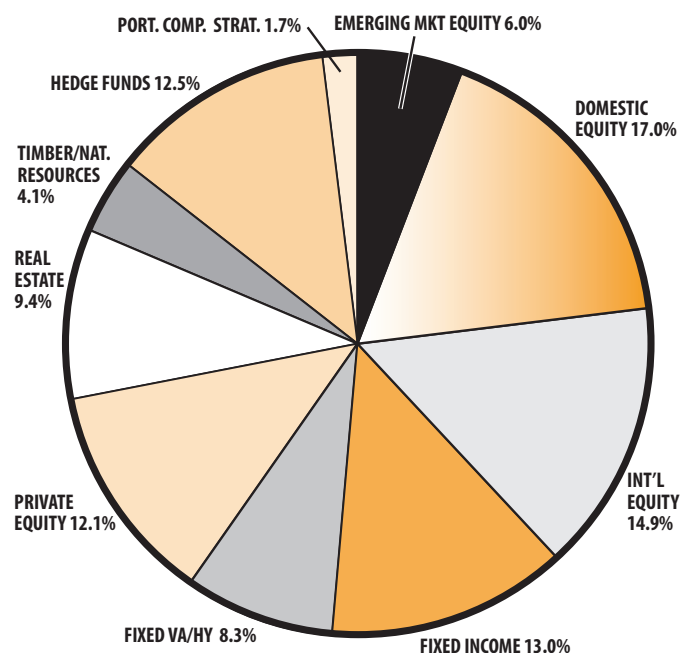
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.44%	8.76%	8.49%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.26%	5.71%	4.92%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.48%	9.98%	9.34%

## ACTUARIAL

▶ Funded Ratio	57.3%
▶ Date of Last Valuation	1/1/18
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.35%
▶ Funding Schedule	4.45% Total Increasing
▶ Year Fully Funded	2033
▶ Unfunded Liability	\$91.7 M
▶ Total Pension Appropriation (Fiscal 2019)	\$11.0 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 (12/31/18)

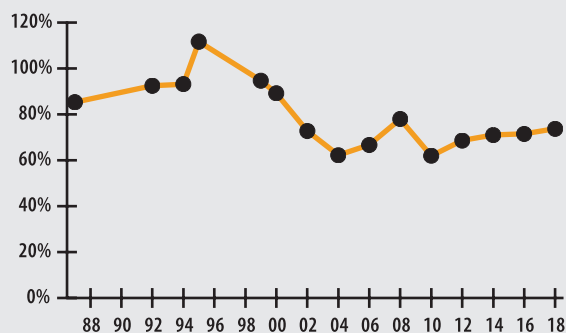


## EARNED INCOME OF DISABILITY RETIREES (2017)

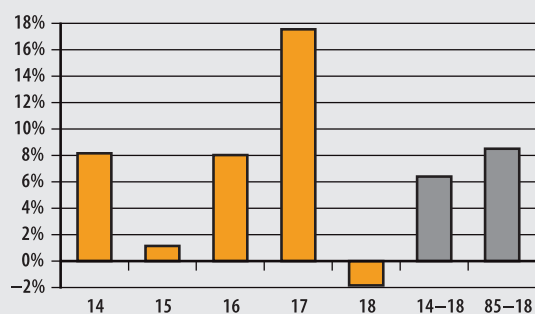
▶ Number of Disability Retirees	44
▶ Number Who Reported Earnings	13
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.79%
▶ 2018 Market Value	\$121.5 M
▶ 2014-2018 (Annualized)	6.48%
▶ 1985-2018 (Annualized)	8.44%

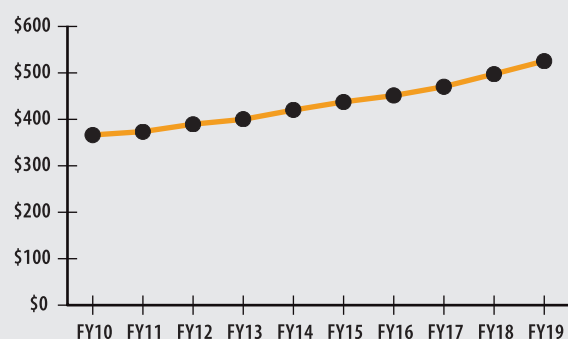
#### FUNDED RATIO (1987-2018)



#### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



#### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



#### INVESTMENT RETURN HISTORY

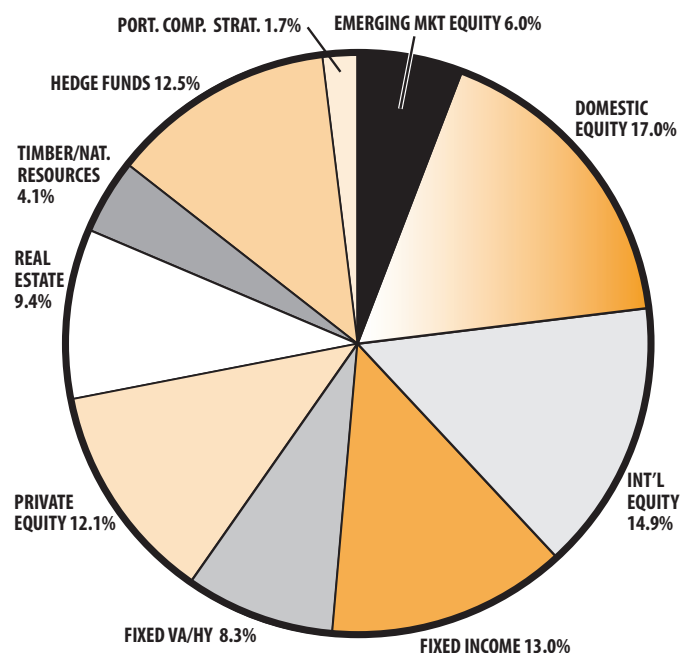
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.52%	8.85%	8.59%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.11%	5.74%	5.22%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.41%	9.87%	9.11%

#### ACTUARIAL

▶ Funded Ratio	73.7%
▶ Date of Last Valuation	1/1/18
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.35%
▶ Funding Schedule	7.1% Total Increasing
▶ Year Fully Funded	2032
▶ Unfunded Liability	\$3.9 M
▶ Total Pension Appropriation (Fiscal 2019)	\$525 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 (12/31/18)



#### EARNED INCOME OF DISABILITY RETIREES (2017)

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

▶ 2018 Return	-1.84%
▶ 2018 Market Value	\$10.9 M
▶ 2014-2018 (Annualized)	6.41%
▶ 1985-2018 (Annualized)	8.52%

## Boston (City)

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

### Board Members

Sally Glora, Daniel Greene\*,  
Michael McLaughlin, Michael O'Reilly,  
Thomas Jackson  
\*indicates Chairperson

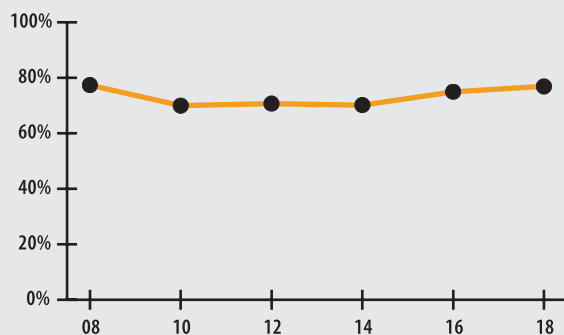
### Board Administrator

Timothy Smyth

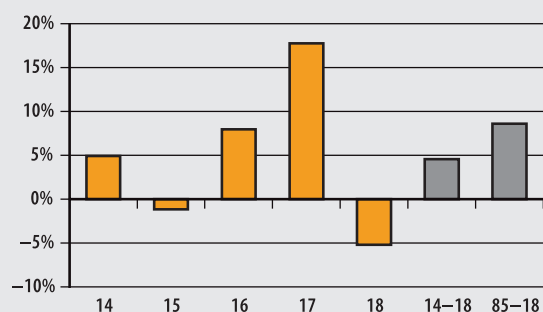
### Board Meeting

Third Wednesday of every month  
at 10:00 am

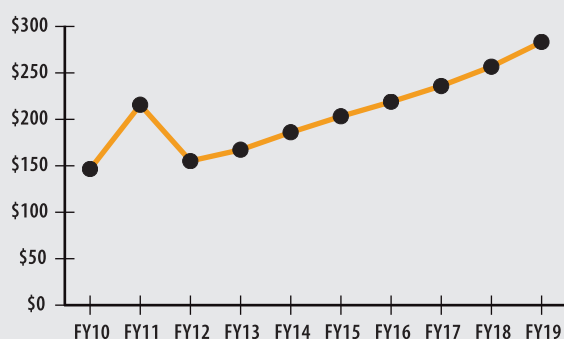
### FUNDED RATIO (2008-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.61%	9.06%	8.79%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.36%	5.97%	5.28%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
4.57%	8.75%	7.86%

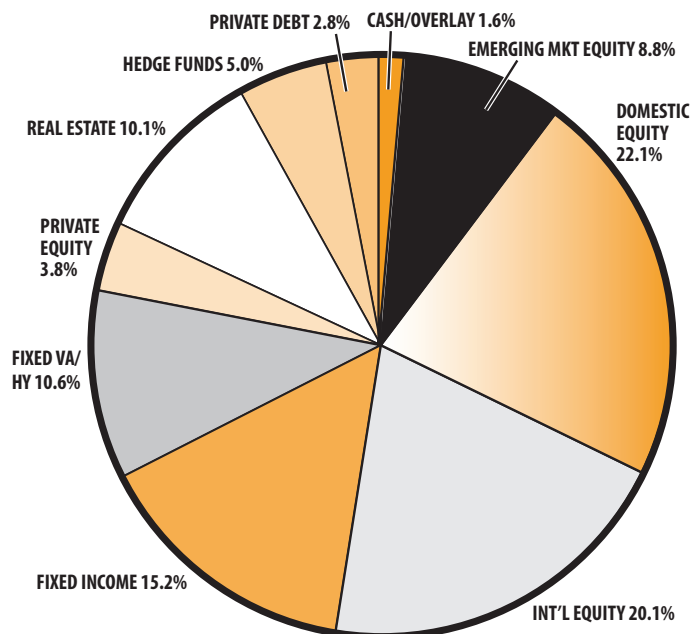
SEE NOTES - NEXT PAGE FOR BOSTON (CITY) & BOSTON TEACHERS

## 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 2019)	\$283.2 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	1532
▶ Number Who Reported Earnings	307
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-5.20%
▶ 2018 Market Value	\$4.8 B
▶ 2014-2018 (Annualized)	4.57%
▶ 1985-2018 (Annualized)	8.61%

## Boston Teachers

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

### Board Members

Sally Glora, Daniel Greene\*,  
Michael McLaughlin, Michael O'Reilly,  
Thomas Jackson  
\*indicates Chairperson

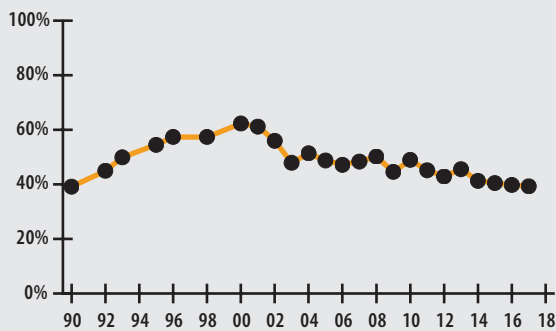
### Board Administrator

Timothy Smyth

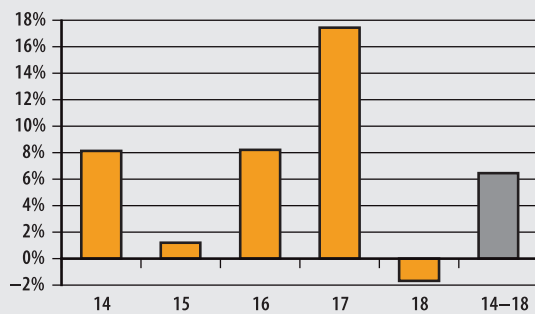
### Board Meeting

Third Wednesday of every month  
at 10:00 am

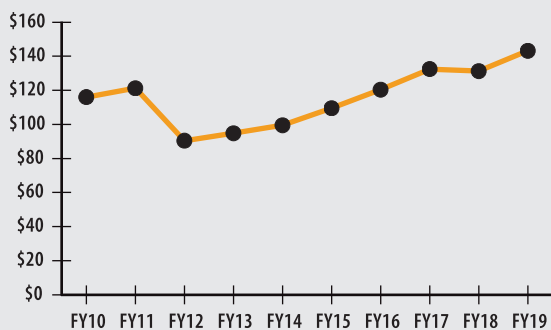
### FUNDED RATIO (1990-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



## NOTES — BOSTON (CITY) & BOSTON TEACHERS

In this report we have separated the results for Boston Teachers and non-teachers (City). 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:

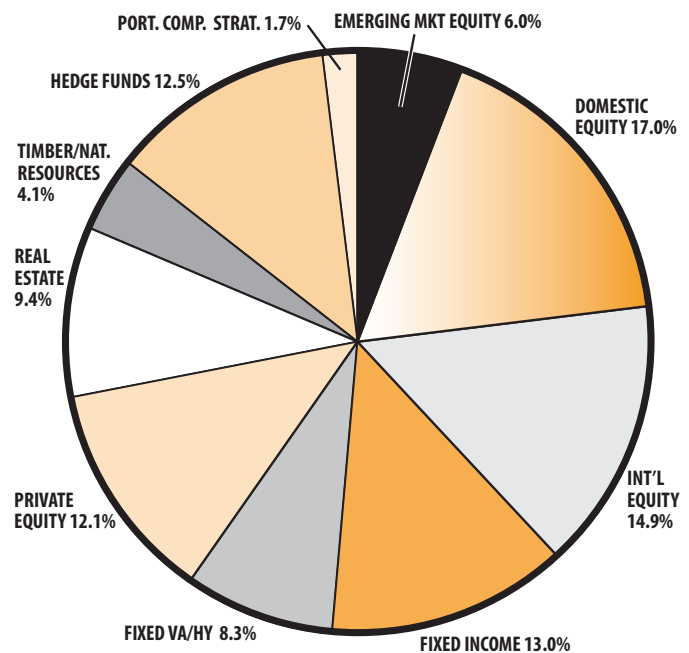
- ▶ Boston Teachers' assets prior to 2010 were estimated as approximately 30% of Boston (System) total assets.
- ▶ The information with respect to Disability Retirees on the City Board Profile page reflects the entire system, including Boston Teachers.
- ▶ The information with respect to Investment Return History for the City reflects actual returns for Boston (City) for 2014-2018 and total returns for the Boston System prior to 2011.

## ACTUARIAL

▶ Funded Ratio	39.3%
▶ Date of Last Valuation	1/1/17
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.50%
▶ Funding Schedule	8.94% Total Increasing
▶ Year Fully Funded	2036
▶ Unfunded Liability	\$2.4 B
▶ Total Pension Appropriation (Fiscal 2019)	\$143.1 M

	ACTIVE	RETIRED
▶ Number of Members	6,479	4,688
▶ Total Payroll/Benefit	\$548.8 M	\$239.4 M
▶ Average Salary/Benefit	\$84,700	\$51,100
▶ Average Age	42	72
▶ Average Service	11.4 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

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

▶ 2018 Return	-1.66%
▶ 2018 Market Value	\$1.6 B
▶ 2014-2018 (Annualized)	6.47%



**Board Members**

Edward Spellman, Peter Morin,  
Frederick Viola, Gerald Kenny\*,  
David DelGallo

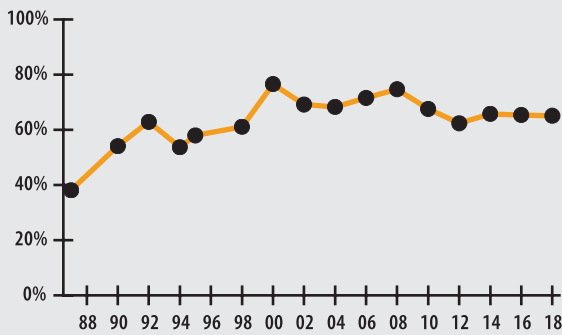
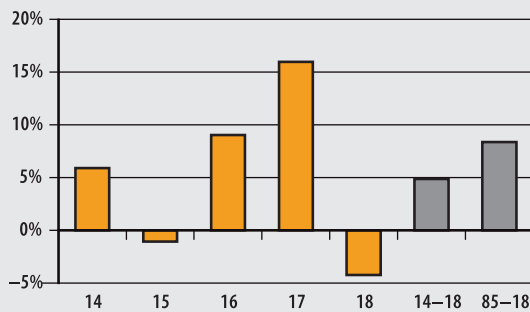
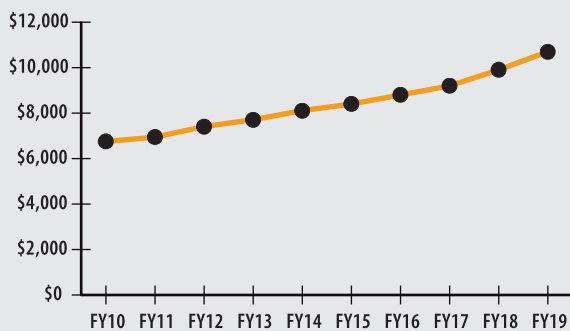
\*indicates Chairperson

**Board Administrator**

Dennis Gallagher

**Board Meeting**

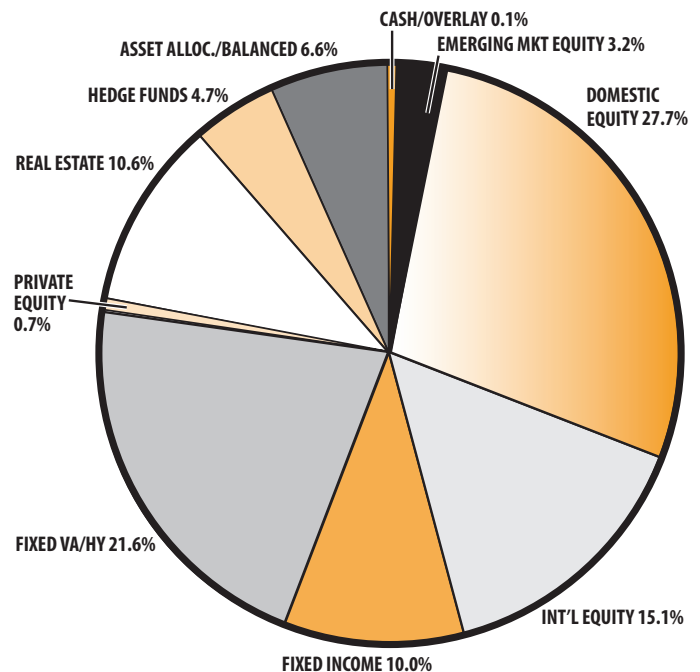
Fourth Thursday of each month at 4 pm

**FUNDED RATIO (1987-2018)**

**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**

**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**

**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.38%	8.79%	8.57%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
8.23%	6.12%	5.35%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
4.89%	8.54%	7.89%

**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 2019)		\$10.7 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)**

**EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	59
▶ Number Who Reported Earnings	17
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-4.21%
▶ 2018 Market Value	\$192.7 M
▶ 2014-2018 (Annualized)	4.89%
▶ 1985-2018 (Annualized)	8.38%

## Bristol County

County Crossing  
645 County Street  
Taunton, MA 02780  
Phone 508-824-4029  
Fax 508-880-8749

### Board Members

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

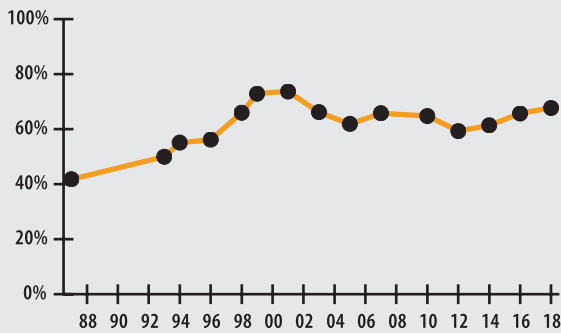
### Board Administrator

Roxanne Donovan

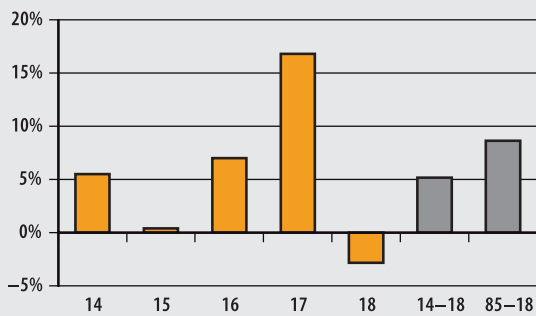
### Board Meeting

Fourth Wednesday of the month at 9:00 am

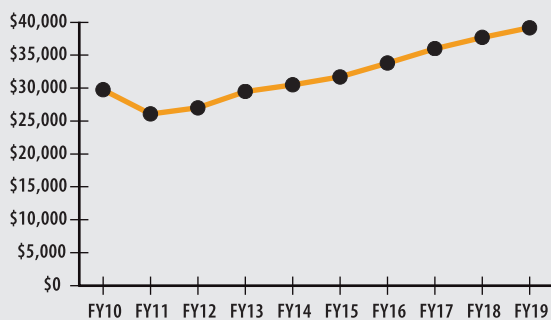
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

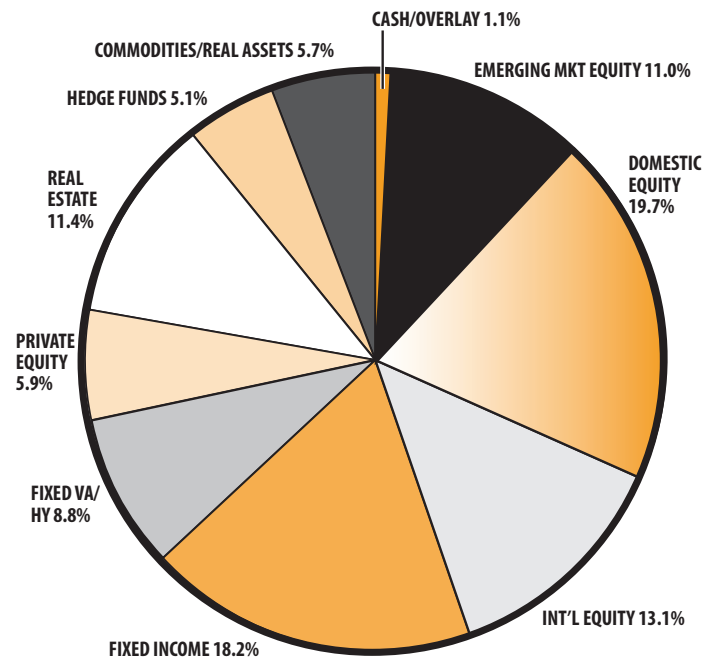
<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.64%	9.01%	8.77%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.24%	6.28%	5.40%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
5.16%	9.42%	9.22%

## ACTUARIAL

▶ Funded Ratio	67.7%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Sherman
▶ Assumed Rate of Return	7.75%
▶ Funding Schedule	4.5% Increasing Phase-In
▶ Year Fully Funded	2028
▶ Unfunded Liability	\$320.5 M
▶ Total Pension Appropriation (Fiscal 2019)	\$39.2 M

	ACTIVE	RETIRED
▶ Number of Members	3,220	2,500
▶ Total Payroll/Benefit	\$164.5 M	\$61.0 M
▶ Average Salary/Benefit	\$51,100	\$24,400
▶ Average Age	NA	72
▶ Average Service	NA years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	227
▶ Number Who Reported Earnings	82
▶ Number of Excess Earners	3
▶ Total Amount of Refund Due	\$15,838.60

▶ 2018 Return	-2.88%
▶ 2018 Market Value	\$647.6 M
▶ 2014-2018 (Annualized)	5.16%
▶ 1985-2018 (Annualized)	8.64%

## 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

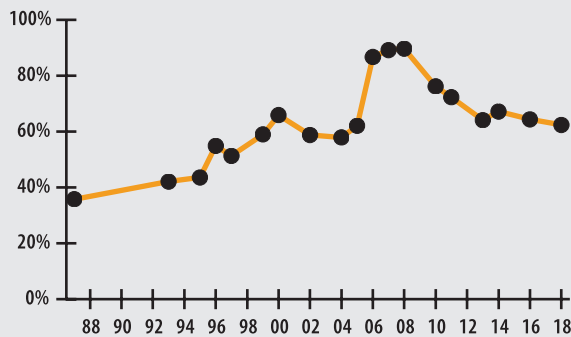
### Board Administrator

Jeanne Martineau

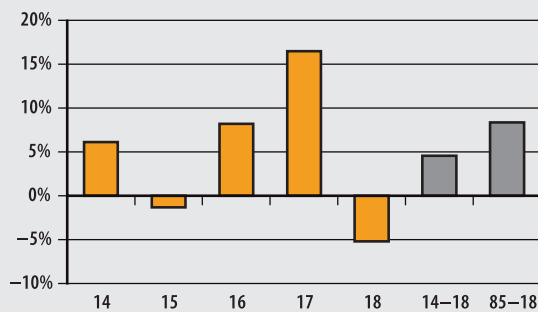
### Board Meeting

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

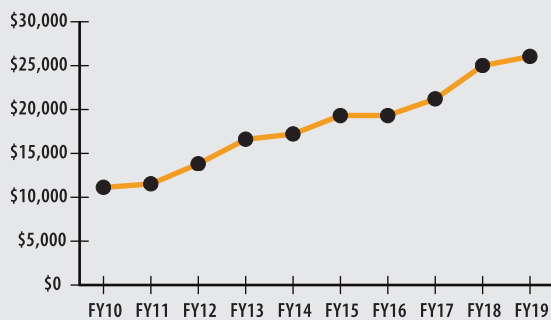
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

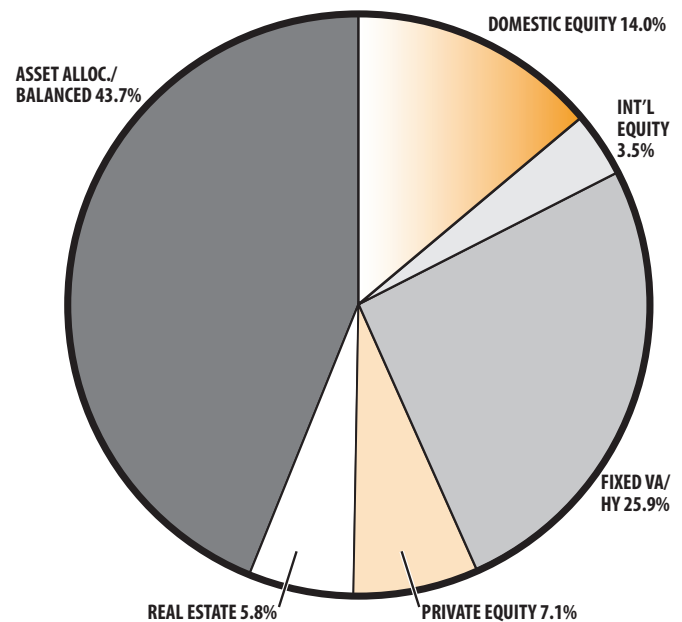
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.39%	8.83%	8.60%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.29%	5.17%	4.28%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
4.59%	8.22%	7.42%

## 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 2019)	\$26.0 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	145
▶ Number Who Reported Earnings	48
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-5.20%
▶ 2018 Market Value	\$385.3 M
▶ 2014-2018 (Annualized)	4.59%
▶ 1985-2018 (Annualized)	8.39%

## Brookline

Public Health Bldg., Ground Fl  
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

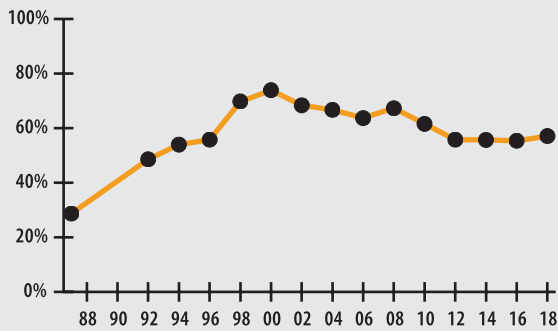
### Board Administrator

Frank Zecha

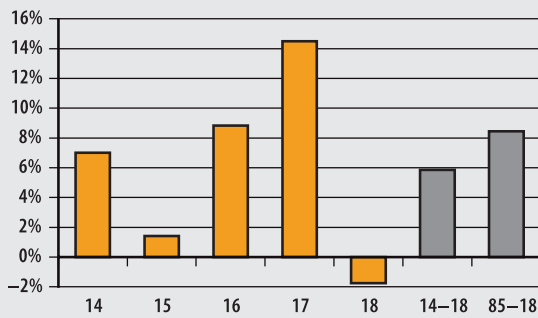
### Board Meeting

Varies

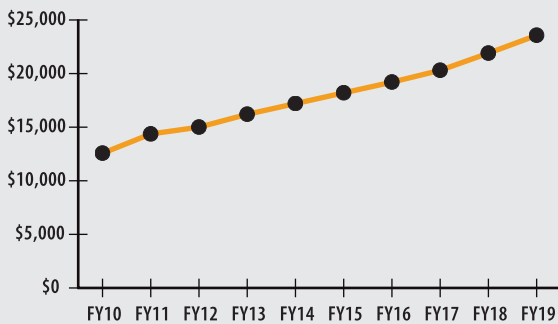
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

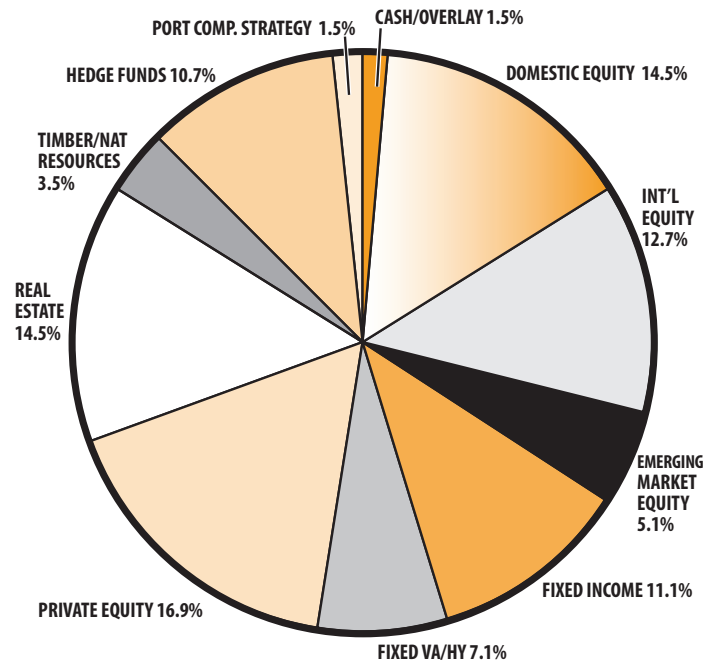
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.45%	8.77%	8.60%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.67%	5.35%	4.63%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.85%	8.69%	8.13%

## 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 2019)	\$23.6 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	160
▶ Number Who Reported Earnings	38
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$20,977.56

▶ 2018 Return	-1.75%
▶ 2018 Market Value	\$299.6 M
▶ 2014-2018 (Annualized)	5.85%
▶ 1985-2018 (Annualized)	8.45%



**Board Members**

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

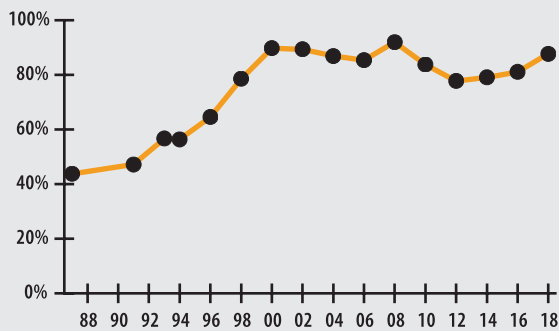
**Board Administrator**

Ellen Philbin

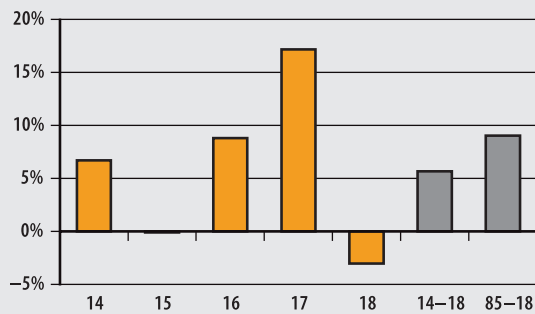
**Board Meeting**

First Monday of the month at 5:00

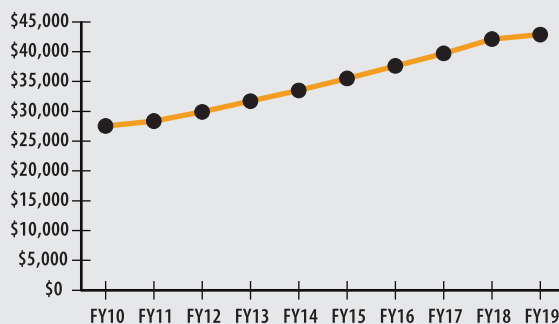
**FUNDED RATIO (1987-2018)**



**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**



**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**



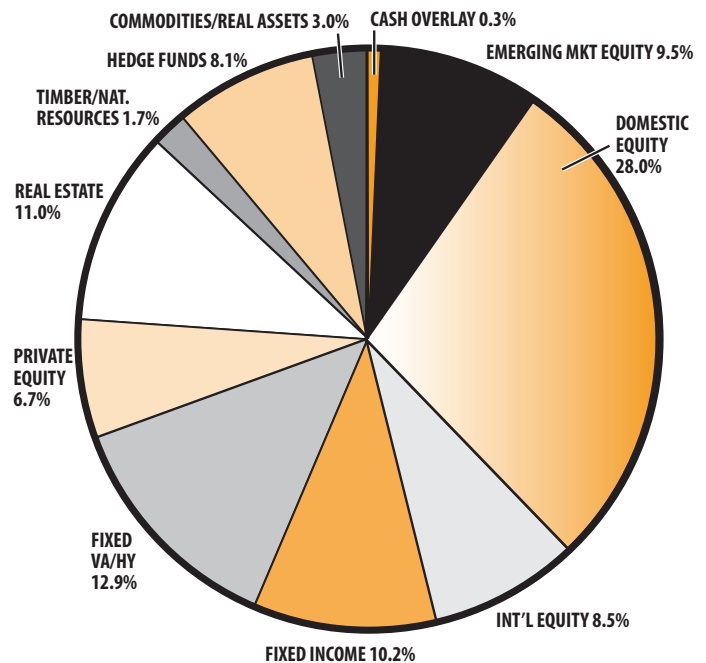
**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
9.06%	9.45%	9.22%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.65%	6.35%	5.86%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
5.67%	10.39%	9.98%

**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 2019)		\$42.9 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)**

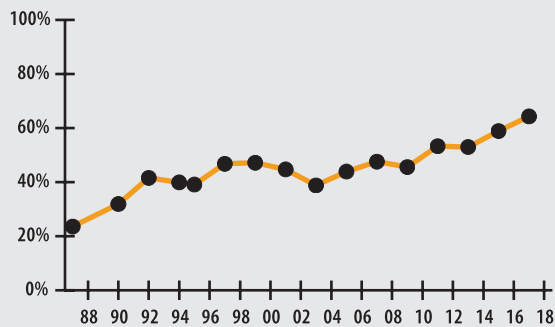


**EARNED INCOME OF DISABILITY RETIREES (2017)**

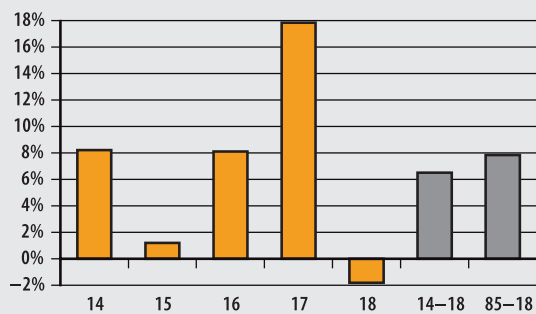
▶ Number of Disability Retirees	230
▶ Number Who Reported Earnings	57
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-3.10%
▶ 2018 Market Value	\$1.3 B
▶ 2014-2018 (Annualized)	5.67%
▶ 1985-2018 (Annualized)	9.06%

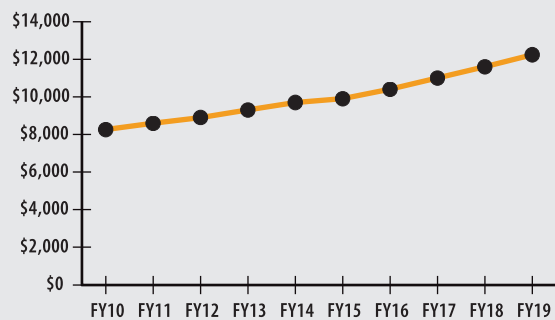
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



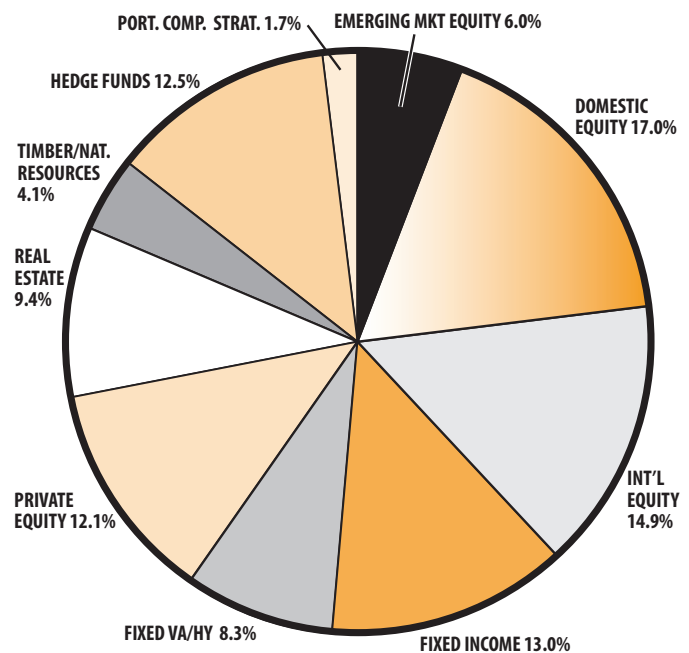
### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.86%	8.17%	7.88%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.17%	5.66%	5.13%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.51%	9.96%	9.18%

### ACTUARIAL

▶ Funded Ratio		64.3%
▶ Date of Last Valuation		1/1/17
▶ Actuary		PERAC
▶ Assumed Rate of Return		7.35%
▶ Funding Schedule		5.7% Total Increasing
▶ Year Fully Funded		2028
▶ Unfunded Liability		\$78.9 M
▶ Total Pension Appropriation (Fiscal 2019)		\$12.2 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	688	381
▶ Total Payroll/Benefit	\$35.9 M	\$10.4 M
▶ Average Salary/Benefit	\$52,200	\$27,200
▶ Average Age	46	73
▶ Average Service	12.6 years	NA

### ASSET ALLOCATION (12/31/18)

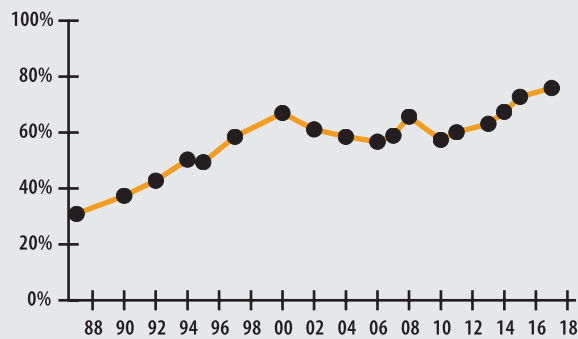


### EARNED INCOME OF DISABILITY RETIREES (2017)

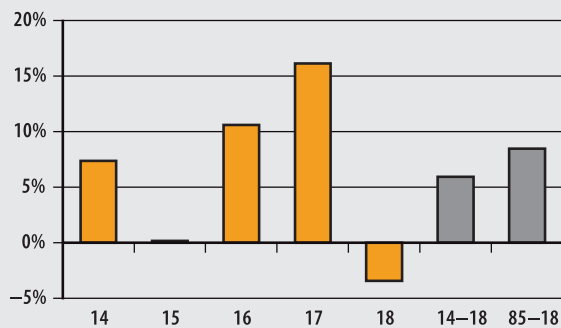
▶ Number of Disability Retirees	59
▶ Number Who Reported Earnings	23
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.80%
▶ 2018 Market Value	\$165.3 M
▶ 2014-2018 (Annualized)	6.51%
▶ 1985-2018 (Annualized)	7.86%

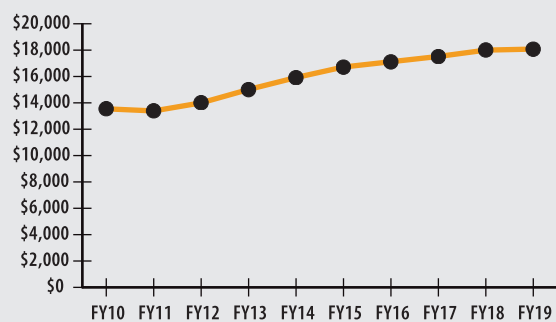
## FUNDED RATIO (1987-2018)



## INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



## 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



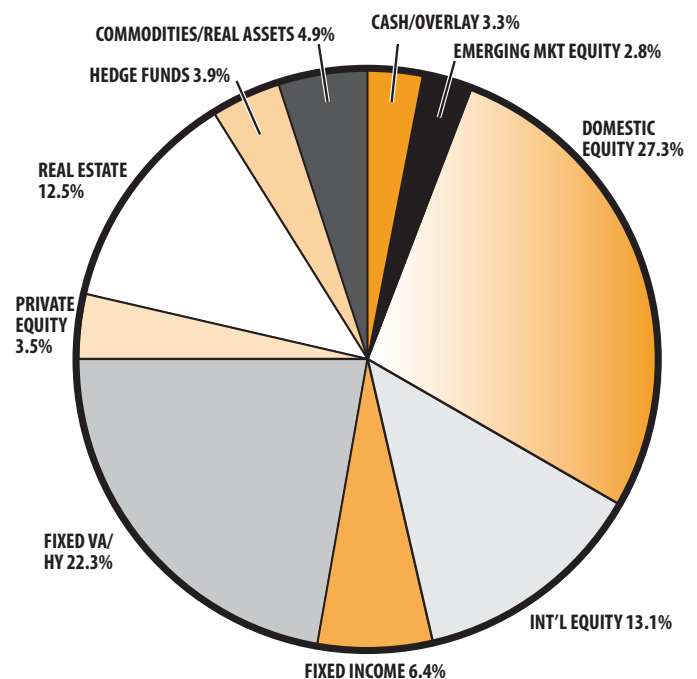
## INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.47%	8.85%	8.63%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
10.73%	7.25%	6.37%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
5.95%	10.11%	10.02%

## ACTUARIAL

▶ Funded Ratio		75.9%
▶ Date of Last Valuation		1/1/17
▶ Actuary		Stone
▶ Assumed Rate of Return		7.50%
▶ Funding Schedule		2.5% Total Increasing
▶ Year Fully Funded		2026
▶ Unfunded Liability		\$91.2 M
▶ Total Pension Appropriation (Fiscal 2019)		\$18.1 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	1,247	797
▶ Total Payroll/Benefit	\$55.1 M	\$19.1 M
▶ Average Salary/Benefit	\$44,200	\$24,000
▶ Average Age	48	73
▶ Average Service	13.3 years	NA

## ASSET ALLOCATION (12/31/18)

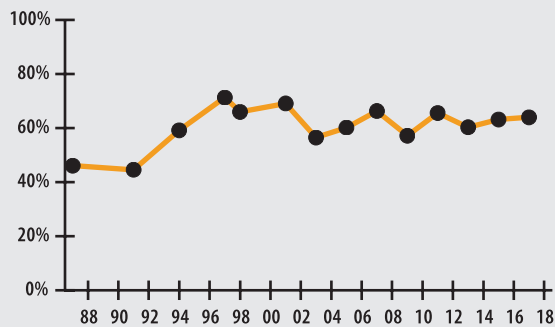


## EARNED INCOME OF DISABILITY RETIREES (2017)

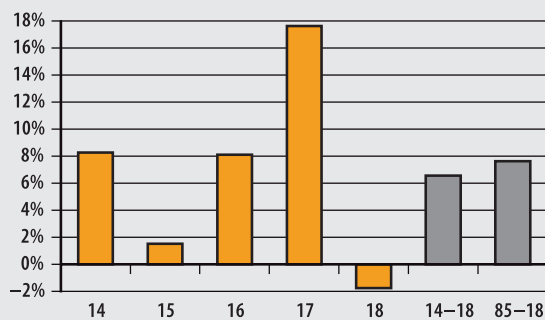
▶ Number of Disability Retirees	92
▶ Number Who Reported Earnings	26
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$10,271.74

▶ 2018 Return	-3.43%
▶ 2018 Market Value	\$311.5 M
▶ 2014-2018 (Annualized)	5.95%
▶ 1985-2018 (Annualized)	8.47%

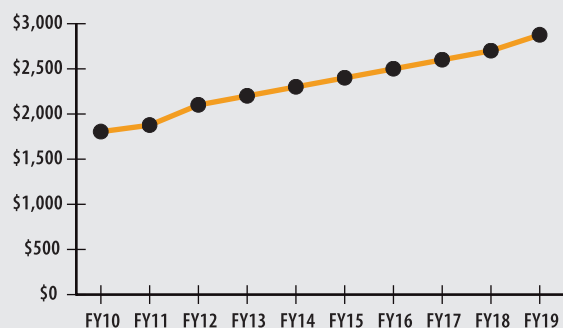
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



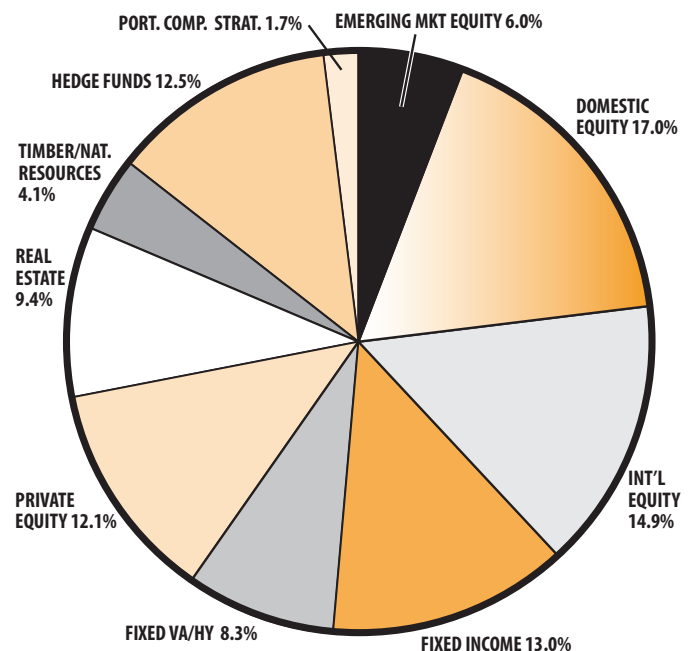
### INVESTMENT RETURN HISTORY

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
7.63%	7.93%	7.64%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.12%	5.18%	4.09%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.56%	9.93%	9.09%

### ACTUARIAL

▶ Funded Ratio		65.2%
▶ Date of Last Valuation		1/1/17
▶ Actuary		PERAC
▶ Assumed Rate of Return		7.40%
▶ Funding Schedule		5.0% Total Increasing
▶ Year Fully Funded		2035
▶ Unfunded Liability		\$23.4 M
▶ Total Pension Appropriation (Fiscal 2019)		\$2.9 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	246	130
▶ Total Payroll/Benefit	\$10.5 M	\$3.4 M
▶ Average Salary/Benefit	\$42,600	\$26,300
▶ Average Age	48	72
▶ Average Service	11.6 years	NA

### ASSET ALLOCATION (12/31/18)



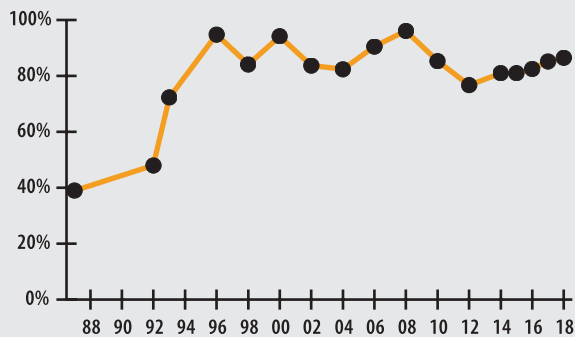
### EARNED INCOME OF DISABILITY RETIREES (2017)

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

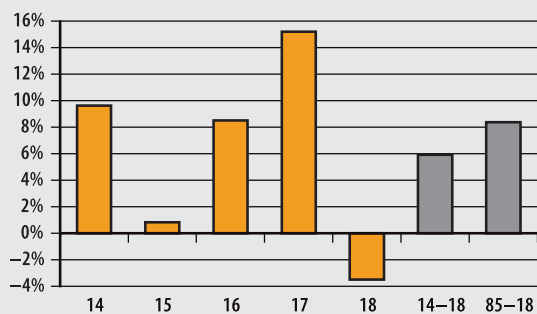
▶ 2018 Return	-1.75%
▶ 2018 Market Value	\$49.1 M
▶ 2014-2018 (Annualized)	6.56%
▶ 1985-2018 (Annualized)	7.63%



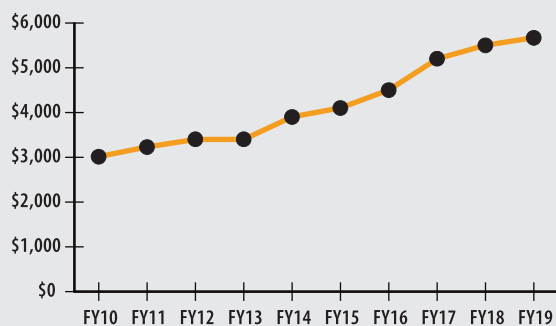
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



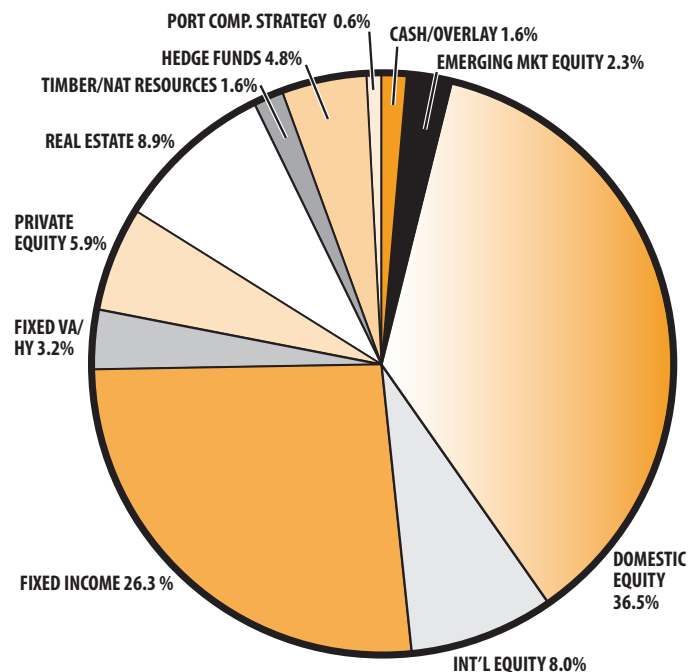
### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.38%	8.76%	8.56%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
8.92%	6.36%	5.74%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
5.93%	9.80%	9.26%

### ACTUARIAL

▶ Funded Ratio		86.5%
▶ Date of Last Valuation		1/1/18
▶ Actuary		Stone
▶ Assumed Rate of Return		7.00%
▶ Funding Schedule		Level Dollar
▶ Year Fully Funded		2029
▶ Unfunded Liability		\$24.9 M
▶ Total Pension Appropriation (Fiscal 2019)		\$5.7 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	519	300
▶ Total Payroll/Benefit	\$32.1 M	\$8.2 M
▶ Average Salary/Benefit	\$61,900	\$27,200
▶ Average Age	50	74
▶ Average Service	12 years	NA

### ASSET ALLOCATION (12/31/18)



### EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	20
▶ Number Who Reported Earnings	7
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-3.49%
▶ 2018 Market Value	\$159.3 M
▶ 2014-2018 (Annualized)	5.93%
▶ 1985-2018 (Annualized)	8.38%

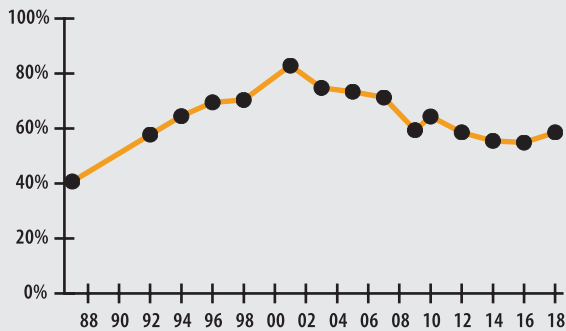
## Danvers

Town Hall  
1 Sylvan Street  
Danvers, MA 01923  
Phone 978-777-0001 Ext. 3044  
Fax 978-762-0264

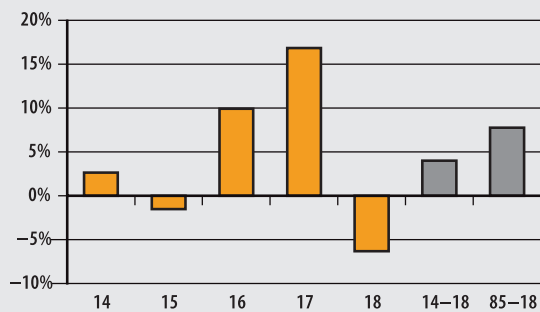
**Board Members**  
Corinna Grace, Wayne Marquis\*,  
Dana Hagan, Joseph Collins,  
Stephen Swanson  
\*indicates Chairperson

**Board Administrator**  
Susan Little  
**Board Meeting**  
Last Wednesday of the month at 3:00 pm

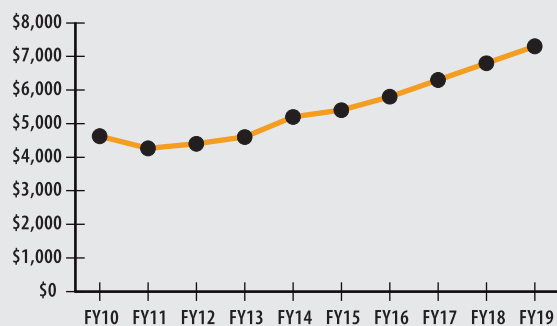
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



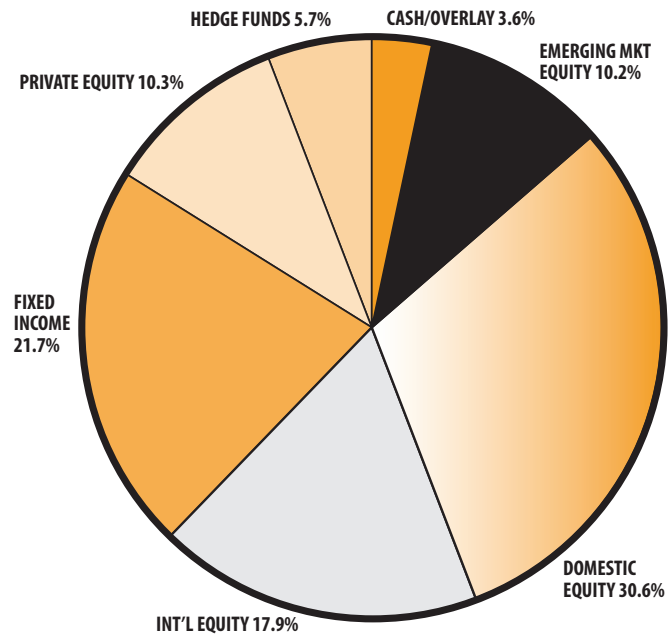
### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.76%	8.21%	7.95%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
8.54%	5.84%	4.79%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
4.01%	9.22%	8.09%

## 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 2019)		\$7.3 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	493	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 (12/31/18)

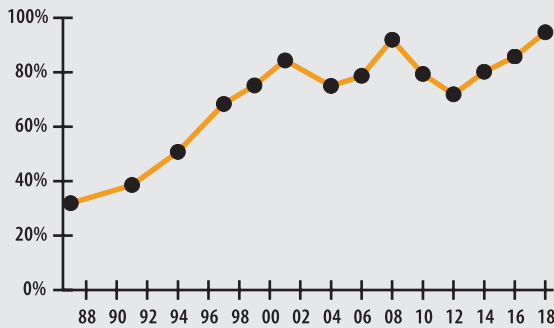


## EARNED INCOME OF DISABILITY RETIREES (2017)

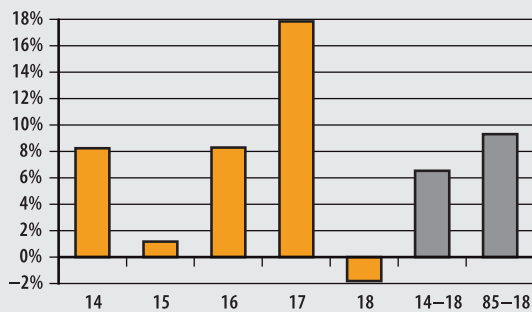
▶ Number of Disability Retirees	23
▶ Number Who Reported Earnings	7
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-6.30%
▶ 2018 Market Value	\$107.7 M
▶ 2014-2018 (Annualized)	4.01%
▶ 1985-2018 (Annualized)	7.76%

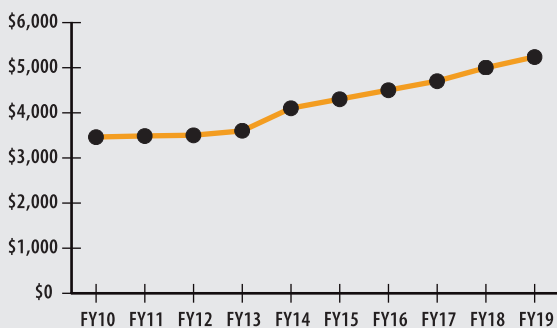
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



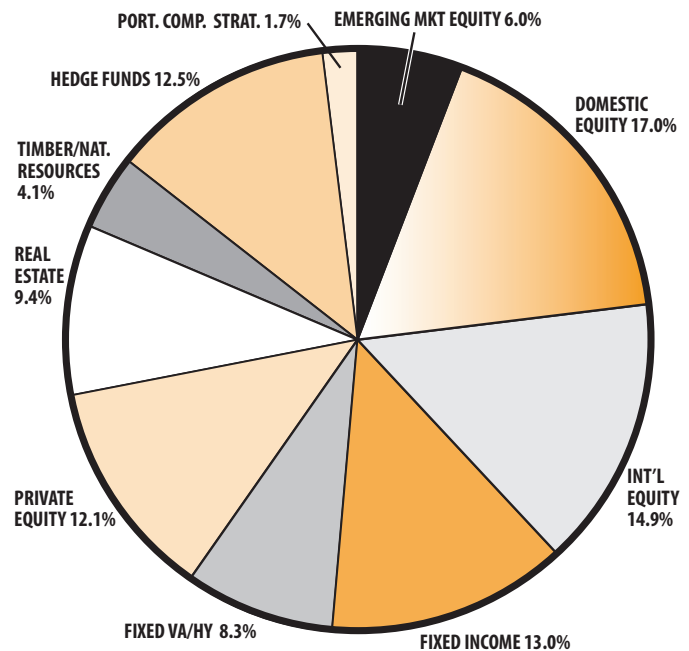
### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
9.33%	9.68%	9.44%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.26%	5.71%	5.19%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.54%	10.04%	9.31%

### ACTUARIAL

▶ Funded Ratio		94.7%
▶ Date of Last Valuation		1/1/18
▶ Actuary		Sherman
▶ Assumed Rate of Return		7.50%
▶ Funding Schedule		2.5% Increasing
▶ Year Fully Funded		2021
▶ Unfunded Liability		\$7.7 M
▶ Total Pension Appropriation (Fiscal 2019)		\$5.2 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	460	332
▶ Total Payroll/Benefit	\$24.3 M	\$9.4 M
▶ Average Salary/Benefit	\$52,900	\$28,400
▶ Average Age	NA	75
▶ Average Service	NA years	NA

### ASSET ALLOCATION (12/31/18)



### EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	47
▶ Number Who Reported Earnings	7
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.81%
▶ 2018 Market Value	\$138.5 M
▶ 2014-2018 (Annualized)	6.54%
▶ 1985-2018 (Annualized)	9.33%

## Dukes County

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

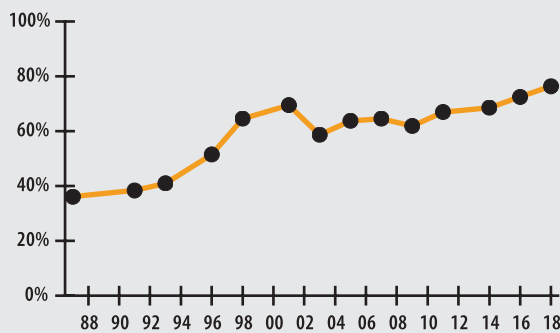
### Board Administrator

Kelly McCracken

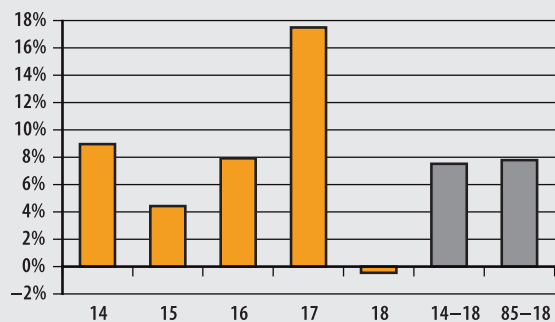
### Board Meeting

Last Wednesday of the month 9:30 am

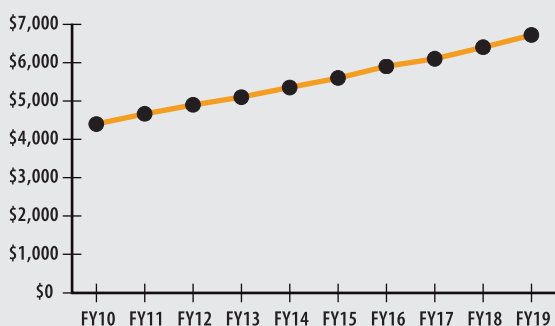
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

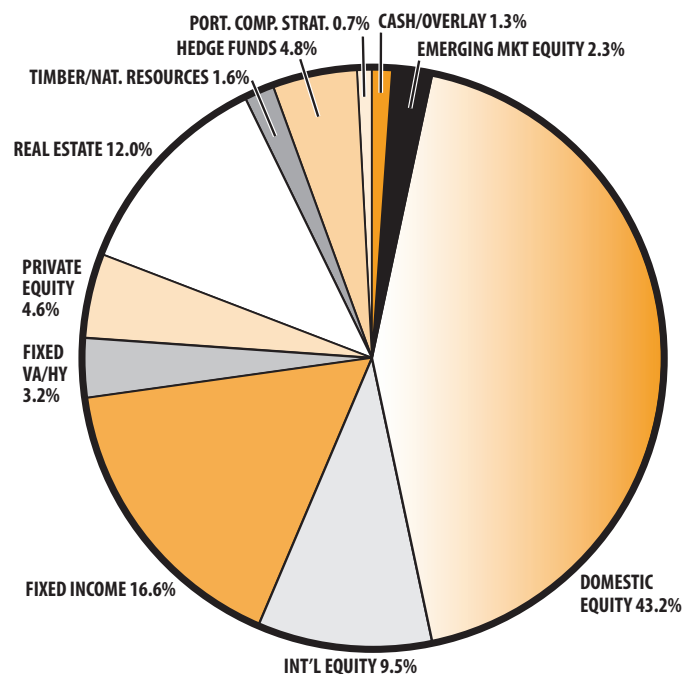
<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.79%	8.05%	7.77%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.85%	6.95%	6.38%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
7.52%	11.08%	9.97%

## 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 2019)	\$6.7 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 (12/31/18)

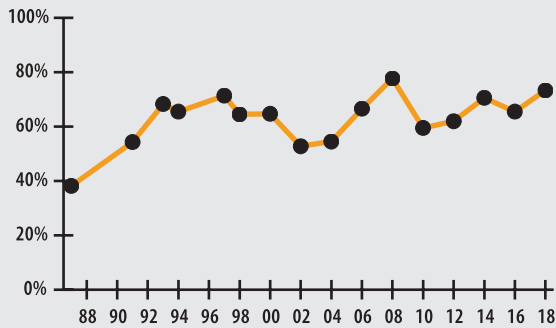


## EARNED INCOME OF DISABILITY RETIREES (2017)

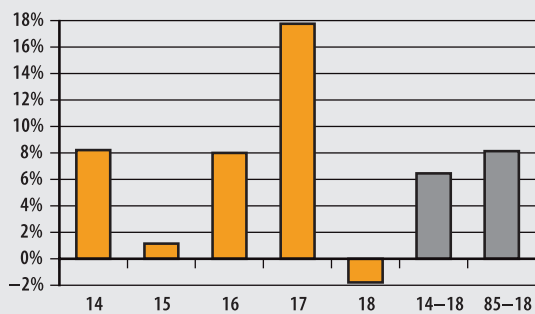
▶ Number of Disability Retirees	27
▶ Number Who Reported Earnings	9
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$7,010.91

▶ 2018 Return	-0.45%
▶ 2018 Market Value	\$154.7 M
▶ 2014-2018 (Annualized)	7.52%
▶ 1985-2018 (Annualized)	7.79%

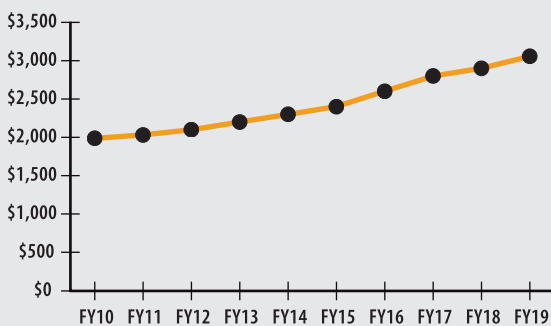
## FUNDED RATIO (1987-2018)



## INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



## 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



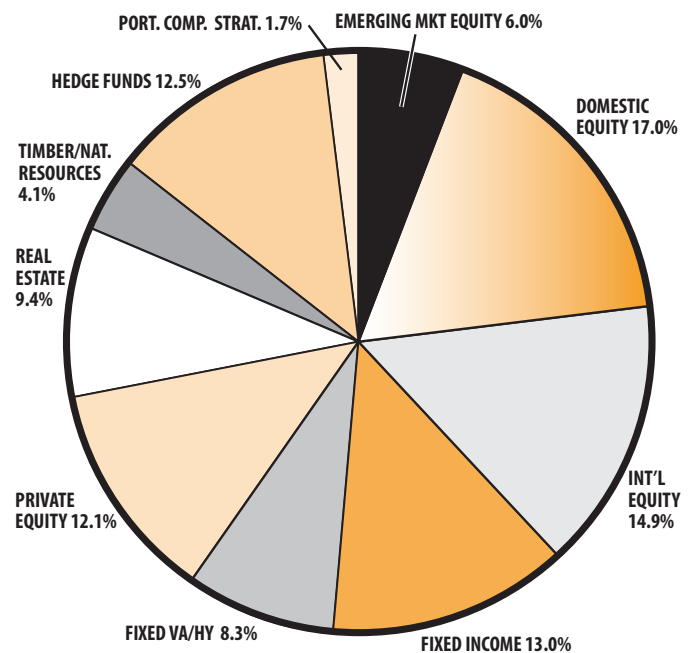
## INVESTMENT RETURN HISTORY

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.15%	8.47%	8.19%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.15%	5.62%	5.09%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.47%	9.94%	9.19%

## 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 2019)		\$3.1 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	20
▶ Number Who Reported Earnings	3
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.78%
▶ 2018 Market Value	\$52.3 M
▶ 2014-2018 (Annualized)	6.47%
▶ 1985-2018 (Annualized)	8.15%



## 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,  
H. Joseph Maney\*, Susan Yaskell,  
Vincent Malgeri  
\*indicates Chairperson

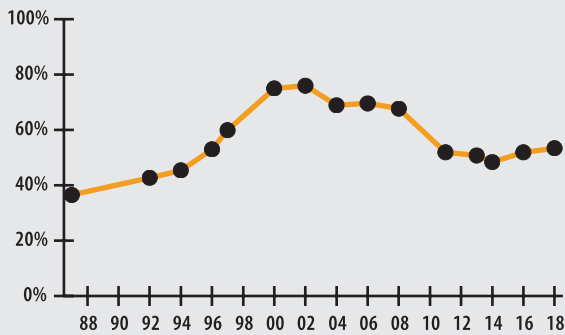
### Board Administrator

Charles Kostro

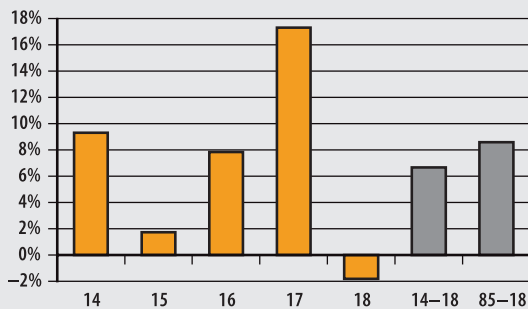
### Board Meeting

Last Monday of every month at 8:30 am

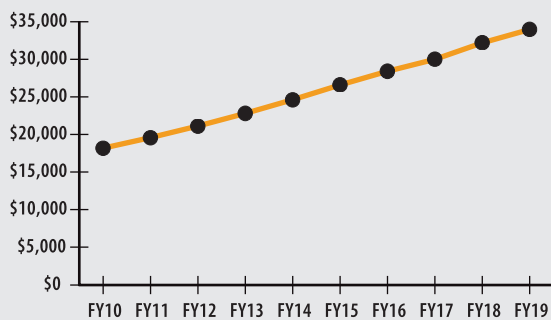
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

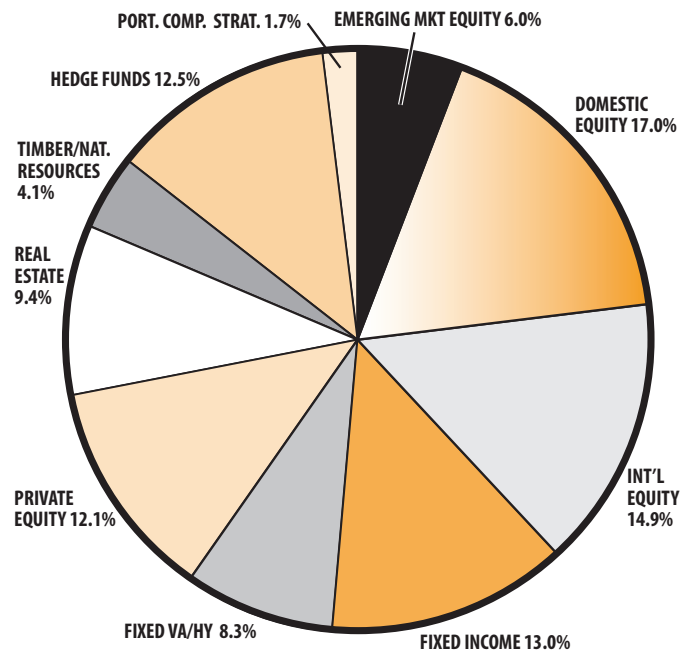
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.59%	8.92%	8.67%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.82%	5.69%	5.00%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.69%	10.11%	9.37%

## 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 2019)	\$34.0 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 (12/31/18)

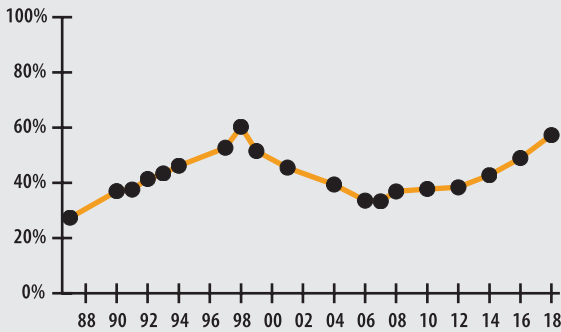


## EARNED INCOME OF DISABILITY RETIREES (2017)

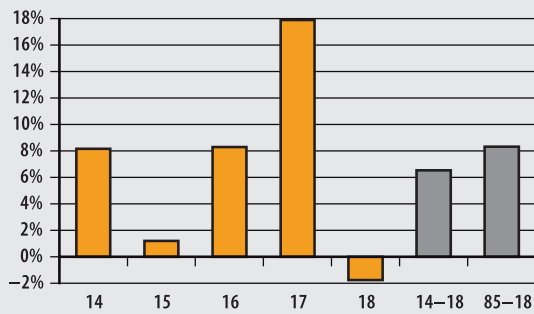
▶ Number of Disability Retirees	114
▶ Number Who Reported Earnings	33
▶ Number of Excess Earners	2
▶ Total Amount of Refund Due	\$23,688.81

▶ 2018 Return	-1.79%
▶ 2018 Market Value	\$451.5 M
▶ 2014-2018 (Annualized)	6.69%
▶ 1985-2018 (Annualized)	8.59%

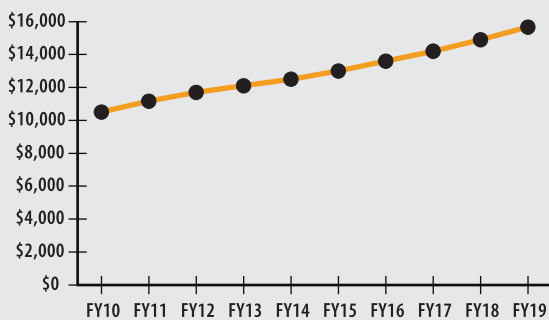
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



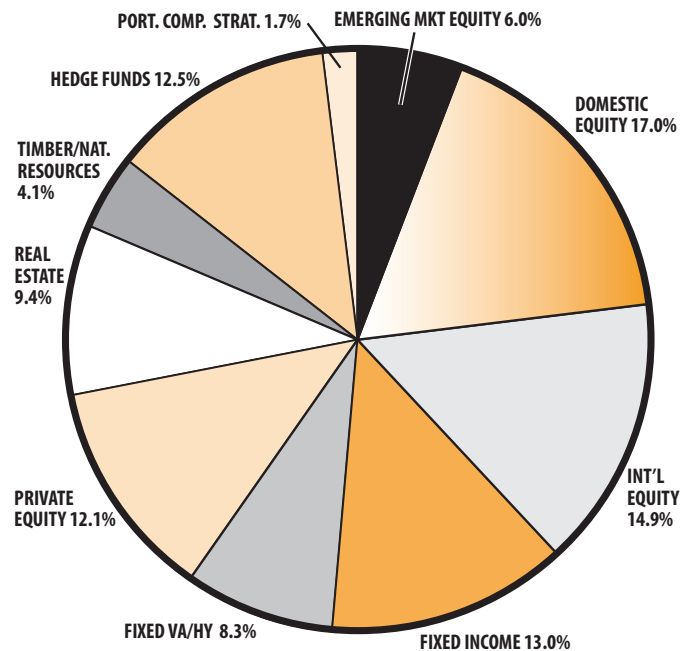
### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.33%	8.65%	8.37%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.33%	5.73%	5.18%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.55%	10.06%	9.32%

### 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 2019)		\$15.7 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)



### EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	70
▶ Number Who Reported Earnings	18
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.74%
▶ 2018 Market Value	\$154.3 M
▶ 2014-2018 (Annualized)	6.55%
▶ 1985-2018 (Annualized)	8.33%

## Fairhaven

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

### Board Members

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

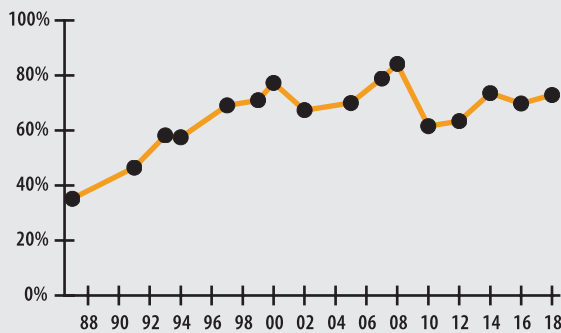
### Board Administrator

Mary Sturgeon

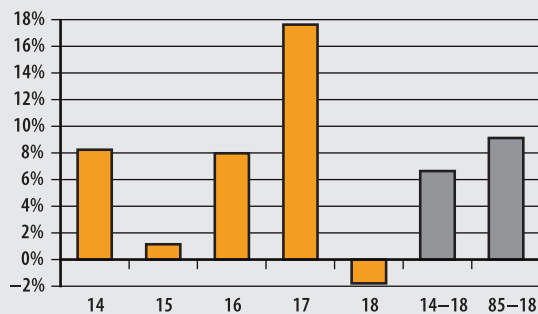
### Board Meeting

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

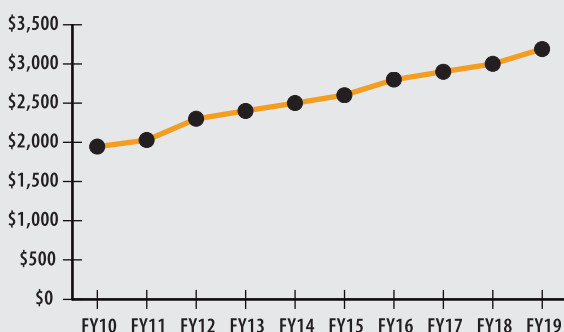
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

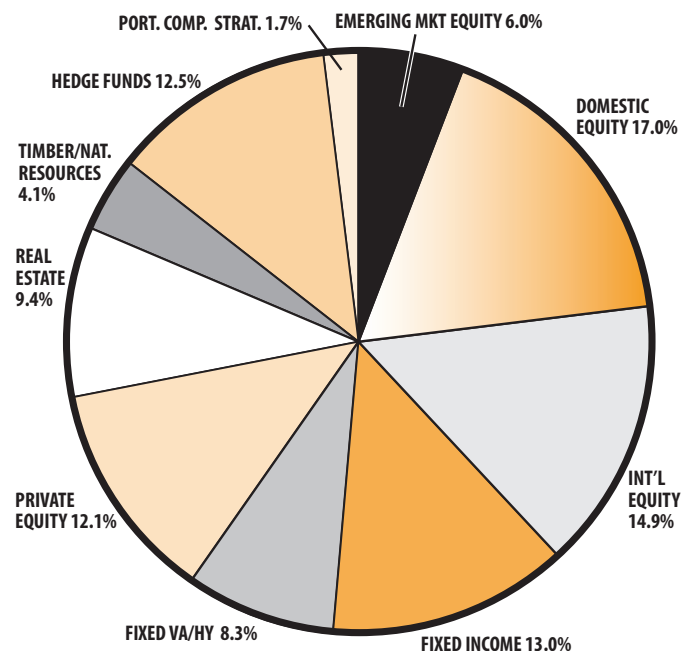
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.12%	9.46%	9.22%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.15%	5.61%	5.08%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.44%	9.91%	9.20%

## ACTUARIAL

▶ Funded Ratio	72.9%
▶ Date of Last Valuation	1/1/18
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.25%
▶ Funding Schedule	5.0% Total Increasing
▶ Year Fully Funded	2031
▶ Unfunded Liability	\$21.9 M
▶ Total Pension Appropriation (Fiscal 2019)	\$3.2 M

	ACTIVE	RETIRED
▶ Number of Members	251	185
▶ Total Payroll/Benefit	\$11.8 M	\$4.1 M
▶ Average Salary/Benefit	\$46,900	\$22,400
▶ Average Age	48	73
▶ Average Service	13.2 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	21
▶ Number Who Reported Earnings	12
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.78%
▶ 2018 Market Value	\$61.5 M
▶ 2014-2018 (Annualized)	6.44%
▶ 1985-2018 (Annualized)	9.12%

## 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, Jr.,  
David Machado, Robert Camara,  
Arthur Viana\*  
\*indicates Chairperson

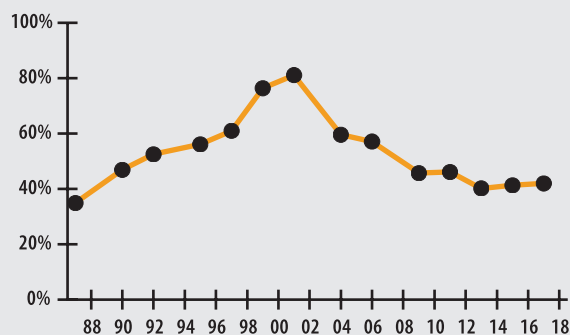
### Board Administrator

(vacant)

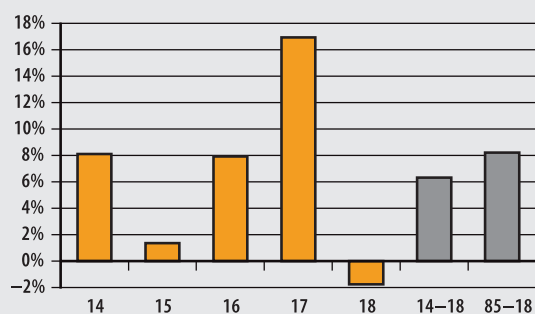
### Board Meeting

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

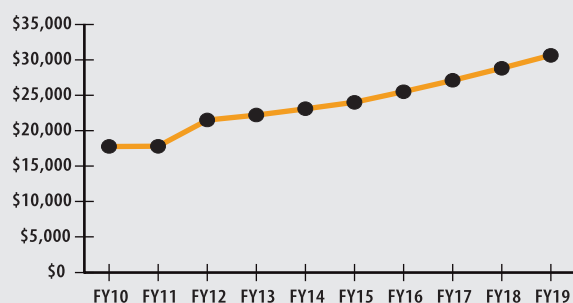
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

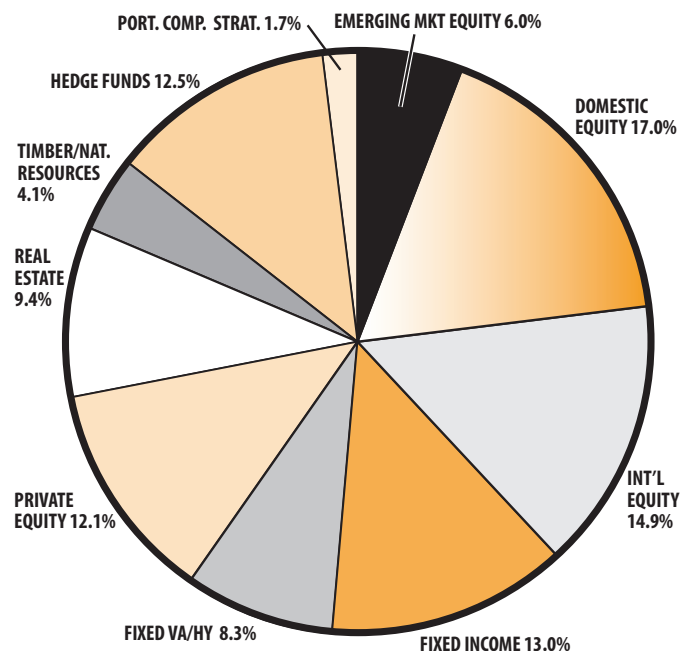
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.23%	8.54%	8.29%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.97%	5.70%	4.80%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.33%	9.71%	9.10%

## ACTUARIAL

▶ Funded Ratio	42.0%
▶ Date of Last Valuation	1/1/17
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.50%
▶ Funding Schedule	6.5% Total Increasing
▶ Year Fully Funded	2035
▶ Unfunded Liability	\$355.0 M
▶ Total Pension Appropriation (Fiscal 2019)	\$30.6 M

	ACTIVE	RETIRED
▶ Number of Members	1,498	1,557
▶ Total Payroll/Benefit	\$72.4 M	\$38.2 M
▶ Average Salary/Benefit	\$48,400	\$24,500
▶ Average Age	47	73
▶ Average Service	13.2 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	204
▶ Number Who Reported Earnings	57
▶ Number of Excess Earners	4
▶ Total Amount of Refund Due	\$92,754.63

▶ 2018 Return	-1.76%
▶ 2018 Market Value	\$257.3 M
▶ 2014-2018 (Annualized)	6.33%
▶ 1985-2018 (Annualized)	8.23%

## Falmouth

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

### Board Members

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

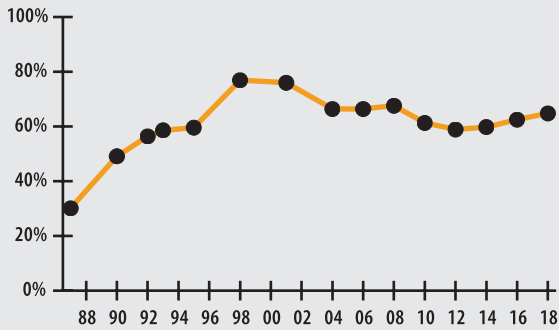
### Board Administrator

Francis St. Germaine

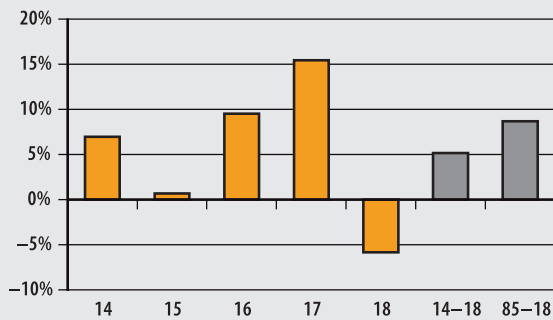
### Board Meeting

Third Thursday of the month at 2:00 pm

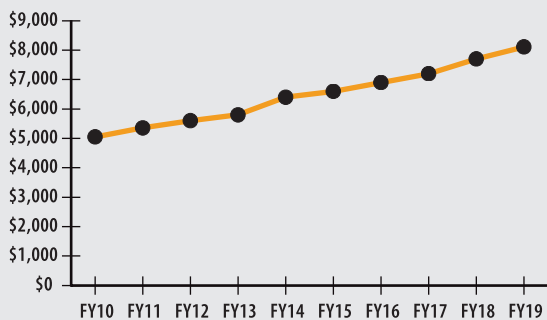
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

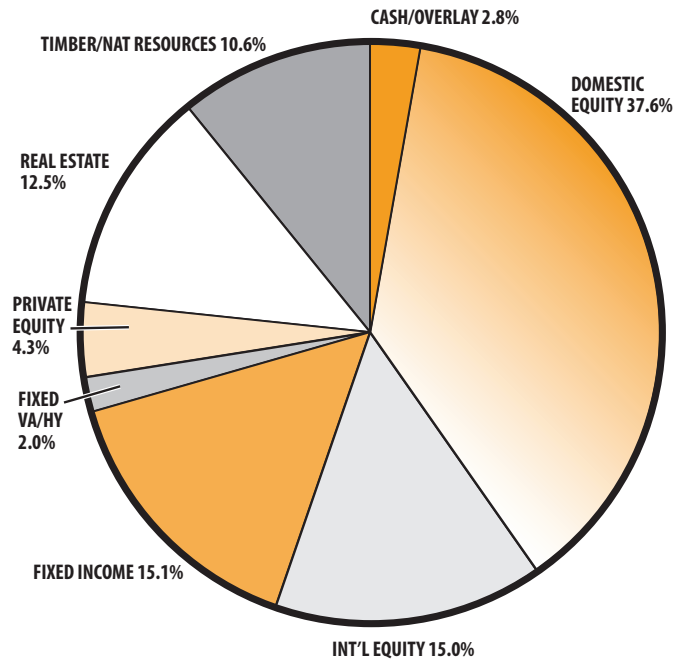
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.69%	9.16%	8.97%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.70%	6.31%	5.51%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.17%	10.33%	9.93%

## 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 2019)	\$8.1 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	39
▶ Number Who Reported Earnings	18
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-5.82%
▶ 2018 Market Value	\$133.8 M
▶ 2014-2018 (Annualized)	5.17%
▶ 1985-2018 (Annualized)	8.69%



**Board Members**

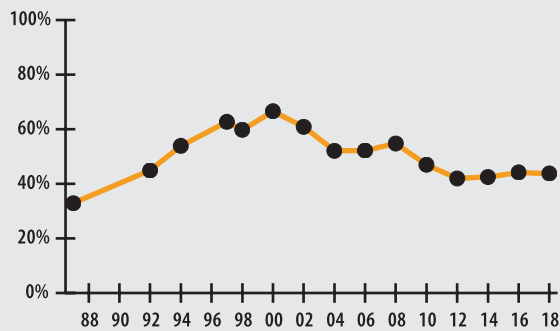
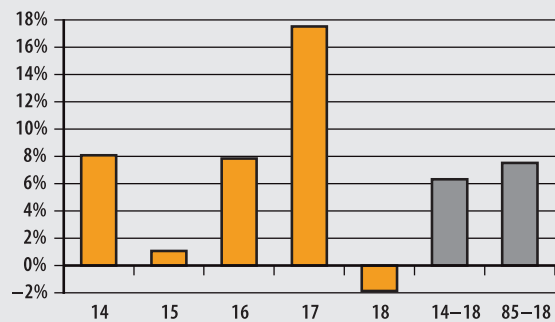
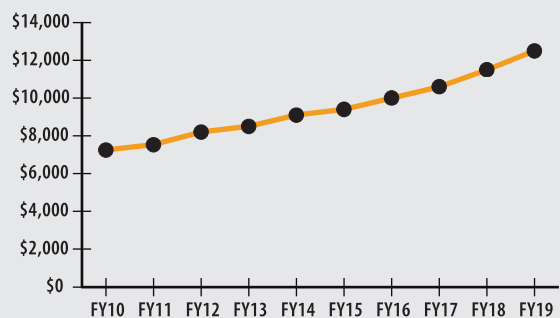
Calvin Brooks\*, Ellen Jerszyk,  
John Curran, Thomas Dateo,  
Norman LeBlanc  
\*indicates Chairperson

**Board Administrator**

Tina Schneider

**Board Meeting**

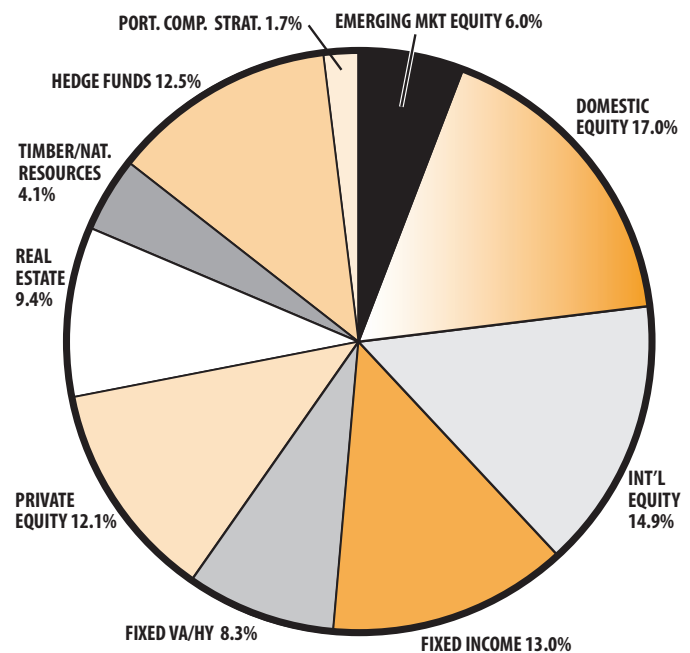
Fourth Tuesday of the month at 10:00 am

**FUNDED RATIO (1987-2018)**

**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**

**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**

**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.54%	7.84%	7.55%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
8.57%	5.39%	4.68%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.34%	9.70%	8.90%

**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 2019)		\$12.5 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)**

**EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	52
▶ Number Who Reported Earnings	12
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.85%
▶ 2018 Market Value	\$116.0 M
▶ 2014-2018 (Annualized)	6.34%
▶ 1985-2018 (Annualized)	7.54%

## 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

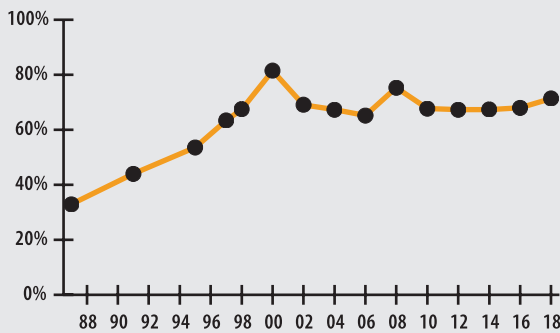
### Board Administrator

Laurie Lizak

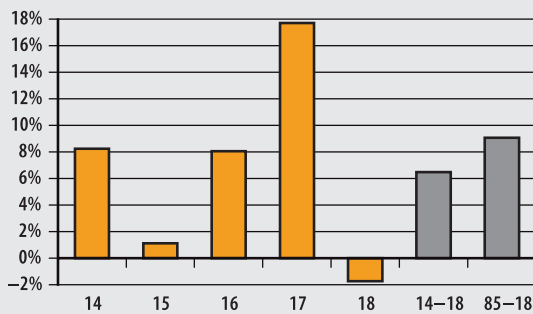
### Board Meeting

Third or Fourth Tuesday of the month at  
10:00 am

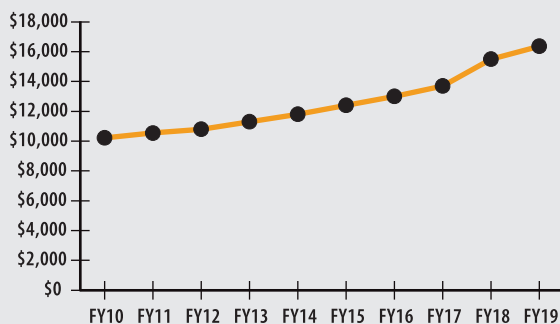
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

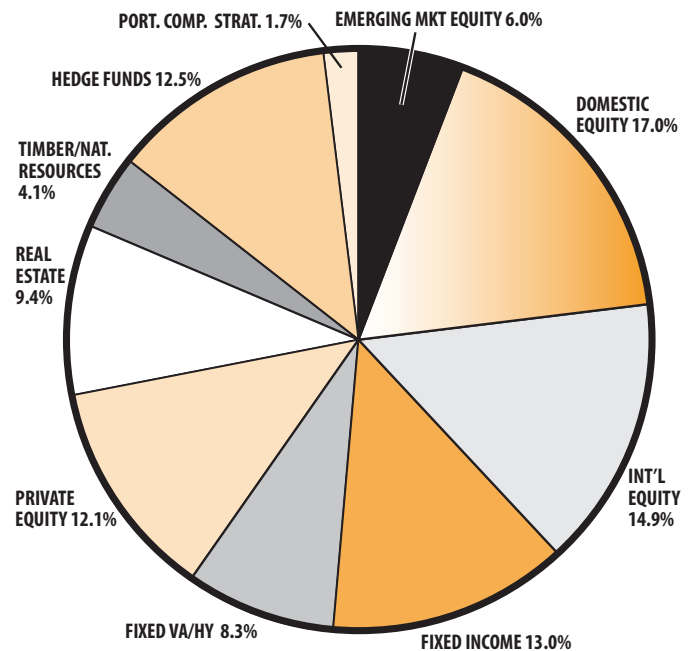
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.09%	9.44%	9.19%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.16%	5.62%	5.10%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.48%	9.92%	9.20%

## 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 2019)	\$16.4 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	61
▶ Number Who Reported Earnings	17
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.71%
▶ 2018 Market Value	\$308.1 M
▶ 2014-2018 (Annualized)	6.48%
▶ 1985-2018 (Annualized)	9.09%

**Board Members**

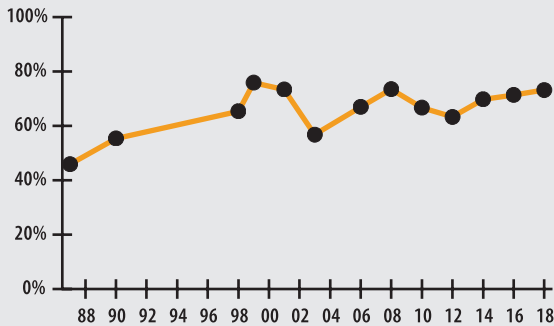
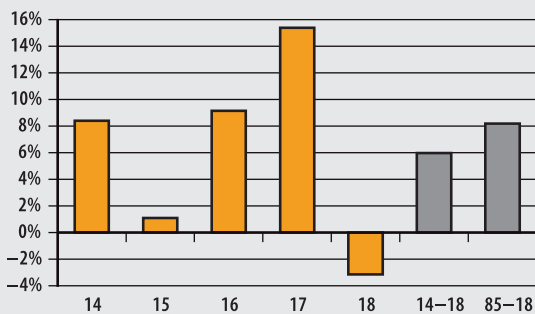
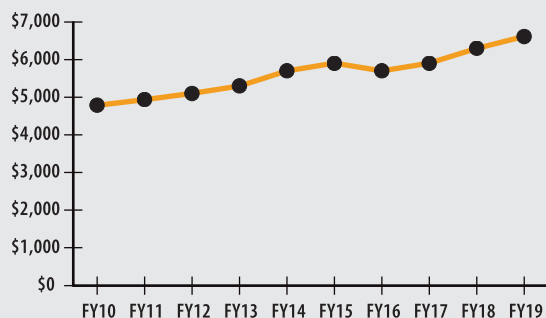
Sandra Hanks\*, Paul Mokrzecki,  
Gabriele Voelker, Mary Stokarski,  
Angel Bragdon  
\*indicates Chairperson

**Board Administrator**

Dale Kowacki

**Board Meeting**

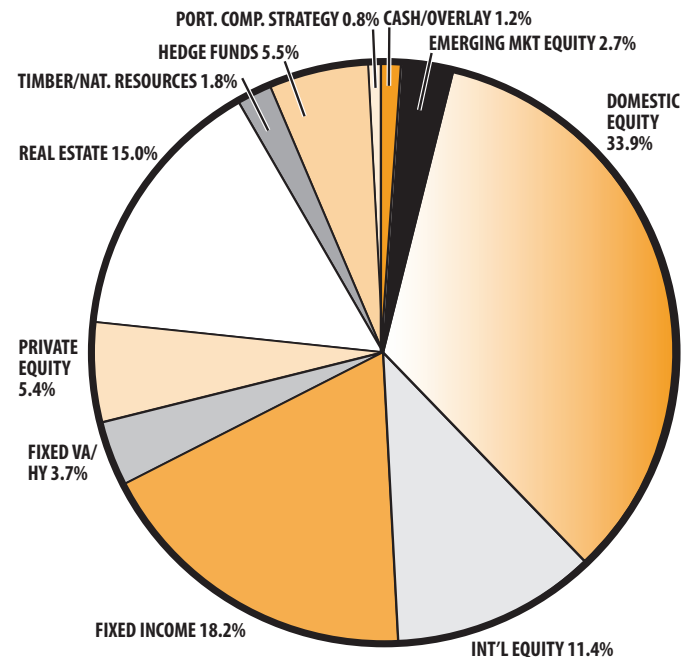
Last Wednesday of the month at 8:00 am

**FUNDED RATIO (1987-2018)**

**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**

**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**

**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.21%	8.57%	8.36%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.60%	6.57%	6.17%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
5.99%	10.59%	10.20%

**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 2019)		\$6.6 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)**

**EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	24
▶ Number Who Reported Earnings	5
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$4,914.65

▶ 2018 Return	-3.13%
▶ 2018 Market Value	\$138.8 M
▶ 2014-2018 (Annualized)	5.99%
▶ 1985-2018 (Annualized)	8.21%

## 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,  
Denise Merriam\*, Robert Newton,  
Neil Janssens  
\*indicates Chairperson

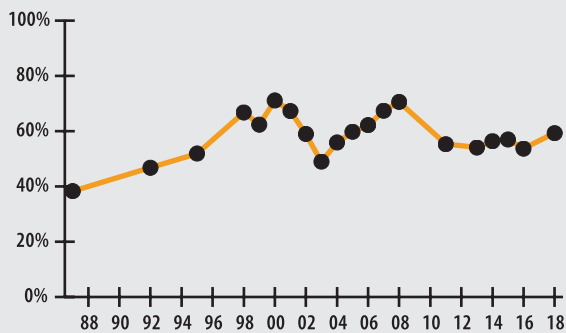
### Board Administrator

Cheryl Bosse

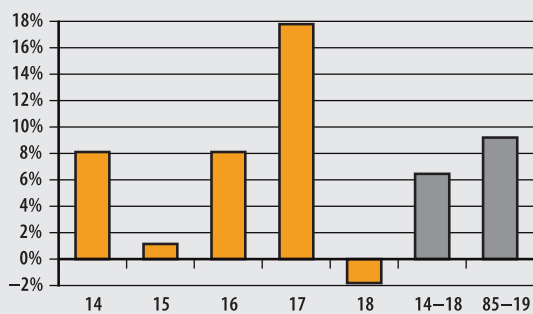
### Board Meeting

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

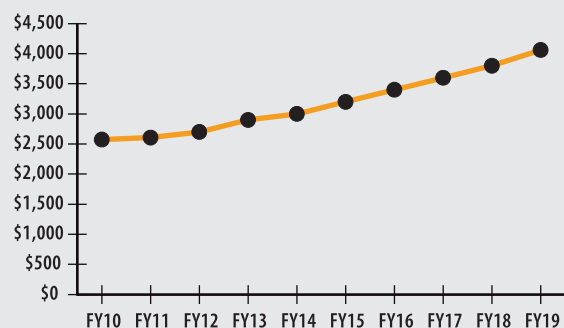
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

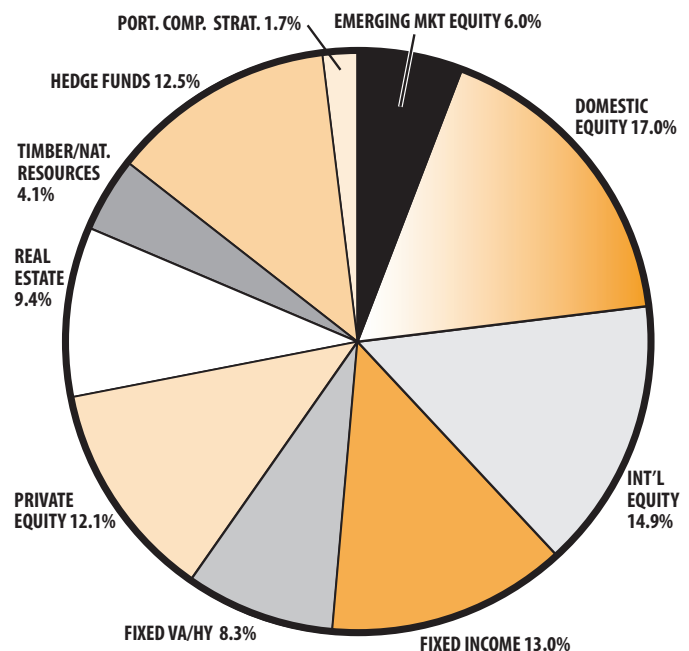
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.21%	9.56%	9.31%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.16%	5.60%	5.07%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.47%	9.94%	9.21%

## ACTUARIAL

▶ Funded Ratio	59.3%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Stone
▶ Assumed Rate of Return	7.50%
▶ Funding Schedule	4.85% Total Increasing
▶ Year Fully Funded	2032
▶ Unfunded Liability	\$38.2 M
▶ Total Pension Appropriation (Fiscal 2019)	\$4.1 M

	ACTIVE	RETIRED
▶ Number of Members	286	248
▶ Total Payroll/Benefit	\$12.5 M	\$5.9 M
▶ Average Salary/Benefit	\$43,700	\$23,700
▶ Average Age	47	73
▶ Average Service	11.5 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	19
▶ Number Who Reported Earnings	3
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.79%
▶ 2018 Market Value	\$53.3 M
▶ 2014-2018 (Annualized)	6.47%
▶ 1985-2018 (Annualized)	9.21%

## 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

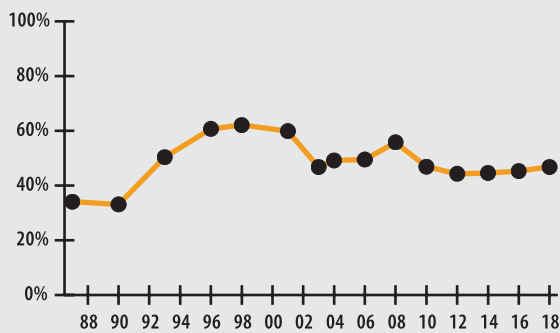
### Board Administrator

Patricia Ivas

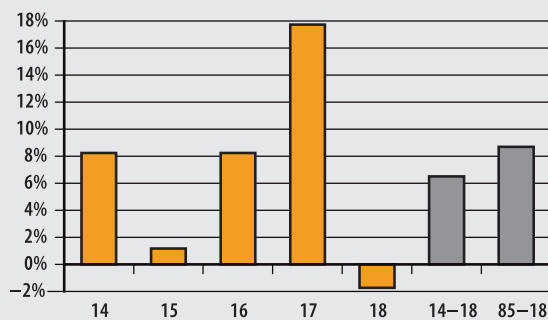
### Board Meeting

Last Wednesday of the month at 3:00 pm

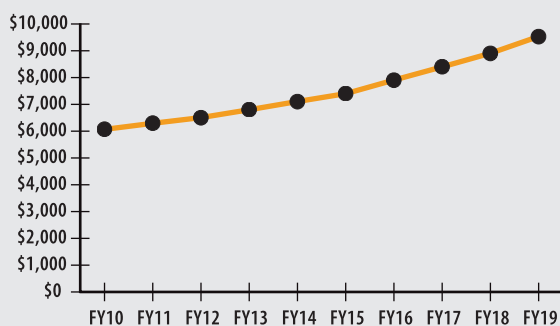
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

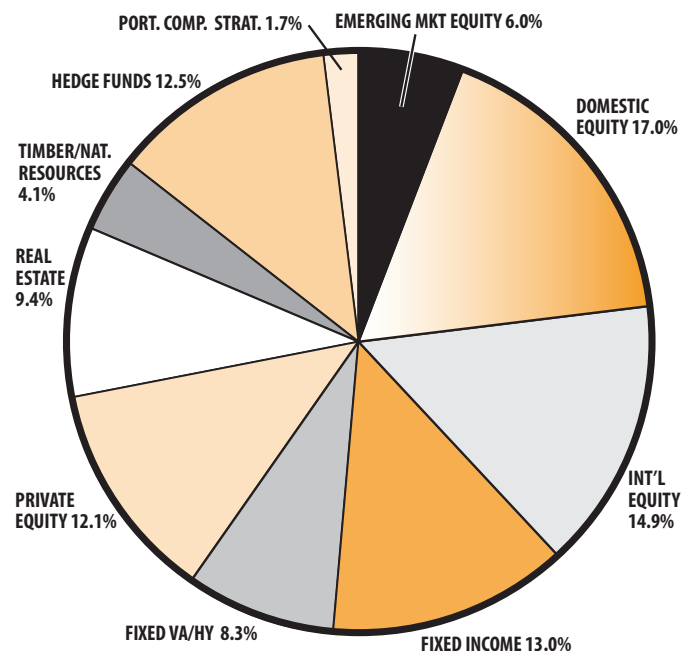
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.71%	9.04%	8.78%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.17%	5.66%	4.87%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.53%	9.95%	9.20%

## ACTUARIAL

▶ Funded Ratio	46.8%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Segal
▶ Assumed Rate of Return	7.50%
▶ Funding Schedule	7.0% Total Increasing
▶ Year Fully Funded	2034
▶ Unfunded Liability	\$116.4 M
▶ Total Pension Appropriation (Fiscal 2019)	\$9.5 M

	ACTIVE	RETIRED
▶ Number of Members	554	471
▶ Total Payroll/Benefit	\$29.7 M	\$12.8 M
▶ Average Salary/Benefit	\$53,600	\$27,200
▶ Average Age	50	73
▶ Average Service	11.8 years	NA

## ASSET ALLOCATION (12/31/18)



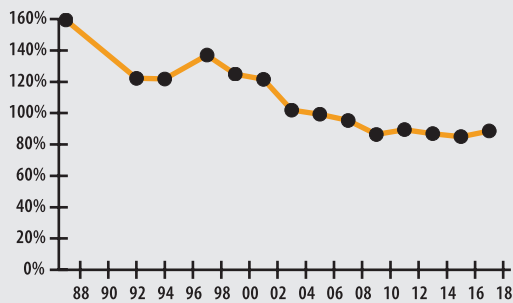
## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	34
▶ Number Who Reported Earnings	13
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

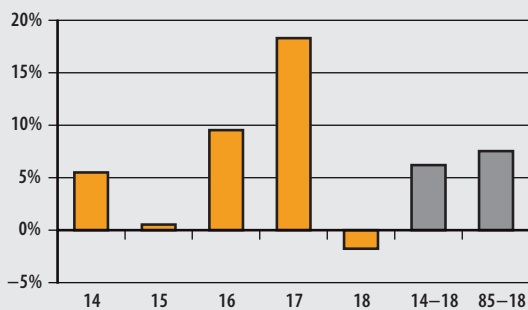
▶ 2018 Return	-1.71%
▶ 2018 Market Value	\$103.8 M
▶ 2014-2018 (Annualized)	6.53%
▶ 1985-2018 (Annualized)	8.71%



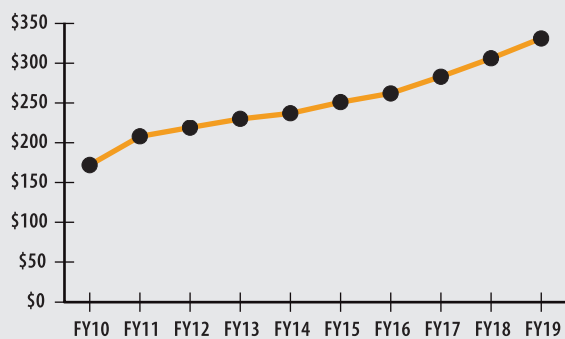
#### FUNDED RATIO (1987-2018)



#### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



#### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



#### INVESTMENT RETURN HISTORY

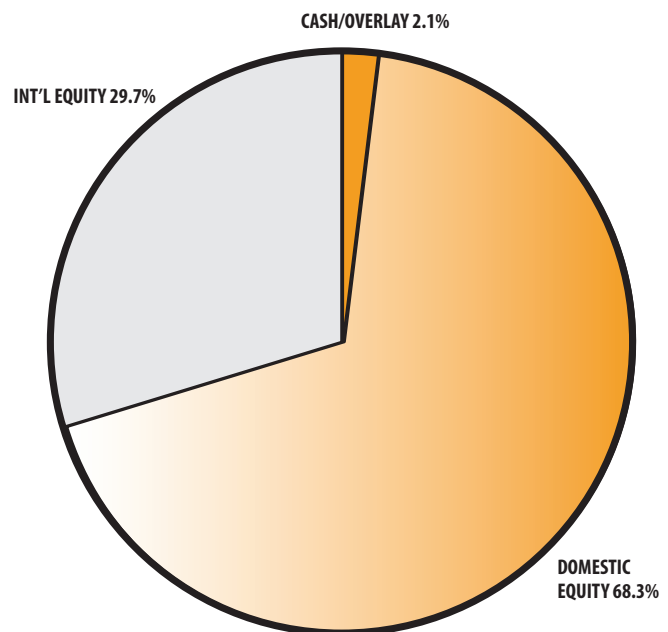
<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.54%	7.84%	7.53%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.81%	7.56%	6.64%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.20%	10.65%	9.23%

#### 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 2019)	\$331 K

	ACTIVE	RETIRED
▶ Number of Members	38	26
▶ Total Payroll/Benefit	\$2.5 M	\$757 K
▶ Average Salary/Benefit	\$67,000	\$29,100
▶ Average Age	52	72
▶ Average Service	18.9 years	NA

#### ASSET ALLOCATION (12/31/18)



#### EARNED INCOME OF DISABILITY RETIREES (2017)

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

▶ 2018 Return	-1.75%
▶ 2018 Market Value	\$17.9 M
▶ 2014-2018 (Annualized)	6.20%
▶ 1985-2018 (Annualized)	7.54%

## Greenfield

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

### Board Members

Elizabeth Gilman, Betty Rice,  
Marilyn Matysiewicz, William Devino\*,  
Frances Stotz  
\*indicates Chairperson

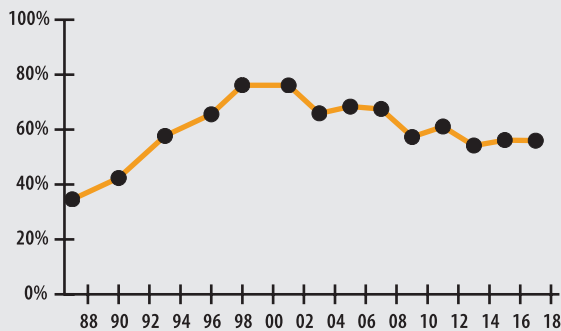
### Board Administrator

Shari Hildreth

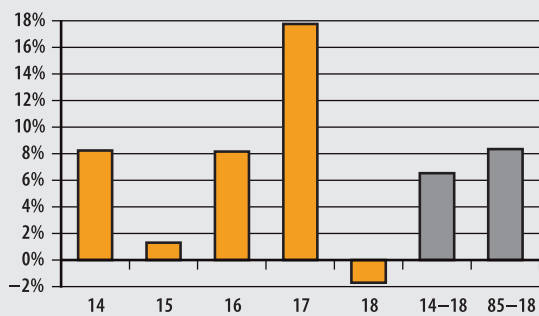
### Board Meeting

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

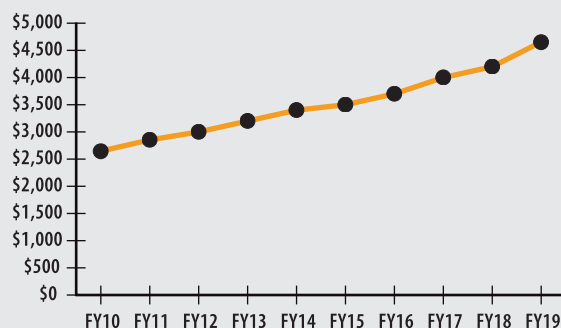
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



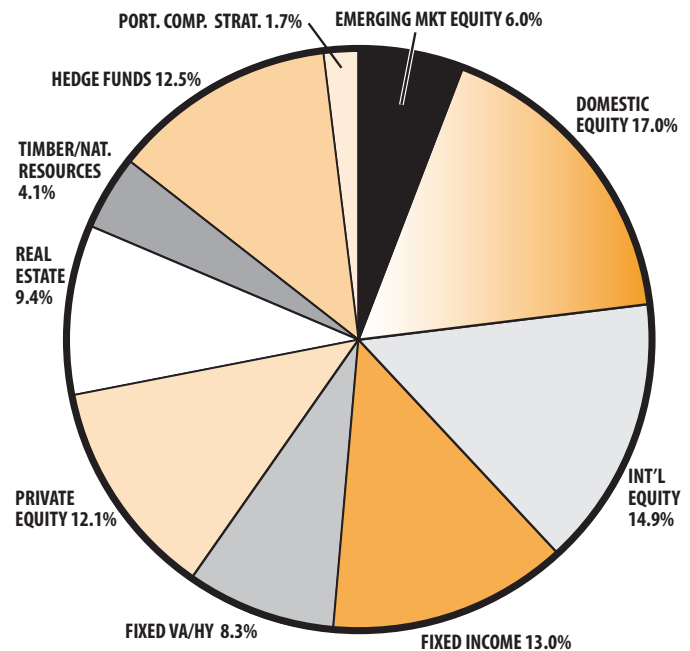
### INVESTMENT RETURN HISTORY

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.37%	8.69%	8.42%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.35%	5.99%	5.19%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.55%	10.01%	9.35%

## ACTUARIAL

▶ Funded Ratio		56.0%
▶ Date of Last Valuation		1/1/17
▶ Actuary		PERAC
▶ Assumed Rate of Return		7.40%
▶ Funding Schedule		Varies Total Increasing
▶ Year Fully Funded		2035
▶ Unfunded Liability		\$49.7 M
▶ Total Pension Appropriation (Fiscal 2019)		\$4.6 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	457	277
▶ Total Payroll/Benefit	\$18.5 M	\$6.5 M
▶ Average Salary/Benefit	\$40,600	\$23,300
▶ Average Age	46	71
▶ Average Service	8.9 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

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

▶ 2018 Return	-1.70%
▶ 2018 Market Value	\$67.5 M
▶ 2014-2018 (Annualized)	6.55%
▶ 1985-2018 (Annualized)	8.37%

## 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

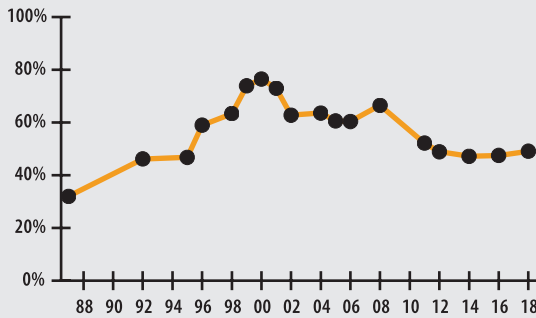
### Board Administrator

Julianne Bartley

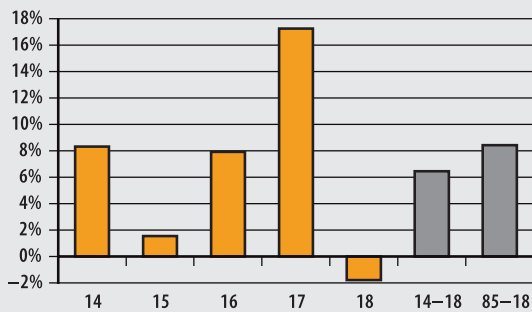
### Board Meeting

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

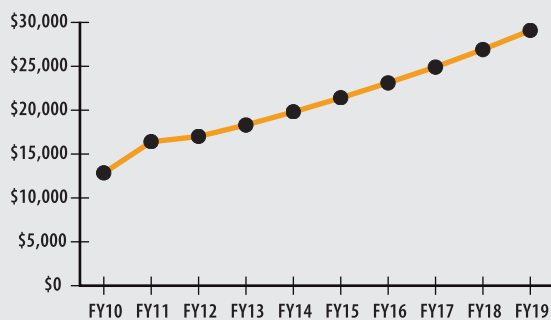
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

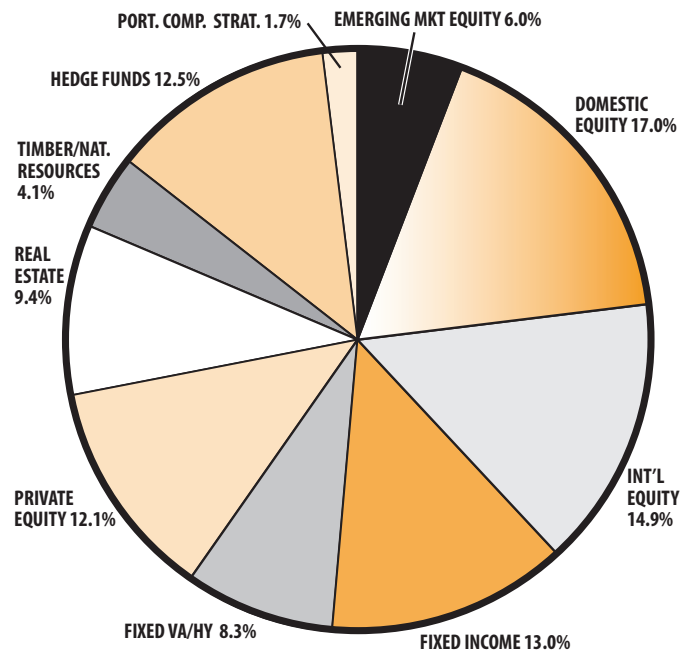
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.45%	8.77%	8.52%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.80%	5.89%	4.89%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.46%	9.78%	8.99%

## ACTUARIAL

▶ Funded Ratio	49.1%
▶ 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	2036
▶ Unfunded Liability	\$370.6 M
▶ Total Pension Appropriation (Fiscal 2019)	\$29.1 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 (12/31/18)

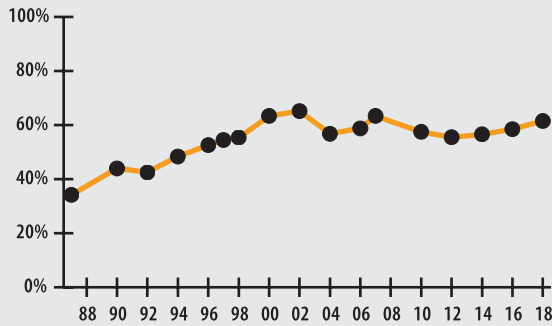


## EARNED INCOME OF DISABILITY RETIREES (2017)

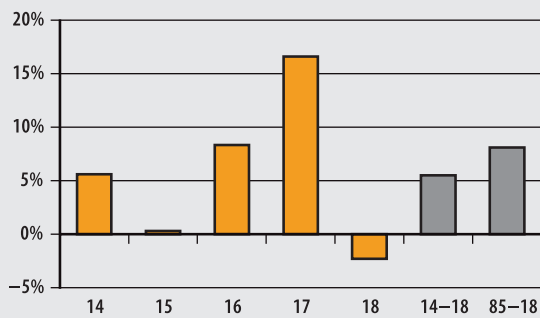
▶ Number of Disability Retirees	99
▶ Number Who Reported Earnings	31
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$67.23

▶ 2018 Return	-1.77%
▶ 2018 Market Value	\$356.8 M
▶ 2014-2018 (Annualized)	6.46%
▶ 1985-2018 (Annualized)	8.45%

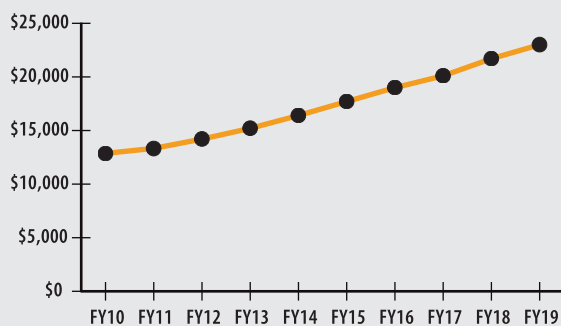
## FUNDED RATIO (1987-2018)



## INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



## 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



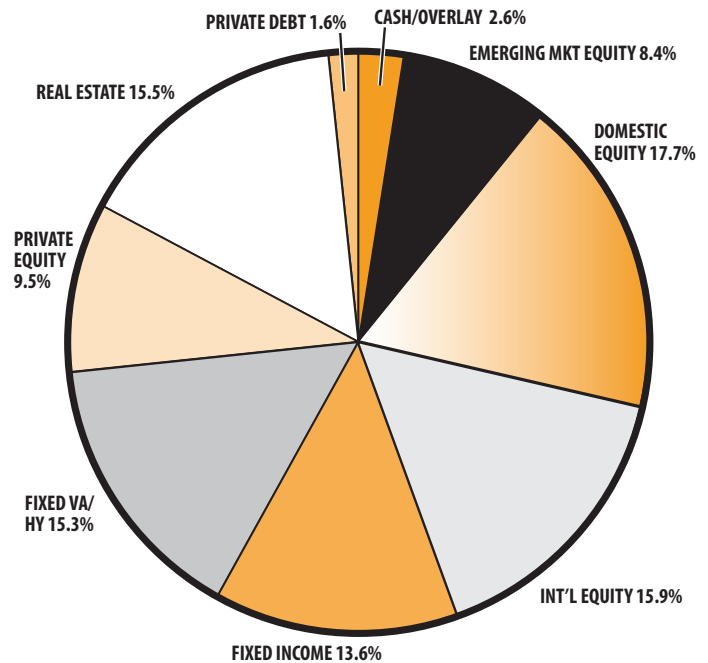
## INVESTMENT RETURN HISTORY

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.11%	8.44%	8.19%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.71%	6.05%	5.02%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.53%	8.43%	8.05%

## 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 2019)		\$23.0 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	71
▶ Number Who Reported Earnings	31
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-2.27%
▶ 2018 Market Value	\$308.6 M
▶ 2014-2018 (Annualized)	5.53%
▶ 1985-2018 (Annualized)	8.11%

## 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, Jr., William Klueber\*,  
James Cleary III, Esq.  
\*indicates Chairperson

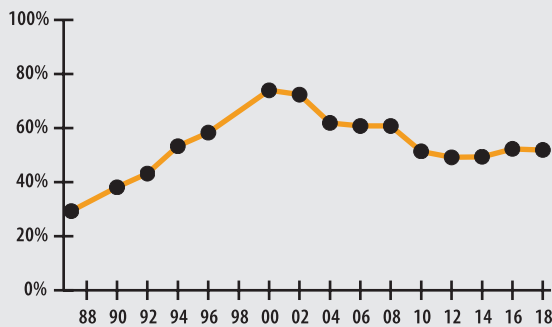
### Board Administrator

David Van Dam

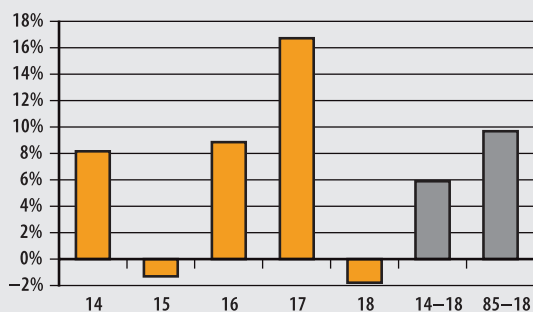
### Board Meeting

Second Tuesday of the month at 9:00 am

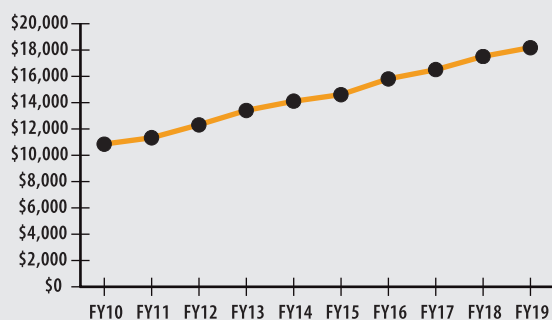
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

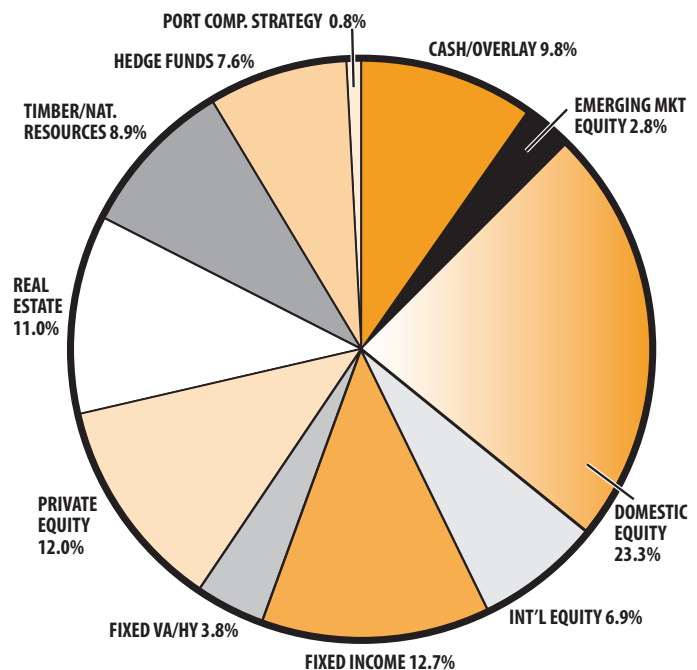
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.68%	10.05%	9.85%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.14%	6.06%	5.60%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.91%	9.52%	8.73%

## 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 2019)	\$18.2 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 (12/31/18)



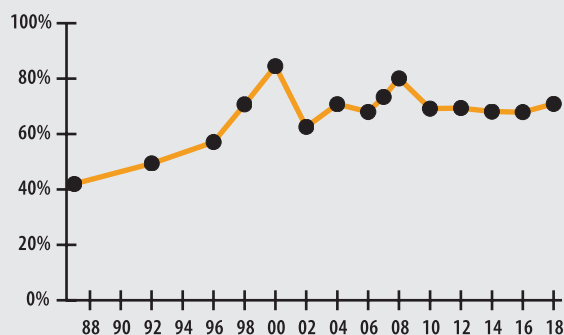
## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	69
▶ Number Who Reported Earnings	20
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

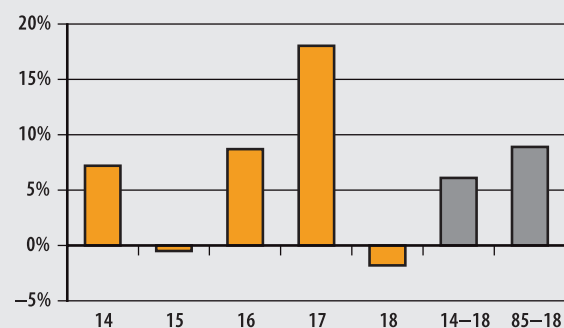
▶ 2018 Return	-1.77%
▶ 2018 Market Value	\$192.5 M
▶ 2014-2018 (Annualized)	5.91%
▶ 1985-2018 (Annualized)	9.68%



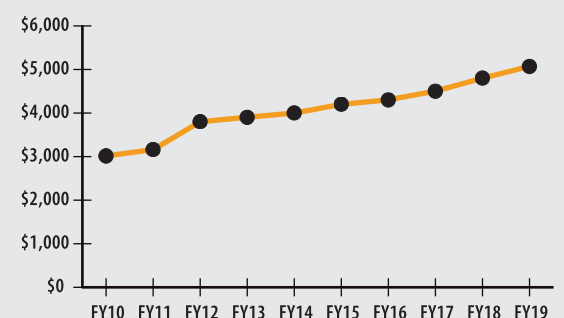
## FUNDED RATIO (1987-2018)



## INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



## 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



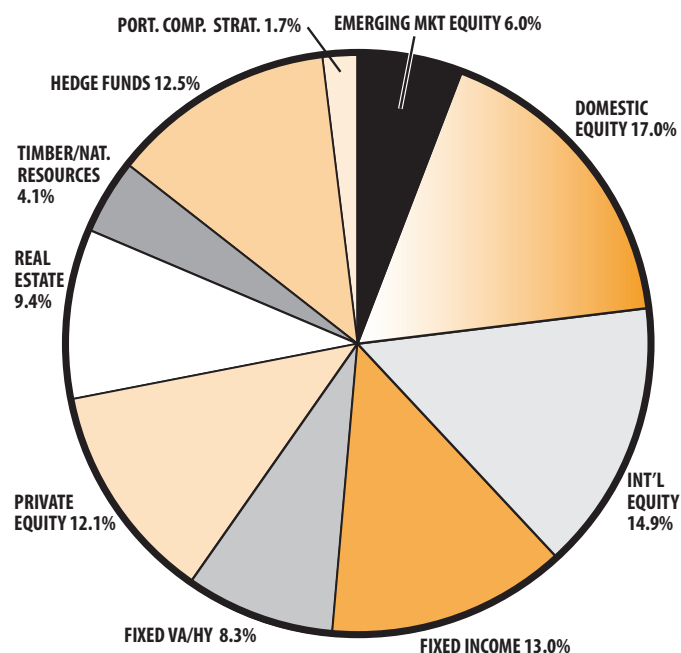
## INVESTMENT RETURN HISTORY

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.92%	9.26%	9.00%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.63%	5.11%	4.56%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.10%	9.00%	7.89%

## 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 2019)		\$5.1 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	627	318
▶ Total Payroll/Benefit	\$32.3 M	\$8.3 M
▶ Average Salary/Benefit	\$51,500	\$25,900
▶ Average Age	48	74
▶ Average Service	10.2 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	10
▶ Number Who Reported Earnings	1
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.79%
▶ 2018 Market Value	\$115.1 M
▶ 2014-2018 (Annualized)	6.10%
▶ 1985-2018 (Annualized)	8.92%

**Board Members**

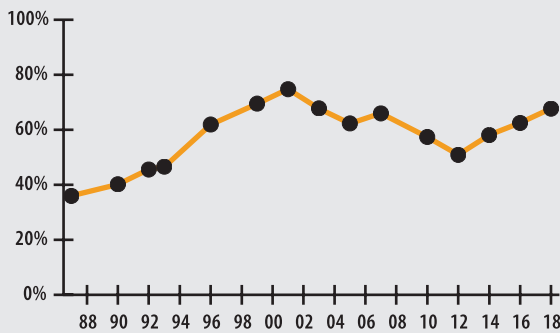
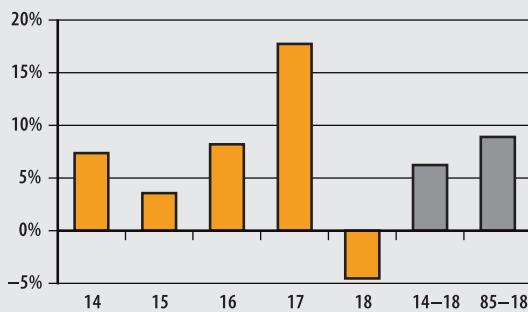
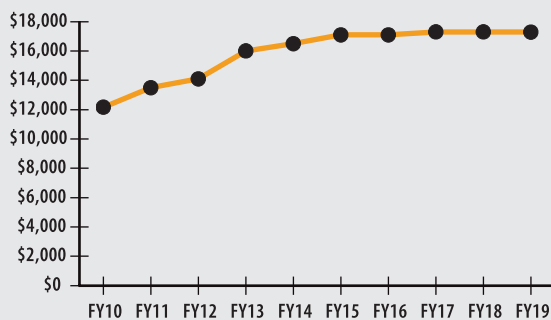
Tanya Wdowiak, Bellamy Schmidt,  
Anthony Dulude, John McCarthy\*,  
Michele Aubrey  
\*indicates Chairperson

**Board Administrator**

Cheryl Dugre

**Board Meeting**

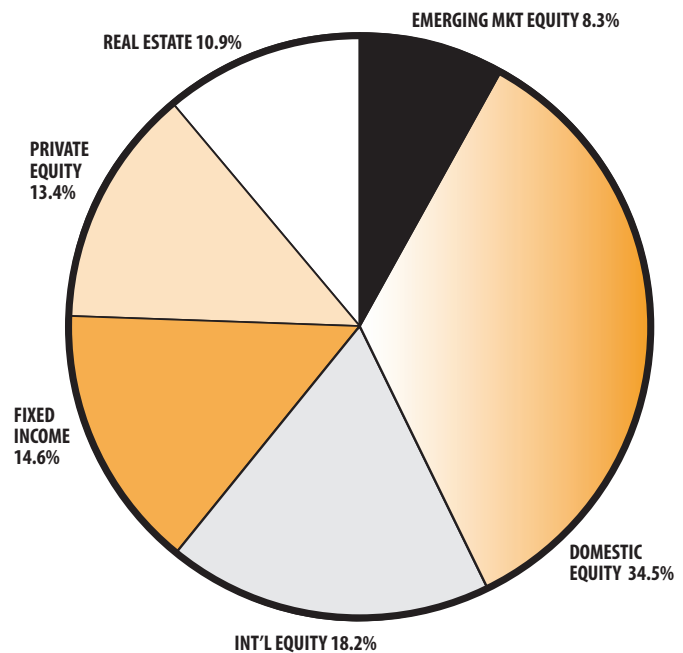
Last Wednesday of the month at 9:00 am

**FUNDED RATIO (1987-2018)**

**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**

**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**

**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
9.14%	9.58%	9.33%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
10.93%	7.14%	6.16%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.24%	11.14%	10.98%

**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 2019)		\$17.3 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)**

**EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	79
▶ Number Who Reported Earnings	16
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-4.51%
▶ 2018 Market Value	\$270.9 M
▶ 2014-2018 (Annualized)	6.24%
▶ 1985-2018 (Annualized)	9.14%

**Board Members**

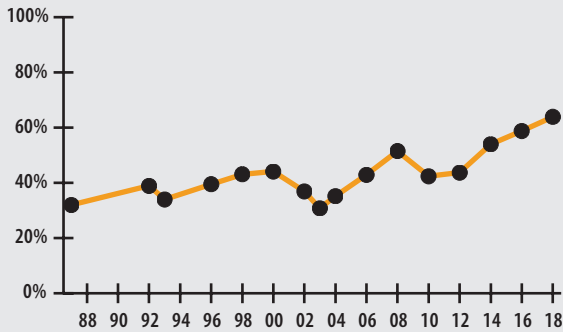
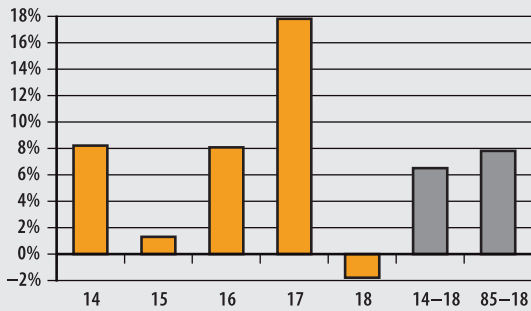
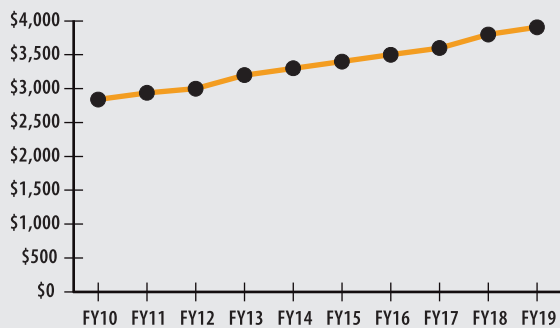
J. Michael Buckley\*, Eileen White,  
Brian Thompson, John King,  
Gregory Galvin  
\*indicates Chairperson

**Board Administrator**

Lauren Durham

**Board Meeting**

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

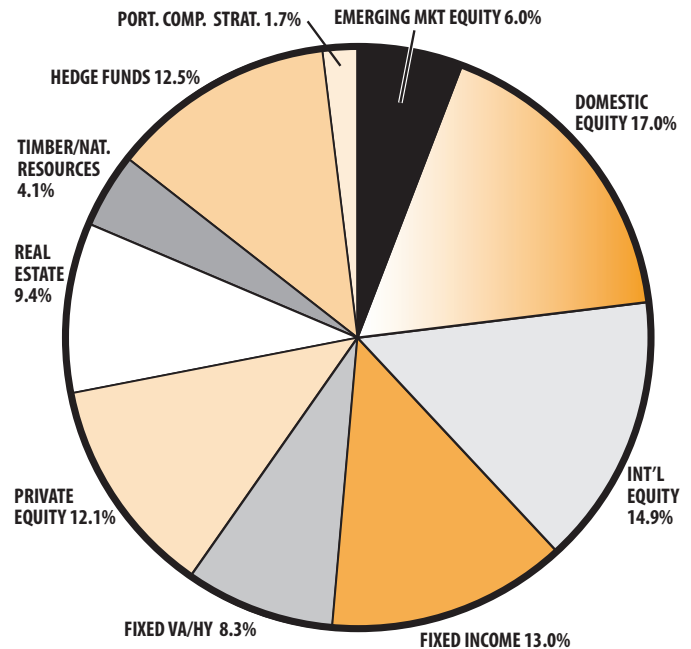
**FUNDED RATIO (1987-2018)****INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)****10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)****INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.82%	8.12%	7.83%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.14%	5.62%	5.09%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.53%	9.95%	9.20%

**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 2019)	\$3.9 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 (12/31/18)****EARNED INCOME OF DISABILITY RETIREES (2017)**

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

▶ 2018 Return	-1.78%
▶ 2018 Market Value	\$47.5 M
▶ 2014-2018 (Annualized)	6.53%
▶ 1985-2018 (Annualized)	7.82%

## 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,  
Gina Rizzo, Kevin Loughlin,  
William Bateman\*  
\*indicates Chairperson

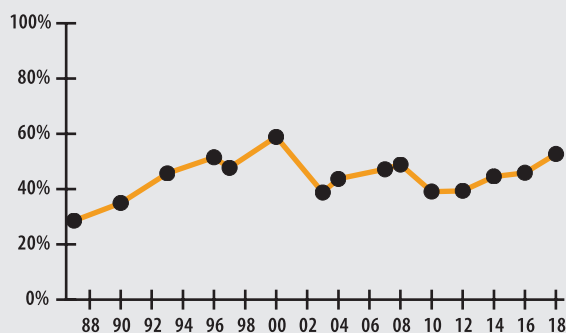
### Board Administrator

Diane Cockroft

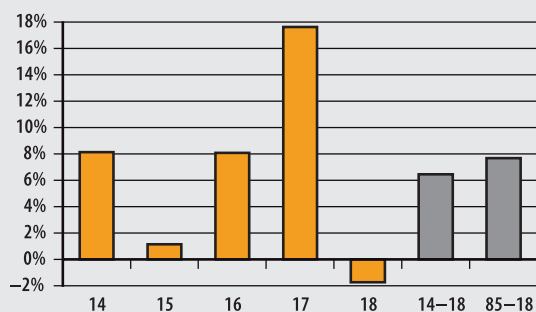
### Board Meeting

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

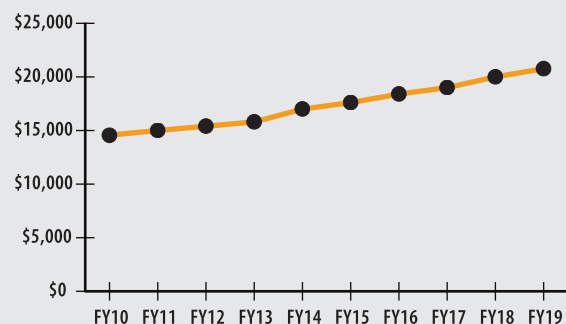
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

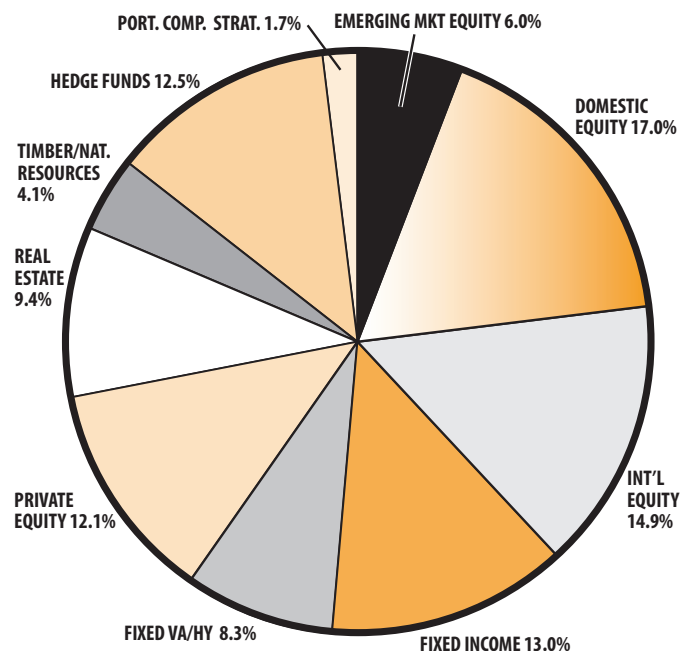
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
7.70%	8.00%	7.71%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.15%	5.63%	4.87%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.46%	9.88%	9.15%

## 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 2019)	\$20.8 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	112
▶ Number Who Reported Earnings	22
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.73%
▶ 2018 Market Value	\$221.9 M
▶ 2014-2018 (Annualized)	6.46%
▶ 1985-2018 (Annualized)	7.70%

## 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,  
John Perry, Jonathan Campagna,  
Douglas Farwell  
\*indicates Chairperson

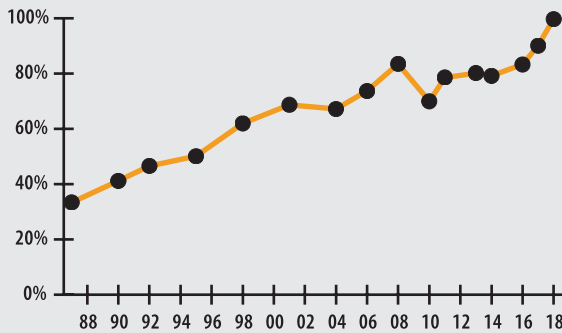
### Board Administrator

Erin Kelley

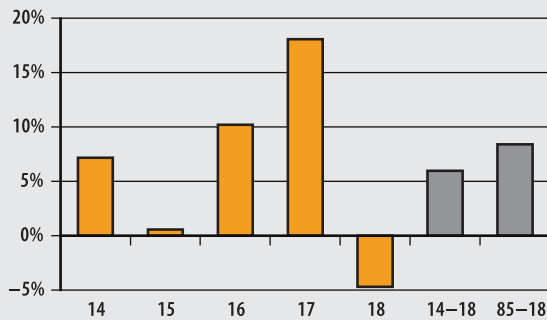
### Board Meeting

Last Tuesday of the month at 10:00 am

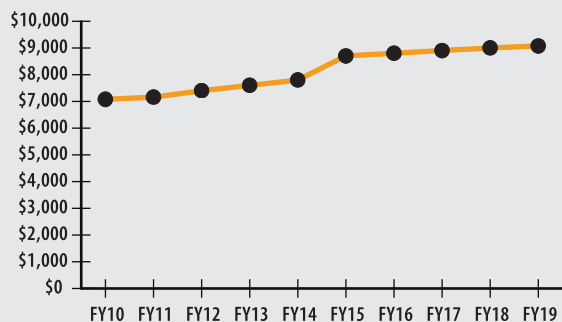
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

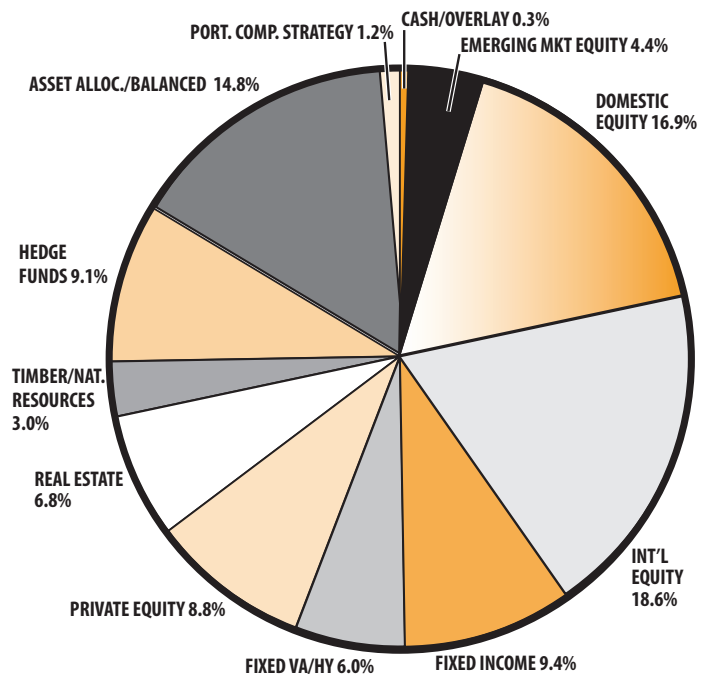
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.41%	8.83%	8.55%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.59%	6.42%	5.75%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.99%	11.32%	10.74%

## ACTUARIAL

▶ Funded Ratio	99.7%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Stone
▶ Assumed Rate of Return	5.50%
▶ Funding Schedule	Normal Cost
▶ Year Fully Funded	2020
▶ Unfunded Liability	\$701 K
▶ Total Pension Appropriation (Fiscal 2019)	\$9.1 M

	ACTIVE	RETIRED
▶ Number of Members	611	415
▶ Total Payroll/Benefit	\$28.8 M	\$9.6 M
▶ Average Salary/Benefit	\$47,200	\$23,100
▶ Average Age	45	73
▶ Average Service	11 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	34
▶ Number Who Reported Earnings	16
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-4.68%
▶ 2018 Market Value	\$196.8 M
▶ 2014-2018 (Annualized)	5.99%
▶ 1985-2018 (Annualized)	8.41%

## Lexington

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

### Board Members

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

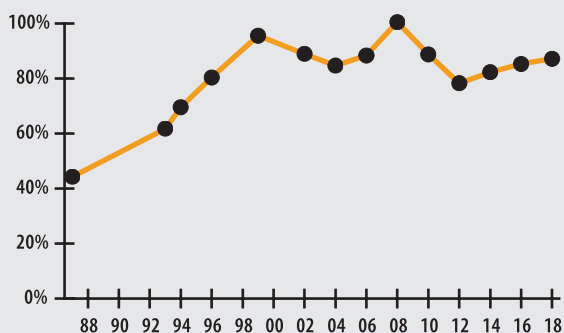
### Board Administrator

Marguerite Oliva

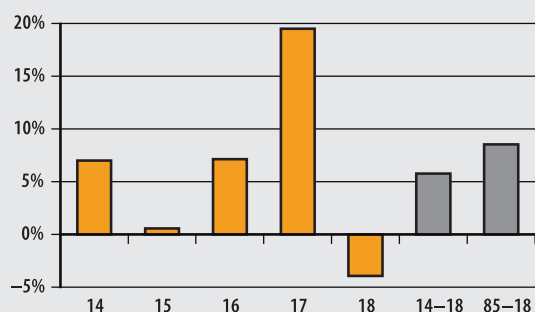
### Board Meeting

Last Thursday of each month at 8:00 am

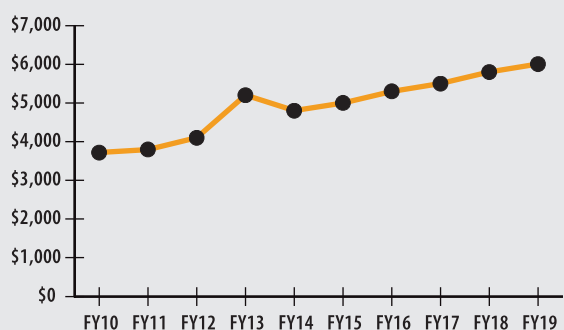
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

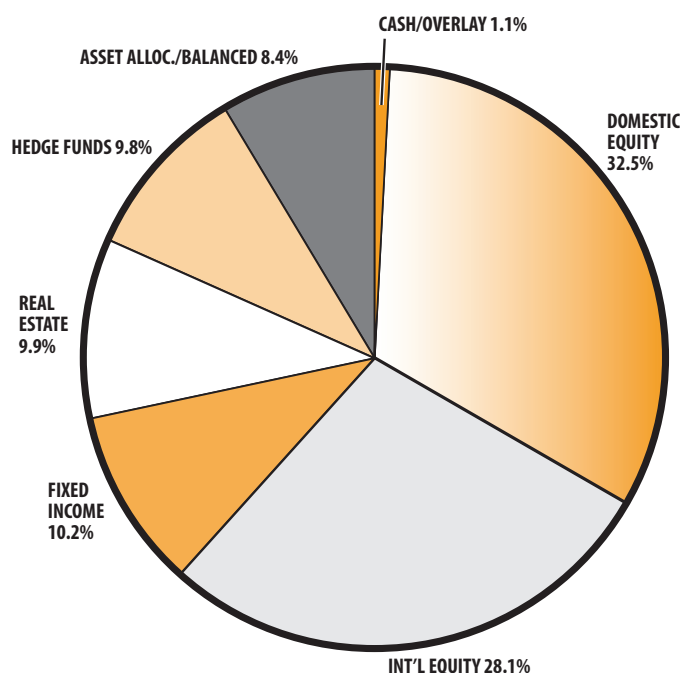
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.55%	8.96%	8.64%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.86%	5.04%	4.48%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.77%	9.43%	8.51%

## 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 2019)	\$6.0 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 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	22
▶ Number Who Reported Earnings	9
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-3.93%
▶ 2018 Market Value	\$157.9 M
▶ 2014-2018 (Annualized)	5.77%
▶ 1985-2018 (Annualized)	8.55%



## Lowell

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

### Board Members

Bryan Perry, David Keene,  
Joseph Mahoney\*, William Desrosiers,  
Michael Brennan  
\*indicates Chairperson

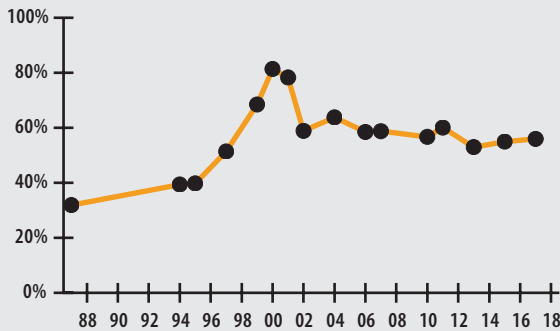
### Board Administrator

Shannon Dowd

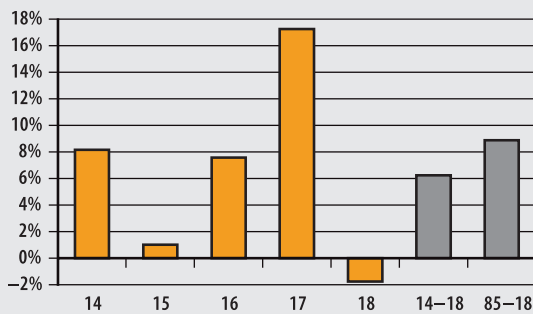
### Board Meeting

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

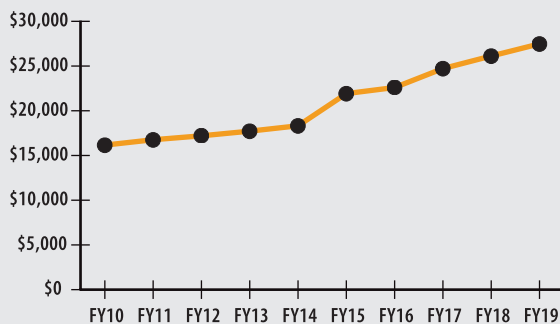
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

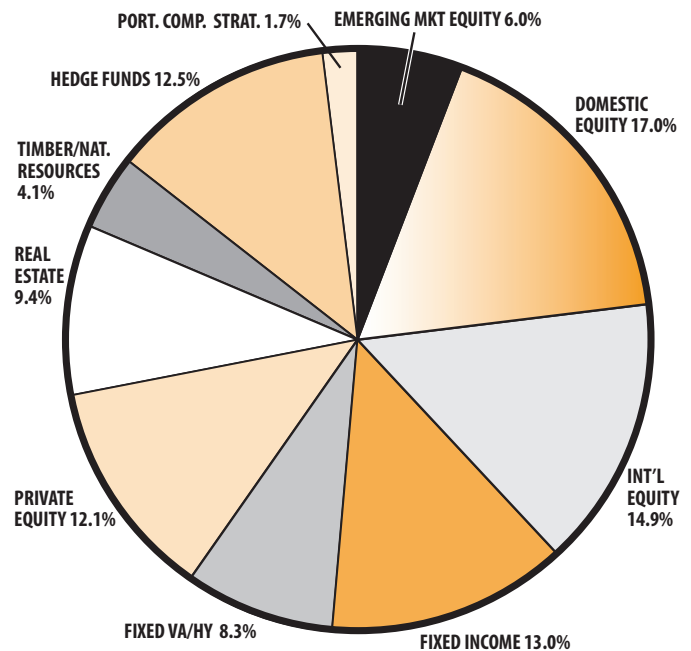
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.90%	9.24%	8.99%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.88%	5.36%	4.86%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.26%	9.65%	8.94%

## ACTUARIAL

▶ Funded Ratio	56.0%
▶ Date of Last Valuation	1/1/17
▶ Actuary	KMS
▶ Assumed Rate of Return	7.75%
▶ Funding Schedule	4.0% Increasing Phase-In
▶ Year Fully Funded	2036
▶ Unfunded Liability	\$269.8 M
▶ Total Pension Appropriation (Fiscal 2019)	\$27.4 M

	ACTIVE	RETIRED
▶ Number of Members	1,693	1,226
▶ Total Payroll/Benefit	\$92.8 M	\$35.9 M
▶ Average Salary/Benefit	\$54,800	\$29,300
▶ Average Age	47	72
▶ Average Service	13.1 years	NA

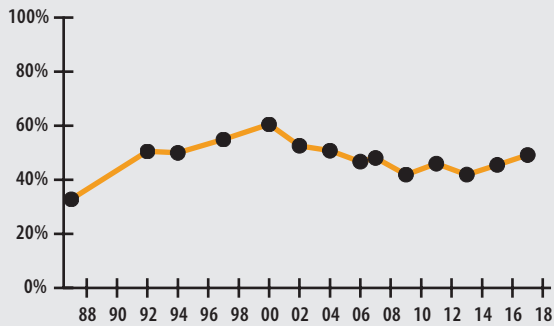
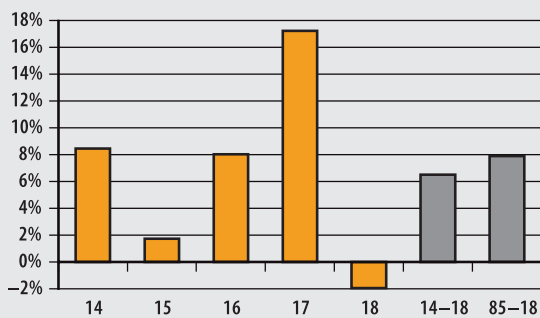
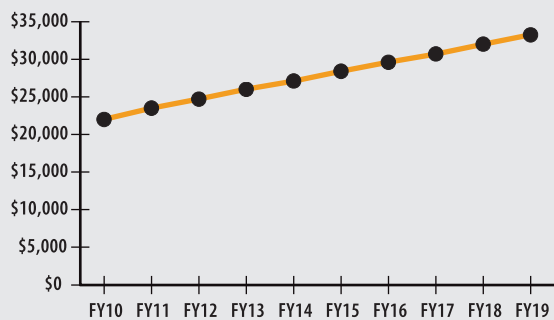
## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	166
▶ Number Who Reported Earnings	53
▶ Number of Excess Earners	3
▶ Total Amount of Refund Due	\$53,957.53

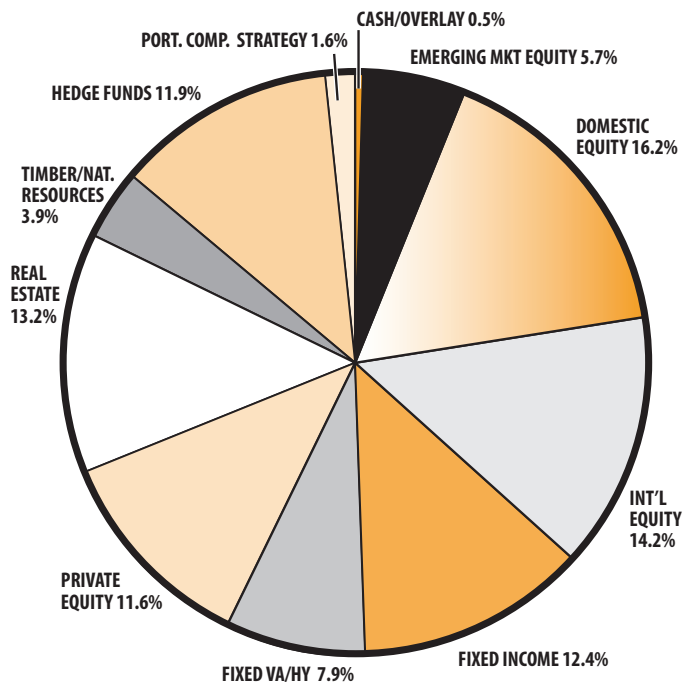
▶ 2018 Return	-1.74%
▶ 2018 Market Value	\$368.0 M
▶ 2014-2018 (Annualized)	6.26%
▶ 1985-2018 (Annualized)	8.90%

**FUNDED RATIO (1987-2018)****INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)****10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)****INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.90%	8.21%	7.94%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
8.51%	5.34%	4.69%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.51%	9.97%	9.25%

**ACTUARIAL**

▶ Funded Ratio	49.2%	
▶ Date of Last Valuation	1/1/17	
▶ Actuary	PERAC	
▶ Assumed Rate of Return	7.40%	
▶ Funding Schedule	Varies Total Increasing	
▶ Year Fully Funded	2034	
▶ Unfunded Liability	\$321.7 M	
▶ Total Pension Appropriation (Fiscal 2019)	\$33.2 M	
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	1,322	1,187
▶ Total Payroll/Benefit	\$75.8 M	\$36.0 M
▶ Average Salary/Benefit	\$57,300	\$30,300
▶ Average Age	50	75
▶ Average Service	15.3 years	NA

**ASSET ALLOCATION (12/31/18)****EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	148
▶ Number Who Reported Earnings	37
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.94%
▶ 2018 Market Value	\$349.4 M
▶ 2014-2018 (Annualized)	6.51%
▶ 1985-2018 (Annualized)	7.90%

## 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, Jr.\*,  
Gregory Lucey  
\*indicates Chairperson

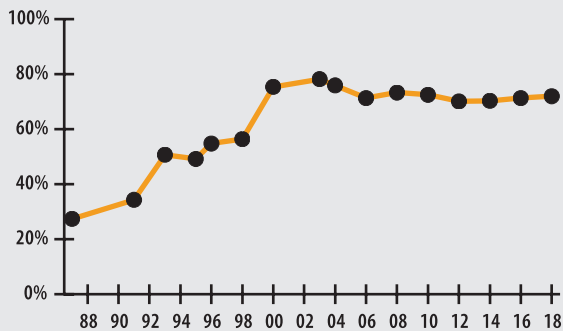
### Board Administrator

James Ryan

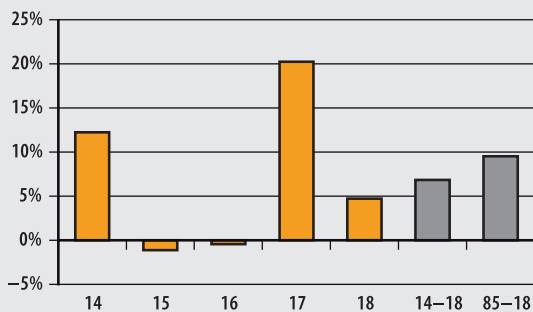
### Board Meeting

Third Wednesday of each month at 8:30 am

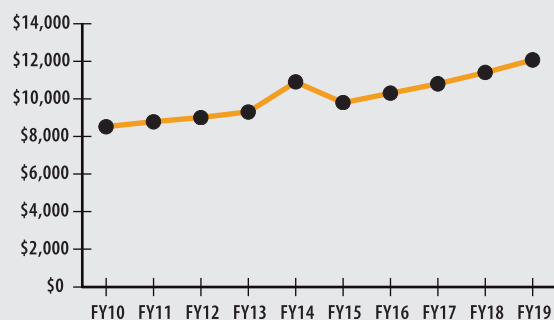
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

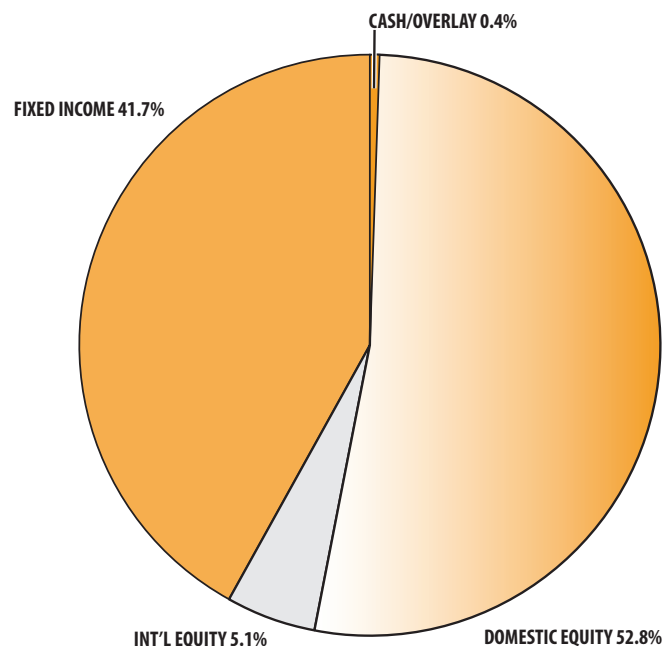
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.53%	9.68%	9.36%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.41%	6.44%	6.04%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.84%	9.21%	7.49%

## 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 2019)	\$12.1 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
▶ Average Service	12.9 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	86
▶ Number Who Reported Earnings	22
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$59,265.00

▶ 2018 Return	4.73%
▶ 2018 Market Value	\$258.3 M
▶ 2014-2018 (Annualized)	6.84%
▶ 1985-2018 (Annualized)	9.53%

## Marblehead

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

### Board Members

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

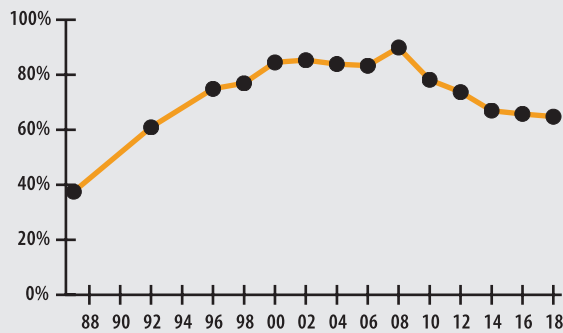
### Board Administrator

Linda Gifford

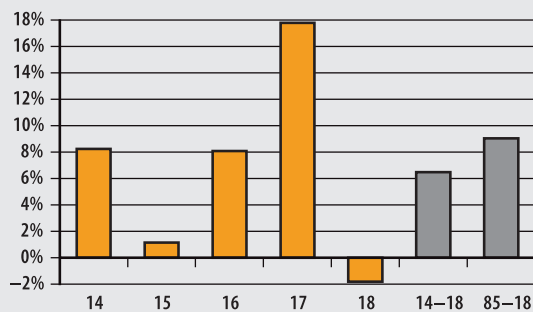
### Board Meeting

Varies

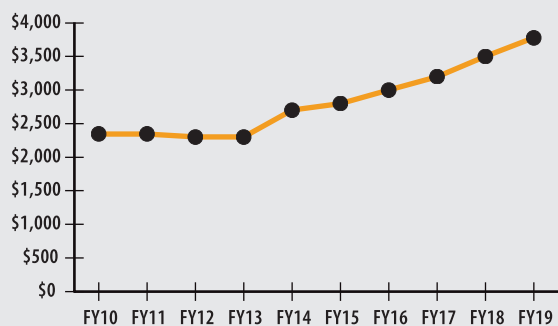
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

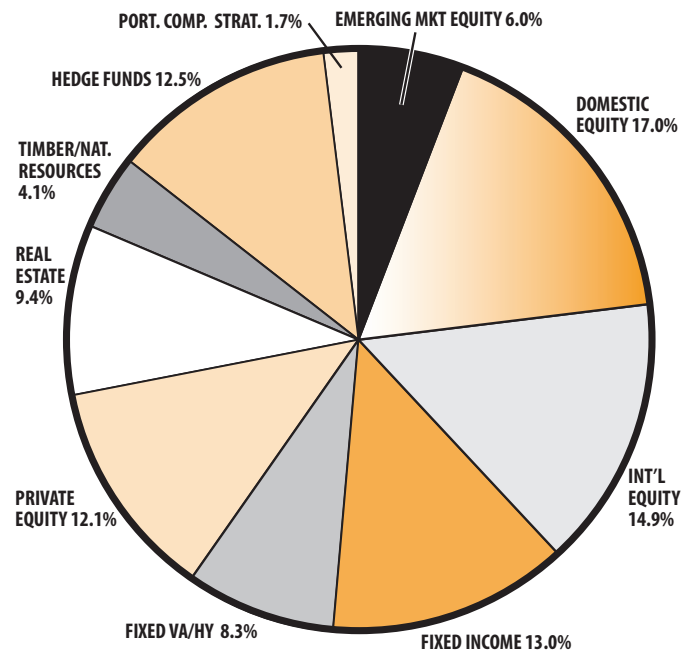
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.04%	9.39%	9.14%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.20%	5.65%	5.13%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.49%	9.96%	9.22%

## 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 2019)	\$3.8 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	18
▶ Number Who Reported Earnings	8
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.81%
▶ 2018 Market Value	\$95.0 M
▶ 2014-2018 (Annualized)	6.49%
▶ 1985-2018 (Annualized)	9.04%

## 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

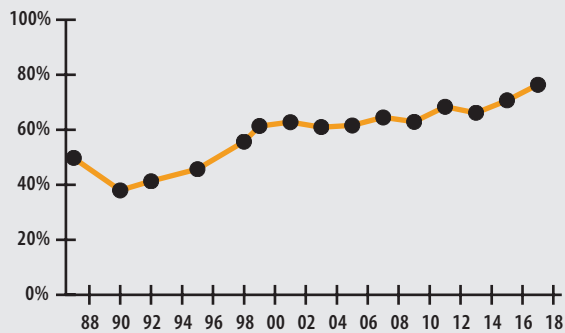
### Board Administrator

Margaret Shea

### Board Meeting

Last Tuesday of each month at 8:15 am

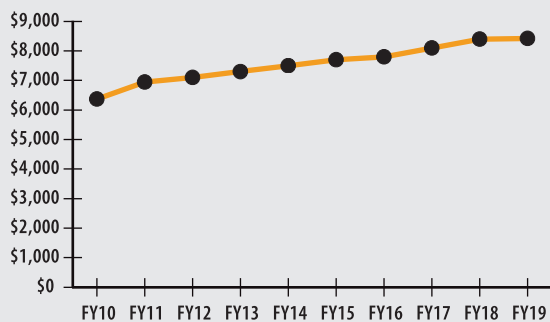
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

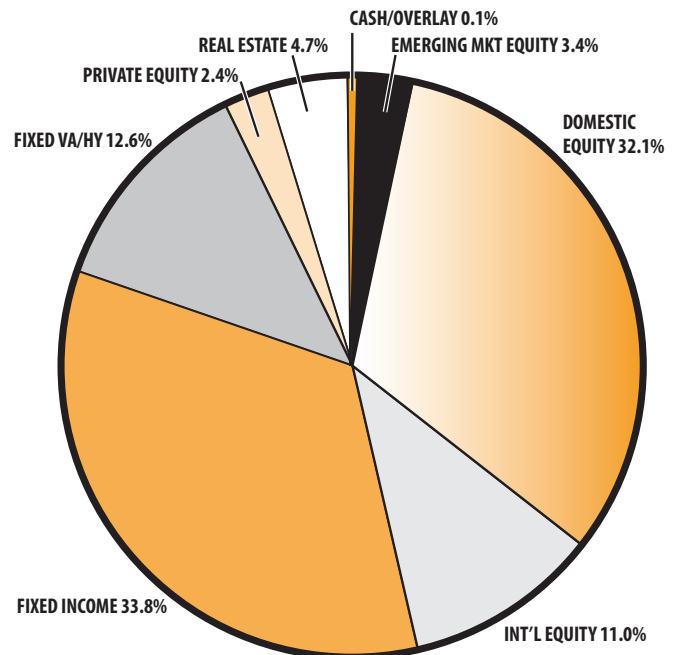
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.06%	8.46%	8.31%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
7.78%	5.81%	5.17%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
4.42%	8.18%	7.71%

## ACTUARIAL

▶ Funded Ratio	76.4%
▶ Date of Last Valuation	1/1/17
▶ Actuary	Sherman
▶ Assumed Rate of Return	7.50%
▶ Funding Schedule	4.5% Increasing
▶ Year Fully Funded	2025
▶ Unfunded Liability	\$47.3 M
▶ Total Pension Appropriation (Fiscal 2019)	\$8.4 M

	ACTIVE	RETIRED
▶ Number of Members	610	415
▶ Total Payroll/Benefit	\$32.6 M	\$12.1 M
▶ Average Salary/Benefit	\$53,400	\$29,100
▶ Average Age	NA	71
▶ Average Service	NA years	NA

## ASSET ALLOCATION (12/31/18)

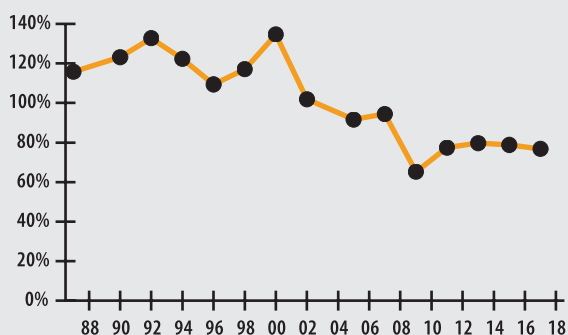


## EARNED INCOME OF DISABILITY RETIREES (2017)

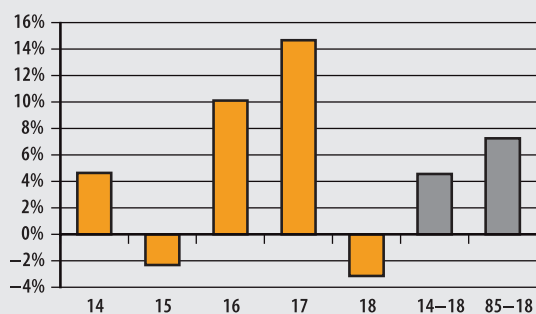
▶ Number of Disability Retirees	28
▶ Number Who Reported Earnings	9
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-4.43%
▶ 2018 Market Value	\$162.1 M
▶ 2014-2018 (Annualized)	4.42%
▶ 1985-2018 (Annualized)	8.06%

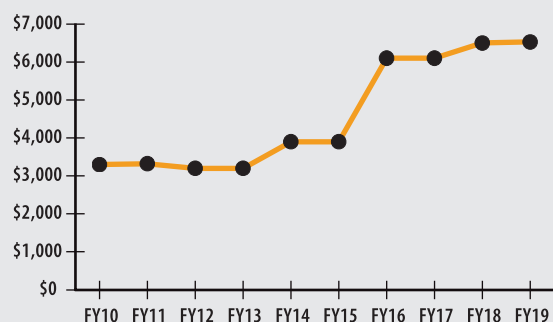
#### FUNDED RATIO (1987-2018)



#### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



#### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



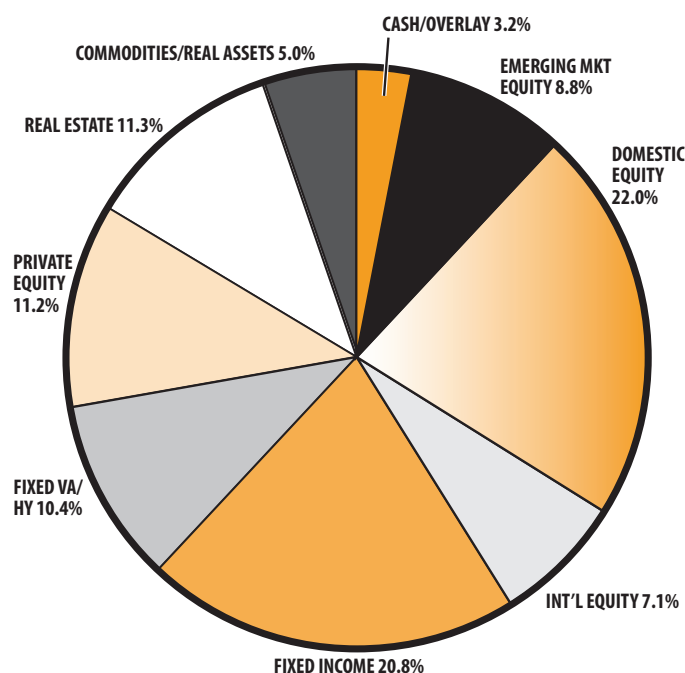
#### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.26%	7.59%	7.38%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
7.86%	5.19%	4.50%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
4.58%	7.54%	7.09%

#### ACTUARIAL

▶ Funded Ratio		76.8%
▶ Date of Last Valuation		1/1/17
▶ Actuary		Stone
▶ Assumed Rate of Return		7.50%
▶ Funding Schedule		Level
▶ Year Fully Funded		2026
▶ Unfunded Liability		\$38.7 M
▶ Total Pension Appropriation (Fiscal 2019)		\$6.5 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	340	151
▶ Total Payroll/Benefit	\$32.0 M	\$9.9 M
▶ Average Salary/Benefit	\$94,200	\$65,600
▶ Average Age	50	71
▶ Average Service	14.3 years	NA

#### ASSET ALLOCATION (12/31/18)



#### EARNED INCOME OF DISABILITY RETIREES (2017)

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

▶ 2018 Return	-3.14%
▶ 2018 Market Value	\$146.2 M
▶ 2014-2018 (Annualized)	4.58%
▶ 1985-2018 (Annualized)	7.26%



## Massport

One Harborside Drive  
Suite 2005  
East Boston, MA 02128  
Phone 617-568-3951  
Fax 617-568-3957

### Board Members

Anna Tenaglia, Michael Grieco,  
Betsy Taylor, Michael O'Brien,  
James Hoyte\*  
\*indicates Chairperson

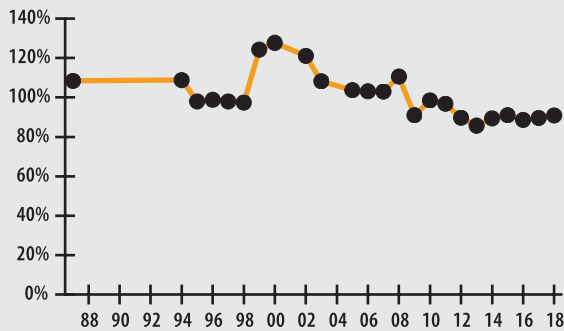
### Board Administrator

Irene Moran

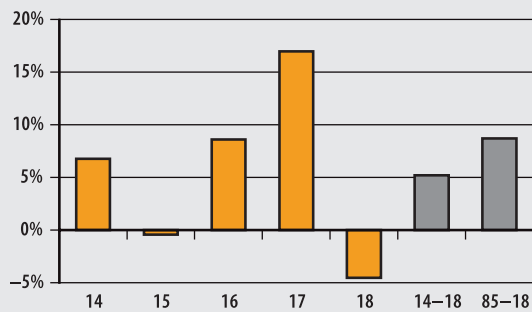
### Board Meeting

Last Thursday of every month at 9:00 am

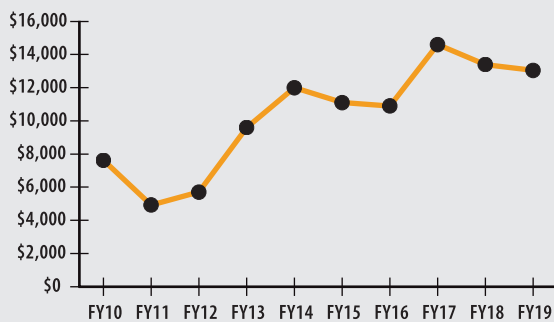
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

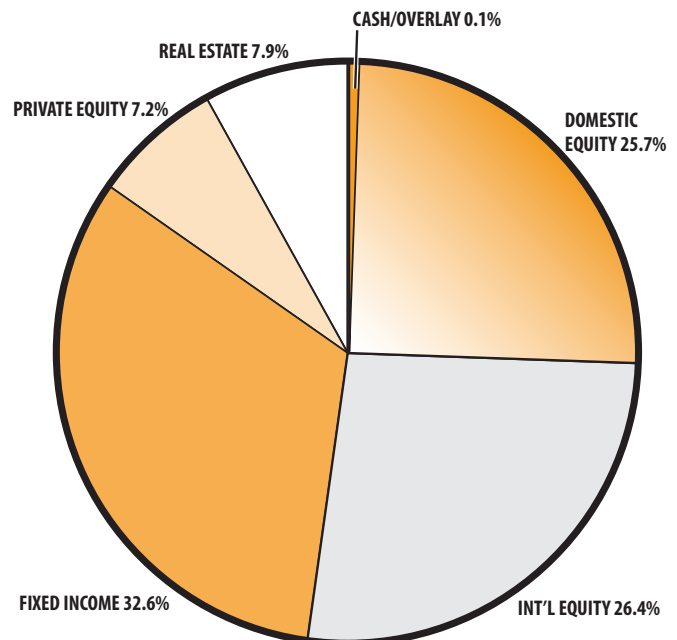
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.72%	9.15%	8.92%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.95%	6.13%	5.28%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.22%	9.25%	8.54%

## ACTUARIAL

▶ Funded Ratio	90.9%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Stone
▶ Assumed Rate of Return	7.25%
▶ Funding Schedule	Frozen Entry Age
▶ Year Fully Funded	NA
▶ Unfunded Liability	\$62.7 M
▶ Total Pension Appropriation (Fiscal 2019)	\$13.0 M

	ACTIVE	RETIRED
▶ Number of Members	1,288	826
▶ Total Payroll/Benefit	\$110.2 M	\$32.6 M
▶ Average Salary/Benefit	\$85,600	\$39,400
▶ Average Age	47	70
▶ Average Service	13 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	48
▶ Number Who Reported Earnings	12
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-4.53%
▶ 2018 Market Value	\$606.5 M
▶ 2014-2018 (Annualized)	5.22%
▶ 1985-2018 (Annualized)	8.72%

#### Board Members

State Treasurer Deborah B. Goldberg (Nicola Favorito designee),  
State Auditor Suzanne Bump (Michael Ruane designee),  
Jeff Wulfson (Chairperson designee), Anne Wass,  
Dennis Naughton, Jacqueline Gorrie, Richard Liston

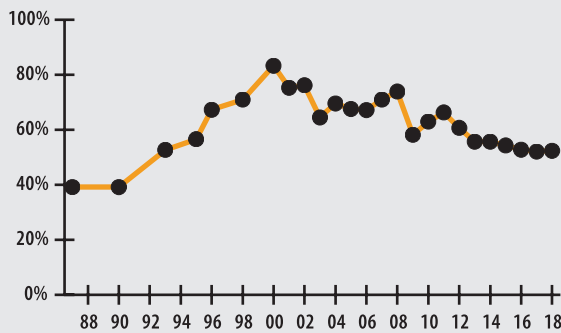
#### Board Administrator

Erika Glaster

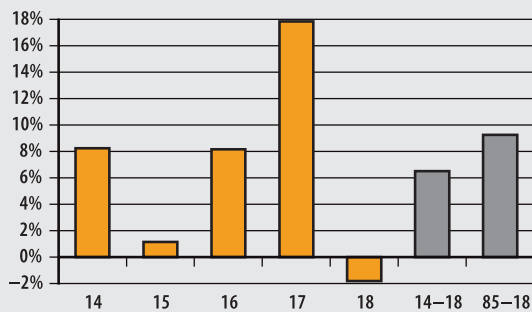
#### Board Meeting

Typically the last Friday of the  
month at 9:00 am

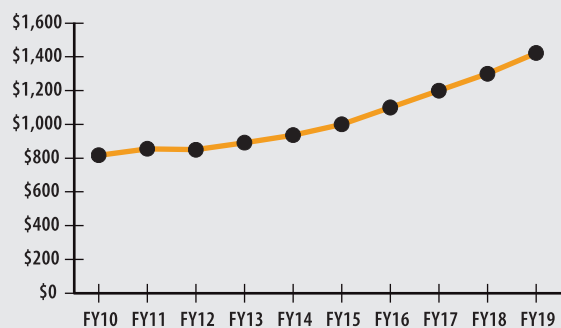
#### FUNDED RATIO (1987-2018)



#### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



#### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



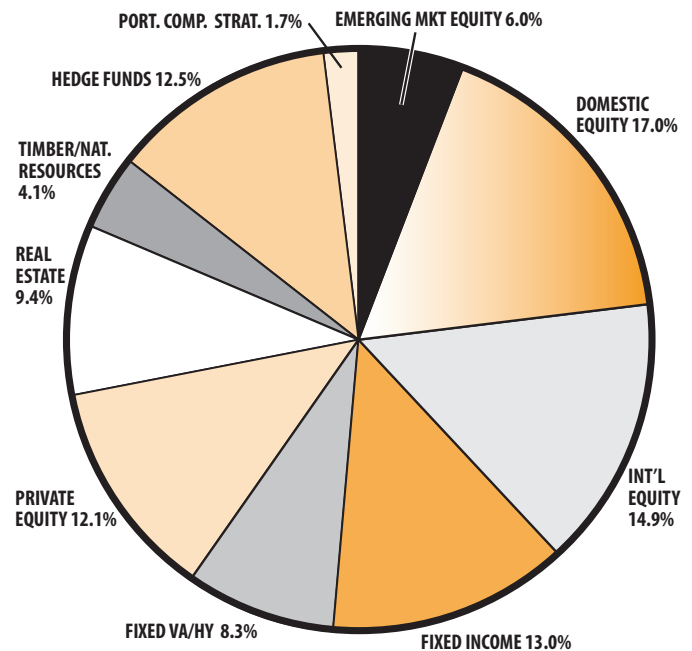
#### INVESTMENT RETURN HISTORY

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.27%	9.62%	9.37%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.25%	5.68%	5.15%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.51%	10.01%	9.28%

#### ACTUARIAL

▶ Funded Ratio		52.4%
▶ Date of Last Valuation		1/1/18
▶ Actuary		PERAC
▶ Assumed Rate of Return		7.35%
▶ Funding Schedule	8.94% Total Increasing	
▶ Year Fully Funded		2036
▶ Unfunded Liability		\$24.6 B
▶ Total Pension Appropriation (Fiscal 2019)		\$1.4 B
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	93,119	66,078
▶ Total Payroll/Benefit	\$6.8 B	\$2.9 B
▶ Average Salary/Benefit	\$73,300	\$44,400
▶ Average Age	44	72
▶ Average Service	13.1 years	NA

#### ASSET ALLOCATION (12/31/18)

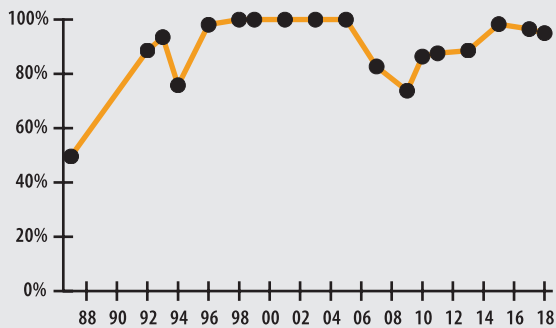


#### EARNED INCOME OF DISABILITY RETIREES (2017)

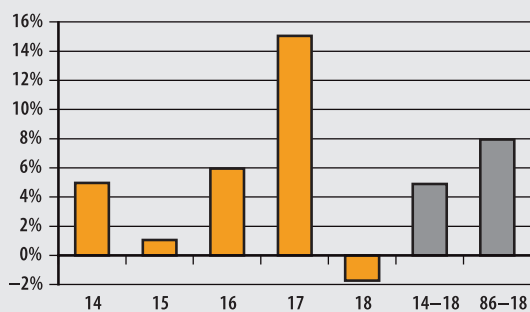
▶ Number of Disability Retirees	555
▶ Number Who Reported Earnings	116
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$12,575.64

▶ 2018 Return	-1.81%
▶ 2018 Market Value	\$27.1 B
▶ 2014-2018 (Annualized)	6.51%
▶ 1985-2018 (Annualized)	9.27%

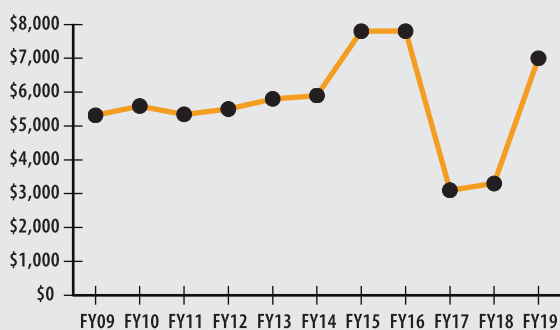
#### FUNDED RATIO (1987-2018)



#### INVESTMENT RETURN (2014-2018, 5 YEAR AND 33 YEAR AVERAGES)



#### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



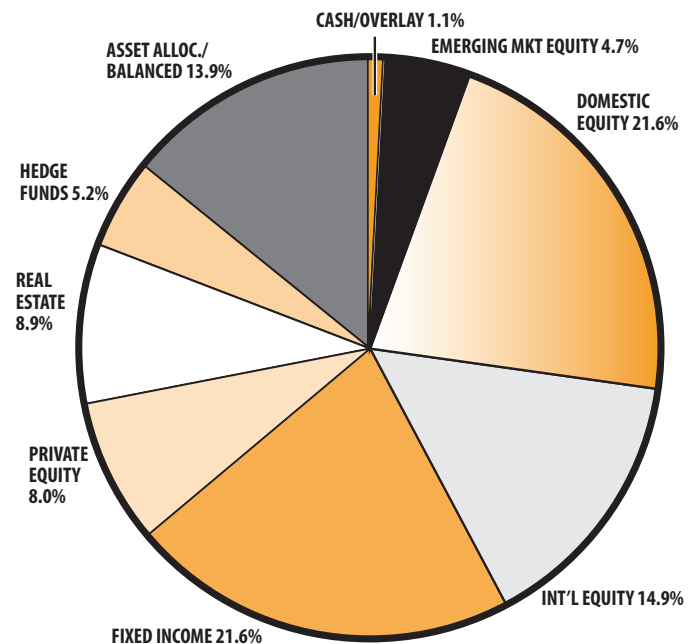
#### INVESTMENT RETURN HISTORY

<u>33 years 2018</u>	<u>32 years 2017</u>	<u>31 years 2016</u>
7.95%	8.27%	8.06%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.07%	6.54%	5.92%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
4.91%	8.60%	8.36%

#### ACTUARIAL

▶ Funded Ratio		95.0%
▶ Date of Last Valuation		1/1/18
▶ Actuary		Segal
▶ Assumed Rate of Return		7.50%
▶ Funding Schedule		4.5% Total Increasing
▶ Year Fully Funded		2026
▶ Unfunded Liability		\$27.7 M
▶ Total Pension Appropriation (Fiscal 2019)		\$7.0 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	1,100	582
▶ Total Payroll/Benefit	\$93.0 M	\$20.2 M
▶ Average Salary/Benefit	\$84,500	\$34,800
▶ Average Age	51	69
▶ Average Service	18 years	NA

#### ASSET ALLOCATION (12/31/18)



#### EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	68
▶ Number Who Reported Earnings	16
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.73%
▶ 2018 Market Value	\$508.8 M
▶ 2014-2018 (Annualized)	4.91%
▶ 1986-2018 (Annualized)	7.95%*

\* Based on 33-year return

**Board Members**

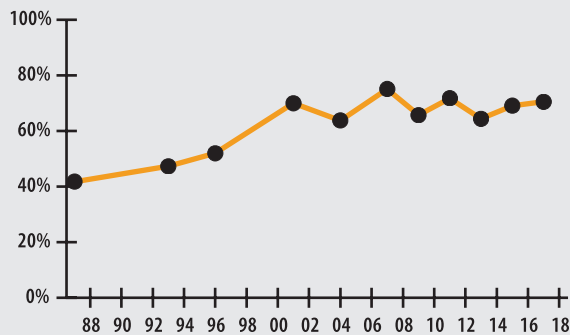
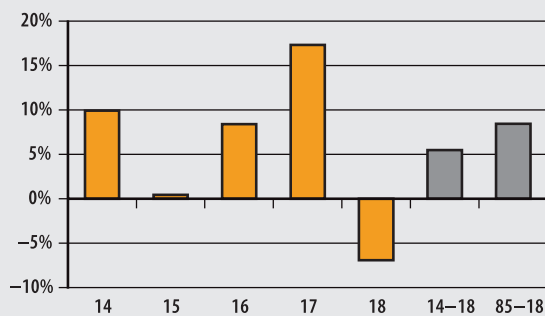
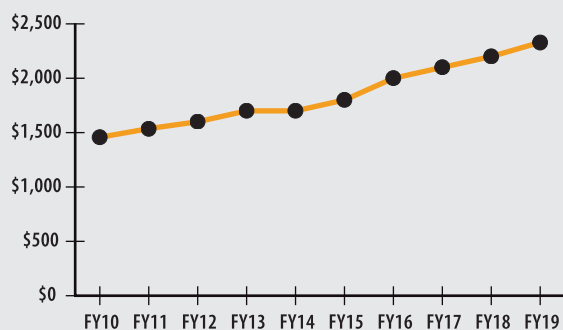
Michael Guzzo, Kevin Petersen,  
Jean Ignachuck, Clifford Wilson,  
Christopher Connolly\*  
\*indicates Chairperson

**Board Administrator**

Kenneth DeMars

**Board Meeting**

The last Thursday of The month at 12:15 pm

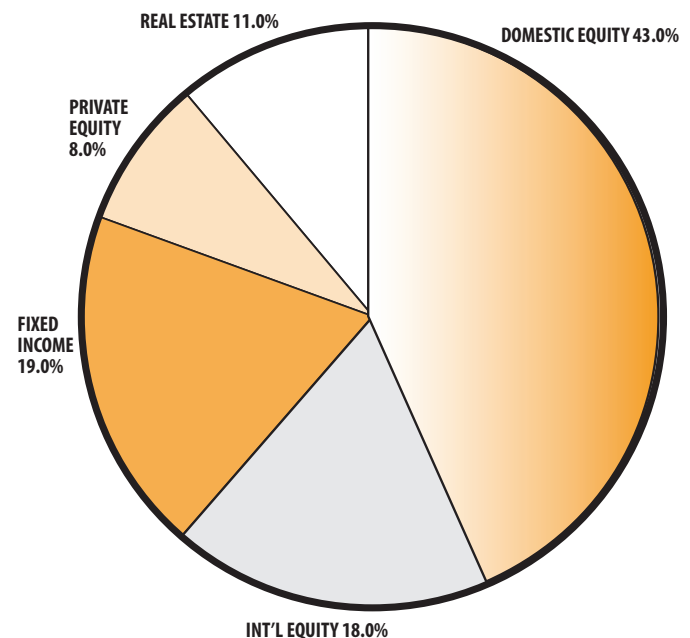
**FUNDED RATIO (1987-2018)**

**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**

**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**

**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.67%	8.15%	7.87%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
8.74%	6.14%	5.35%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
5.51%	10.72%	9.40%

**ACTUARIAL**

▶ Funded Ratio	70.5%
▶ Date of Last Valuation	1/1/17
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.00%
▶ Funding Schedule	6.0% Total Increasing
▶ Year Fully Funded	2035
▶ Unfunded Liability	\$16.7 M
▶ Total Pension Appropriation (Fiscal 2019)	\$2.3 M

	ACTIVE	RETIRED
▶ Number of Members	220	108
▶ Total Payroll/Benefit	\$9.8 M	\$2.9 M
▶ Average Salary/Benefit	\$44,700	\$26,600
▶ Average Age	47	75
▶ Average Service	9.9 years	NA

**ASSET ALLOCATION (12/31/18)**

**EARNED INCOME OF DISABILITY RETIREES (2017)**

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

▶ 2018 Return	-6.90%
▶ 2018 Market Value	\$42.1 M
▶ 2014-2018 (Annualized)	5.51%
▶ 1985-2018 (Annualized)	7.67%

## 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

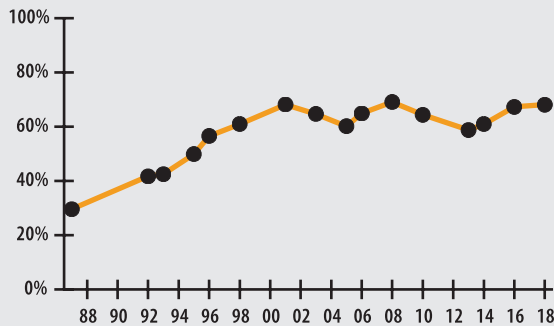
### Board Administrator

Mark Minervini

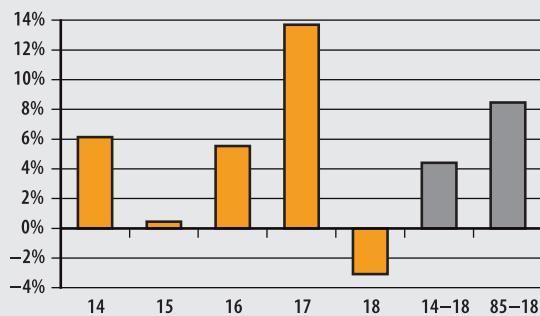
### Board Meeting

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

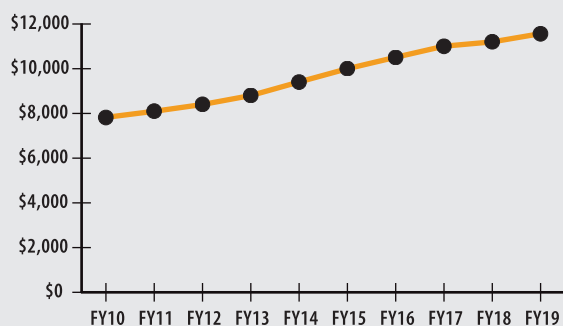
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

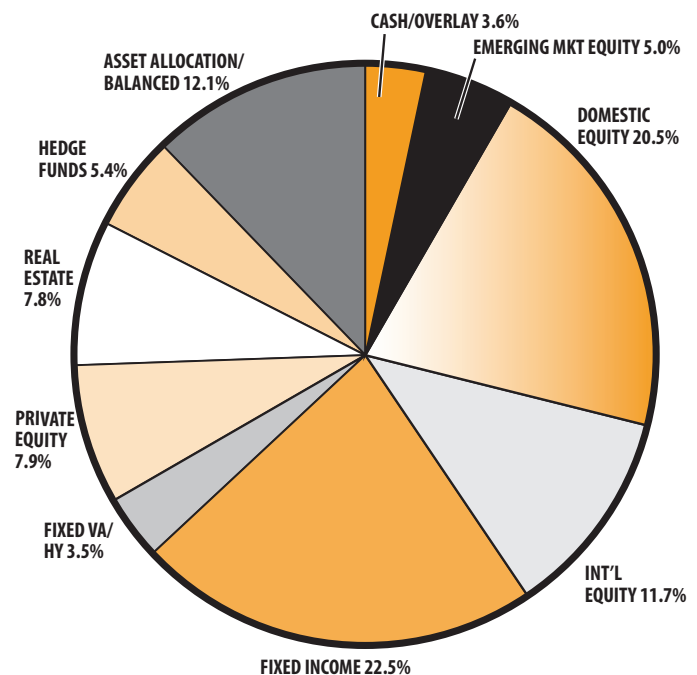
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.47%	8.84%	8.69%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.04%	5.65%	5.00%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
4.40%	7.33%	7.20%

## 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 2019)	\$11.6 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 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	97
▶ Number Who Reported Earnings	15
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-3.07%
▶ 2018 Market Value	\$183.9 M
▶ 2014-2018 (Annualized)	4.40%
▶ 1985-2018 (Annualized)	8.47%

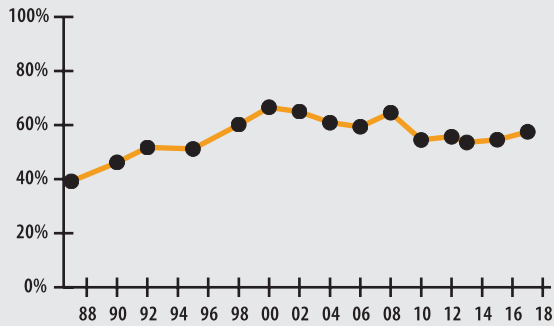
## Melrose

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

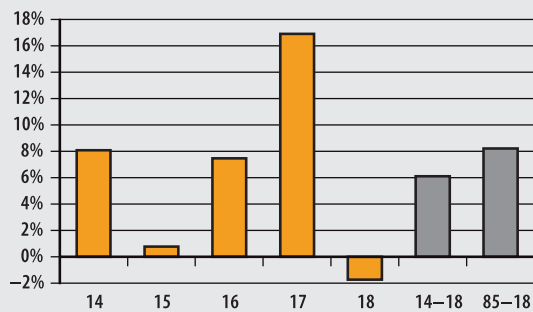
**Board Members**  
Patrick Dello Russo\*, Kelly Cogavin,  
Scott Colborne, Michael Lyle,  
Mark Garipay  
\*indicates Chairperson

**Board Administrator**  
Adam Travinski  
**Board Meeting**  
The last Wednesday of each month  
at 9:00 am

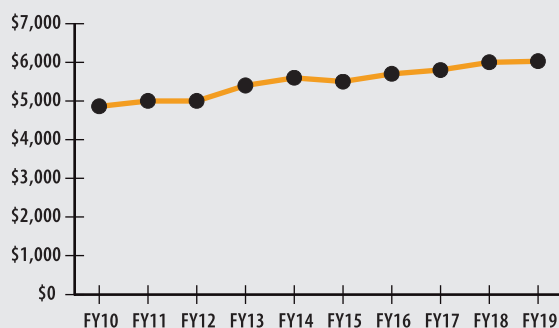
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

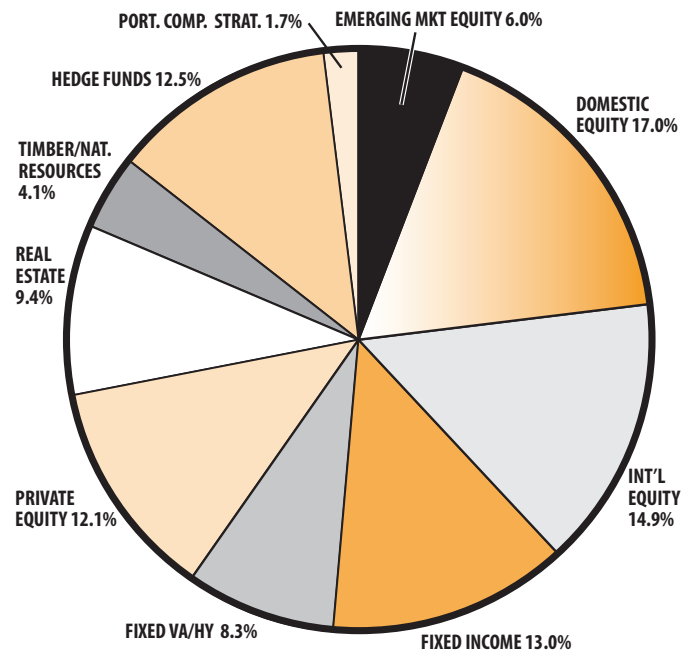
<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.23%	8.54%	8.29%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
8.50%	5.34%	4.81%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.12%	9.41%	8.66%

## ACTUARIAL

▶ Funded Ratio	57.5%
▶ Date of Last Valuation	1/1/17
▶ Actuary	Stone
▶ Assumed Rate of Return	7.75%
▶ Funding Schedule	2.96% Increasing
▶ Year Fully Funded	2037
▶ Unfunded Liability	\$59.1 M
▶ Total Pension Appropriation (Fiscal 2019)	\$6.0 M

	ACTIVE	RETIRED
▶ Number of Members	428	379
▶ Total Payroll/Benefit	\$20.5 M	\$8.6 M
▶ Average Salary/Benefit	\$47,900	\$22,700
▶ Average Age	48	74
▶ Average Service	11 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	27
▶ Number Who Reported Earnings	7
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.72%
▶ 2018 Market Value	\$84.0 M
▶ 2014-2018 (Annualized)	6.12%
▶ 1985-2018 (Annualized)	8.23%



## Methuen

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

### Board Members

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

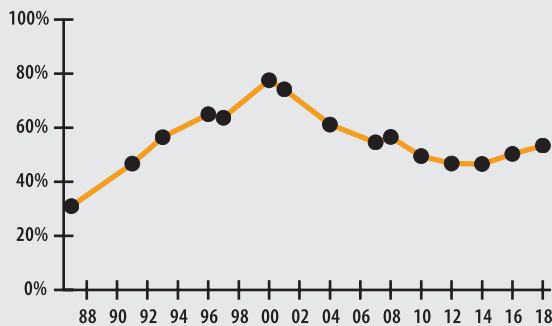
### Board Administrator

Kaitlyn Doucette

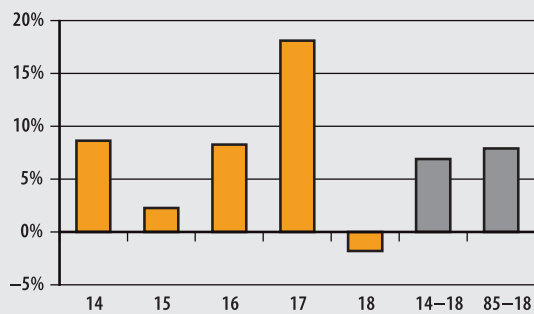
### Board Meeting

The last Thursday of the month at 9:30 am

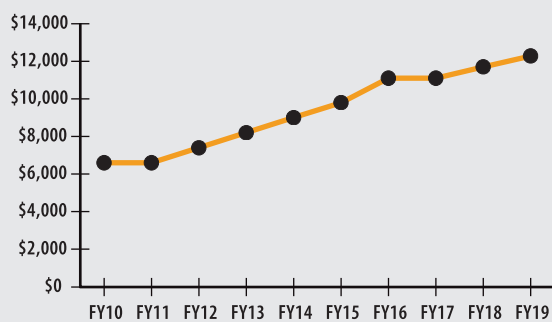
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

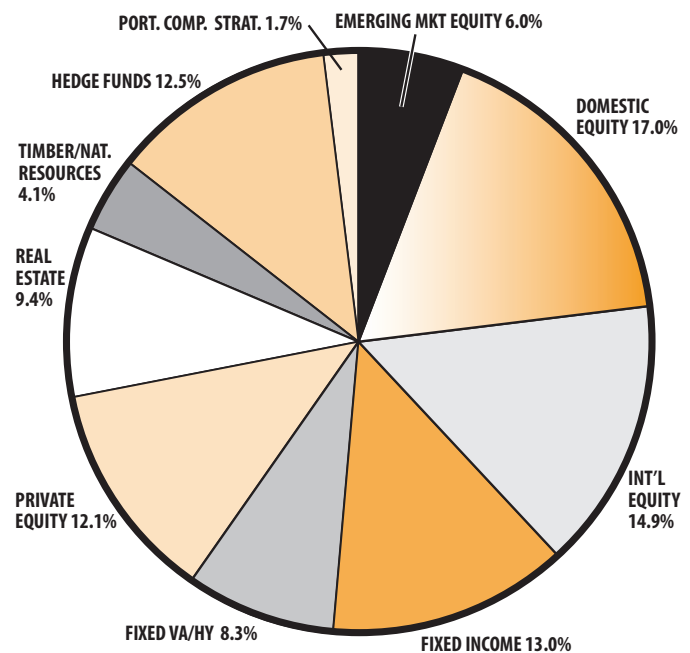
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
7.91%	8.22%	7.92%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.10%	6.02%	4.97%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.90%	10.43%	9.60%

## 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 2019)	\$12.3 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	50
▶ Number Who Reported Earnings	16
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.77%
▶ 2018 Market Value	\$149.8 M
▶ 2014-2018 (Annualized)	6.90%
▶ 1985-2018 (Annualized)	7.91%

## 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,  
Joseph Kearns, John Brown,  
Robert Healy  
\*indicates Chairperson

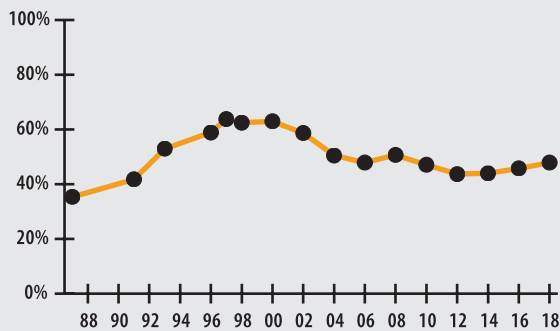
### Board Administrator

Lisa Maloney

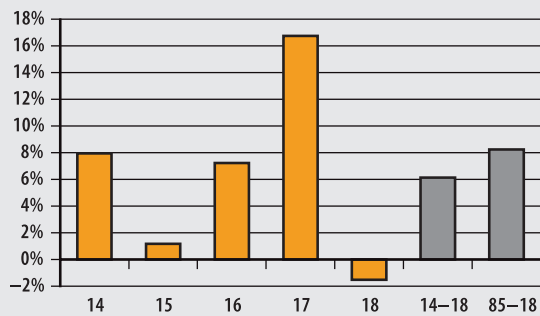
### Board Meeting

Varies

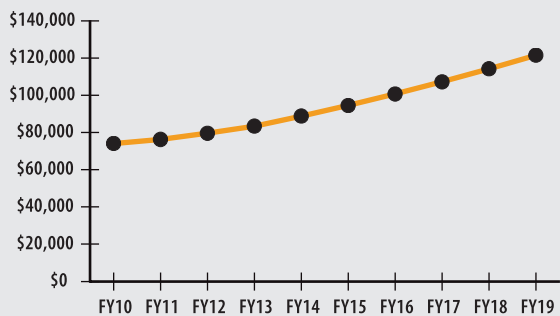
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

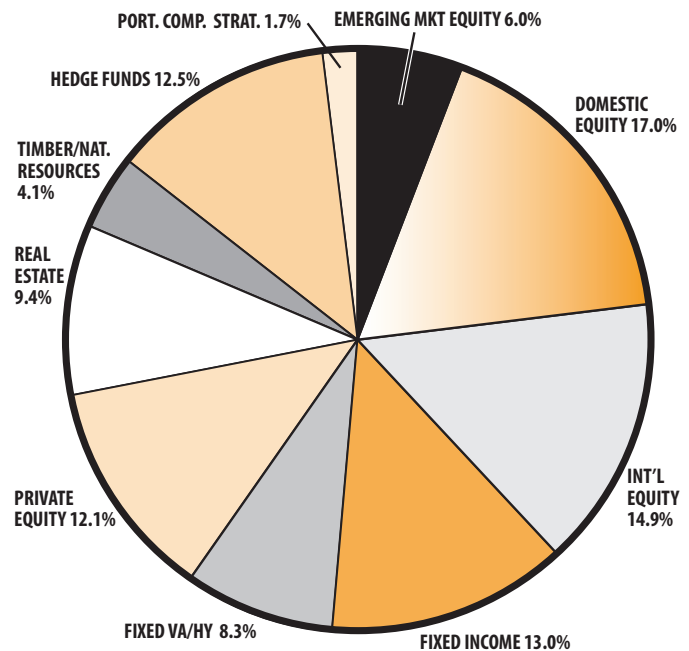
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.24%	8.55%	8.30%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.45%	5.61%	5.05%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.14%	9.42%	8.79%

## 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 2019)	\$121.5 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	358
▶ Number Who Reported Earnings	116
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.51%
▶ 2018 Market Value	\$1.3 B
▶ 2014-2018 (Annualized)	6.14%
▶ 1985-2018 (Annualized)	8.24%

## Milford

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

### Board Members

Zachary Taylor\*, Michael Diorio,  
Richard Villani, Linda DeDominick,  
Ernest Pettinari  
\*indicates Chairperson

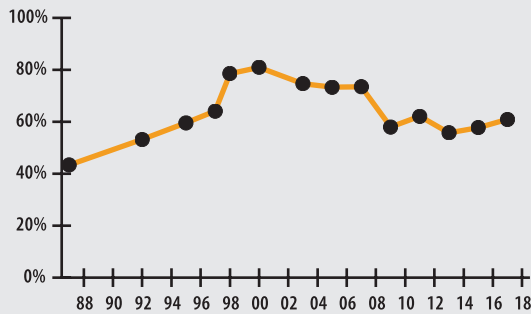
### Board Administrator

Alberta Farley

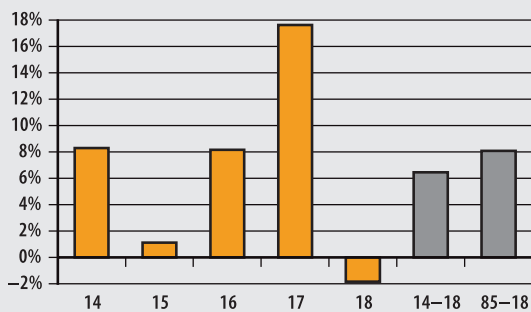
### Board Meeting

Third Tuesday of the month at 1:00 pm

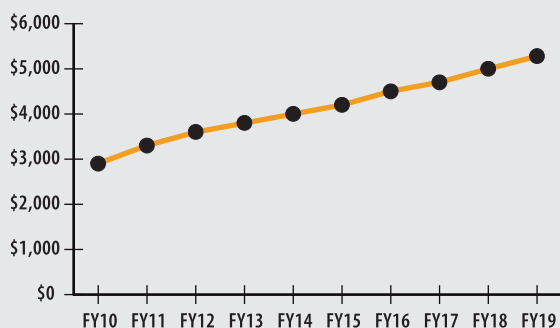
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

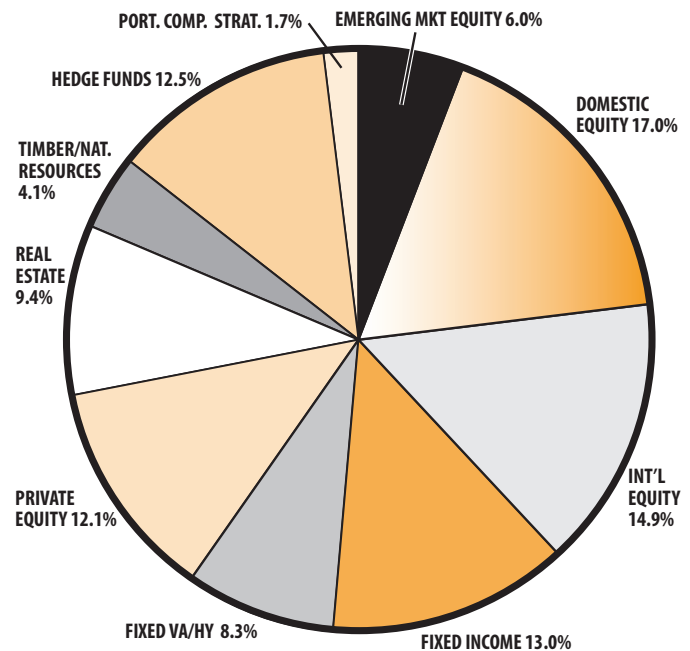
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.09%	8.40%	8.13%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.99%	5.09%	4.28%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.47%	9.87%	9.07%

## ACTUARIAL

▶ Funded Ratio	60.9%
▶ Date of Last Valuation	1/1/17
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.40%
▶ Funding Schedule	6.5% Total Increasing
▶ Year Fully Funded	2036
▶ Unfunded Liability	\$53.7 M
▶ Total Pension Appropriation (Fiscal 2019)	\$5.3 M

	ACTIVE	RETIRED
▶ Number of Members	486	297
▶ Total Payroll/Benefit	\$21.1 M	\$7.1 M
▶ Average Salary/Benefit	\$43,500	\$23,800
▶ Average Age	48	74
▶ Average Service	11.9 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	28
▶ Number Who Reported Earnings	12
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.82%
▶ 2018 Market Value	\$92.8 M
▶ 2014-2018 (Annualized)	6.47%
▶ 1985-2018 (Annualized)	8.09%

## Milton

40 Willard Street  
Suite G102  
Quincy, MA 02169  
Phone 617-770-5970  
Fax 617-770-5971

### Board Members

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

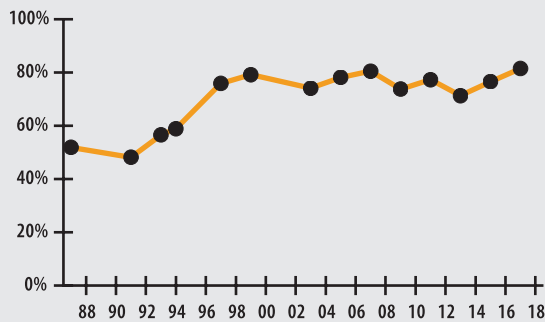
### Board Administrator

Jeanne Darcy

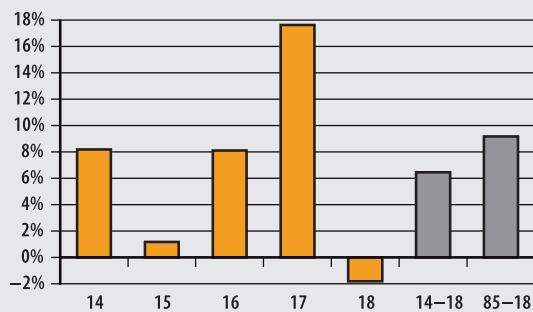
### Board Meeting

Last Thursday of the month at 3:30 pm

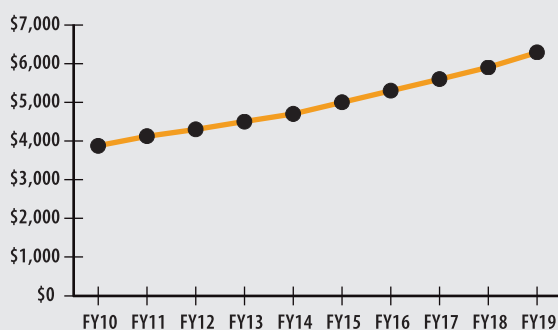
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

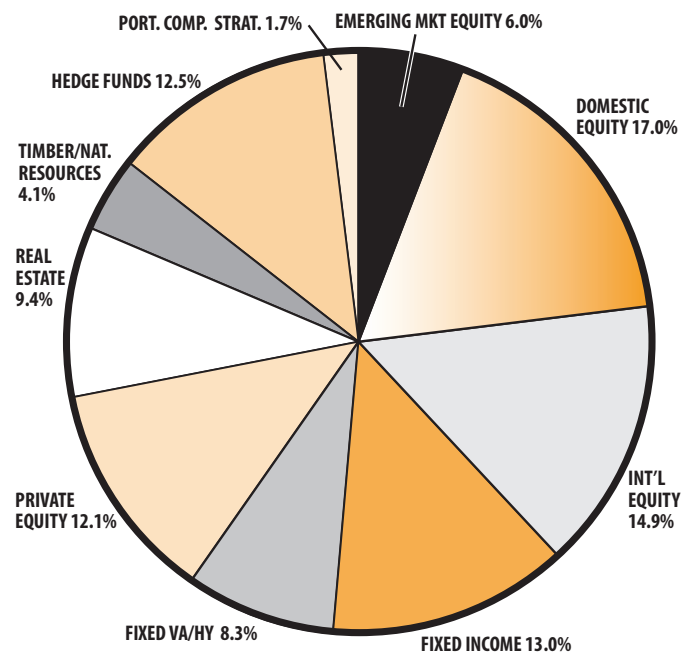
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.18%	9.53%	9.29%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.19%	5.67%	5.12%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.45%	9.93%	9.22%

## ACTUARIAL

▶ Funded Ratio	81.5%
▶ Date of Last Valuation	1/1/17
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.50%
▶ Funding Schedule	6.0% Total Increasing
▶ Year Fully Funded	2025
▶ Unfunded Liability	\$27.0 M
▶ Total Pension Appropriation (Fiscal 2019)	\$6.3 M

	ACTIVE	RETIRED
▶ Number of Members	377	273
▶ Total Payroll/Benefit	\$21.6 M	\$8.3 M
▶ Average Salary/Benefit	\$57,200	\$30,300
▶ Average Age	47	75
▶ Average Service	12.3 years	NA

## ASSET ALLOCATION (12/31/18)

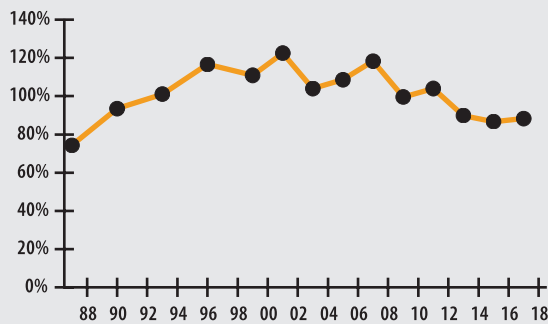


## EARNED INCOME OF DISABILITY RETIREES (2017)

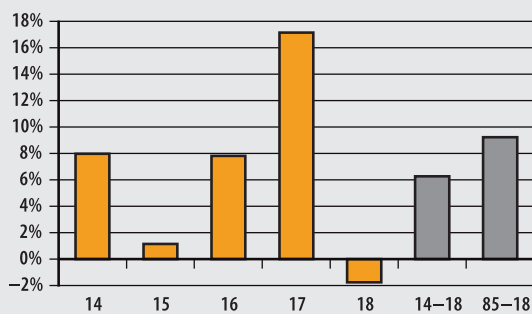
▶ Number of Disability Retirees	30
▶ Number Who Reported Earnings	7
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.81%
▶ 2018 Market Value	\$131.8 M
▶ 2014-2018 (Annualized)	6.45%
▶ 1985-2018 (Annualized)	9.18%

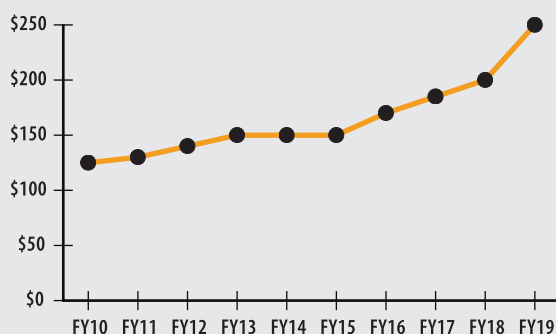
#### FUNDED RATIO (1987-2018)



#### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



#### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



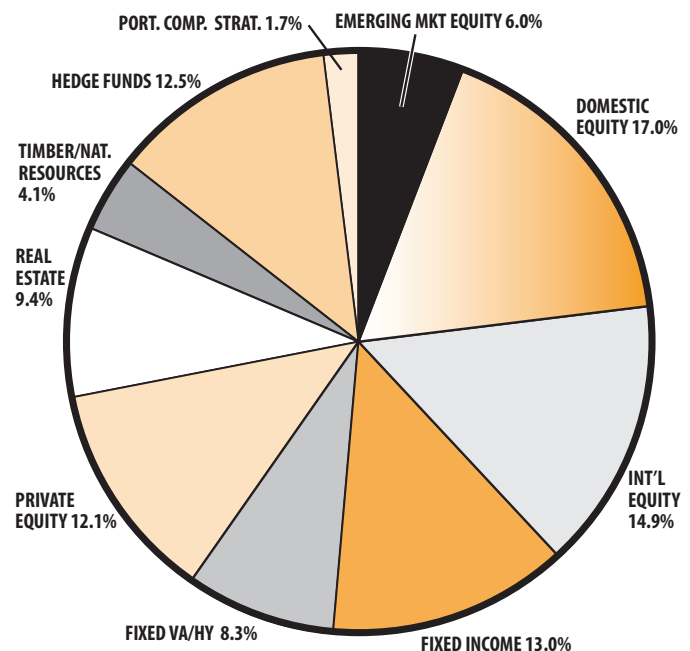
#### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
9.24%	9.59%	9.37%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.00%	5.41%	4.95%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.27%	9.60%	8.87%

#### 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 2019)		\$250 K
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)



#### EARNED INCOME OF DISABILITY RETIREES (2017)

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

▶ 2018 Return	-1.76%
▶ 2018 Market Value	\$13.4 M
▶ 2014-2018 (Annualized)	6.27%
▶ 1985-2018 (Annualized)	9.24%

## Montague

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

### Board Members

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

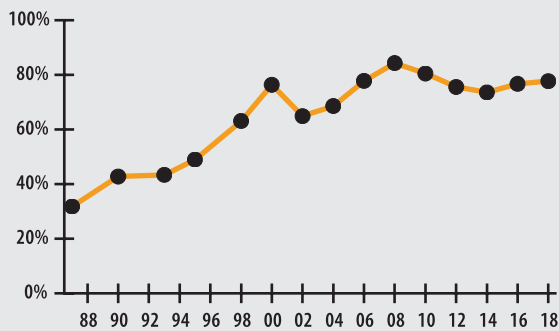
### Board Administrator

Debra Underhill

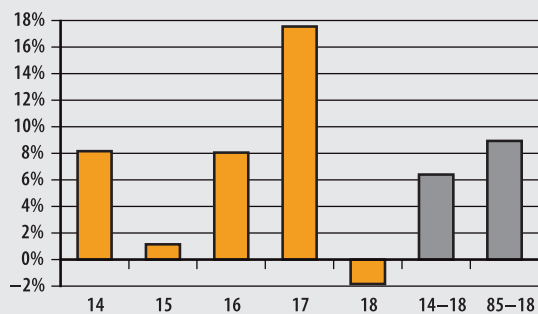
### Board Meeting

Fourth Tuesday of the month at 9:30 am

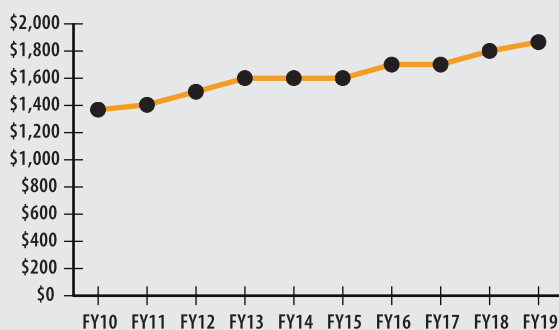
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

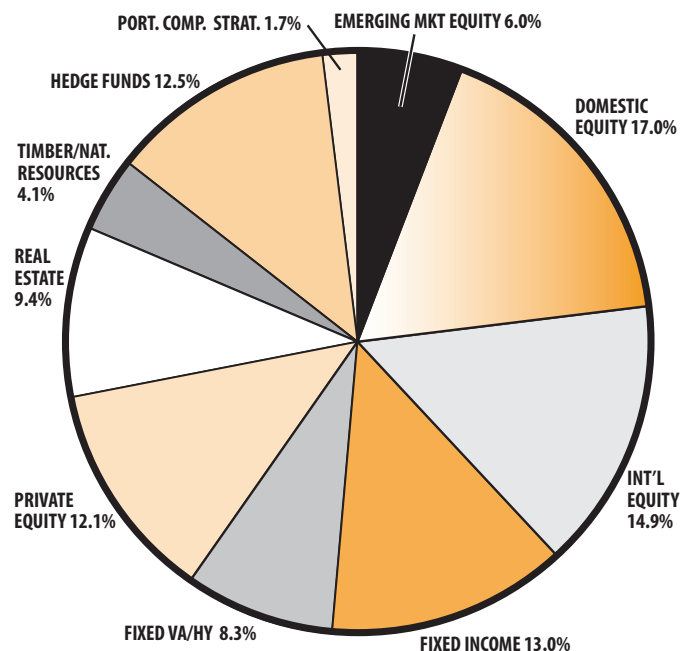
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.94%	9.29%	9.04%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.12%	5.59%	5.09%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.41%	9.89%	9.20%

## 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 2019)	\$1.9 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	12
▶ Number Who Reported Earnings	2
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.84%
▶ 2018 Market Value	\$41.3 M
▶ 2014-2018 (Annualized)	6.41%
▶ 1985-2018 (Annualized)	8.94%



**Board Members**

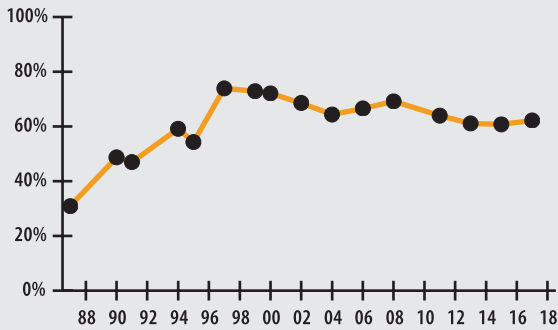
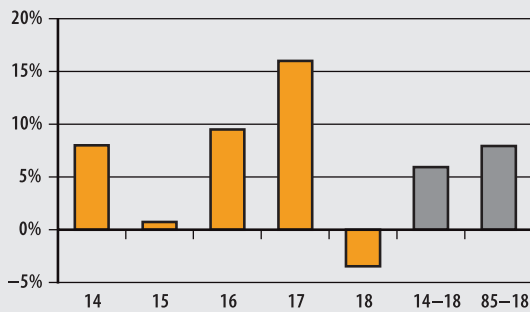
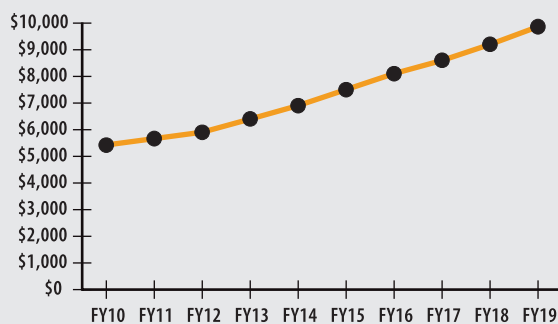
Arti Mehta, Michael Melchiorri\*,  
Nicholas Mabardy, B. Michael Reardon  
\*indicates Chairperson

**Board Administrator**

Kathleen Bacon

**Board Meeting**

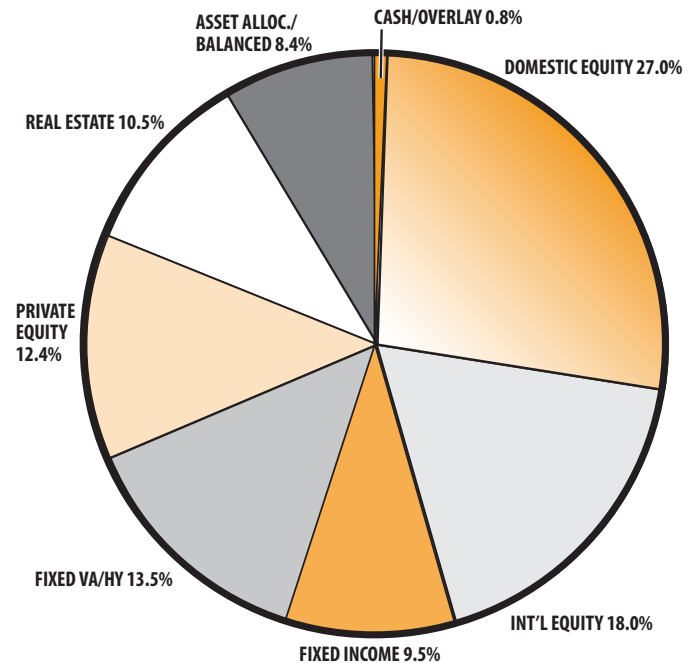
Generally the last Wednesday of the month  
at 4:00 pm

**FUNDED RATIO (1987-2018)**

**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**

**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**

**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.94%	8.30%	8.07%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.47%	5.70%	5.06%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
5.96%	10.48%	10.16%

**ACTUARIAL**

▶ Funded Ratio	62.2%	
▶ Date of Last Valuation	1/1/17	
▶ Actuary	Segal	
▶ Assumed Rate of Return	7.38%	
▶ Funding Schedule	4.0% Increasing Phase-In	
▶ Year Fully Funded	2030	
▶ Unfunded Liability	\$80.9 M	
▶ Total Pension Appropriation (Fiscal 2019)	\$9.9 M	
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	644	397
▶ Total Payroll/Benefit	\$37.4 M	\$10.9 M
▶ Average Salary/Benefit	\$58,100	\$27,500
▶ Average Age	47	NA
▶ Average Service	11.5 years	NA

**ASSET ALLOCATION (12/31/18)**

**EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	14
▶ Number Who Reported Earnings	7
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-3.44%
▶ 2018 Market Value	\$137.8 M
▶ 2014-2018 (Annualized)	5.96%
▶ 1985-2018 (Annualized)	7.94%

## 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, Thomas Welch,  
Robert Mearls  
\*indicates Chairperson

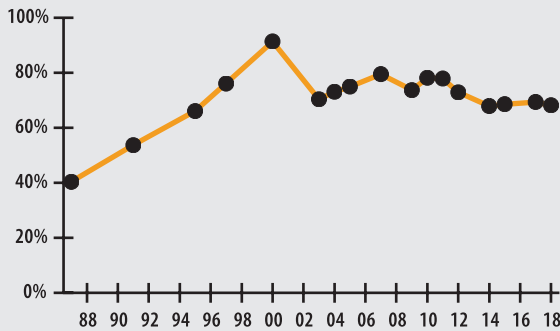
### Board Administrator

Jacob Cole

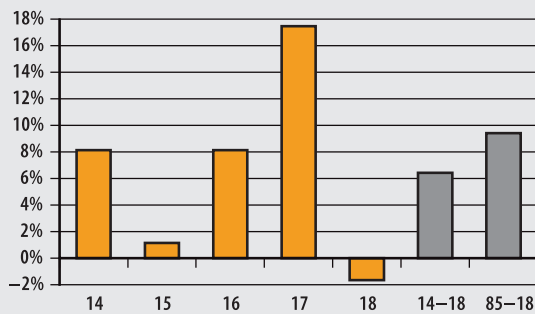
### Board Meeting

Second Wednesday of every month  
at 9:30 am

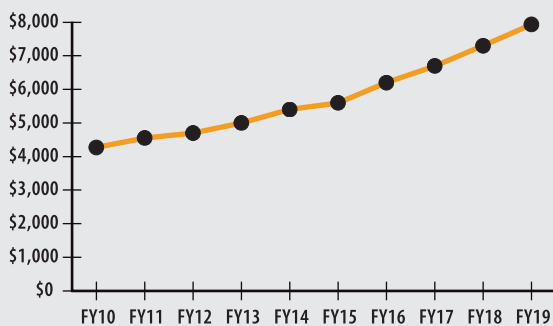
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

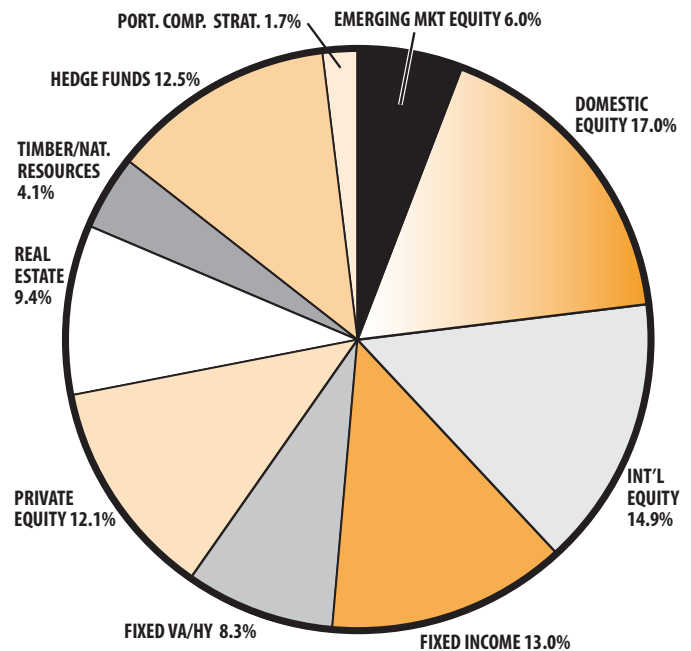
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.43%	9.79%	9.55%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.02%	5.54%	5.04%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.44%	9.82%	9.11%

## 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 2019)	\$7.9 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
▶ Average Service	11.2 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	28
▶ Number Who Reported Earnings	6
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.72%
▶ 2018 Market Value	\$158.8 M
▶ 2014-2018 (Annualized)	6.44%
▶ 1985-2018 (Annualized)	9.43%

## 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,  
James Allen\*, Leonard Baillargeon,  
Susan Thompson  
\*indicates Chairperson

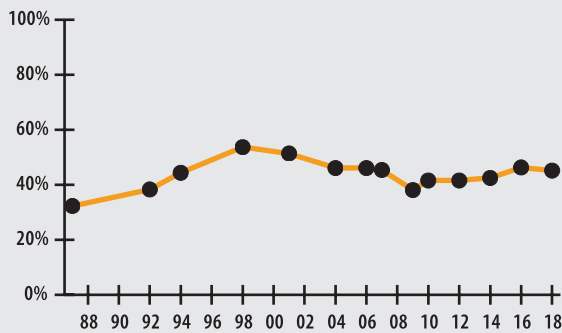
### Board Administrator

Gerry Arnaudet

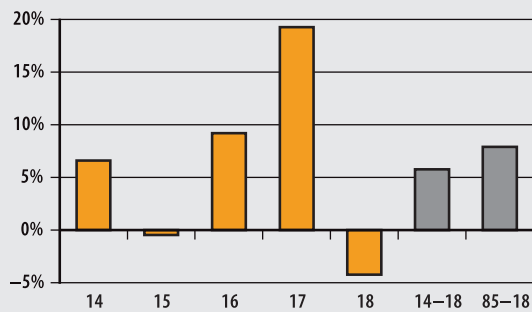
### Board Meeting

Last Thursday of the month at 9:00 am

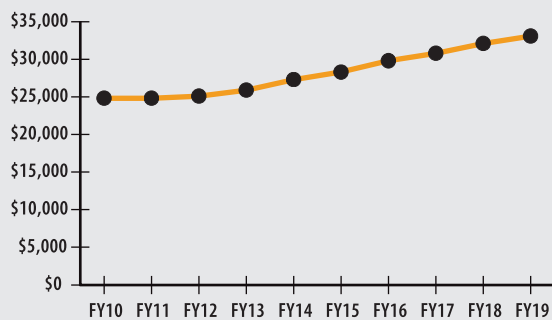
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



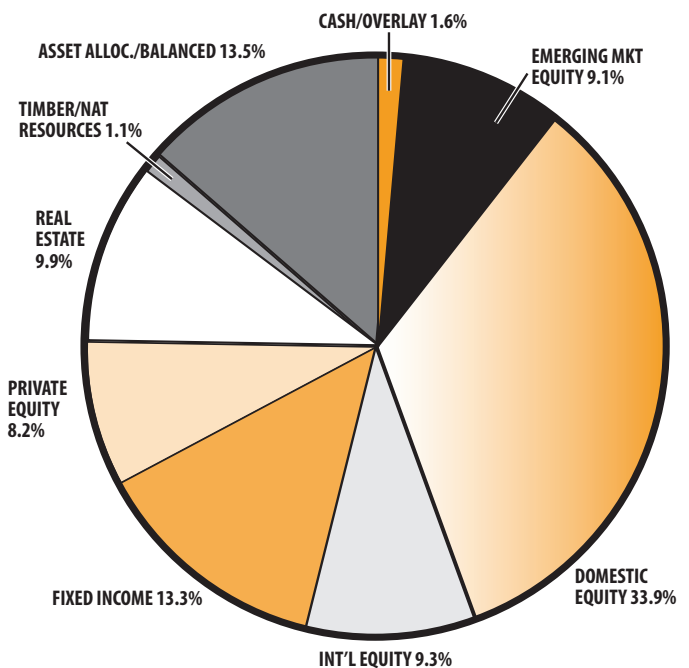
### INVESTMENT RETURN HISTORY

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
7.91%	8.30%	7.98%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.03%	6.12%	5.30%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.78%	10.13%	9.28%

## 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 2019)		\$33.1 M
	<b>ACTIVE</b>	<b>RETIRED</b>
► 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

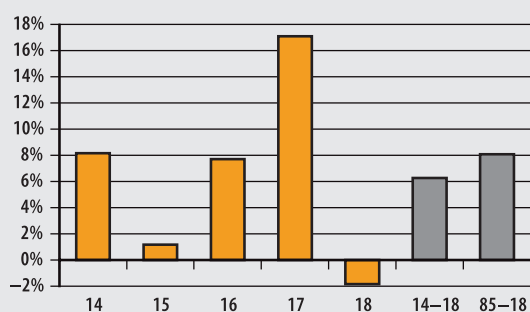
▶ Number of Disability Retirees	275
▶ Number Who Reported Earnings	83
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$23,260.81

▶ 2018 Return	-4.22%
▶ 2018 Market Value	\$311.0 M
▶ 2014-2018 (Annualized)	5.78%
▶ 1985-2018 (Annualized)	7.91%

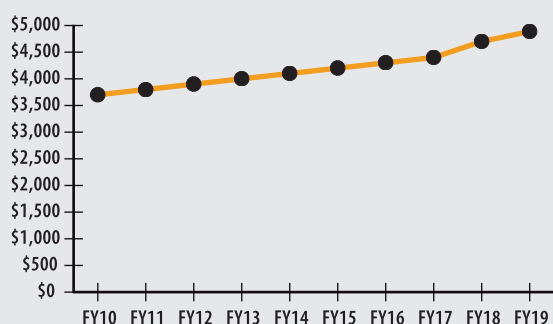
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



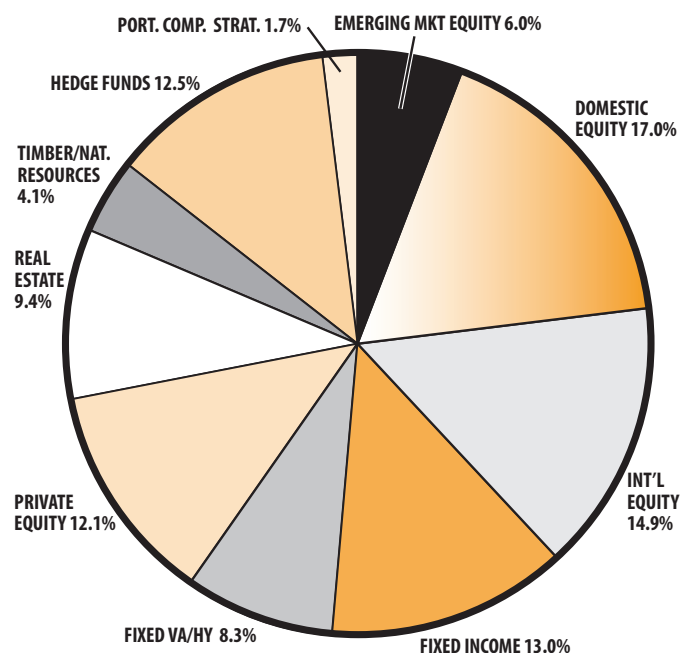
### INVESTMENT RETURN HISTORY

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.08%	8.39%	8.13%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.01%	5.50%	5.02%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.27%	9.71%	9.07%

### 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 2019)		\$4.9 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)



### EARNED INCOME OF DISABILITY RETIREES (2017)

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

▶ 2018 Return	-1.82%
▶ 2018 Market Value	\$80.6 M
▶ 2014-2018 (Annualized)	6.27%
▶ 1985-2018 (Annualized)	8.08%

## 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

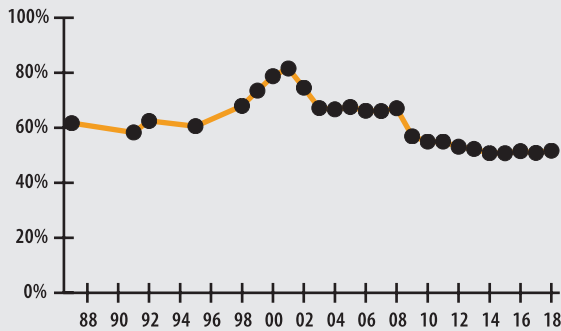
### Board Administrator

Kelly Byrne

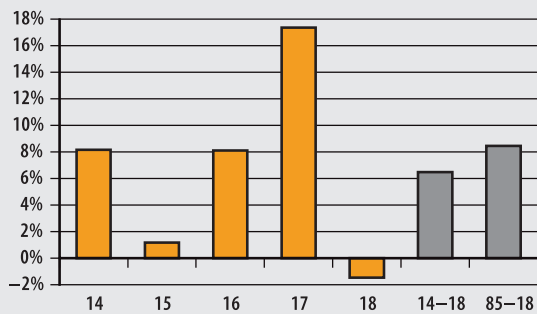
### Board Meeting

Third or Fourth Wednesday of the month  
at 3:00 pm

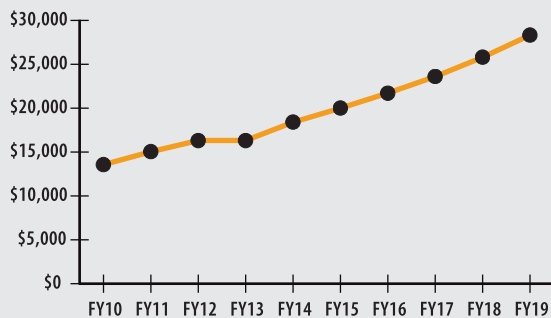
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

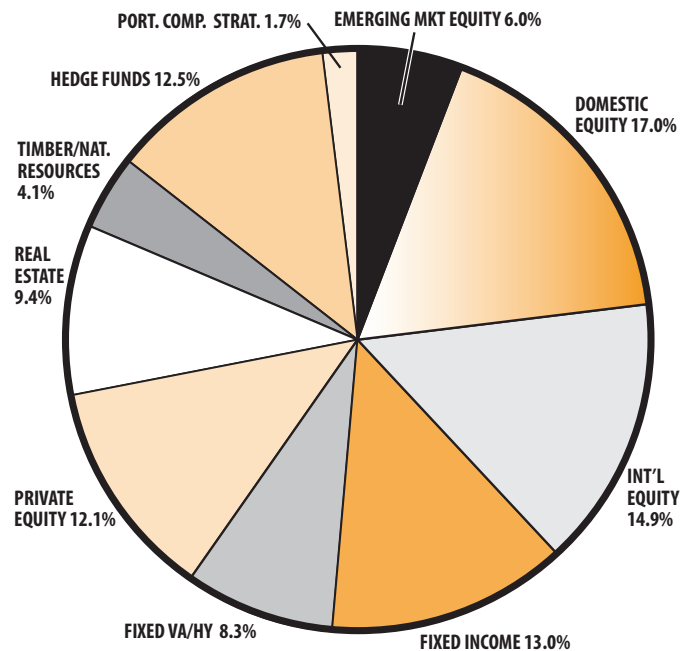
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.47%	8.79%	8.53%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.94%	5.61%	5.01%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.48%	9.75%	9.14%

## ACTUARIAL

▶ Funded Ratio	51.7%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Segal
▶ Assumed Rate of Return	7.25%
▶ Funding Schedule	9.6% Total Increasing
▶ Year Fully Funded	2030
▶ Unfunded Liability	\$318.5 M
▶ Total Pension Appropriation (Fiscal 2019)	\$28.3 M

	ACTIVE	RETIRED
▶ Number of Members	1,581	1,315
▶ Total Payroll/Benefit	\$101.0 M	\$37.5 M
▶ Average Salary/Benefit	\$63,900	\$28,500
▶ Average Age	46	NA
▶ Average Service	12 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	135
▶ Number Who Reported Earnings	29
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$14,241.92

▶ 2018 Return	-1.45%
▶ 2018 Market Value	\$341.7 M
▶ 2014-2018 (Annualized)	6.48%
▶ 1985-2018 (Annualized)	8.47%

## Board Members

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

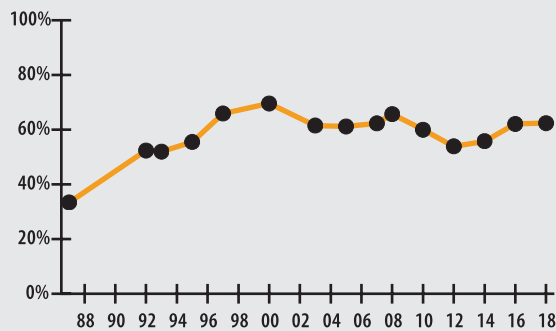
## Board Administrator

Kathleen Kiely-Becchetti

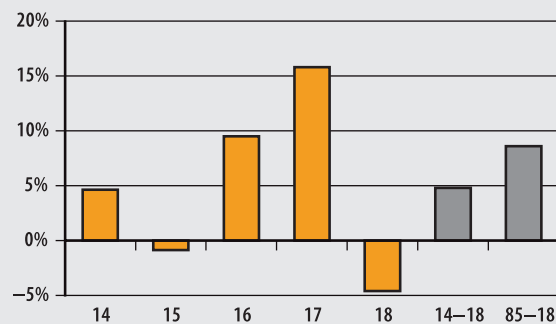
## Board Meeting

Last Wednesday of every month at 8:30 am

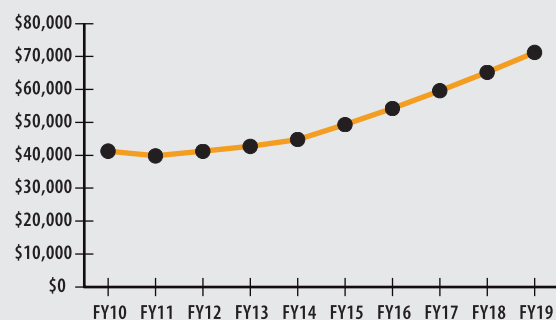
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



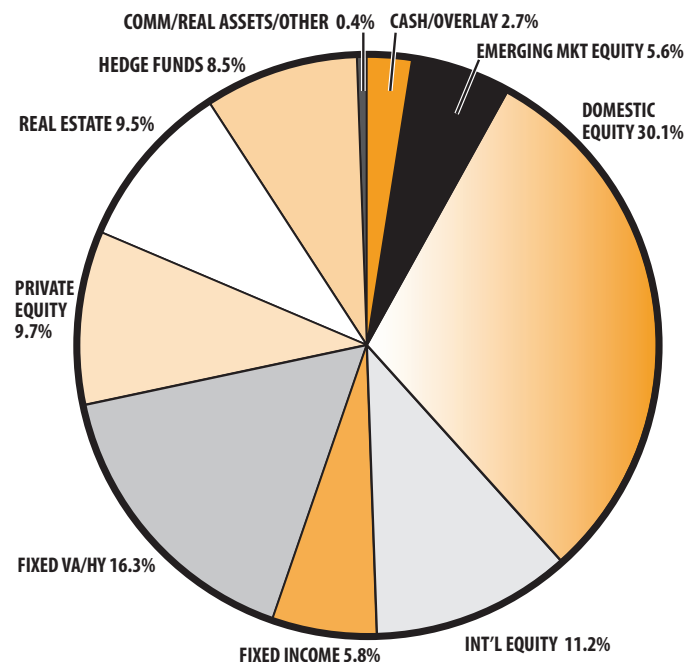
### INVESTMENT RETURN HISTORY

34 years 2018	33 years 2017	32 years 2016
8.35%	8.76%	8.55%
10 years 2018	10 years 2017	10 years 2016
8.86%	5.73%	5.18%
5 years 2018	5 years 2017	5 years 2016
4.83%	9.32%	8.82%

## 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 2019)		\$71.2 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	289
▶ Number Who Reported Earnings	92
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$5,537.57

▶ 2018 Return	-4.58%
▶ 2018 Market Value	\$913.8 M
▶ 2014-2018 (Annualized)	4.83%
▶ 1985-2018 (Annualized)	8.35%

## 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,  
Lawrence O'Brien\*, Matthew LaBonte,  
Fred Thompson  
\*indicates Chairperson

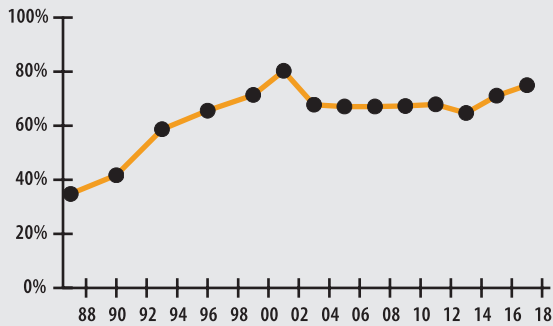
### Board Administrator

Beth Matson

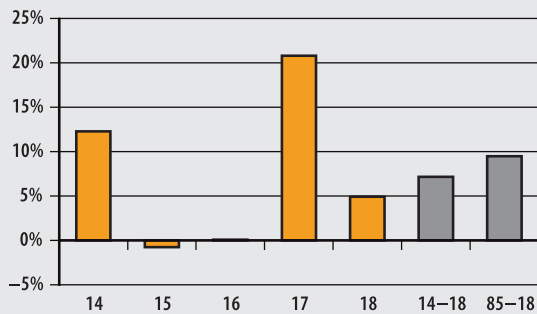
### Board Meeting

Third Tuesday of the month at 10:00 am

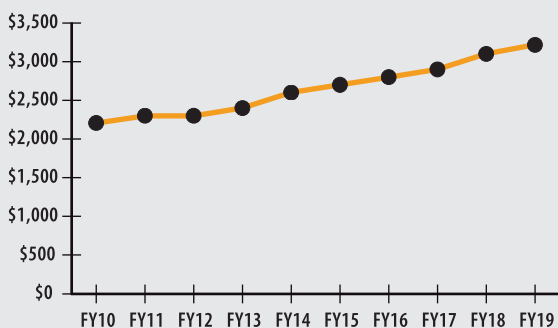
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

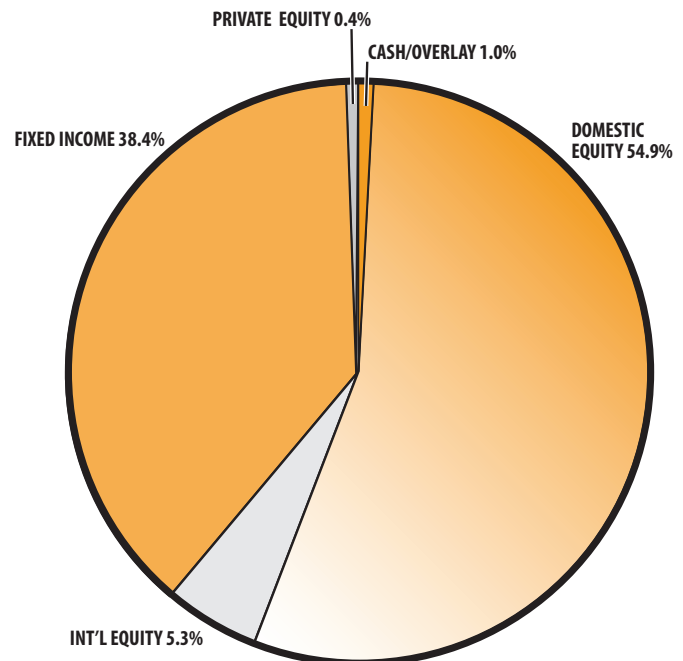
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.50%	9.64%	9.31%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
10.01%	6.90%	6.51%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
7.18%	9.94%	8.13%

## ACTUARIAL

▶ Funded Ratio	75.0%
▶ Date of Last Valuation	1/1/17
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.40%
▶ Funding Schedule	4.5% Increasing
▶ Year Fully Funded	2029
▶ Unfunded Liability	\$19.3 M
▶ Total Pension Appropriation (Fiscal 2019)	\$3.2 M

	ACTIVE	RETIRED
▶ Number of Members	329	228
▶ Total Payroll/Benefit	\$10.9 M	\$4.5 M
▶ Average Salary/Benefit	\$33,100	\$19,800
▶ Average Age	48	74
▶ Average Service	11.1 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

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

▶ 2018 Return	4.95%
▶ 2018 Market Value	\$65.9 M
▶ 2014-2018 (Annualized)	7.18%
▶ 1985-2018 (Annualized)	9.50%



## 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

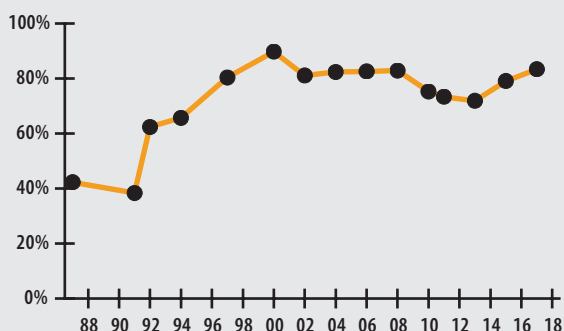
### Board Administrator

Debra Bush

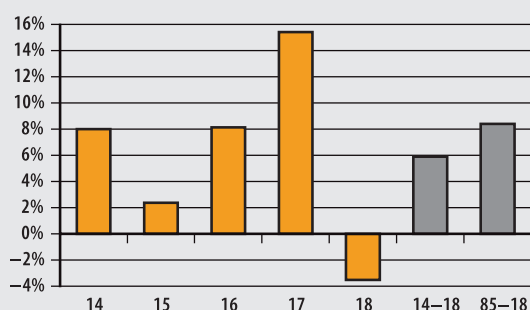
### Board Meeting

Fourth Thursday of the month at 4:30 pm

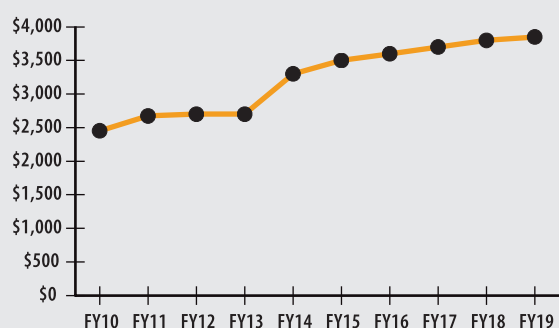
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

#### 34 years 2018

8.41%

#### 33 years 2017

8.79%

#### 32 years 2016

8.59%

#### 10 years 2018

9.57%

#### 10 years 2017

6.95%

#### 10 years 2016

5.98%

#### 5 years 2018

5.90%

#### 5 years 2017

10.56%

#### 5 years 2016

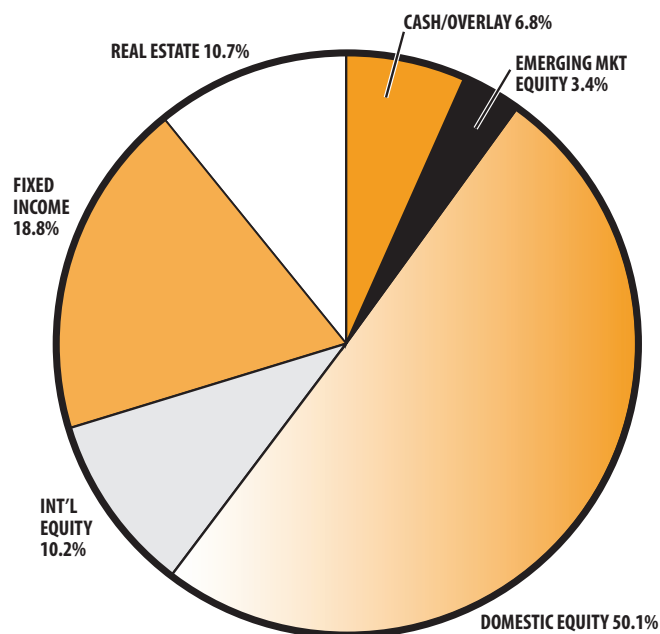
9.82%

## ACTUARIAL

▶ Funded Ratio	83.4%
▶ Date of Last Valuation	1/1/17
▶ Actuary	Sherman
▶ Assumed Rate of Return	7.50%
▶ Funding Schedule	3.0% Increasing
▶ Year Fully Funded	2027
▶ Unfunded Liability	\$20.9 M
▶ Total Pension Appropriation (Fiscal 2019)	\$3.9 M

	ACTIVE	RETIRED
▶ Number of Members	479	266
▶ Total Payroll/Benefit	\$22.9 M	\$6.2 M
▶ Average Salary/Benefit	\$47,800	\$23,400
▶ Average Age	NA	71
▶ Average Service	NA years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	23
▶ Number Who Reported Earnings	9
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-3.50%
▶ 2018 Market Value	\$111.4 M
▶ 2014-2018 (Annualized)	5.90%
▶ 1985-2018 (Annualized)	8.41%

## 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, Shirley LaRose,  
Thomas Sullivan  
\*indicates Chairperson

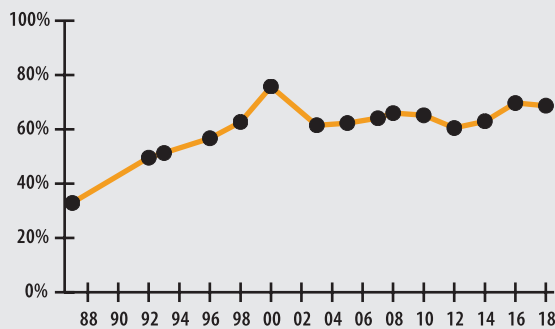
### Board Administrator

David Shipka

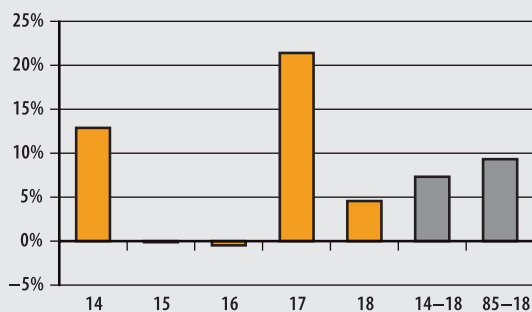
### Board Meeting

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

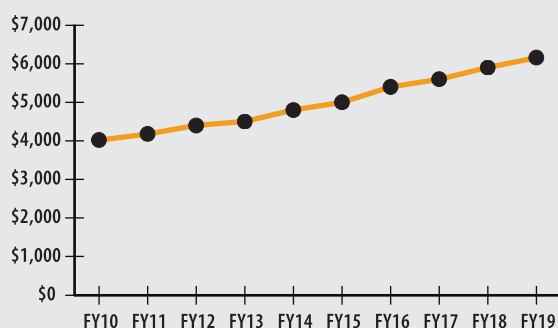
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

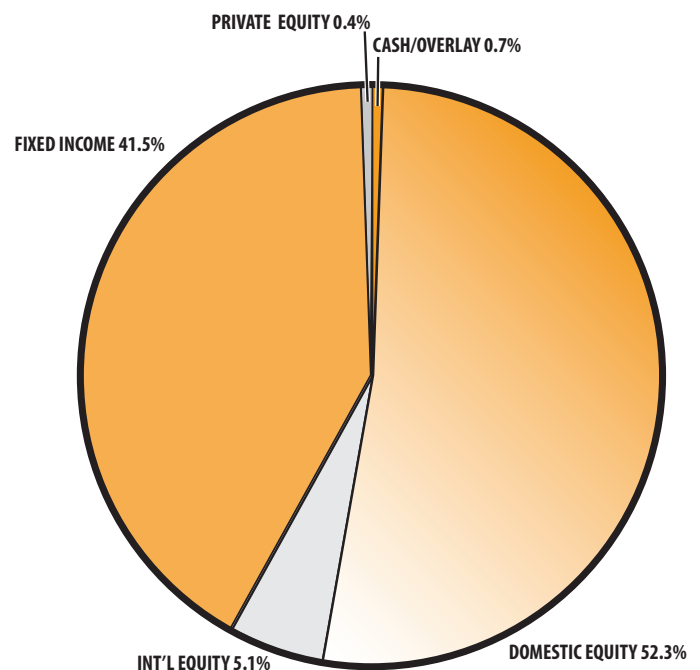
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.32%	9.47%	9.11%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.82%	7.01%	6.48%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
7.35%	10.02%	8.01%

## 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 2019)	\$6.2 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 (12/31/18)

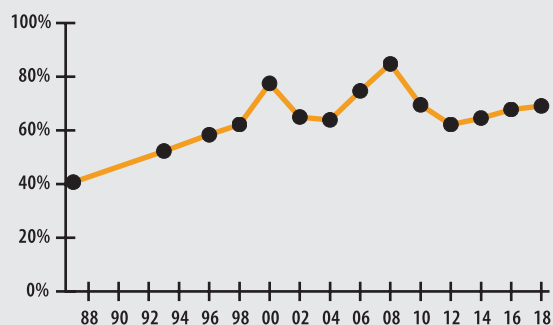


## EARNED INCOME OF DISABILITY RETIREES (2017)

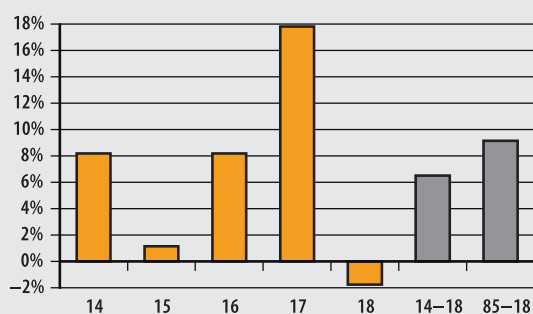
▶ Number of Disability Retirees	31
▶ Number Who Reported Earnings	14
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	4.58%
▶ 2018 Market Value	\$128.5 M
▶ 2014-2018 (Annualized)	7.35%
▶ 1985-2018 (Annualized)	9.32%

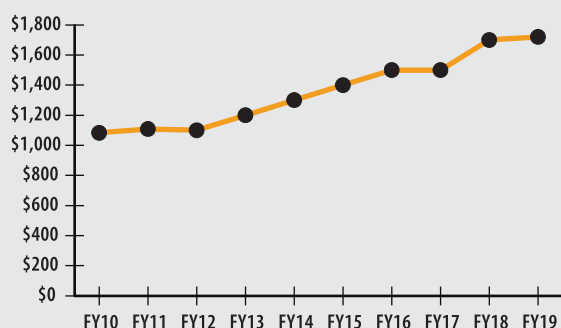
## FUNDED RATIO (1987-2018)



## INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



## 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



## INVESTMENT RETURN HISTORY

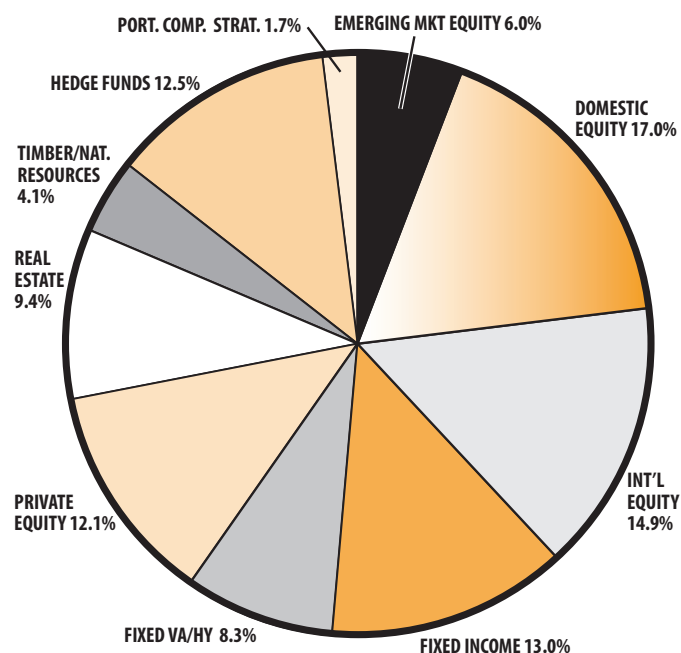
<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
9.16%	9.51%	9.26%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.24%	5.67%	5.15%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.52%	9.98%	9.25%

## 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 2019)	\$1.7 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	9
▶ Number Who Reported Earnings	3
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.74%
▶ 2018 Market Value	\$34.8 M
▶ 2014-2018 (Annualized)	6.52%
▶ 1985-2018 (Annualized)	9.16%

## 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

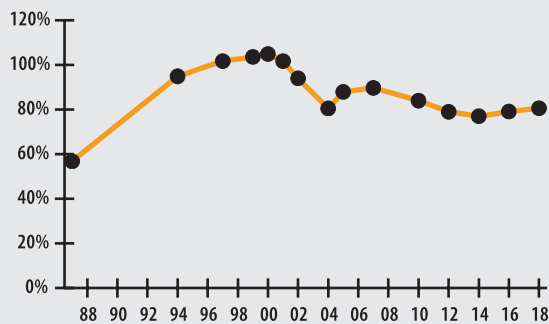
### Board Administrator

Debra Wilkes

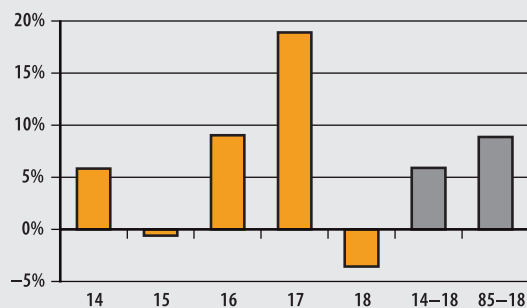
### Board Meeting

Third Wednesday of the month at 9:00 am

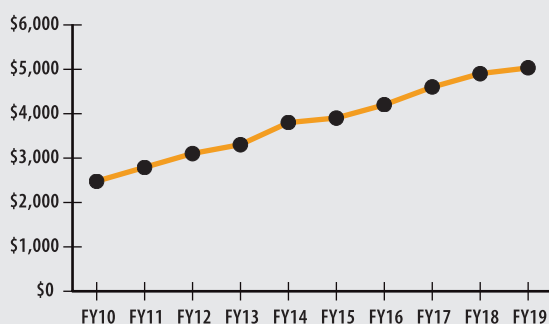
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

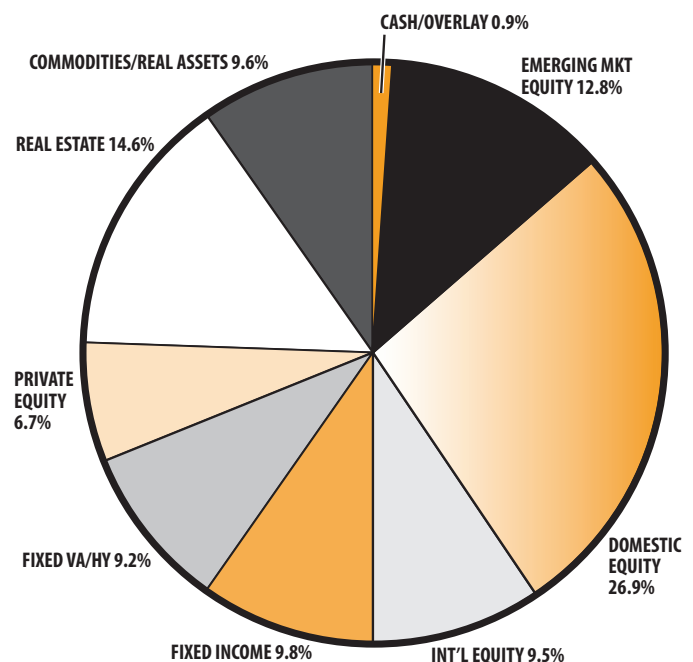
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.88%	9.28%	8.99%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.10%	7.01%	6.00%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.90%	9.85%	8.57%

## 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 2019)	\$5.0 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 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	36
▶ Number Who Reported Earnings	13
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$32,301.38

▶ 2018 Return	-3.54%
▶ 2018 Market Value	\$154.2 M
▶ 2014-2018 (Annualized)	5.90%
▶ 1985-2018 (Annualized)	8.88%

**Board Members**

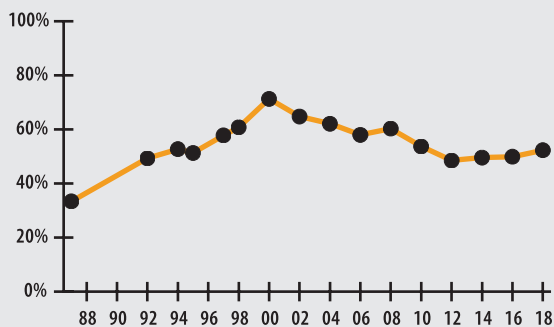
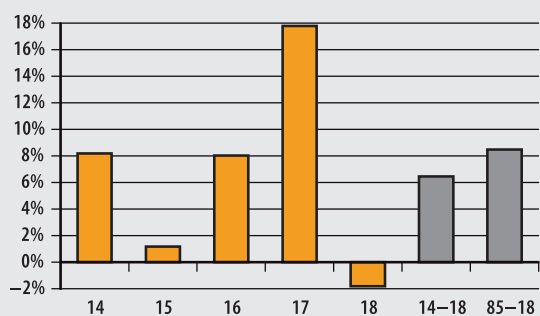
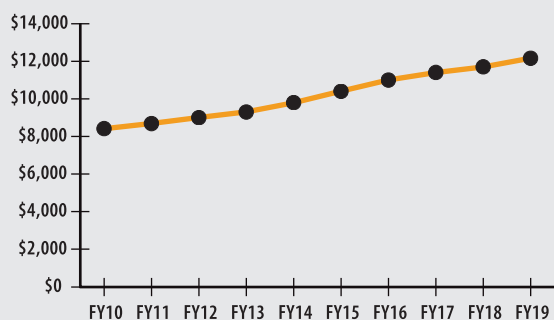
Michael Gingras, Edward Lomasney III,  
Joseph DiFranco, Sr., Linda Cavallon,  
Richard Yagjian\*  
\*indicates Chairperson

**Board Administrator**

James Freeman

**Board Meeting**

Generally a Tuesday or Wednesday  
at 7:00 am

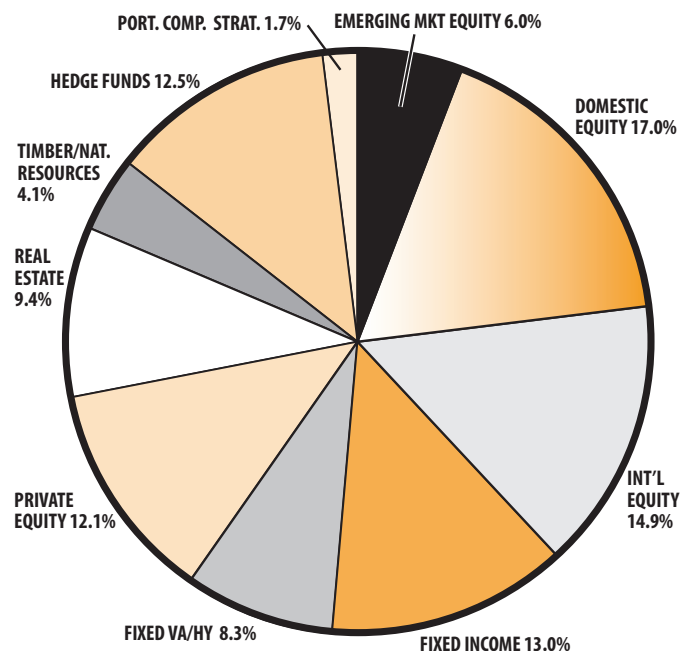
**FUNDED RATIO (1987-2018)**

**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**

**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**

**INVESTMENT RETURN HISTORY**

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.48%	8.81%	8.54%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.20%	5.65%	5.00%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.47%	9.95%	9.23%

**ACTUARIAL**

▶ Funded Ratio	52.3%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Sherman
▶ Assumed Rate of Return	7.75%
▶ Funding Schedule	4.0% Increasing
▶ Year Fully Funded	2036
▶ Unfunded Liability	\$138.1 M
▶ Total Pension Appropriation (Fiscal 2019)	\$12.2 M

	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 years	NA

**ASSET ALLOCATION (12/31/18)**

**EARNED INCOME OF DISABILITY RETIREES (2017)**

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

▶ 2018 Return	-1.81%
▶ 2018 Market Value	\$144.8 M
▶ 2014-2018 (Annualized)	6.47%
▶ 1985-2018 (Annualized)	8.48%

## Pittsfield

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

### Board Members

Matthew Kerwood\*, Gerald Doyle, Jr.,  
Timothy Bartini, Timothy Hannigan,  
William Flynn

\*indicates Chairperson

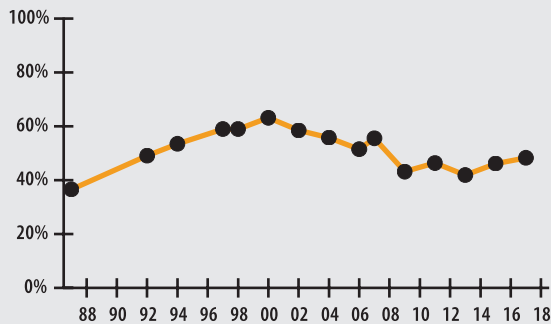
### Board Administrator

Karen Lancro

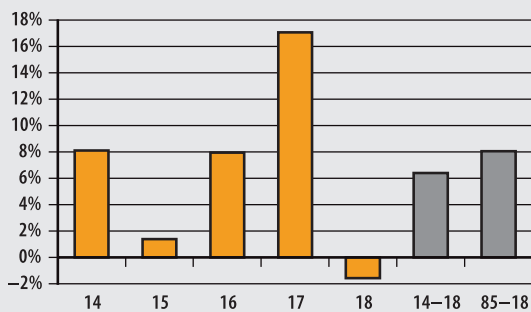
### Board Meeting

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

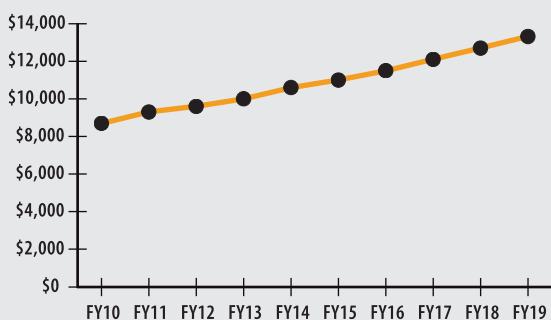
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

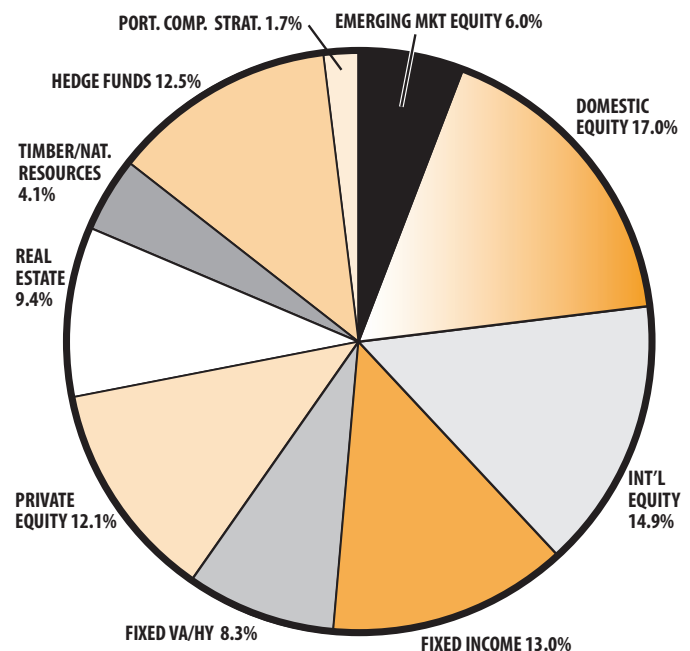
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.07%	8.37%	8.11%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.86%	5.58%	4.73%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.41%	9.76%	9.13%

## ACTUARIAL

▶ Funded Ratio	48.3%
▶ Date of Last Valuation	1/1/17
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.50%
▶ Funding Schedule	5.1% Total Increasing
▶ Year Fully Funded	2037
▶ Unfunded Liability	\$135.4 M
▶ Total Pension Appropriation (Fiscal 2019)	\$13.3 M

	ACTIVE	RETIRED
▶ Number of Members	955	770
▶ Total Payroll/Benefit	\$35.4 M	\$16.3 M
▶ Average Salary/Benefit	\$37,100	\$21,200
▶ Average Age	48	75
▶ Average Service	11.5 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	66
▶ Number Who Reported Earnings	18
▶ Number of Excess Earners	2
▶ Total Amount of Refund Due	\$35,681.80

▶ 2018 Return	-1.55%
▶ 2018 Market Value	\$136.3 M
▶ 2014-2018 (Annualized)	6.41%
▶ 1985-2018 (Annualized)	8.07%

**Board Members**

Lynne Barrett, Shawn Duhamel,  
Dale Webber, Thomas Kelley\*,  
Gerald Coughlin  
\*indicates Chairperson

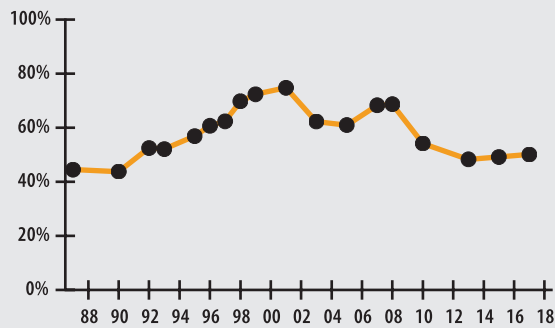
**Board Administrator**

Wendy Cherry

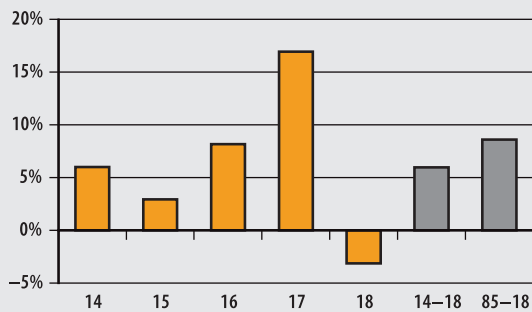
**Board Meeting**

Fourth Friday of each month at 8:00 am

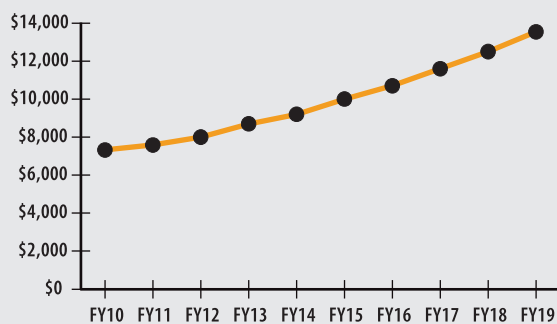
**FUNDED RATIO (1987-2018)**



**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**



**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**



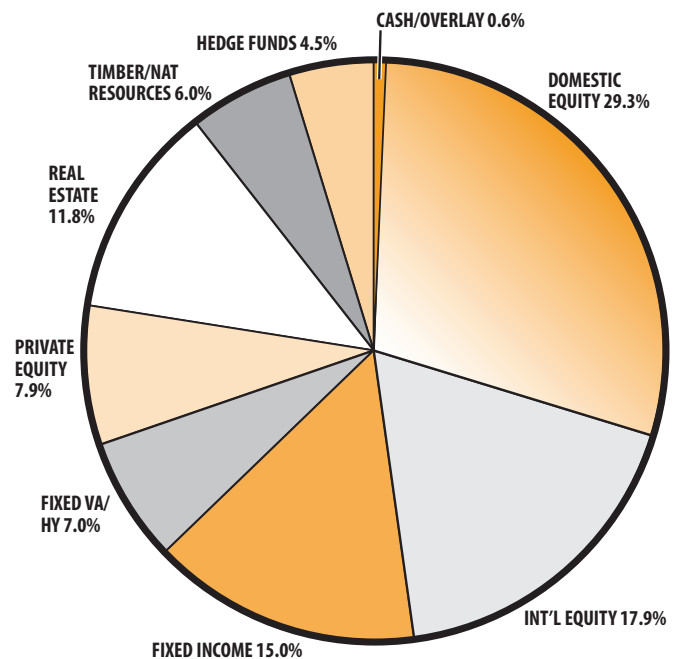
**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.61%	8.99%	8.75%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.71%	6.52%	5.70%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
5.99%	10.61%	10.24%

**ACTUARIAL**

▶ Funded Ratio		50.1%
▶ Date of Last Valuation		1/1/17
▶ Actuary		PERAC
▶ Assumed Rate of Return		7.25%
▶ Funding Schedule		8.0% Total Increasing
▶ Year Fully Funded		2035
▶ Unfunded Liability		\$157.6 M
▶ Total Pension Appropriation (Fiscal 2019)		\$13.5 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	897	710
▶ Total Payroll/Benefit	\$43.5 M	\$17.2 M
▶ Average Salary/Benefit	\$48,500	\$24,300
▶ Average Age	48	70
▶ Average Service	12 years	NA

**ASSET ALLOCATION (12/31/18)**



**EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	80
▶ Number Who Reported Earnings	32
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-3.13%
▶ 2018 Market Value	\$169.4 M
▶ 2014-2018 (Annualized)	5.99%
▶ 1985-2018 (Annualized)	8.61%



**Board Members**

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

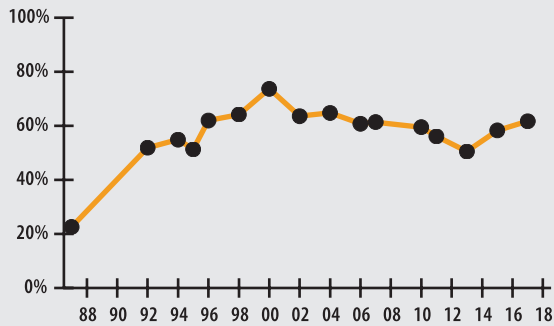
**Board Administrator**

David Sullivan

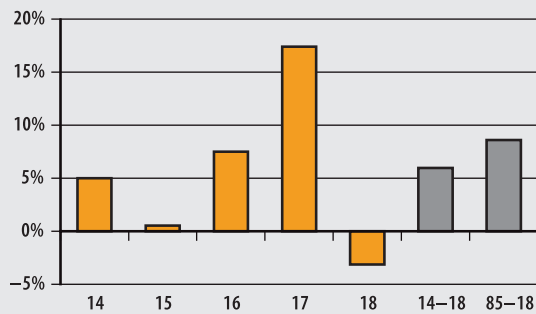
**Board Meeting**

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

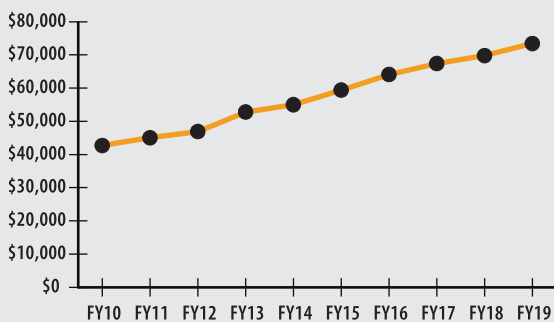
**FUNDED RATIO (1987-2018)**



**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**



**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**



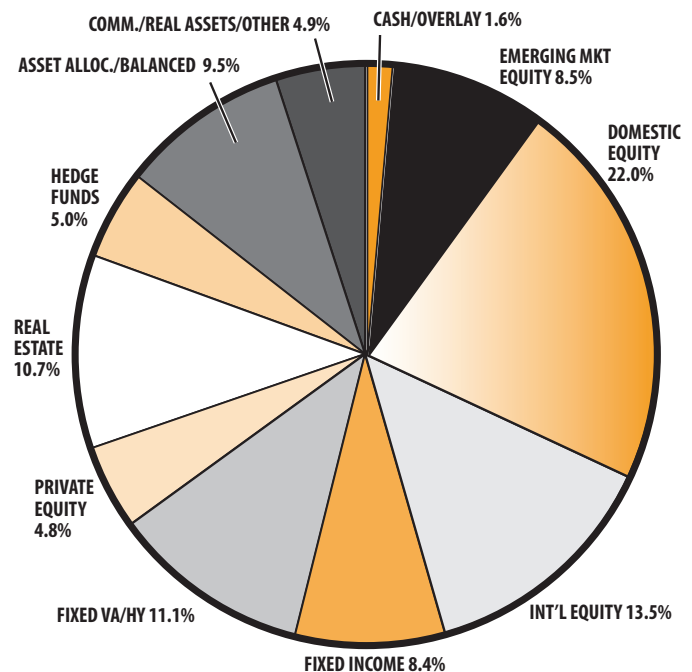
**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.75%	9.25%	9.00%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
8.70%	5.74%	4.82%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
4.49%	9.37%	8.47%

**ACTUARIAL**

▶ Funded Ratio		61.7%
▶ Date of Last Valuation		1/1/17
▶ Actuary		Sherman
▶ Assumed Rate of Return		8.00%
▶ Funding Schedule		3.5% Increasing
▶ Year Fully Funded		2029
▶ Unfunded Liability		\$582.7 M
▶ Total Pension Appropriation (Fiscal 2019)		\$73.4 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	5,815	3,968
▶ Total Payroll/Benefit	\$265.0 M	\$93.7 M
▶ Average Salary/Benefit	\$45,600	\$23,600
▶ Average Age	NA	72
▶ Average Service	NA years	NA

**ASSET ALLOCATION (12/31/18)**



**EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	299
▶ Number Who Reported Earnings	99
▶ Number of Excess Earners	3
▶ Total Amount of Refund Due	\$36,056.98

▶ 2018 Return	-6.53%
▶ 2018 Market Value	\$939.6 M
▶ 2014-2018 (Annualized)	4.49%
▶ 1985-2018 (Annualized)	8.75%

## 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

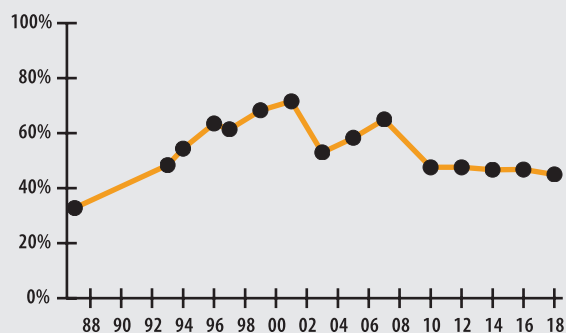
### Board Administrator

Lisa McBirney

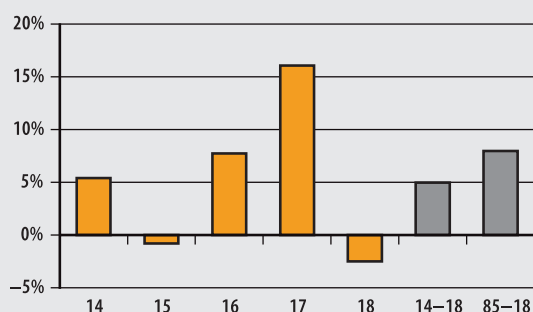
### Board Meeting

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

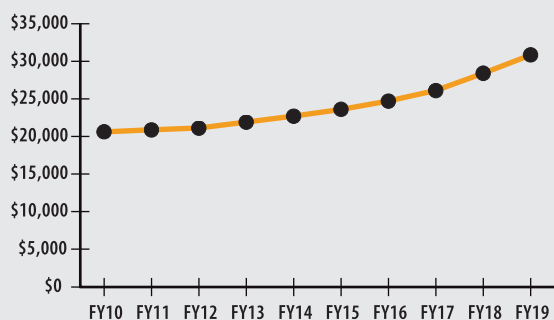
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

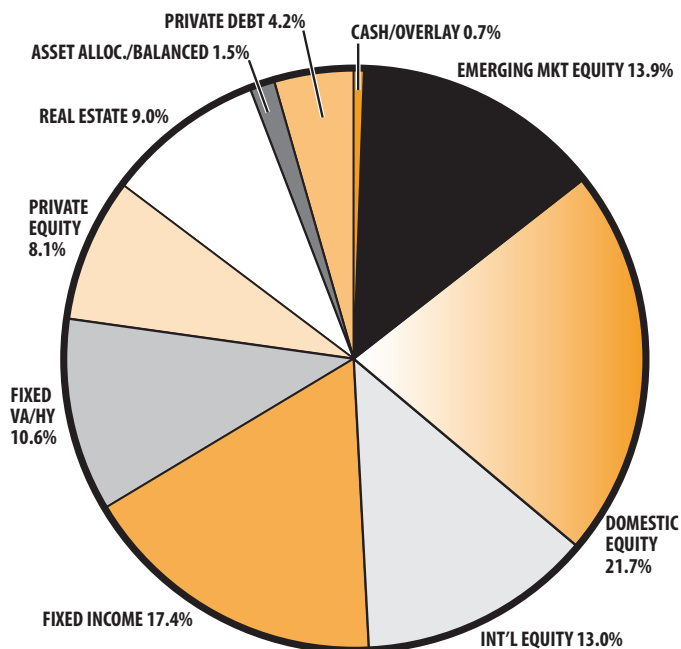
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
7.98%	8.31%	8.08%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.06%	5.30%	4.42%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
4.99%	8.08%	7.47%

## 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 2019)	\$30.8 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	124
▶ Number Who Reported Earnings	33
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-2.46%
▶ 2018 Market Value	\$319.0 M
▶ 2014-2018 (Annualized)	4.99%
▶ 1985-2018 (Annualized)	7.98%

## 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

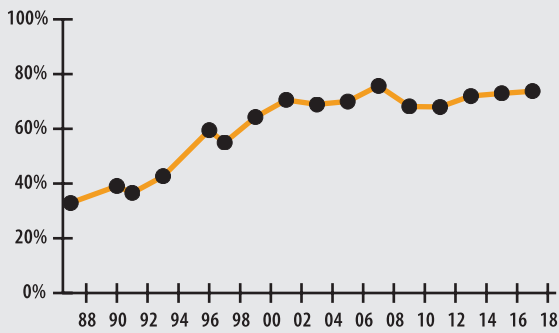
## Board Administrator

Colleen Loughlin

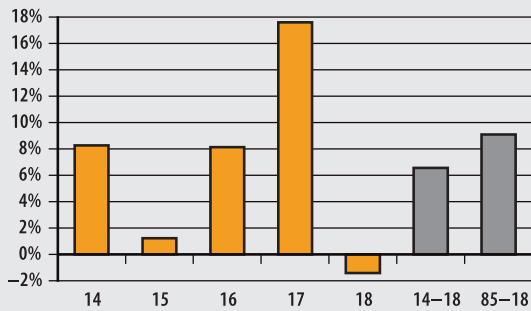
## Board Meeting

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

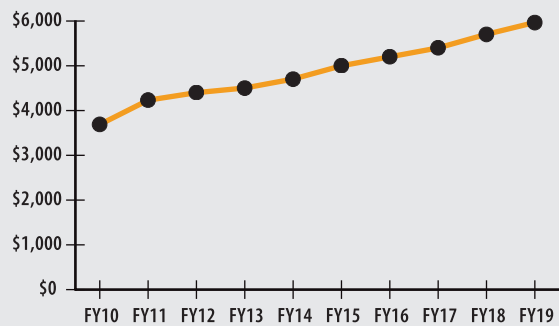
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

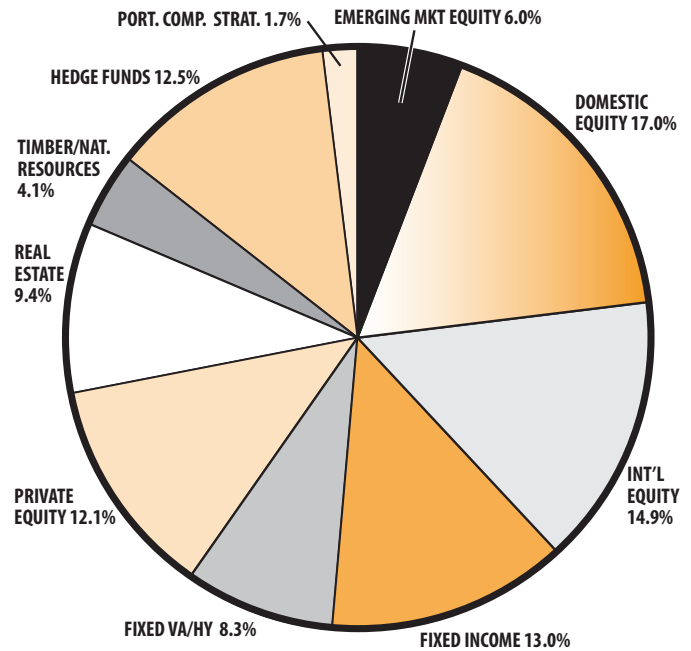
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.10%	9.43%	9.18%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.26%	5.67%	5.17%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.57%	9.94%	9.29%

## ACTUARIAL

▶ Funded Ratio	73.8%
▶ Date of Last Valuation	1/1/17
▶ Actuary	KMS
▶ Assumed Rate of Return	7.65%
▶ Funding Schedule	5.34% Total Increasing
▶ Year Fully Funded	2029
▶ Unfunded Liability	\$45.4 M
▶ Total Pension Appropriation (Fiscal 2019)	\$6.0 M

	ACTIVE	RETIRED
▶ Number of Members	341	345
▶ Total Payroll/Benefit	\$24.9 M	\$10.3 M
▶ Average Salary/Benefit	\$73,000	\$30,000
▶ Average Age	48	74
▶ Average Service	14.1 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	30
▶ Number Who Reported Earnings	9
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.39%
▶ 2018 Market Value	\$136.2 M
▶ 2014-2018 (Annualized)	6.57%
▶ 1985-2018 (Annualized)	9.10%

## 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

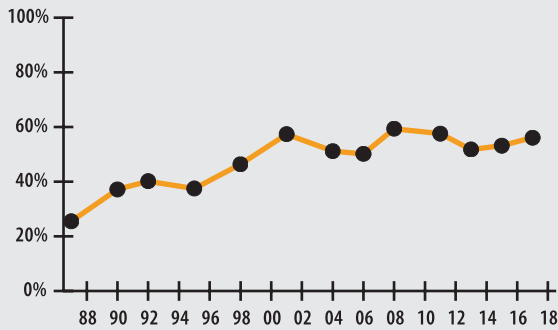
### Board Administrator

Sandor Zapolin

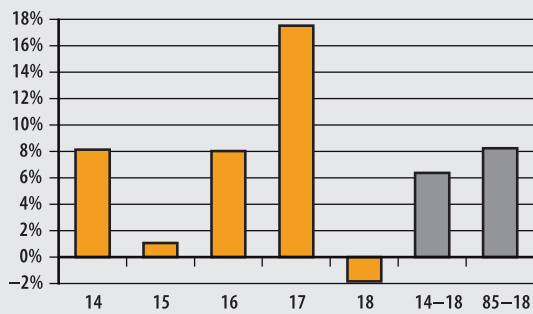
### Board Meeting

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

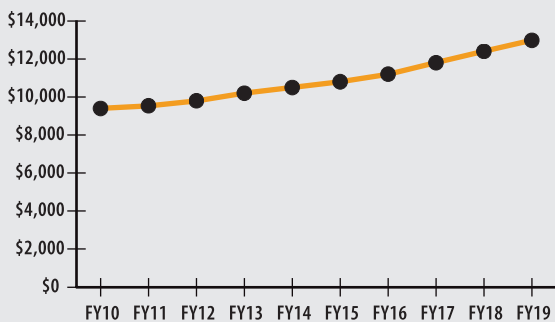
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

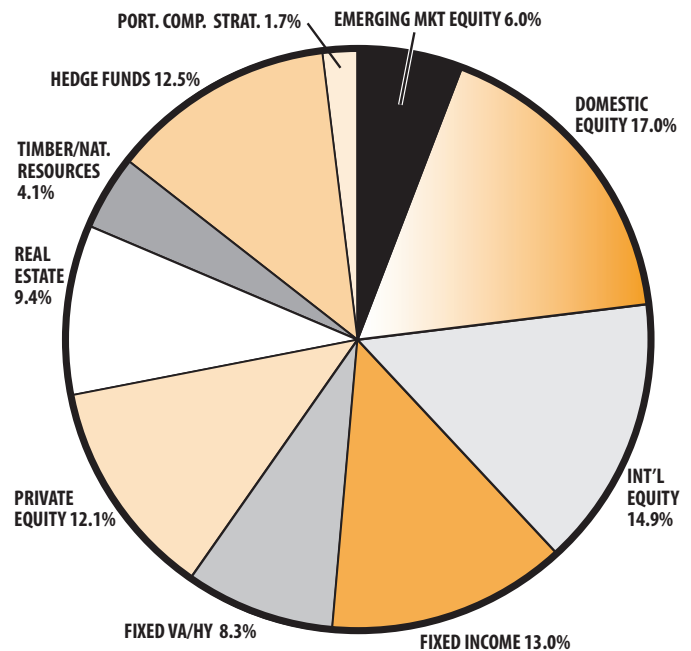
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.24%	8.56%	8.29%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.92%	5.53%	4.96%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.39%	9.81%	9.08%

## ACTUARIAL

▶ Funded Ratio	56.1%
▶ Date of Last Valuation	1/1/17
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.40%
▶ Funding Schedule	5.0% Total Increasing
▶ Year Fully Funded	2033
▶ Unfunded Liability	\$108.3 M
▶ Total Pension Appropriation (Fiscal 2019)	\$13.0 M

	ACTIVE	RETIRED
▶ Number of Members	560	509
▶ Total Payroll/Benefit	\$33.3 M	\$15.1 M
▶ Average Salary/Benefit	\$59,500	\$29,600
▶ Average Age	50	75
▶ Average Service	13.5 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	88
▶ Number Who Reported Earnings	39
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.82%
▶ 2018 Market Value	\$157.7 M
▶ 2014-2018 (Annualized)	6.39%
▶ 1985-2018 (Annualized)	8.24%

## Salem

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

### Board Members

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

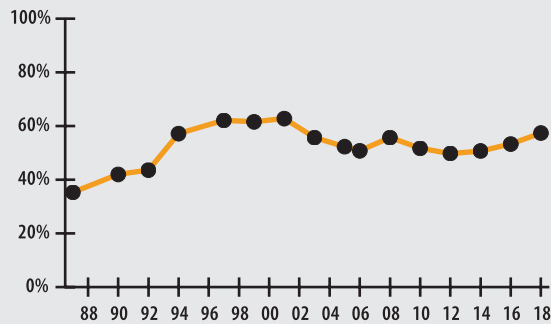
### Board Administrator

Paul Findlen

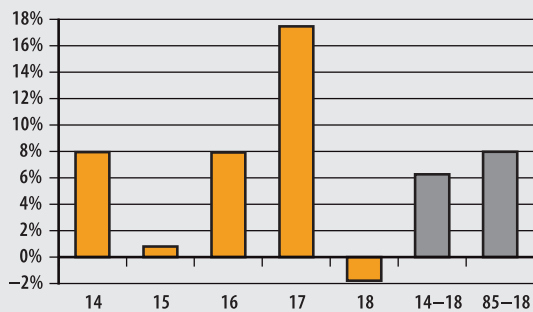
### Board Meeting

Last Wednesday of the month at 12:00 pm

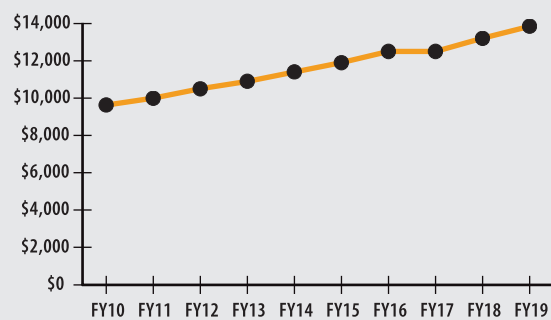
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

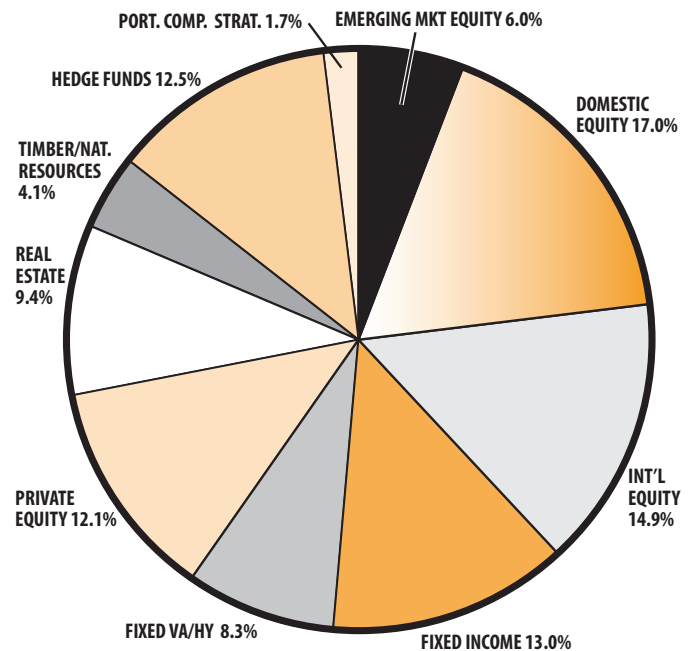
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
7.99%	8.30%	8.03%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.63%	5.17%	4.27%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.28%	9.63%	8.73%

## ACTUARIAL

▶ Funded Ratio	57.4%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Segal
▶ Assumed Rate of Return	7.38%
▶ Funding Schedule	5.55 % Total Increasing
▶ Year Fully Funded	2031
▶ Unfunded Liability	\$126.8 M
▶ Total Pension Appropriation (Fiscal 2019)	\$13.9 M

	ACTIVE	RETIRED
▶ Number of Members	910	589
▶ Total Payroll/Benefit	\$46.6 M	\$15.0 M
▶ Average Salary/Benefit	\$51,200	\$25,500
▶ Average Age	49	74
▶ Average Service	12 years	NA

## ASSET ALLOCATION (12/31/18)

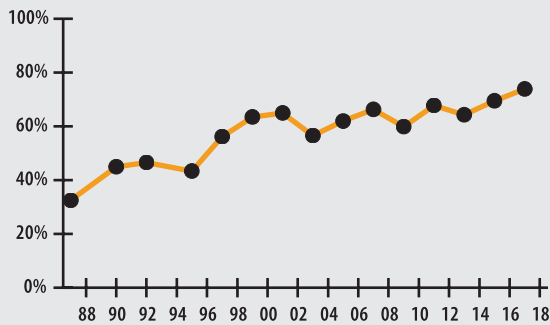


## EARNED INCOME OF DISABILITY RETIREES (2017)

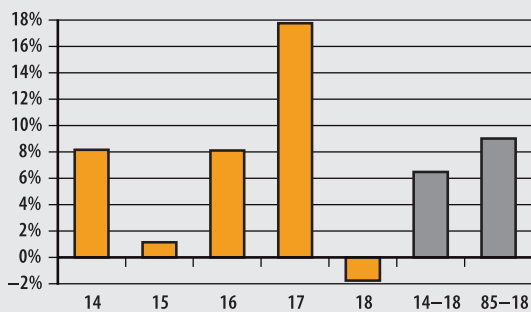
▶ Number of Disability Retirees	44
▶ Number Who Reported Earnings	14
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.78%
▶ 2018 Market Value	\$174.7 M
▶ 2014-2018 (Annualized)	6.28%
▶ 1985-2018 (Annualized)	7.99%

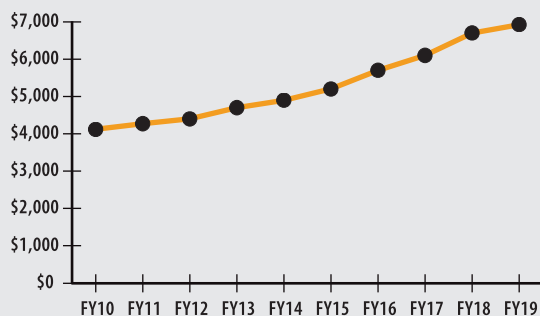
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



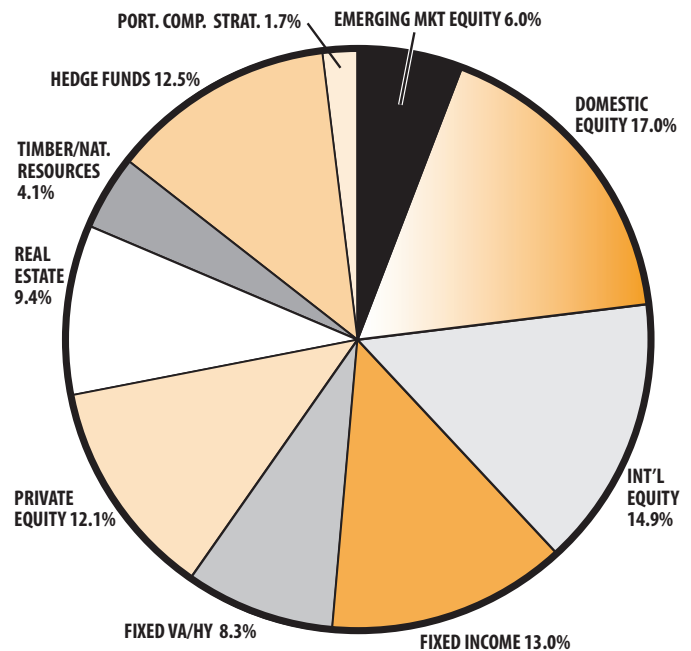
### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
9.03%	9.38%	9.13%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.20%	5.66%	5.13%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.49%	9.96%	9.22%

### ACTUARIAL

▶ Funded Ratio		73.9%
▶ Date of Last Valuation		1/1/17
▶ Actuary		PERAC
▶ Assumed Rate of Return		7.40%
▶ Funding Schedule		3.5% Total Increasing
▶ Year Fully Funded		2026
▶ Unfunded Liability		\$32.5 M
▶ Total Pension Appropriation (Fiscal 2019)		\$6.9 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	372	282
▶ Total Payroll/Benefit	\$17.5 M	\$7.4 M
▶ Average Salary/Benefit	\$47,100	\$26,400
▶ Average Age	46	74
▶ Average Service	11.7 years	NA

### ASSET ALLOCATION (12/31/18)



### EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	27
▶ Number Who Reported Earnings	5
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.75%
▶ 2018 Market Value	\$100.2 M
▶ 2014-2018 (Annualized)	6.49%
▶ 1985-2018 (Annualized)	9.03%

## Shrewsbury

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

### Board Members

Mary Thompson, Thomas Kennedy\*,  
Ralph Iaccarino, Robert Tozeski,  
Alice Ferro

\*indicates Chairperson

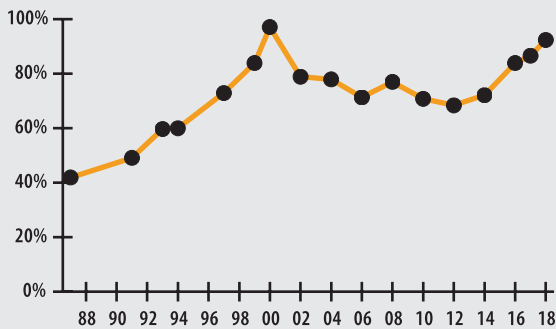
### Board Administrator

Gregory Gatsogiannis

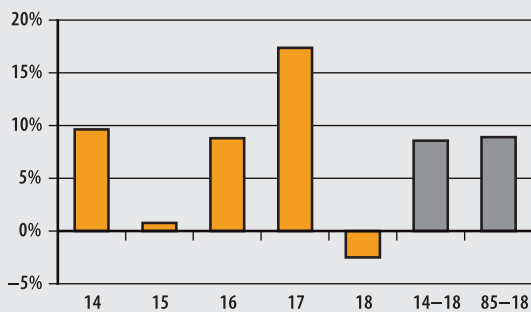
### Board Meeting

Varies - Generally try for a Wednesday  
morning at 7:30

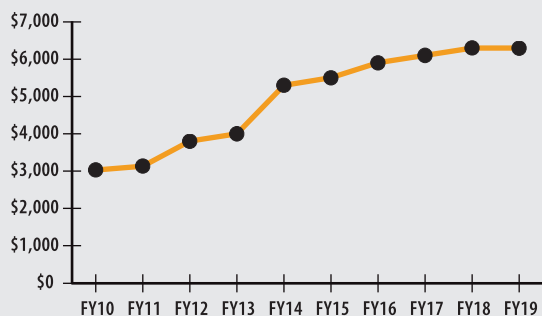
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

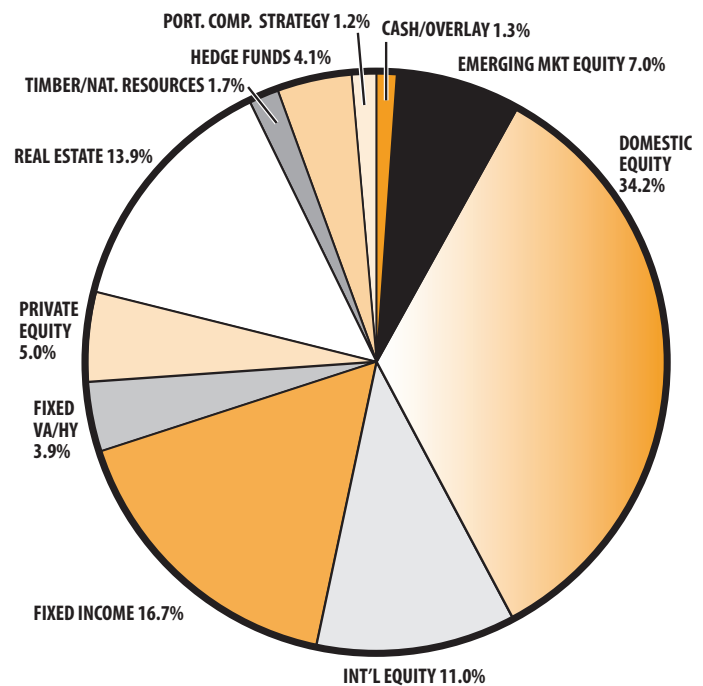
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.93%	9.30%	9.06%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.81%	6.59%	5.89%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.59%	10.83%	10.17%

## ACTUARIAL

▶ 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 2019)	\$6.3 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
▶ Average Service	NA years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	21
▶ Number Who Reported Earnings	9
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-2.49%
▶ 2018 Market Value	\$121.9 M
▶ 2014-2018 (Annualized)	6.59%
▶ 1985-2018 (Annualized)	8.93%



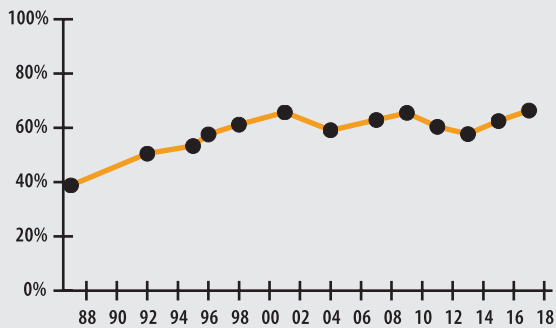
## Somerville

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

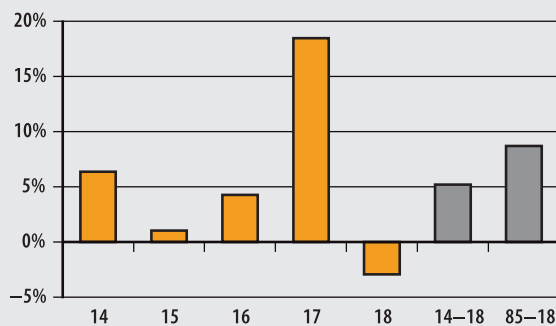
**Board Members**  
Edward Bean, Jr.\*, Michael Mastrobuoni,  
John Memory, Thomas Ross  
\*indicates Chairperson

**Board Administrator**  
Michael Pasquariello  
**Board Meeting**  
Varies

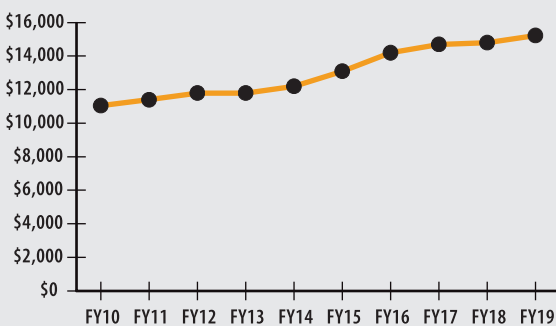
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

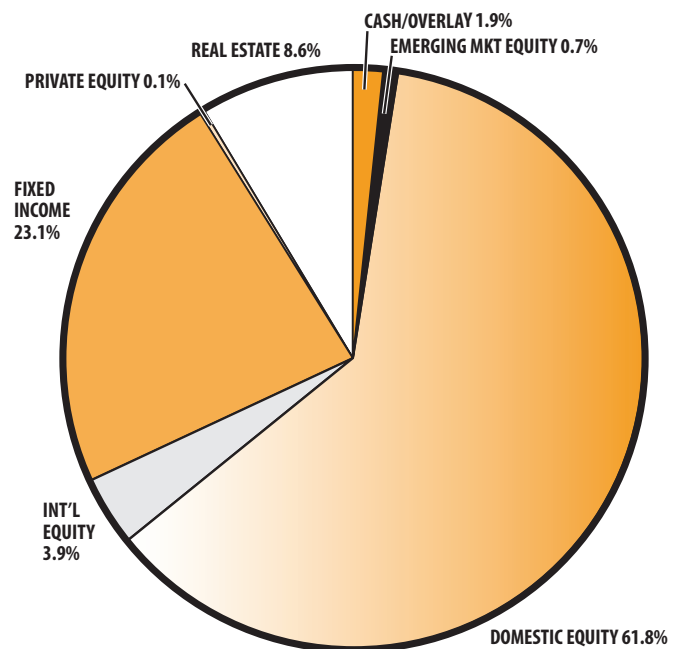
<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.70%	9.07%	8.79%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.89%	6.90%	6.32%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
5.22%	9.85%	9.28%

## ACTUARIAL

▶ Funded Ratio	66.4%
▶ Date of Last Valuation	1/1/17
▶ Actuary	Sherman
▶ Assumed Rate of Return	8.00%
▶ Funding Schedule	3.5% Increasing
▶ Year Fully Funded	2033
▶ Unfunded Liability	\$132.0 M
▶ Total Pension Appropriation (Fiscal 2019)	\$15.2 M

	ACTIVE	RETIRED
▶ Number of Members	1,195	906
▶ Total Payroll/Benefit	\$71.5 M	\$25.8 M
▶ Average Salary/Benefit	\$59,800	\$28,500
▶ Average Age	NA	75
▶ Average Service	NA years	NA

## ASSET ALLOCATION (12/31/18)

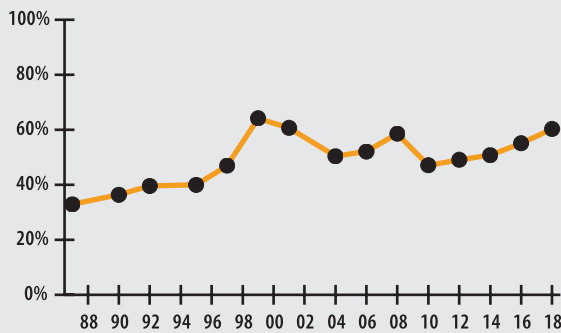


## EARNED INCOME OF DISABILITY RETIREES (2017)

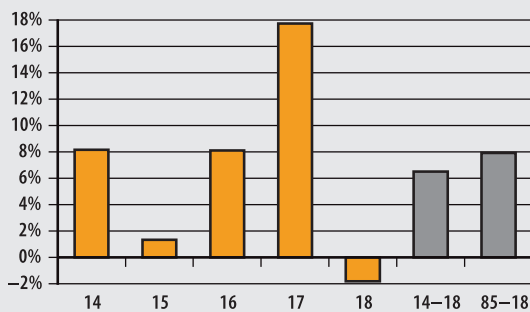
▶ Number of Disability Retirees	93
▶ Number Who Reported Earnings	31
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$20,754.88

▶ 2018 Return	-2.92%
▶ 2018 Market Value	\$262.8 M
▶ 2014-2018 (Annualized)	5.22%
▶ 1985-2018 (Annualized)	8.70%

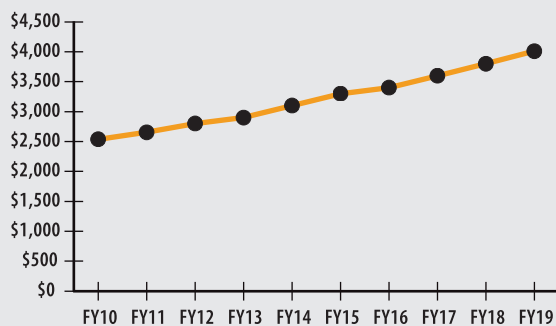
## FUNDED RATIO (1987-2018)



## INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



## 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



## INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.93%	8.24%	7.95%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
8.47%	4.81%	3.78%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.51%	9.84%	8.95%

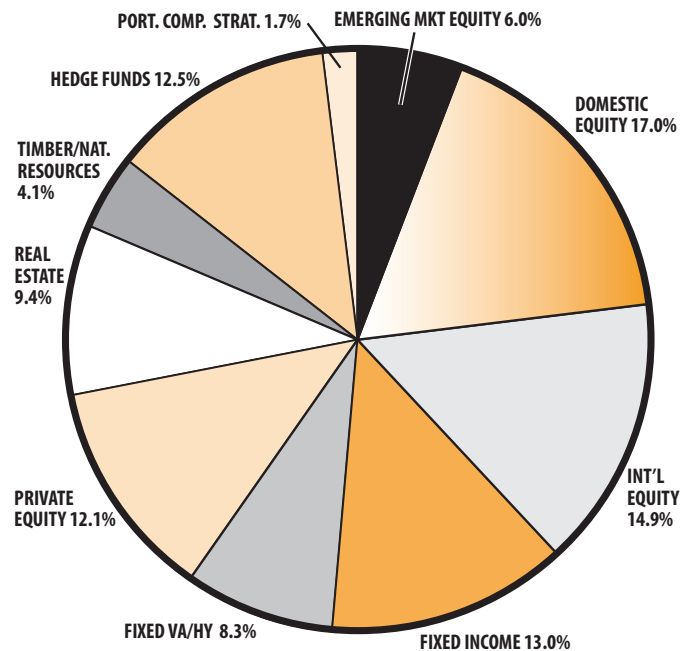
## ACTUARIAL

▶ 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 2019)	\$4.0 M

	ACTIVE	RETIRED
▶ Number of Members	356	180
▶ Total Payroll/Benefit	\$15.9 M	\$4.3 M
▶ Average Salary/Benefit	\$44,600	\$24,100
▶ Average Age	48	73
▶ Average Service	10.1 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	16
▶ Number Who Reported Earnings	8
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.80%
▶ 2018 Market Value	\$52.7 M
▶ 2014-2018 (Annualized)	6.51%
▶ 1985-2018 (Annualized)	7.93%

## Springfield

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

### Board Members

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

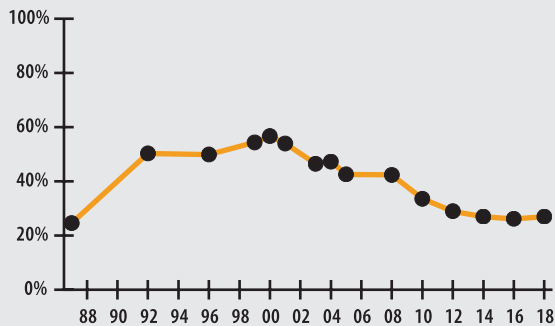
### Board Administrator

Susana Baltazar

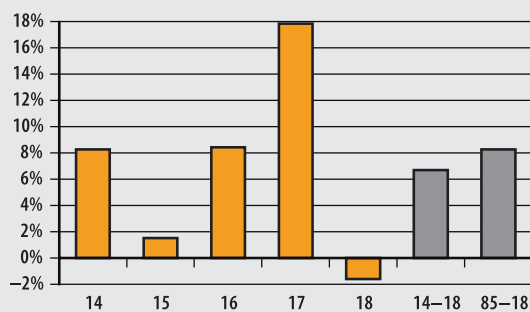
### Board Meeting

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

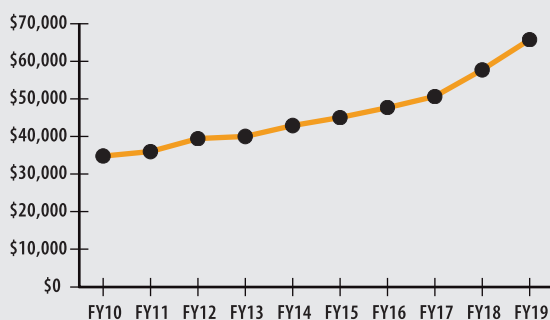
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

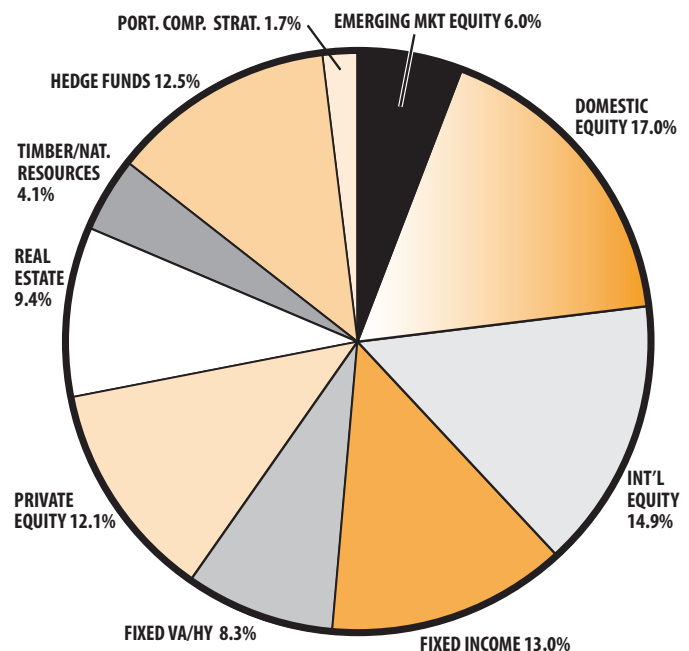
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.27%	8.58%	8.30%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.97%	5.53%	4.99%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.70%	10.16%	9.37%

## ACTUARIAL

▶ 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 2019)	\$65.7 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	390
▶ Number Who Reported Earnings	119
▶ Number of Excess Earners	5
▶ Total Amount of Refund Due	\$60,035.00

▶ 2018 Return	-1.59%
▶ 2018 Market Value	\$337.6 M
▶ 2014-2018 (Annualized)	6.70%
▶ 1985-2018 (Annualized)	8.27%

## State

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

## Board Members

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

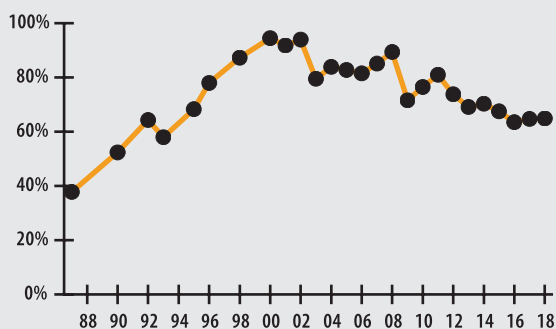
## Board Administrator

Nicola Favorito

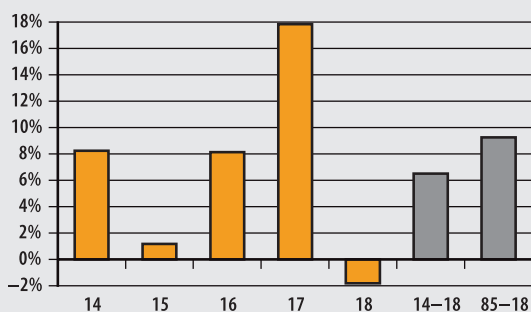
## Board Meeting

Last Thursday of the month at 10:00 am

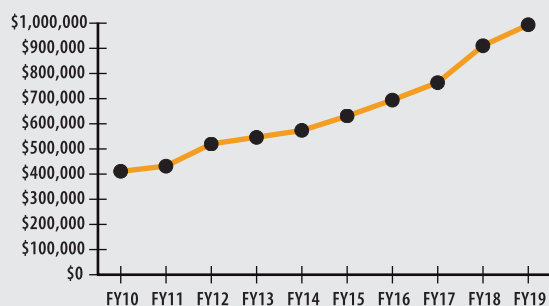
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

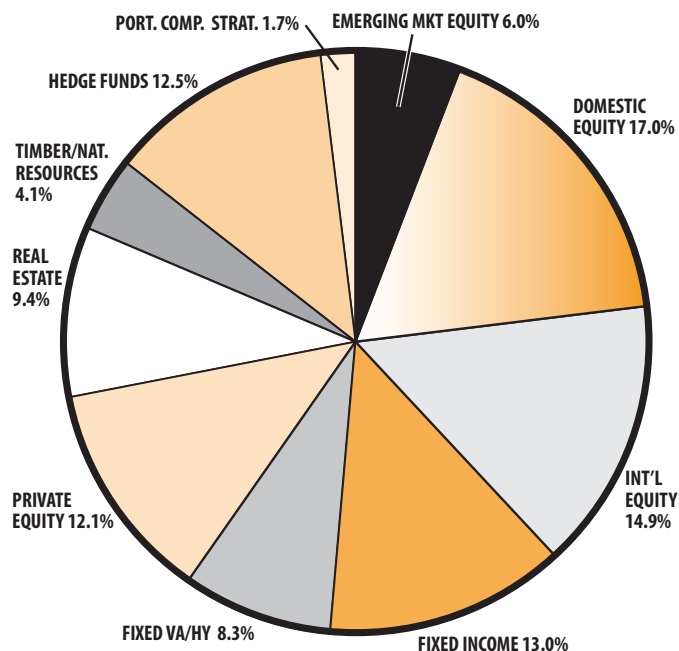
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.26%	9.61%	9.36%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.25%	5.68%	5.15%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.52%	10.01%	9.28%

## ACTUARIAL

▶ Funded Ratio	64.9%
▶ Date of Last Valuation	1/1/18
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.35%
▶ Funding Schedule	8.94% Total Increasing
▶ Year Fully Funded	2036
▶ Unfunded Liability	\$14.2 B
▶ Total Pension Appropriation (Fiscal 2019)	\$993 M

	ACTIVE	RETIRED
▶ Number of Members	87,822	63,194
▶ Total Payroll/Benefit	\$6.2 B	\$2.2 B
▶ Average Salary/Benefit	\$70,100	\$34,800
▶ Average Age	47	72
▶ Average Service	12.5 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	3318
▶ Number Who Reported Earnings	921
▶ Number of Excess Earners	18
▶ Total Amount of Refund Due	\$225,674.25

▶ 2018 Return	-1.81%
▶ 2018 Market Value	\$26.2 B
▶ 2014-2018 (Annualized)	6.52%
▶ 1985-2018 (Annualized)	9.26%

## 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

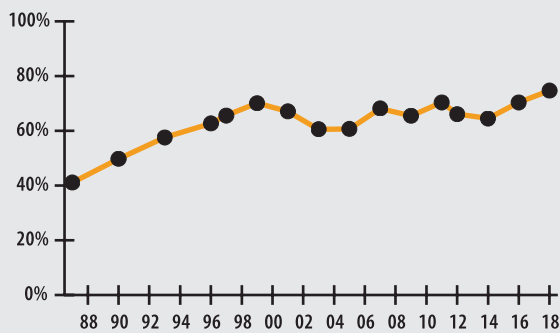
### Board Administrator

Karen DeAngelis

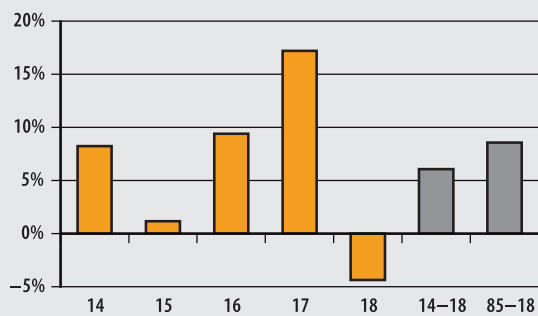
### Board Meeting

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

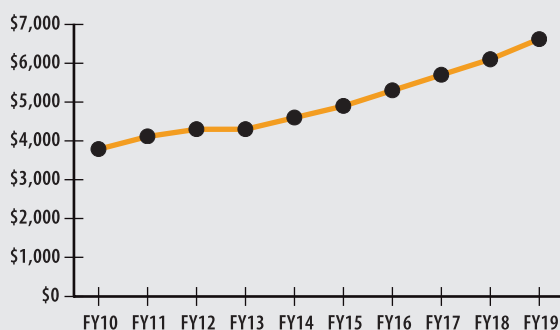
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



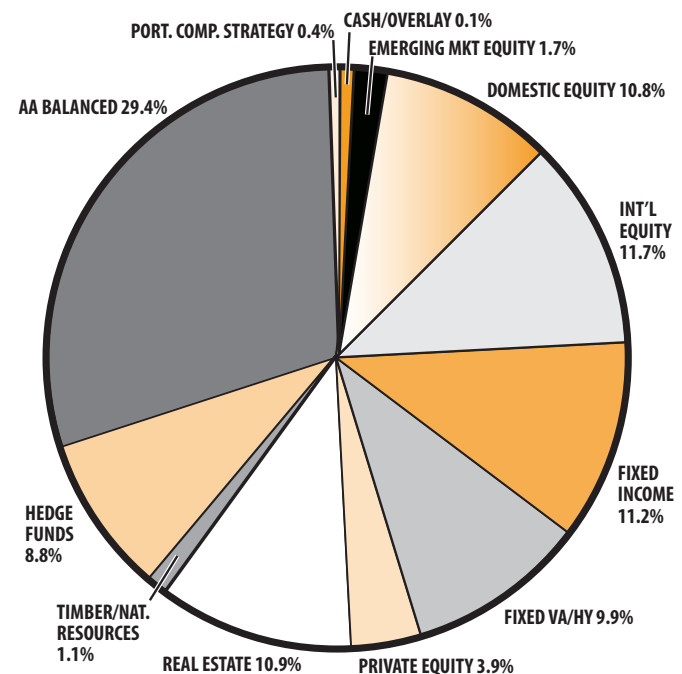
### INVESTMENT RETURN HISTORY

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.59%	9.01%	8.76%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.99%	5.74%	5.26%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.09%	10.11%	9.48%

## 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 2019)		\$6.6 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	16
▶ Number Who Reported Earnings	4
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-4.35%
▶ 2018 Market Value	\$88.1 M
▶ 2014-2018 (Annualized)	6.09%
▶ 1985-2018 (Annualized)	8.59%

**Board Members**

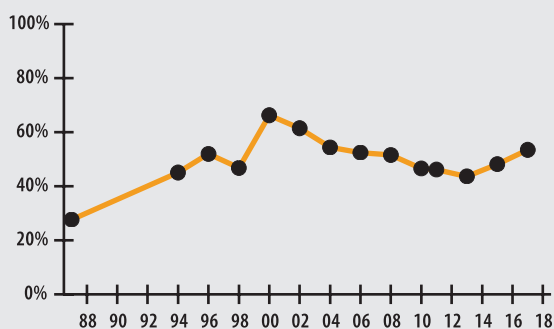
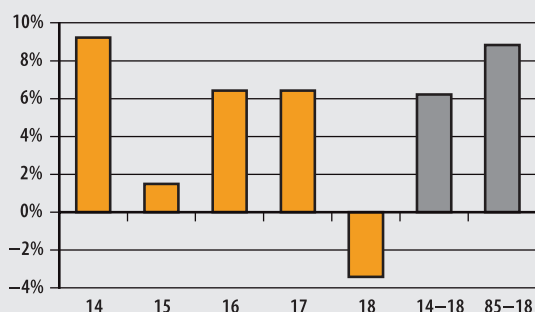
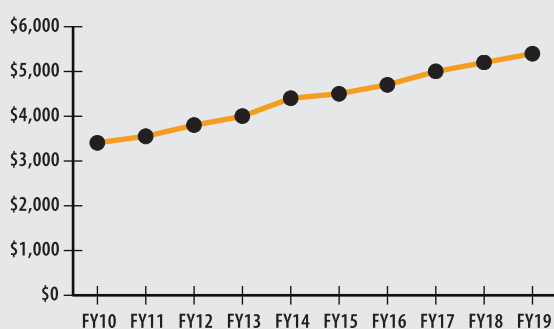
Cheryl Stella, Thomas Driscoll\*,  
Kevin Breen, John Behen,  
Robert Powell III  
\*indicates Chairperson

**Board Administrator**

Nancy Lord

**Board Meeting**

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

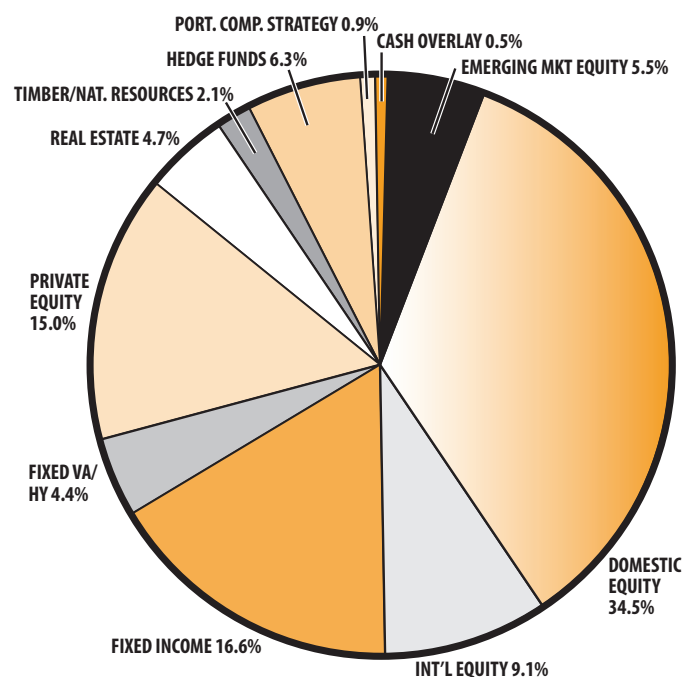
**FUNDED RATIO (1987-2018)**

**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**

**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**

**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.83%	9.23%	8.94%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
8.42%	5.97%	5.31%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.22%	10.36%	9.75%

**ACTUARIAL**

▶ Funded Ratio	53.5%
▶ Date of Last Valuation	1/1/17
▶ Actuary	Stone
▶ Assumed Rate of Return	7.50%
▶ Funding Schedule	2.9% Increasing
▶ Year Fully Funded	2031
▶ Unfunded Liability	\$44.4 M
▶ Total Pension Appropriation (Fiscal 2019)	\$5.4 M

	ACTIVE	RETIRED
▶ Number of Members	246	200
▶ Total Payroll/Benefit	\$13.1 M	\$5.2 M
▶ Average Salary/Benefit	\$53,200	\$26,200
▶ Average Age	50	74
▶ Average Service	13.7 years	NA

**ASSET ALLOCATION (12/31/18)**

**EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	19
▶ Number Who Reported Earnings	3
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$6,675.68

▶ 2018 Return	-3.41%
▶ 2018 Market Value	\$56.4 M
▶ 2014-2018 (Annualized)	6.22%
▶ 1985-2018 (Annualized)	8.83%

**Board Members**

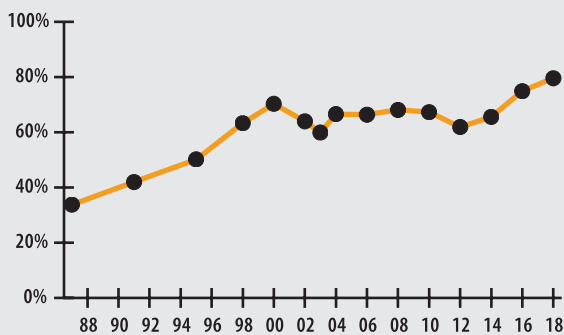
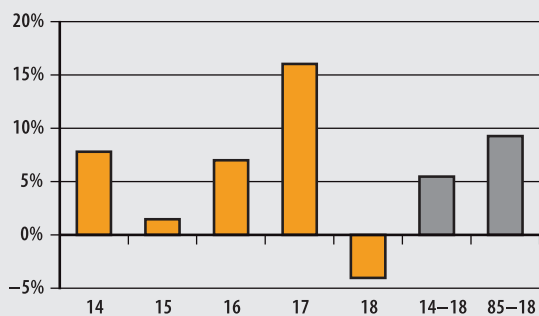
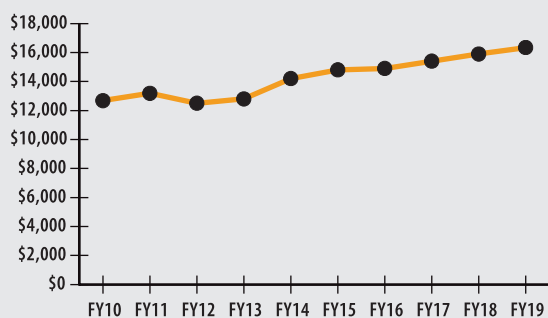
Ann Marie Hebert\*, Gill Enos,  
Peter Corr, Dennis Smith,  
Barry Amaral  
\*indicates Chairperson

**Board Administrator**

Paul Slivinski

**Board Meeting**

Fourth Wednesday of the month at 1:00 pm

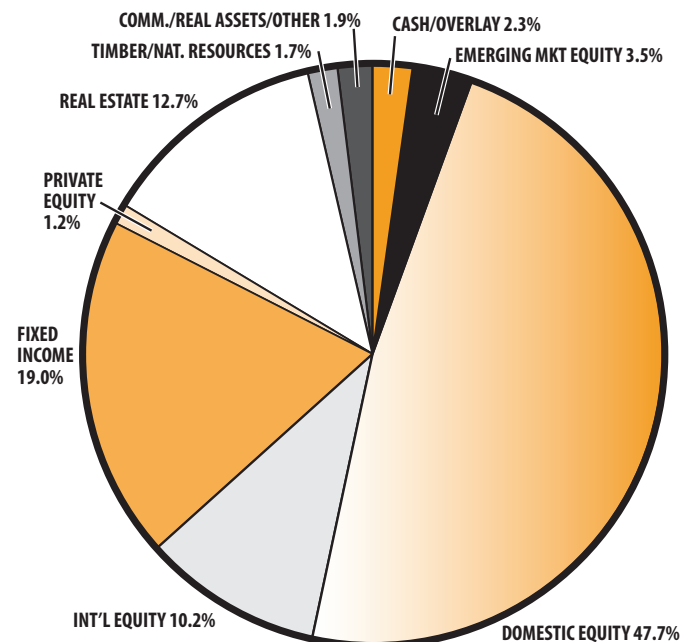
**FUNDED RATIO (1987-2018)**

**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**

**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**

**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
9.28%	9.71%	9.51%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.27%	6.71%	5.99%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
5.47%	10.11%	9.37%

**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 2019)	\$16.3 M

	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)**

**EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	79
▶ Number Who Reported Earnings	16
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-4.01%
▶ 2018 Market Value	\$296.0 M
▶ 2014-2018 (Annualized)	5.47%
▶ 1985-2018 (Annualized)	9.28%



**Board Members**

Kevin Gill\*, Richard Smith,  
Richard DeFelice,  
Daniel Sherman  
\*indicates Chairperson

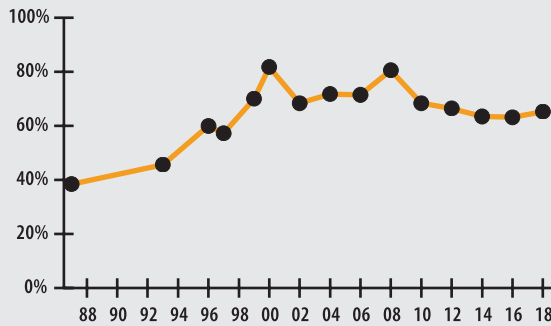
**Board Administrator**

Cathy Cheek

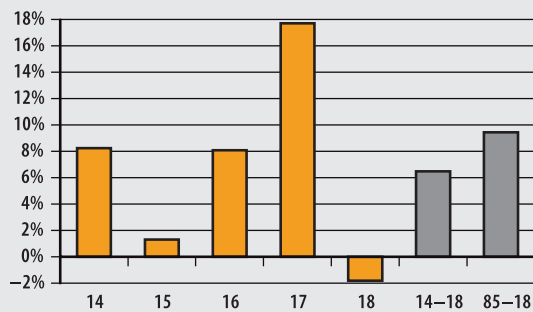
**Board Meeting**

Third Thursday of the month at 8:00 am

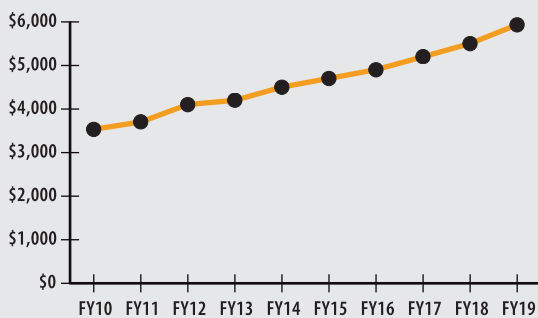
**FUNDED RATIO (1987-2018)**



**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**



**10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)**



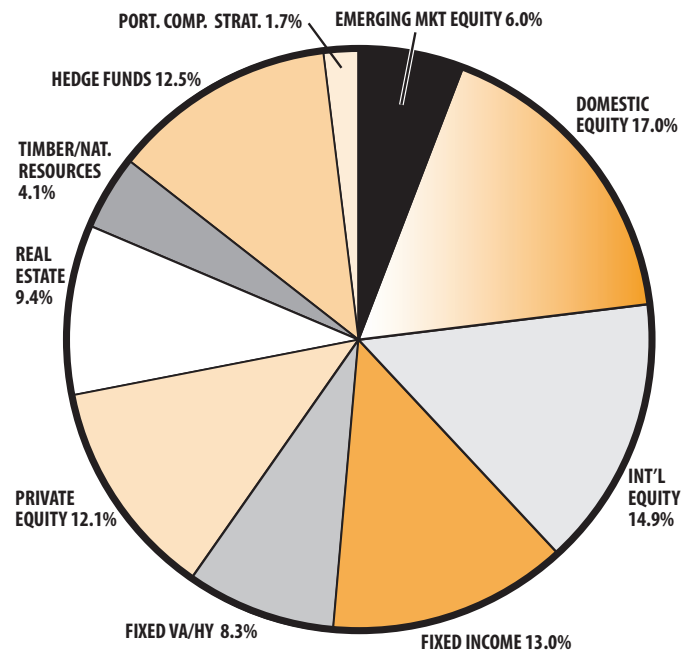
**INVESTMENT RETURN HISTORY**

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
9.45%	9.81%	9.57%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.24%	5.68%	5.16%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.50%	10.00%	9.29%

**ACTUARIAL**

▶ Funded Ratio		65.3%
▶ Date of Last Valuation		1/1/18
▶ Actuary		PERAC
▶ Assumed Rate of Return		7.50%
▶ Funding Schedule		7.18% Total Increasing
▶ Year Fully Funded		2036
▶ Unfunded Liability		\$62.2 M
▶ Total Pension Appropriation (Fiscal 2019)		\$5.9 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	449	363
▶ Total Payroll/Benefit	\$26.4 M	\$10.3 M
▶ Average Salary/Benefit	\$58,800	\$28,400
▶ Average Age	49	75
▶ Average Service	12.6 years	NA

**ASSET ALLOCATION (12/31/18)**



**EARNED INCOME OF DISABILITY RETIREES (2017)**

▶ Number of Disability Retirees	31
▶ Number Who Reported Earnings	8
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.80%
▶ 2018 Market Value	\$118.3 M
▶ 2014-2018 (Annualized)	6.50%
▶ 1985-2018 (Annualized)	9.45%

## Waltham

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

### Board Members

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

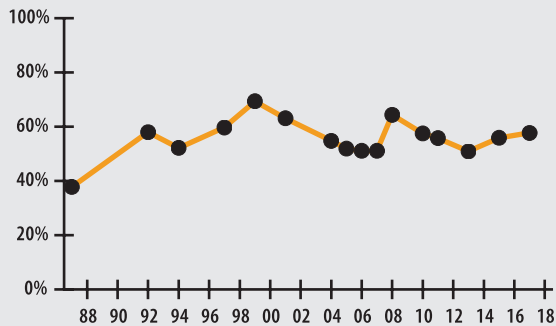
### Board Administrator

Karen Doucet

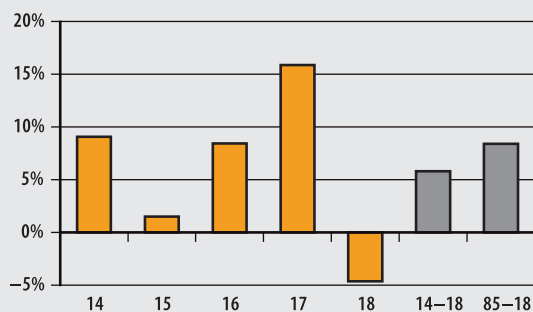
### Board Meeting

Third Wednesday of the month at 4:45 pm

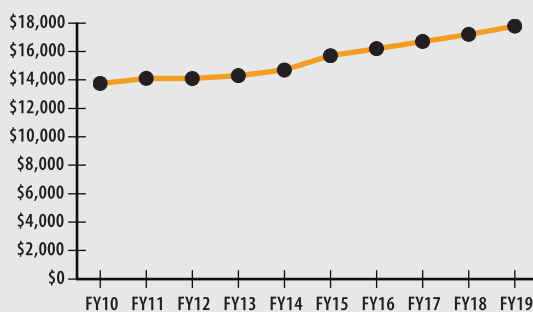
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

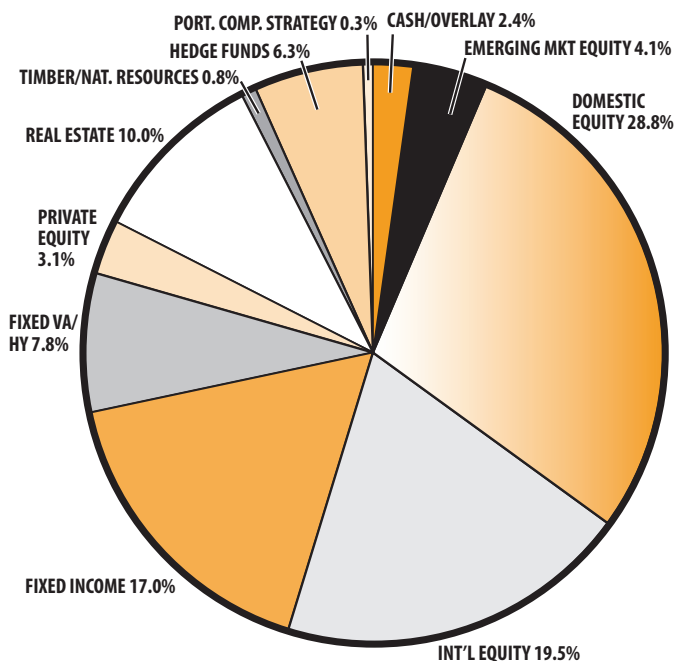
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.41%	8.83%	8.61%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.22%	5.70%	5.07%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.83%	9.99%	9.66%

## ACTUARIAL

▶ Funded Ratio	57.7%
▶ Date of Last Valuation	1/1/17
▶ Actuary	Sherman
▶ Assumed Rate of Return	7.75%
▶ Funding Schedule	Varies Total Increasing
▶ Year Fully Funded	2032
▶ Unfunded Liability	\$164.2 M
▶ Total Pension Appropriation (Fiscal 2019)	\$17.8 M

	ACTIVE	RETIRED
▶ Number of Members	910	766
▶ Total Payroll/Benefit	\$61.6 M	\$23.7 M
▶ Average Salary/Benefit	\$67,700	\$30,900
▶ Average Age	NA	74
▶ Average Service	NA	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	73
▶ Number Who Reported Earnings	19
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-4.61%
▶ 2018 Market Value	\$233.5 M
▶ 2014-2018 (Annualized)	5.83%
▶ 1985-2018 (Annualized)	8.41%

## 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,  
Thomas Thibaut\*, Domenic Arone,  
Kathleen Kiely-Becchetti  
\*indicates Chairperson

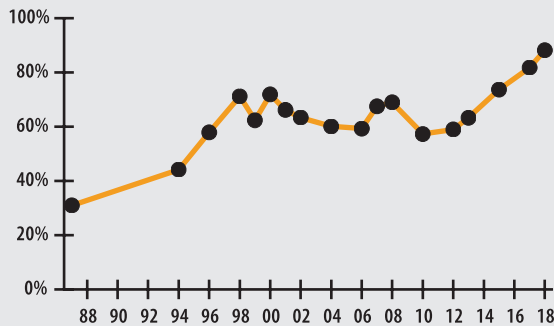
### Board Administrator

Barbara Sheehan

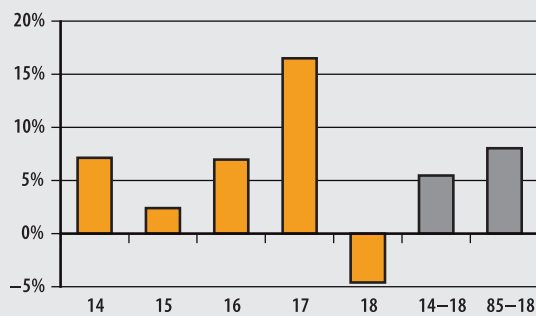
### Board Meeting

Third Tuesday of each month at 8:30 am

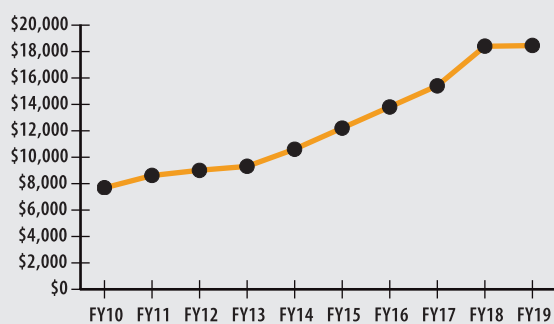
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

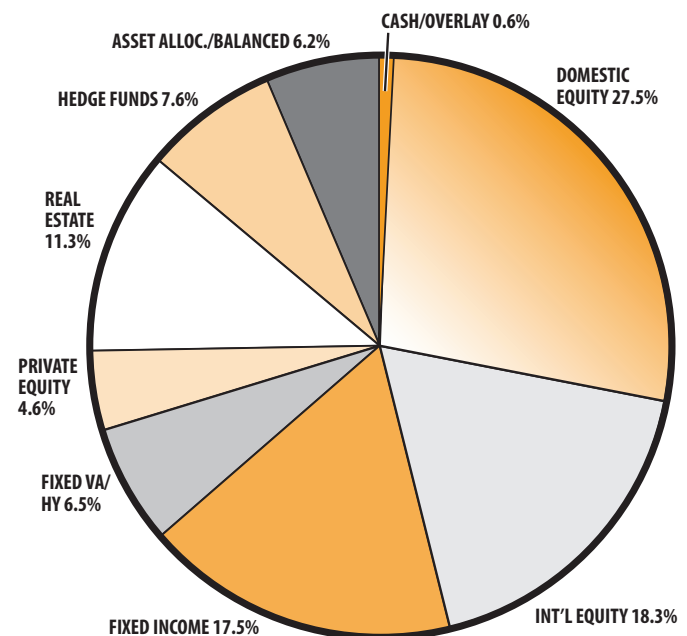
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.06%	8.46%	8.22%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.53%	5.78%	4.96%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.47%	9.66%	8.99%

## ACTUARIAL

▶ Funded Ratio	88.2%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Sherman
▶ Assumed Rate of Return	7.90%
▶ Funding Schedule	Varies Total Increasing
▶ Year Fully Funded	2020
▶ Unfunded Liability	\$24.2 M
▶ Total Pension Appropriation (Fiscal 2019)	\$18.4 M

	ACTIVE	RETIRED
▶ Number of Members	523	425
▶ Total Payroll/Benefit	\$33.5 M	\$13.5 M
▶ Average Salary/Benefit	\$64,100	\$31,800
▶ Average Age	NA	75
▶ Average Service	NA	NA

## ASSET ALLOCATION (12/31/18)

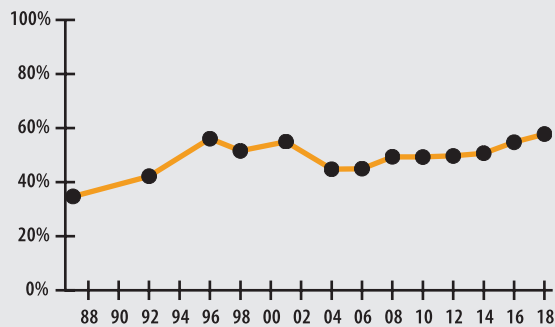


## EARNED INCOME OF DISABILITY RETIREES (2017)

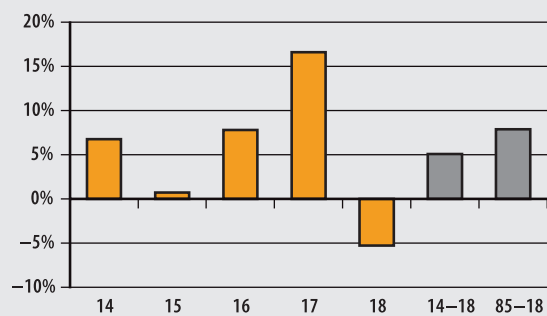
▶ Number of Disability Retirees	42
▶ Number Who Reported Earnings	12
▶ Number of Excess Earners	1
▶ Total Amount of Refund Due	\$46,355.76

▶ 2018 Return	-4.58%
▶ 2018 Market Value	\$182.6 M
▶ 2014-2018 (Annualized)	5.47%
▶ 1985-2018 (Annualized)	8.06%

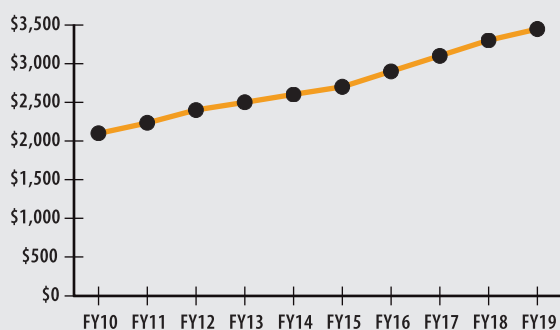
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

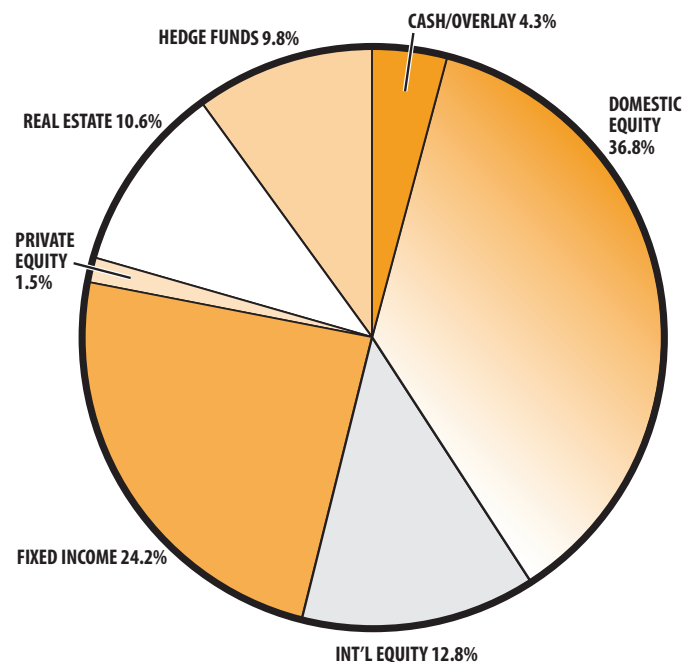
<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
7.89%	8.31%	8.06%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.29%	6.45%	5.66%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
5.08%	9.85%	9.32%

## 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 2019)	\$3.4 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 (12/31/18)

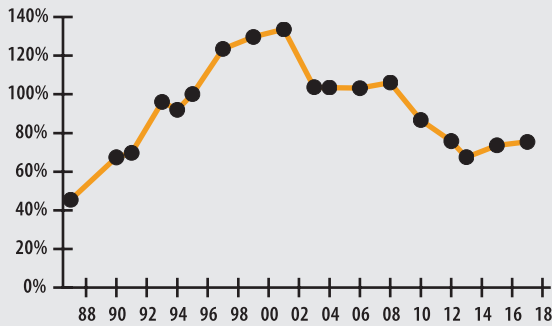


## EARNED INCOME OF DISABILITY RETIREES (2017)

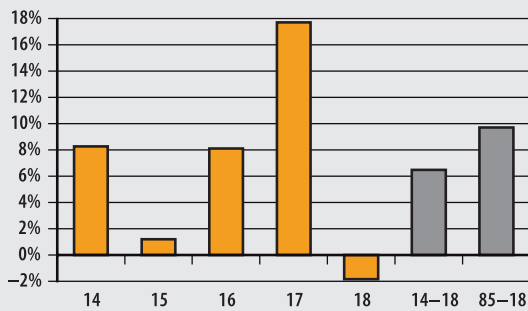
▶ Number of Disability Retirees	7
▶ Number Who Reported Earnings	2
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-5.27%
▶ 2018 Market Value	\$37.5 M
▶ 2014-2018 (Annualized)	5.08%
▶ 1985-2018 (Annualized)	7.89%

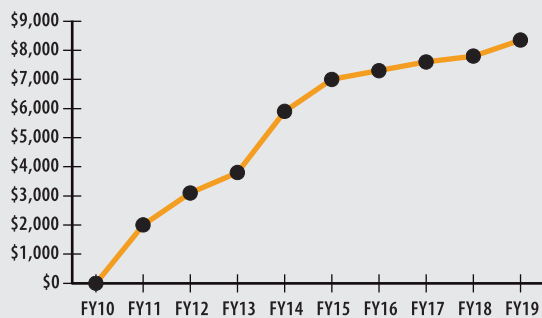
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



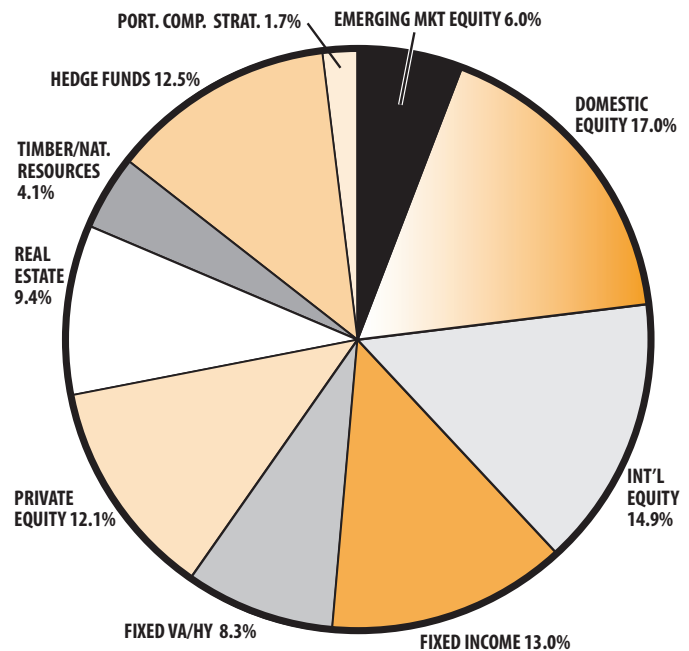
### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
9.72%	10.09%	9.86%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.22%	5.69%	4.82%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.49%	9.99%	9.27%

### ACTUARIAL

▶ Funded Ratio		75.4%
▶ Date of Last Valuation		1/1/17
▶ Actuary		Segal
▶ Assumed Rate of Return		6.63%
▶ Funding Schedule		3.5% Increasing
▶ Year Fully Funded		2030
▶ Unfunded Liability		\$55.0 M
▶ Total Pension Appropriation (Fiscal 2019)		\$8.4 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	702	403
▶ Total Payroll/Benefit	\$38.2 M	\$10.8 M
▶ Average Salary/Benefit	\$54,500	\$26,900
▶ Average Age	46	NA
▶ Average Service	10.7 years	NA

### ASSET ALLOCATION (12/31/18)



### EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	29
▶ Number Who Reported Earnings	6
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.82%
▶ 2018 Market Value	\$187.9 M
▶ 2014-2018 (Annualized)	6.49%
▶ 1985-2018 (Annualized)	9.72%

## 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,  
William Flaherty, Gwen Keough,  
Daniel Marini  
\*indicates Chairperson

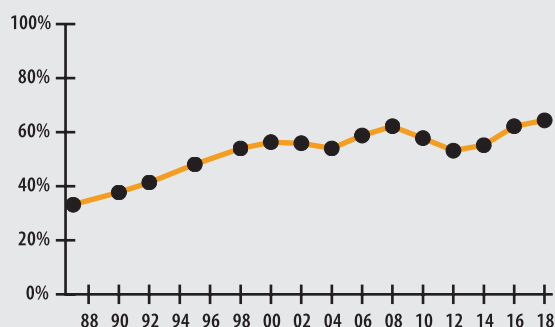
### Board Administrator

James Lovotti

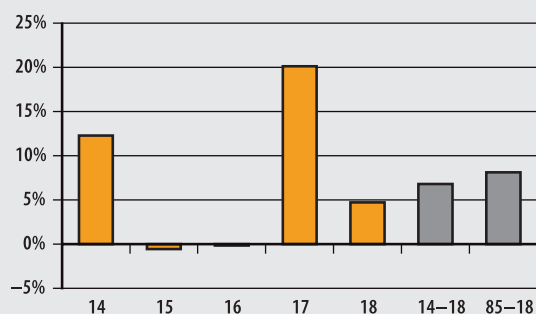
### Board Meeting

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

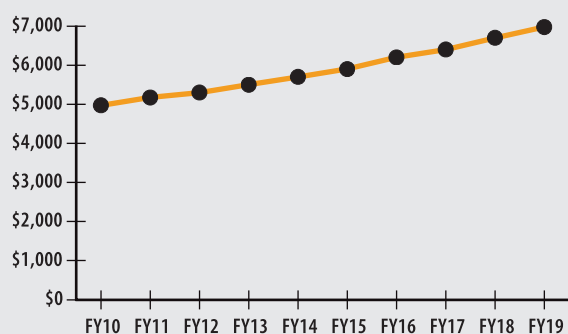
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

#### 34 years 2018

8.15%

#### 33 years 2017

8.29%

#### 32 years 2016

7.94%

#### 10 years 2018

9.31%

#### 10 years 2017

6.25%

#### 10 years 2016

5.26%

#### 5 years 2018

6.81%

#### 5 years 2017

9.85%

#### 5 years 2016

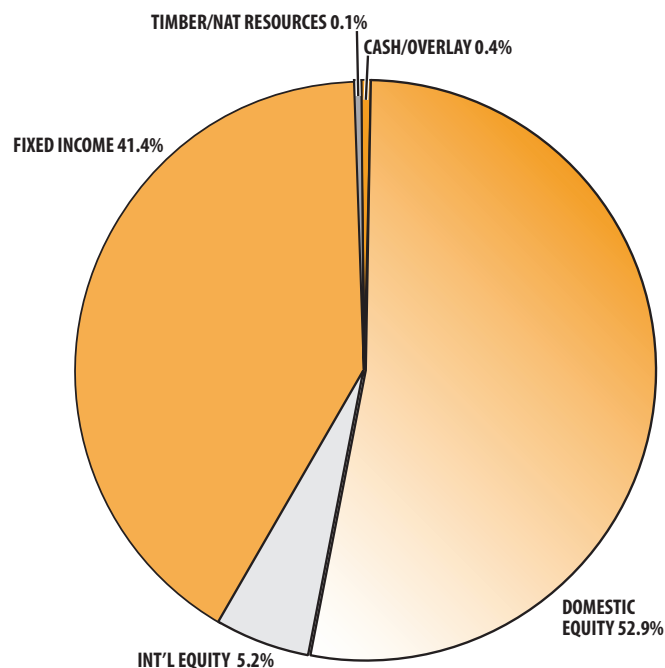
8.06%

## 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 2019)	\$7.0 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 (12/31/18)

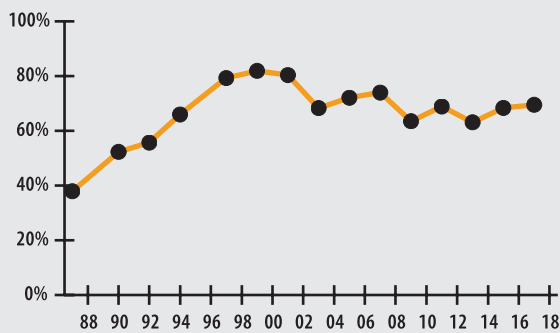


## EARNED INCOME OF DISABILITY RETIREES (2017)

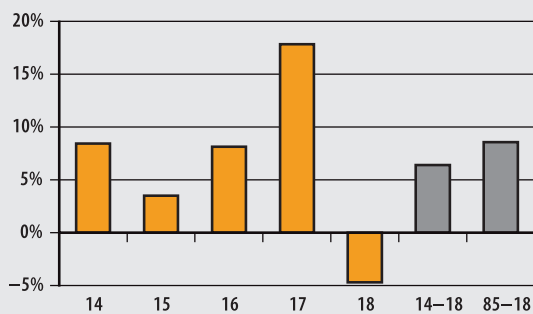
▶ Number of Disability Retirees	33
▶ Number Who Reported Earnings	12
▶ Number of Excess Earners	2
▶ Total Amount of Refund Due	\$52,129.68

▶ 2018 Return	4.75%
▶ 2018 Market Value	\$121.7 M
▶ 2014-2018 (Annualized)	6.81%
▶ 1985-2018 (Annualized)	8.15%

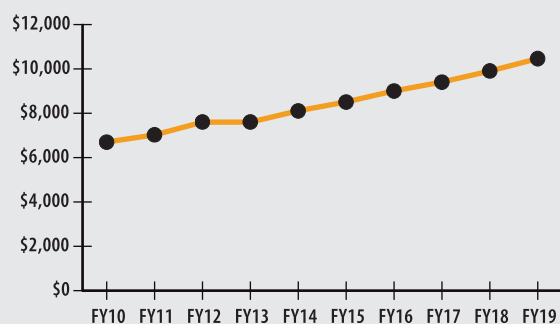
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



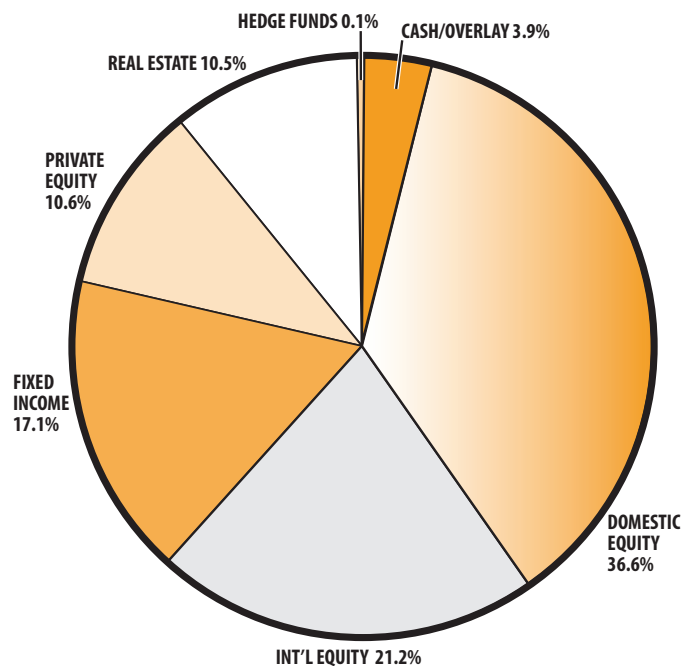
### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.59%	9.02%	8.75%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
9.96%	7.36%	6.34%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.40%	11.46%	10.93%

### ACTUARIAL

▶ Funded Ratio		69.5%
▶ Date of Last Valuation		1/1/17
▶ Actuary		PERAC
▶ Assumed Rate of Return		7.50%
▶ Funding Schedule		5.8% Total Increasing
▶ Year Fully Funded		2034
▶ Unfunded Liability		\$91.0 M
▶ Total Pension Appropriation (Fiscal 2019)		\$10.5 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	895	663
▶ Total Payroll/Benefit	\$40.8 M	\$17.2 M
▶ Average Salary/Benefit	\$45,500	\$26,000
▶ Average Age	47	72
▶ Average Service	11.8 years	NA

### ASSET ALLOCATION (12/31/18)



### EARNED INCOME OF DISABILITY RETIREES (2017)

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

▶ 2018 Return	-4.67%
▶ 2018 Market Value	\$220.4 M
▶ 2014-2018 (Annualized)	6.40%
▶ 1985-2018 (Annualized)	8.59%



## Weymouth

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

### Board Members

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

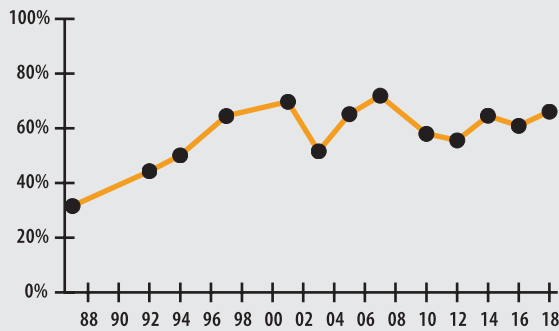
### Board Administrator

Edward Masterson

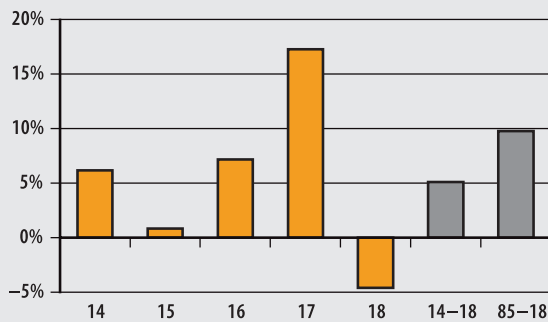
### Board Meeting

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

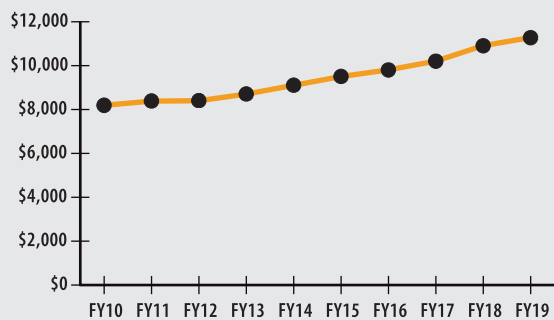
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

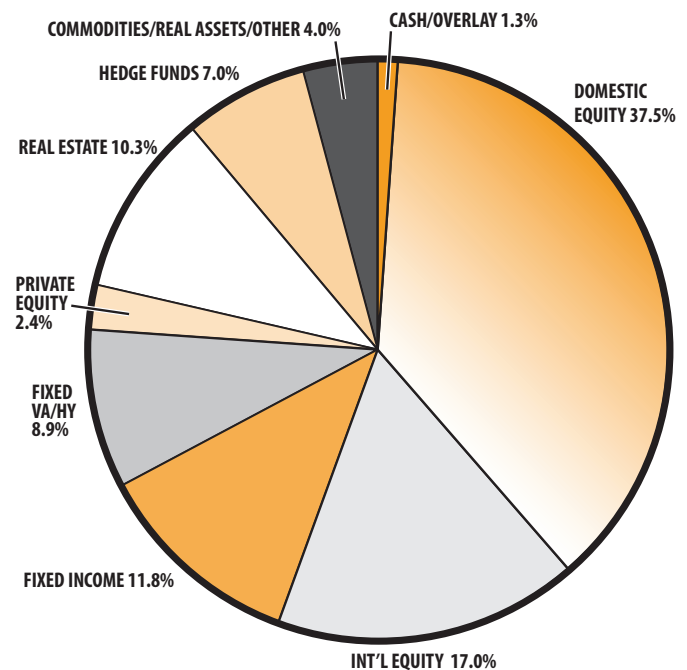
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.49%	9.95%	9.73%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.13%	6.11%	5.19%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.12%	9.73%	9.28%

## ACTUARIAL

▶ Funded Ratio	66.1%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Stone
▶ Assumed Rate of Return	7.50%
▶ Funding Schedule	2.88% Increasing
▶ Year Fully Funded	2035
▶ Unfunded Liability	\$102.2 M
▶ Total Pension Appropriation (Fiscal 2019)	\$11.3 M

	ACTIVE	RETIRED
▶ Number of Members	854	635
▶ Total Payroll/Benefit	\$41.5 M	\$18.4 M
▶ Average Salary/Benefit	\$48,600	\$28,900
▶ Average Age	49	73
▶ Average Service	11.2 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	81
▶ Number Who Reported Earnings	31
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-4.60%
▶ 2018 Market Value	\$185.8 M
▶ 2014-2018 (Annualized)	5.12%
▶ 1985-2018 (Annualized)	9.49%

## Winchester

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

### Board Members

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

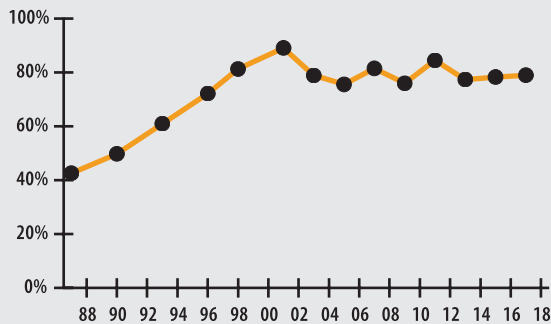
### Board Administrator

Karen Manchuso

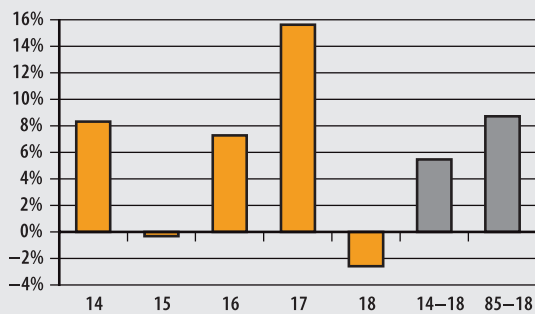
### Board Meeting

Last Tuesday of each month at 8:30 am

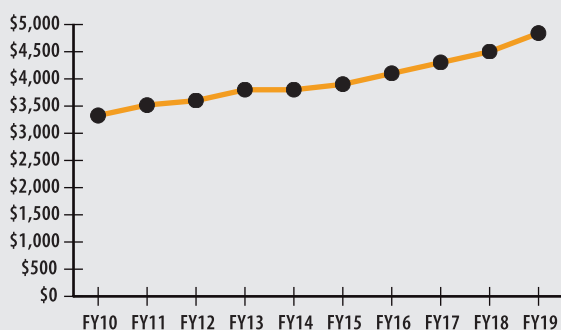
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

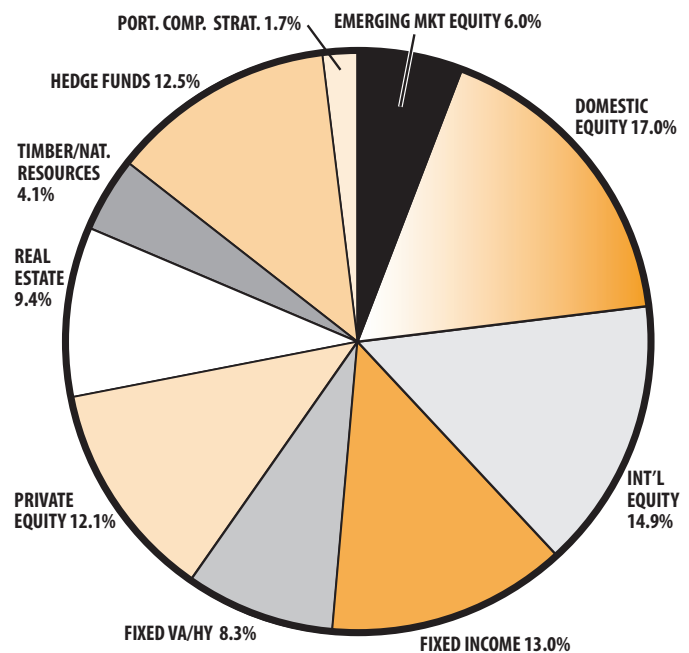
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.74%	9.10%	8.90%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
7.75%	4.87%	4.45%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.48%	8.58%	7.70%

## ACTUARIAL

▶ Funded Ratio	79.0%
▶ Date of Last Valuation	1/1/17
▶ Actuary	PERAC
▶ Assumed Rate of Return	7.00%
▶ Funding Schedule	7.1% Total Increasing
▶ Year Fully Funded	2029
▶ Unfunded Liability	\$29.7 M
▶ Total Pension Appropriation (Fiscal 2019)	\$4.8 M

	ACTIVE	RETIRED
▶ Number of Members	363	273
▶ Total Payroll/Benefit	\$19.7 M	\$7.3 M
▶ Average Salary/Benefit	\$54,400	\$26,800
▶ Average Age	49	76
▶ Average Service	13.6 years	NA

## ASSET ALLOCATION (12/31/18)

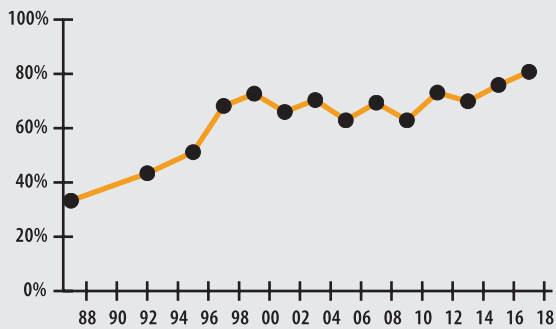


## EARNED INCOME OF DISABILITY RETIREES (2017)

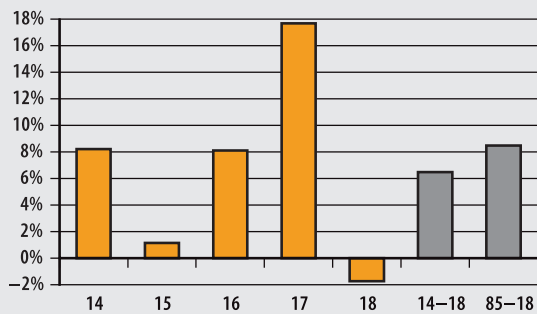
▶ Number of Disability Retirees	18
▶ Number Who Reported Earnings	5
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-2.58%
▶ 2018 Market Value	\$118.3 M
▶ 2014-2018 (Annualized)	5.48%
▶ 1985-2018 (Annualized)	8.74%

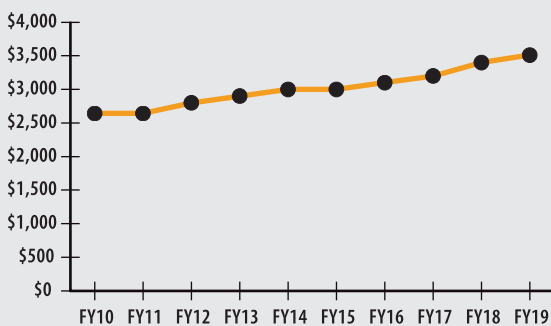
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



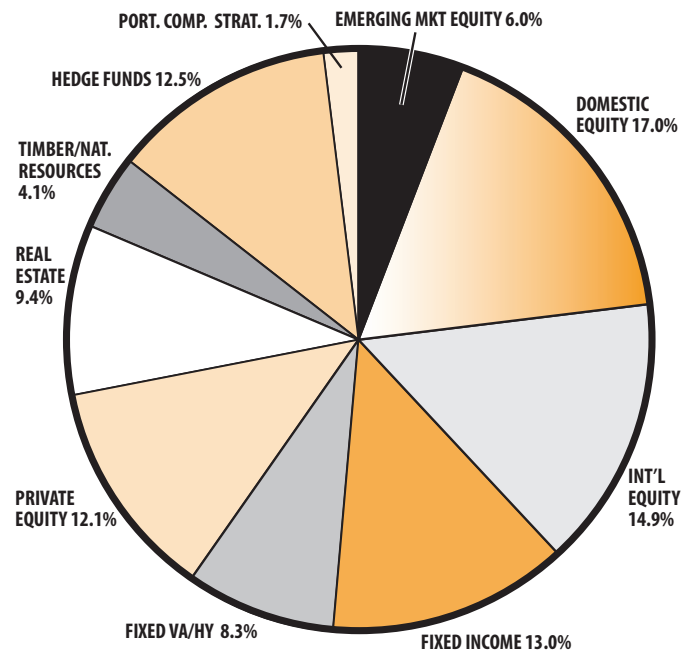
### INVESTMENT RETURN HISTORY

<b>34 years 2018</b>	<b>33 years 2017</b>	<b>32 years 2016</b>
8.50%	8.83%	8.56%
<b>10 years 2018</b>	<b>10 years 2017</b>	<b>10 years 2016</b>
8.87%	5.53%	4.99%
<b>5 years 2018</b>	<b>5 years 2017</b>	<b>5 years 2016</b>
6.49%	9.83%	8.88%

### ACTUARIAL

▶ Funded Ratio		80.8%
▶ Date of Last Valuation		1/1/17
▶ Actuary		PERAC
▶ Assumed Rate of Return		7.25%
▶ Funding Schedule		4.0% Total Increasing
▶ Year Fully Funded		2028
▶ Unfunded Liability		\$14.5 M
▶ Total Pension Appropriation (Fiscal 2019)		\$3.5 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ Number of Members	267	182
▶ Total Payroll/Benefit	\$12.9 M	\$3.5 M
▶ Average Salary/Benefit	\$48,100	\$19,400
▶ Average Age	50	75
▶ Average Service	12.6 years	NA

### ASSET ALLOCATION (12/31/18)



### EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	14
▶ Number Who Reported Earnings	1
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.72%
▶ 2018 Market Value	\$69.0 M
▶ 2014-2018 (Annualized)	6.49%
▶ 1985-2018 (Annualized)	8.50%

## 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,  
Marilou Lundin, Denis Devine\*,  
Michael Gorman  
\*indicates Chairperson

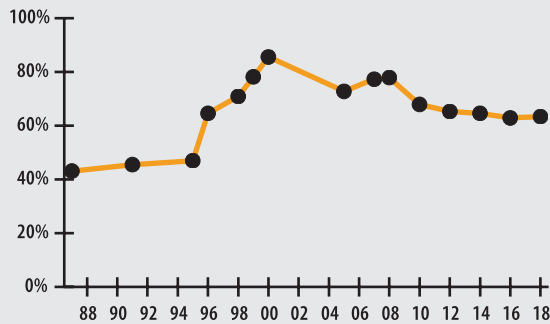
### Board Administrator

Maureen Marcucci

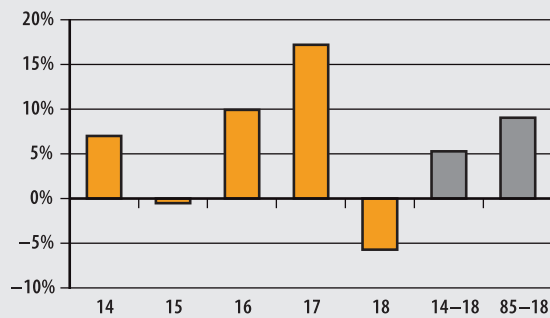
### Board Meeting

Last Tuesday of each month at 8:30 am

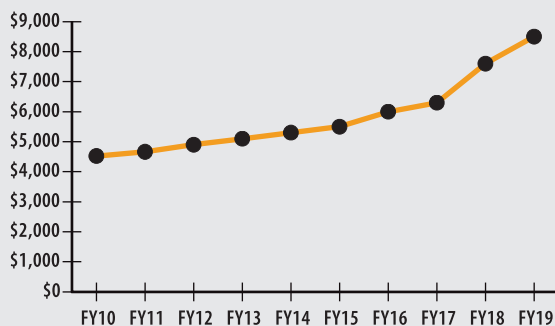
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



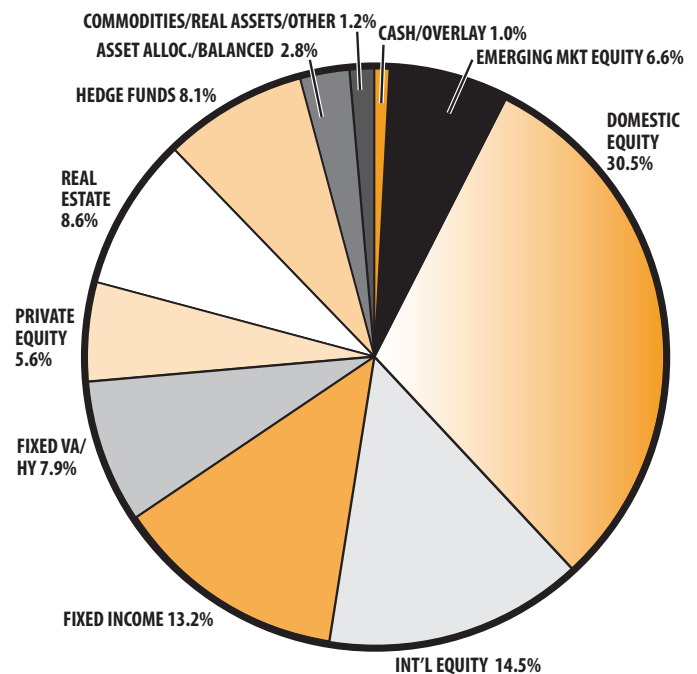
### INVESTMENT RETURN HISTORY

<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
9.06%	9.54%	9.31%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
9.41%	6.70%	6.08%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.28%	10.27%	9.63%

## ACTUARIAL

▶ Funded Ratio		63.4%
▶ 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 2019)		\$8.5 M
	<b>ACTIVE</b>	<b>RETIRED</b>
▶ 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

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

▶ 2018 Return	-5.71%
▶ 2018 Market Value	\$136.4 M
▶ 2014-2018 (Annualized)	5.28%
▶ 1985-2018 (Annualized)	9.06%

## 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\*,  
John Mahan, Elizabeth Early,  
Tamara Cullen  
\*indicates Chairperson

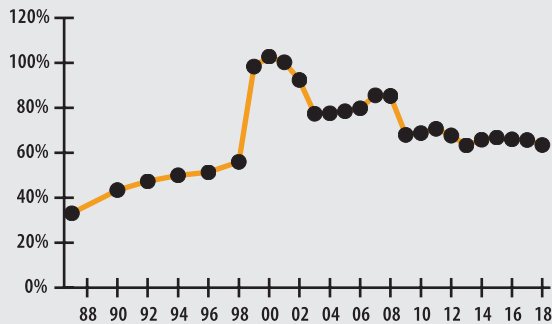
### Board Administrator

Elizabeth Early

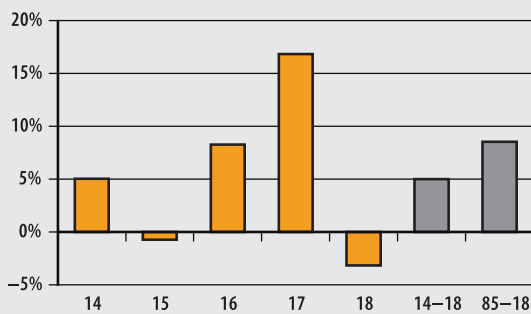
### Board Meeting

Second Thursday of month at 8:30 am

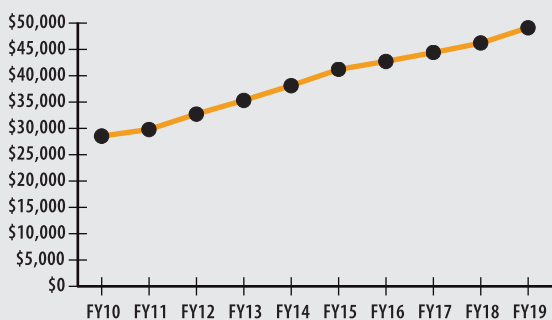
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

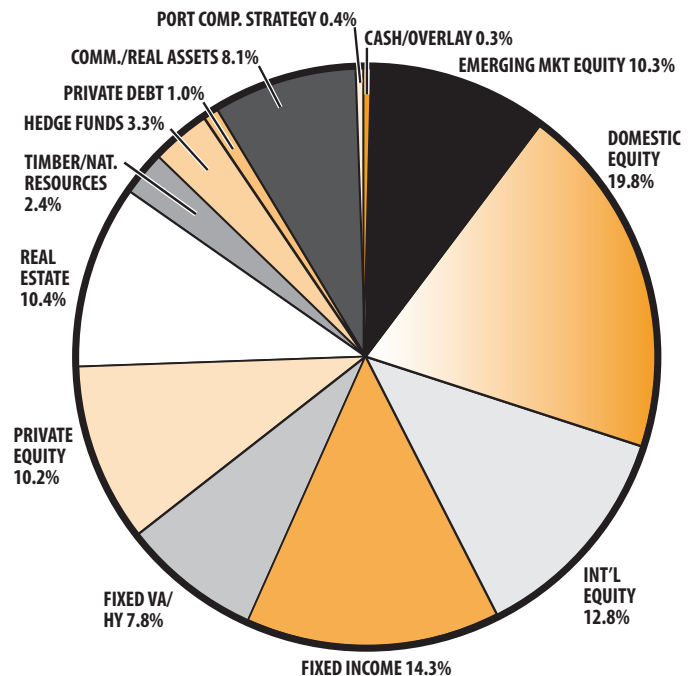
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.56%	8.93%	8.69%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.44%	5.38%	4.66%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
5.03%	8.32%	7.85%

## ACTUARIAL

▶ Funded Ratio	63.5%
▶ Date of Last Valuation	1/1/18
▶ Actuary	Segal
▶ Assumed Rate of Return	7.00%
▶ Funding Schedule	6.33% Total Increasing
▶ Year Fully Funded	2034
▶ Unfunded Liability	\$534.1 M
▶ Total Pension Appropriation (Fiscal 2019)	\$49.1 M

	ACTIVE	RETIRED
▶ Number of Members	3,455	2,707
▶ Total Payroll/Benefit	\$186.8 M	\$80.1 M
▶ Average Salary/Benefit	\$54,100	\$29,600
▶ Average Age	46	74
▶ Average Service	12.8 years	NA

## ASSET ALLOCATION (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	317
▶ Number Who Reported Earnings	72
▶ Number of Excess Earners	2
▶ Total Amount of Refund Due	\$21,360.44

▶ 2018 Return	-3.16%
▶ 2018 Market Value	\$904.5 M
▶ 2014-2018 (Annualized)	5.03%
▶ 1985-2018 (Annualized)	8.56%

## 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

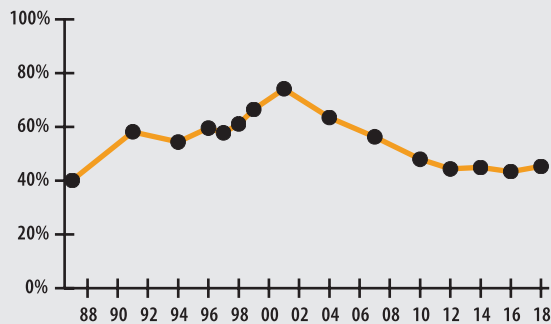
### Board Administrator

Colleen Canty

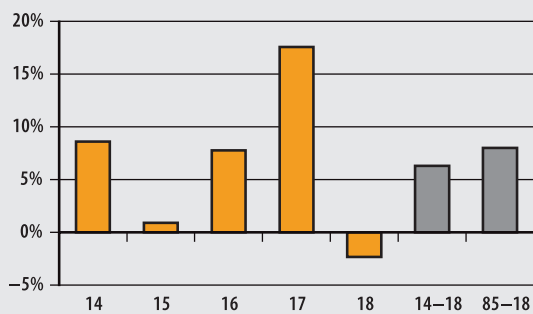
### Board Meeting

Last Tuesday of every month at 8:00 am

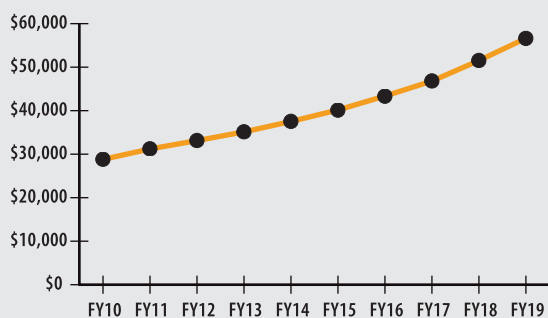
### FUNDED RATIO (1987-2018)



### INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)



### 10-YEAR HISTORY OF APPROPRIATIONS (IN THOUSANDS)



### INVESTMENT RETURN HISTORY

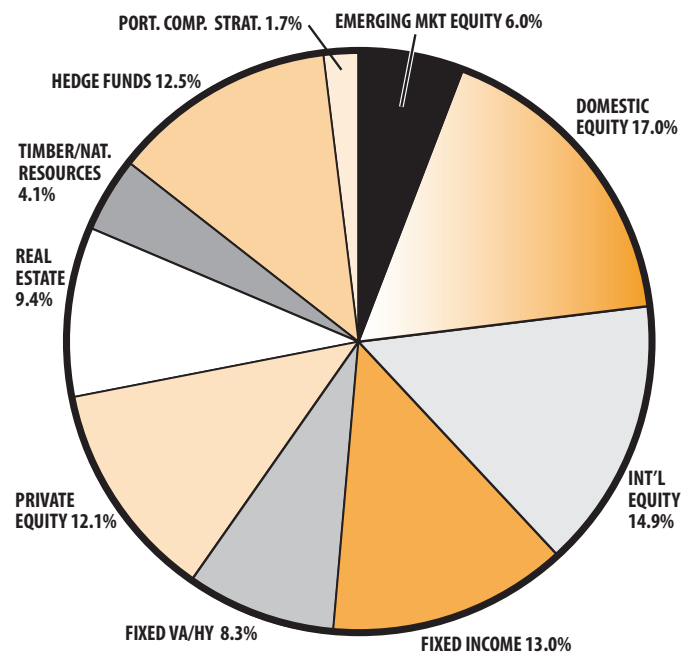
<u>34 years 2018</u>	<u>33 years 2017</u>	<u>32 years 2016</u>
8.04%	8.36%	8.08%
<u>10 years 2018</u>	<u>10 years 2017</u>	<u>10 years 2016</u>
8.46%	5.35%	4.53%
<u>5 years 2018</u>	<u>5 years 2017</u>	<u>5 years 2016</u>
6.39%	9.80%	9.03%

## ACTUARIAL

▶ 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 2019)	\$56.6 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 (12/31/18)



## EARNED INCOME OF DISABILITY RETIREES (2017)

▶ Number of Disability Retirees	238
▶ Number Who Reported Earnings	84
▶ Number of Excess Earners	0
▶ Total Amount of Refund Due	\$0.00

▶ 2018 Return	-1.91%
▶ 2018 Market Value	\$693.2 M
▶ 2014-2018 (Annualized)	6.39%
▶ 1985-2018 (Annualized)	8.04%

**Board Members**

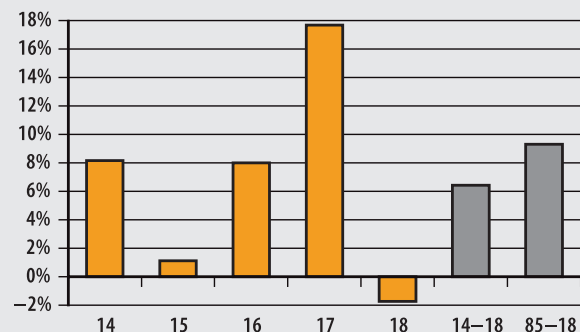
State Treasurer Deborah B. Goldberg (Chairperson),  
Robert Brousseau, Ruth Ellen Fitch, Esq., James Hearty,  
Theresa McGoldrick, Esq., Peter Monaco,  
Dennis Naughton, Carly Rose, Paul E. Shanley, Esq.

**Board Administrator**

Michael G. Trotsky, CFA

**Board Meeting**

Every other month, day and date varies

**INVESTMENT RETURN (2014-2018, 5 YEAR AND 34 YEAR AVERAGES)**

**INVESTMENT RETURN HISTORY**
**34 years 2018**

9.33%

**33 years 2017**

9.69%

**32 years 2016**

9.45%

**10 years 2018**

9.14%

**10 years 2017**

5.57%

**10 years 2016**

5.04%

**5 years 2018**

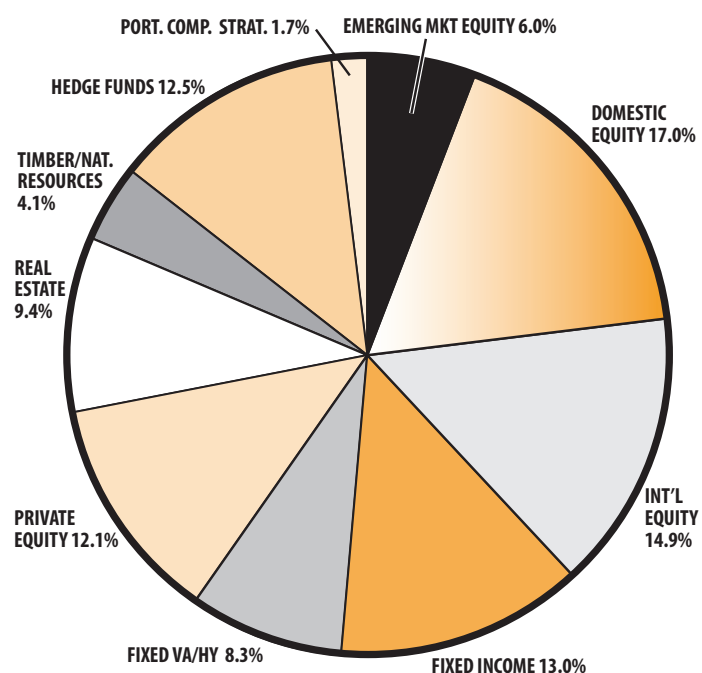
6.44%

**5 years 2017**

9.89%

**5 years 2016**

9.17%

**ASSET ALLOCATION (12/31/18)**


▶ 2018 Return	-1.73%
▶ 2018 Market Value	\$69.3B
▶ 2014-2018 (Annualized)	6.44%
▶ 1985-2018 (Annualized)	9.33%



# DISABILITY

## RETIREMENT STATISTICS

(as of 12/31/18)

DISABILITY NURSE CME REVIEWS  
ACCIDENTAL DEATH APPROVALS  
DISABILITY RETIREMENT APPROVALS  
DISABILITY PANEL REQUESTS

RETIREMENT BOARDS WITH 40–399 ACTIVE MEMBERS				
Adams Retirement Board	1	0	0	0
Amesbury Retirement Board	0	0	0	0
Blue Hills Regional School Retirement Board	0	0	0	0
Clinton Retirement Board	0	1	0	2
Easthampton Retirement Board	1	1	0	3
Fairhaven Retirement Board	2	3	0	2
Gardner Retirement Board	0	0	0	2
Gr. Lawrence Sanitary District Retirement Board	0	0	0	0
Hull Retirement Board	1	0	0	0
Mass Housing Finance Agency Retirement Board	0	0	0	1
Maynard Retirement Board	1	0	0	0
Milton Retirement Board	0	1	0	2
Minuteman Regional School District Ret. Board	0	0	0	1
Montague Retirement Board	0	1	0	1
Newburyport Retirement Board	0	0	0	2
North Adams Retirement Board	1	1	0	3
Northbridge Retirement Board	0	1	0	0
Reading Retirement Board	1	1	0	2
Saugus Retirement Board	1	0	0	6
Southbridge Retirement Board	0	2	0	4
Stoneham Retirement Board	1	2	0	1
Webster Retirement Board	1	1	0	3
Winthrop Retirement Board	3	3	0	0
RETIREMENT BOARDS WITH 400–599 ACTIVE MEMBERS				
Belmont Retirement Board	0	3	0	6
Concord Retirement Board	0	0	0	2
Danvers Retirement Board	3	0	0	1
Dedham Retirement Board	5	5	0	4
Gloucester Retirement Board	3	1	0	0
Greenfield Retirement Board	1	1	0	2
Marblehead Retirement Board	3	2	0	1
Melrose Retirement Board	1	1	0	4
Milford Retirement Board	2	1	0	3
Natick Retirement Board	1	3	0	2
North Attleboro Retirement Board	0	4	0	3
Norwood Retirement Board	1	2	0	2
Revere Retirement Board	3	4	1	8
Shrewsbury Retirement Board	3	1	1	3
Swampscott Retirement Board	0	1	0	4
Wakefield Retirement Board	0	1	0	2
Winchester Retirement Board	0	1	0	2

# DISABILITY

## RETIREMENT STATISTICS

(as of 12/31/18)

DISABILITY RETIREMENT APPROVALS  
ACCIDENTAL DEATH APPROVALS  
DISABILITY NURSE CME REVIEWS  
DISABILITY PANEL REQUESTS

RETIREMENT BOARDS WITH 600-899 ACTIVE MEMBERS				
Andover Retirement Board	2	2	0	3
Arlington Retirement Board	2	5	0	9
Attleboro Retirement Board	4	3	1	6
Beverly Retirement Board	1	2	0	3
Braintree Retirement Board	2	1	0	1
Chelsea Retirement Board	5	6	1	8
Dukes County Contributory Retirement System	1	0	0	2
Everett Retirement Board	3	4	0	4
Falmouth Retirement Board	0	0	0	4
Fitchburg Retirement Board	4	1	0	1
Hingham Retirement Board	1	1	0	2
Leominster Retirement Board	2	5	0	4
Lexington Retirement Board	0	2	0	2
Malden Retirement Board	4	4	0	2
Marlborough Retirement Board	4	3	0	4
Medford Retirement Board	3	8	0	9
Methuen Retirement Board	4	2	0	6
Needham Retirement Board	1	1	0	1
Northampton Retirement Board	0	0	0	3
Peabody Retirement Board	3	2	0	1
Watertown Retirement Board	5	3	0	4
Wellesley Retirement Board	1	4	0	2
West Springfield Retirement Board	1	2	0	6
Weymouth Retirement Board	3	5	0	6
Woburn Retirement Board	3	0	0	5
RETIREMENT BOARDS WITH 900-2,399 ACTIVE MEMBERS				
Berkshire County Retirement Board	2	1	0	0
Brockton Retirement Board	8	12	0	22
Brookline Retirement Board	6	5	0	13
Chicopee Retirement Board	2	3	0	17
Fall River Retirement Board	12	10	0	20
Framingham Retirement Board	2	5	0	3
Franklin County Retirement Board	0	0	0	3
Haverhill Retirement Board	1	2	0	8
Holyoke Retirement Board	4	3	0	15
Lawrence Retirement Board	3	8	0	10
Lowell Retirement Board	6	8	0	27
Lynn Retirement Board	6	10	0	15

# DISABILITY

## RETIREMENT STATISTICS

(as of 12/31/18)

	DISABILITY PANEL REQUESTS	DISABILITY RETIREMENT APPROVALS	ACCIDENTAL DEATH APPROVALS	DISABILITY NURSE CME REVIEWS
<b>RETIREMENT BOARDS WITH 900-2,399 ACTIVE MEMBERS (CONT'D)</b>				
Mass Port Authority Retirement Board	3	7	0	7
Mass Water Resource Authority Retirement Board	3	4	0	14
New Bedford Retirement Board	10	9	0	27
Newton Retirement Board	5	4	0	9
Pittsfield Retirement Board	3	1	0	7
Plymouth Retirement Board	2	3	0	11
Quincy Retirement Board	11	12	0	9
Salem Retirement Board	4	3	0	4
Somerville Retirement Board	6	2	0	8
Taunton Retirement Board	4	5	0	3
Waltham Retirement Board	4	3	0	7
Westfield Retirement Board	0	3	0	7
<b>RETIREMENT BOARDS WITH 2,400-10,000 ACTIVE MEMBERS</b>				
Barnstable County Board of Retirement	19	10	0	48
Bristol County Board of Retirement	8	4	0	26
Cambridge Retirement Board	19	18	0	21
Essex Regional Retirement Board	7	9	1	11
Hampden County Regional Retirement Board	10	7	0	12
Hampshire County Regional Retirement Board	2	3	0	9
Middlesex County Retirement Board	17	15	0	38
Norfolk County Retirement Board	15	9	0	22
Plymouth County Retirement Board	18	24	0	24
Springfield Retirement Board	16	16	0	46
Worcester Regional Retirement Board	10	13	0	34
Worcester Retirement Board	22	12	0	19
<b>RETIREMENT BOARDS WITH 20,500-90,000 ACTIVE MEMBERS</b>				
Boston Retirement Board	61	53	0	77
State Retirement Board	179	157	4	424
Teachers Retirement Board	32	28	0	44
<b>TOTAL ALL RETIREMENT BOARDS:</b>	<b>641</b>	<b>616</b>	<b>9</b>	<b>1312</b>

# 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.

RETIREMENT BOARD	INVESTMENT VENDORS		
<b>ADAMS</b> ► <b>Custodian:</b> State Street Bank & Trust ► <b>Consultant:</b> Fiduciary Investment Advisors	• PRIT	• RhumbLine Advisers	
<b>AMESBURY</b>	• PRIT		
<b>ANDOVER</b> ► <b>Consultant:</b> Dahab Associates	• PRIT	• RhumbLine Advisers	
<b>ARLINGTON</b> ► <b>Custodian:</b> State Street Bank & Trust	• PRIT	• Wilshire Associates Inc.	
<b>ATTLEBORO</b> ► <b>Custodian:</b> People's United Bank ► <b>Consultant:</b> Dahab Associates Inc.	• Boston Advisors, LLC • BTG Pactual Timberland Investment Group • Copeland Capital Management • Fidelity Institutional Asset Management • Frontier Capital Management Co., LLC	• Hancock Timber Resource Group, Inc. • Intercontinental Real Estate Corp. • Invesco Core Real Estate USA, LP • Invesco National Trust Company	• Invesco National Trust Company • PRIT • RhumbLine Advisers • State Street Global Advisors
<b>BARNSTABLE COUNTY</b>	• PRIT	• UBS Realty Investors, LLC	
<b>BELMONT</b> ► <b>Custodian:</b> People's United Bank ► <b>Consultant:</b> New England Pension Consultants	• AEW Capital Management, LP • Atlanta Capital • Carillion Tower Advisors	• Harbourvest Partners, LLC • Loomis Sayles & Company • Pacific Investment Management Company, LLC	• PRIT • RhumbLine Advisers • Rothschild Asset Management Inc.
<b>BERKSHIRE COUNTY</b>	• PRIT		
<b>BEVERLY</b>	• PRIT		
<b>BLUE HILLS REGIONAL</b>	• PRIT		
<b>BOSTON (CITY)</b> ► <b>Custodian:</b> State Street Bank & Trust ► <b>Consultant:</b> New England Pension Consultants	• 57 Stars, 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 • AXA Real Estate Investment Managers Ltd. • 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 • Centersquare Investment Management Holdings, Inc. • Columbia Management Investment Advisors, LLC • Commonwealth Capital Ventures • Courtland Partners • Crescent Capital Group, LP • DDJ Capital Management • D.E. Shaw Investment Management, LLC • DRC Capital, LLP • Dune Capital Management, LP • Energy Spectrum Partners	• EnTrust Permal, LLC • Federal Street Partners, LLC • Fisher Investments • GAM, US • Goldentree Asset Management, LP • Grosvenor Capital Management, LP • Hamilton Lane • Hearthstone Inc. • Hunt Commercial Property • Income Research & Management • Insight Venture Management • Intech • Intercontinental Real Estate Corp. • Invesco Core Real Estate USA, LP • J.F. Lehman & Company, Inc. • J.P. Morgan Investment Management, Inc. • J.W. Childs Associates, LP • LaSalle Investment Management, Inc. • Lazard Asset Management, LLC • Lexington Partners, LP • Loomis Sayles & Company • Mesirow Advanced Strategies, Inc. • Mesirow Financial Investment Management, Inc. • MPM Capital, LP • NGP Energy Capital Management, LLC • Oaktree Capital Management, LP • PanAgora Asset Management, Inc. • Pearlmark Investment Advisors, LLC • Perella Weinberg Partners Capital Management, LP	• Polunin Capital Partners • Prudential Capital Partners • Prudential Real Estate Investors • RhumbLine Advisers • Sanderling Ventures • SCP Private Equity Partners • Segall Bryant & Hamill • Siguler Guff Advisers, LLC • SL Capital Partners • State Street Global Advisors • Sterling Venture Partners, LLC • TA Realty • TH Lee Putnam Ventures • Thomas H. Lee Partners, LP • Thoma Bravo, LLC • Thomas Weisel Global Growth Partners, LLC • Todd Asset Management • Tristan Capital Partners • Vanguard Venture Partners, LLC • 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 • Zevenbergen Capital Investments, LLC

RETIREMENT BOARD		INVESTMENT VENDORS	
<b>BOSTON TEACHERS</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>BRAINTREE</b> ▶ <b>Custodian:</b> SEI Private Trust Company	<ul style="list-style-type: none"> <li>• Lexington Partners, LP</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• SEI Investments Management Corporation</li> </ul>
<b>BRISTOL COUNTY</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Segal Marco Advisors	<ul style="list-style-type: none"> <li>• Aberdeen Asset Management</li> <li>• Arrowstreet Capital, LP</li> <li>• Ashmore Investment Advisors, Ltd.</li> <li>• BlackRock Investment Management, LLC</li> <li>• Brookfield Timberlands Management, LP</li> <li>• CB Richard Ellis Group, Inc.</li> <li>• Clearbridge Investments</li> <li>• Colchester Global Investors</li> <li>• Columbia Management Investment Advisers, LLC</li> <li>• DN Partners</li> <li>• Dupont Capital Management</li> <li>• Earnest Partners, LLC</li> <li>• Fiera Capital Inc.</li> </ul>	<ul style="list-style-type: none"> <li>• Frontier Capital Management Co., LLC</li> <li>• GCM Customized Fund Investment Group</li> <li>• Hunt Investment Management, LLC</li> <li>• IFM Investors (US) Advisor</li> <li>• Income Research &amp; Management</li> <li>• Intech</li> <li>• Intercontinental Real Estate Corp.</li> <li>• Invesco Advisers, Inc.</li> <li>• Lazard Asset Management, LLC</li> <li>• LSV Asset Management</li> <li>• Lyrical Asset Management, LP</li> <li>• Massachusetts Financial Services Company</li> </ul>	<ul style="list-style-type: none"> <li>• Mesirow Financial Private Equity Advisors, Inc.</li> <li>• New Boston Fund, Inc.</li> <li>• Pacific Investment Management Company, LLC</li> <li>• Polaris Capital Management, LLC</li> <li>• PRIT</li> <li>• RBC Global Asset Management (U.S.), Inc.</li> <li>• Rice Hall James &amp; Associates, LLC</li> <li>• RREEF Management, LLC</li> <li>• Stone Harbor Investment Partners</li> <li>• TerraCap Management, LLC</li> <li>• Timberland Investment Resources, LLC</li> <li>• WL Ross &amp; Co., LLC</li> </ul>
<b>BROCKTON</b> ▶ <b>Custodian:</b> SEI Private Trust Company ▶ <b>Consultant:</b> Fiduciary Investment Advisors	<ul style="list-style-type: none"> <li>• Aberdeen Asset Management</li> <li>• Arsenal Real Estate Partners</li> <li>• Ascent Venture Partners</li> <li>• Boston Capital Ventures</li> <li>• Charlesbank Capital Partners, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• HealthPoint, LLC</li> <li>• Hunt Investment Management, LLC</li> <li>• Invesco Private Capital</li> <li>• Landmark Partners, LLC</li> <li>• Mesirow Financial Investment Management, Inc.</li> </ul>	<ul style="list-style-type: none"> <li>• Oppenheimer Alternative Investment Management</li> <li>• SEI Investments Management Corp.</li> <li>• Siguler Guff Advisers, LLC</li> </ul>
<b>BROOKLINE</b>	<ul style="list-style-type: none"> <li>• AEW Capital Management, LP</li> <li>• Hancock Timber Resource Group, Inc.</li> <li>• HarbourVest Partners, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• Invesco Private Capital, Inc.</li> <li>• Lexington Partners, LP</li> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• Russell Investment Group</li> <li>• Sustainable Woodlands Partners, LLC</li> </ul>
<b>CAMBRIDGE</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Segal Marco Advisors	<ul style="list-style-type: none"> <li>• Aberdeen Asset Management</li> <li>• AEW Capital Management, LP</li> <li>• Ascent Venture Partners</li> <li>• BlackRock Investment Management, LLC</li> <li>• Brandywine Global Investment Management, LLC</li> <li>• Campbell Global LLC</li> <li>• Fidelity Institutional Asset Management</li> <li>• Hamilton Lane</li> <li>• Hancock Natural Resource Group, Inc.</li> </ul>	<ul style="list-style-type: none"> <li>• IFM Investors (US) Advisor</li> <li>• Income Research &amp; Management</li> <li>• Intercontinental Real Estate Corp.</li> <li>• J.P. Morgan Investment Management</li> <li>• Landmark Partners, LLC</li> <li>• Lazard Asset Management, LLC</li> <li>• Lexington Partners, LP</li> <li>• Loomis Sayles &amp; Co.</li> <li>• Penn Square Global Real Estate Group, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• Polaris Capital Management, LLC</li> <li>• PRIT</li> <li>• RBC Global Asset Management (U.S.), Inc.</li> <li>• RhumbLine Advisers</li> <li>• Rockwood Capital, LLC</li> <li>• State Street Global Advisors</li> <li>• UBS Realty Advisors, LLC</li> <li>• WEDGE Capital Management, LLP</li> <li>• Wellington Management Company</li> </ul>
<b>CHELSEA</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>CHICOPEE</b> ▶ <b>Custodian:</b> SEI Private Trust Company	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• SEI Investments Management Corp.</li> </ul>	
<b>CLINTON</b> ▶ <b>Consultant:</b> Trust Advisory Group, Ltd.	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>CONCORD</b> ▶ <b>Custodian:</b> Comerica Securities ▶ <b>Consultant:</b> Fiduciary Investment Advisors	<ul style="list-style-type: none"> <li>• Columbia Threadneedle Investments</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• Russell Investment Group</li> </ul>
<b>DANVERS</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Graystone Consulting	<ul style="list-style-type: none"> <li>• Barings, LLC</li> <li>• BMO Asset Management Corporation</li> <li>• Equus Capital Partners, Ltd.</li> <li>• Gerber-Taylor Management Company</li> </ul>	<ul style="list-style-type: none"> <li>• Hillswick Asset Management</li> <li>• Lyrical Asset Management</li> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• RhumbLine Advisers</li> <li>• TA Realty</li> <li>• TWIN Capital Management</li> </ul>

RETIREMENT BOARD	INVESTMENT VENDORS		
<b>DEDHAM</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>DUKES COUNTY</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Dahab Associates, Inc.	<ul style="list-style-type: none"> <li>Atlanta Capital</li> <li>Garcia Hamilton &amp; Associates LP</li> </ul>	<ul style="list-style-type: none"> <li>Polen Capital Management, LLC</li> <li>PRIT</li> </ul>	<ul style="list-style-type: none"> <li>Vanguard</li> </ul>
<b>EASTHAMPTON</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>ESSEX COUNTY</b>	<ul style="list-style-type: none"> <li>Ascent Venture Partners</li> <li>BlackRock Investment Management, LLC</li> <li>Boston Millennia Partners</li> </ul>	<ul style="list-style-type: none"> <li>Intercontinental Real Estate Corp.</li> <li>Levine Leichtman Capital Partners, Inc..</li> <li>PRIT</li> </ul>	<ul style="list-style-type: none"> <li>Principal Real Estate Investors, LLC</li> <li>TA Realty</li> </ul>
<b>EVERETT</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>FAIRHAVEN</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>FALL RIVER</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>	<ul style="list-style-type: none"> <li>SL Capital Partners, LLP</li> </ul>	
<b>FALMOUTH</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Wainwright Investment Counsel, LLC	<ul style="list-style-type: none"> <li>Dimensional Fund Advisors, LP</li> <li>Earnest Partners, LLC</li> <li>Hamilton Lane</li> <li>HGK Asset Management, Inc.</li> <li>Lexington Partners, LP</li> </ul>	<ul style="list-style-type: none"> <li>LMCG Investments, LLC</li> <li>Mesirow Financial Private Equity Advisors, Inc.</li> <li>Metropolitan Real Estate Equity Management, LLC</li> <li>PRIT</li> <li>Principial Real Estate Investors, LLC</li> </ul>	<ul style="list-style-type: none"> <li>RhumbLine Advisers</li> <li>SEI Trust Company</li> <li>Seizert Capital Partners, LLC</li> <li>Siguler Guff Advisers, LLC</li> <li>State Street Global Advisors</li> </ul>
<b>FITCHBURG</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>	<ul style="list-style-type: none"> <li>TA Realty</li> </ul>	
<b>FRAMINGHAM</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>FRANKLIN COUNTY</b> ▶ <b>Custodian:</b> Comerica Bank ▶ <b>Consultant:</b> Dahab Associates, Inc.	<ul style="list-style-type: none"> <li>Aberdeen Asset Management</li> <li>Income Research &amp; Management</li> <li>Loomis Sayles</li> </ul>	<ul style="list-style-type: none"> <li>O'Shaughnessy Asset Management, LLC</li> <li>Polen Capital Management, LLC</li> <li>PRIT</li> </ul>	<ul style="list-style-type: none"> <li>Seizert Capital Partners, LLC</li> <li>Systematic Financial Management, LP</li> </ul>
<b>GARDNER</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>GLOUCESTER</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>GREATER LAWRENCE</b> ▶ <b>Custodian:</b> BNY Mellon Asset Servicing	<ul style="list-style-type: none"> <li>Seaward Management</li> </ul>		
<b>GREENFIELD</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>HAMPDEN COUNTY</b> ▶ <b>Consultant:</b> Segal Marco Advisors	<ul style="list-style-type: none"> <li>GCM Customized Fund Investment Group</li> </ul>	<ul style="list-style-type: none"> <li>Invesco Private Capital, Inc.</li> </ul>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>
<b>HAMPSHIRE COUNTY</b> ▶ <b>Consultant:</b> New England Pension Consultants	<ul style="list-style-type: none"> <li>Ascent Venture Partners</li> <li>Barings LLC</li> <li>Colchester Global Investors</li> <li>Glouston Capital Partners, LLC</li> <li>Lexington Partners, LP</li> </ul>	<ul style="list-style-type: none"> <li>Massachusetts Financial Services Company</li> <li>Perella Weinberg Partners Capital Management, LP</li> <li>Polaris Capital Management, LLC</li> <li>Portfolio Advisors, LLC</li> </ul>	<ul style="list-style-type: none"> <li>PRIT</li> <li>RBC Global Asset Management (U.S.) Inc.</li> <li>RhumbLine Advisers</li> <li>Shenkman Capital Management, Inc.</li> </ul>

RETIREMENT BOARD		INVESTMENT VENDORS	
<b>HAVERHILL</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Wainwright Investment Counsel, LLC	<ul style="list-style-type: none"> <li>• DDJ Capital Management, LLC</li> <li>• Fisher Investments</li> <li>• Global Forest Partners, LP</li> <li>• Globespan Capital Management, Inc.</li> <li>• GrandBanks Capital</li> <li>• income research &amp; Management</li> </ul>	<ul style="list-style-type: none"> <li>• Massachusetts Financial Services Company</li> <li>• Mesirow Financial Institutional Real Estate</li> <li>• Molpus Woodlands Group, LLC</li> <li>• PRIT</li> <li>• Putnam Advisory Company, LLC</li> <li>• RhumbLine Advisers</li> </ul>	<ul style="list-style-type: none"> <li>• Stafford Private Equity, Inc.</li> <li>• Systematic Financial Management, LP</li> <li>• TerraCap Management</li> <li>• The DSF Group</li> </ul>
<b>HINGHAM</b> ▶ <b>Consultant:</b> Meketa Investment Group	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>HOLYOKE</b> ▶ <b>Consultant:</b> Segal Marco Advisors	<ul style="list-style-type: none"> <li>• Aberdeen Asset Management</li> <li>• Acadian Asset Management, LLC</li> <li>• Alkert Global</li> <li>• American Realty Advisors</li> <li>• Aristotle Capital Management</li> <li>• Boston Company Asset Management, LLC</li> <li>• Brandywine Global Investment Management, LLC</li> <li>• Constitution Capital Partners, LLC</li> <li>• Fidelity Institutional Asset Management</li> </ul>	<ul style="list-style-type: none"> <li>• Industry Capital Advisors—Berkley Partners</li> <li>• LMCG Investments</li> <li>• Long Wharf Real Estate Partners, LLC</li> <li>• Mesirow Financial Private Equity Advisors, Inc.</li> <li>• Monroe Capital</li> <li>• Oberweis Asset Management, Inc.</li> <li>• Polaris Capital Management, LLC</li> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• Putnam Investment Management, LLC</li> <li>• RBC Global Asset Management (U.S.) Inc.</li> <li>• Seizert Capital Partners, LLC</li> <li>• State Street Global Advisors</li> <li>• TerraCap Management</li> <li>• Wasatch Advisors, Inc.</li> <li>• Wells Capital Management, Inc.</li> <li>• Wisdom Tree Asset Management Inc.</li> </ul>
<b>HULL</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>LAWRENCE</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>LEOMINSTER</b> ▶ <b>Custodian:</b> State Street Bank & Trust	<ul style="list-style-type: none"> <li>• Massachusetts Financial Services Company</li> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• Templeton Investment Counsel</li> </ul>	<ul style="list-style-type: none"> <li>• Union Labor Life Insurance Company</li> </ul>
<b>LEXINGTON</b> ▶ <b>Custodian:</b> State Street Bank & Trust ▶ <b>Consultant:</b> Meketa Investment Group, Inc.	<ul style="list-style-type: none"> <li>• Acadian Asset Management, LLC</li> <li>• Beacon Capital Partners, LLC</li> <li>• Fidelity Investments</li> <li>• Fiduciary Management, Inc.</li> <li>• Golub Capital Partners</li> </ul>	<ul style="list-style-type: none"> <li>• Kayne Anderson Rudnick Investment Management</li> <li>• Loomis Sayles &amp; Company</li> <li>• Matthews International Capital Management, LLC</li> <li>• Monroe Capital</li> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• RhumbLine Advisers</li> <li>• Wellington Management Company, LLP</li> <li>• White Oak Global Advisors, LLC</li> <li>• William Blair &amp; Company, LLC</li> </ul>
<b>LOWELL</b> ▶ <b>Custodian:</b> People's United Bank	<ul style="list-style-type: none"> <li>• Ascent Venture Partners</li> <li>• Boston Millennia Partners</li> </ul>	<ul style="list-style-type: none"> <li>• Charles River Ventures</li> <li>• Intercontinental Real Estate Corporation</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> <li>• Sentinel Real Estate Corporation</li> </ul>
<b>LYNN</b>	<ul style="list-style-type: none"> <li>• Ascent Venture Partners</li> <li>• BlackRock Investment Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• BlackRock Realty Advisors, Inc.</li> <li>• Hunt Investment Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>
<b>MALDEN</b> ▶ <b>Custodian:</b> State Street Bank & Trust	<ul style="list-style-type: none"> <li>• De Burlo Group, Inc.</li> </ul>		
<b>MARBLEHEAD</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>MARLBOROUGH</b> ▶ <b>Custodian:</b> Comerica Bank ▶ <b>Consultant:</b> Meketa Investment Group, Inc.	<ul style="list-style-type: none"> <li>• Clarion Partners</li> <li>• Colony Realty Partners</li> <li>• Constitution Capital Partners, LLC</li> <li>• Dimensional Fund Advisors LP</li> </ul>	<ul style="list-style-type: none"> <li>• Driehaus Capital Management, LLC</li> <li>• Fiduciary Management, Inc.</li> <li>• Frontier Capital Management Co., LLC</li> <li>• Payden &amp; Rygel</li> </ul>	<ul style="list-style-type: none"> <li>• RhumbLine Advisers</li> <li>• Shenkman Capital Management, Inc.</li> <li>• SL Capital Partners, LLP</li> <li>• State Street Global Advisors</li> </ul>
<b>MHFA</b> ▶ <b>Custodian:</b> State Street Bank & Trust ▶ <b>Consultant:</b> Meketa Investment Group, Inc.	<ul style="list-style-type: none"> <li>• Aberdeen Asset Management</li> <li>• AEW Capital Management, LP</li> <li>• Angelo Gordon</li> <li>• Ascent Venture Partners</li> <li>• Columbia Management Investment Advisers, LLC</li> <li>• Constitution Capital Partners, LLC</li> <li>• Dimensional Fund Advisors, LP</li> </ul>	<ul style="list-style-type: none"> <li>• Goldman Sachs Asset Management, LP</li> <li>• HarbourVest Partners, LLC</li> <li>• IFM Investors Advisor</li> <li>• Intercontinental Real Estate Corporation</li> <li>• KBI Global Investors (North America) Ltd.</li> </ul>	<ul style="list-style-type: none"> <li>• LMCG Investments, LLC</li> <li>• Logan Circle Partners, LP</li> <li>• Longfellow Investment Management</li> <li>• State Street Global Advisors</li> <li>• TA Realty</li> <li>• Victoria Capital Management</li> </ul>
<b>MASSPORT</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Wilshire Associates	<ul style="list-style-type: none"> <li>• Aberdeen Asset Management, Inc.</li> <li>• Baillie Gifford Overseas Limited</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> <li>• Pzena Investment Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• State Street Global Advisors</li> <li>• Wellington Management Company, LLP</li> </ul>



RETIREMENT BOARD		INVESTMENT VENDORS	
<b>MTRS</b> (Mass Teachers' Retirement System)	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>MWRA</b> <ul style="list-style-type: none"> <li><b>Custodian:</b> People's United Bank</li> <li><b>Consultant:</b> New England Pension Consultants</li> </ul>	<ul style="list-style-type: none"> <li>Alcentra NY, LLC</li> <li>Ascent Venture Partners</li> <li>Boston Capital Ventures</li> <li>Boston Company Asset Management, LLC</li> <li>Boston Partners</li> <li>CarVal Investors</li> <li>Castile Ventures</li> <li>Cerberus Capital Management, LP</li> <li>Coho Partners, Ltd.</li> <li>Constitution Capital Partners LLC</li> <li>Corbin Capital Partners LP</li> <li>Courtland Partners</li> <li>Entrust Permal, LLC</li> <li>Foundry Group, LLP</li> <li>Garcia Hamilton &amp; Associates LP</li> </ul>	<ul style="list-style-type: none"> <li>Invesco Trust Company</li> <li>Invesco Private Capital, Inc.</li> <li>J.F. Lehman &amp; Company</li> <li>Kayne Anderson Capital Advisors, LP</li> <li>Landmark Partners, LLC</li> <li>Lee Munder Capital Group, LLC</li> <li>Loomis Sayles &amp; Company</li> <li>Lord, Abbe tt &amp; Co. LLC</li> <li>Morgan Stanley</li> <li>Pacific Investment Management Company, LLC</li> <li>Park Square Capital</li> <li>Pinebridge Investments, LLC</li> <li>Polen Capital Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>PRIT</li> <li>Private Advisors, LLC</li> <li>RhumbLine Advisers</li> <li>Schroders Investment Management North America, Inc.</li> <li>SEI Trust Corporation</li> <li>Select Equity Group, LP</li> <li>TA Realty</li> <li>TerraCap Management</li> <li>UBS Hedge Fund Solutions, LLC</li> <li>Wellington Management Company, LLP</li> <li>William Blair &amp; Company, LLC</li> <li>WL Ross &amp; Co., LLC</li> </ul>
<b>MAYNARD</b> <ul style="list-style-type: none"> <li><b>Custodian:</b> State Street Bank &amp; Trust</li> </ul>	<ul style="list-style-type: none"> <li>Boston Advisors, LLC</li> </ul>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>	<ul style="list-style-type: none"> <li>Sequin Partners, LLC</li> </ul>
<b>MEDFORD</b> <ul style="list-style-type: none"> <li><b>Custodian:</b> People's United Bank</li> <li><b>Consultant:</b> New England Pension Consultants</li> </ul>	<ul style="list-style-type: none"> <li>City of London Investment Management</li> <li>Columbia Management Investment Advisors, LLC</li> <li>Garcia Hamilton</li> <li>Lazard Asset Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>Loomis Sayles &amp; Company</li> <li>PRIT</li> <li>RhumbLine Advisers</li> </ul>	<ul style="list-style-type: none"> <li>Standard Life Investment</li> <li>Western Asset Management Company</li> <li>William Blair &amp; Company, LLC</li> </ul>
<b>MELROSE</b>	<ul style="list-style-type: none"> <li>Ascent Venture Partners</li> <li>Hunt Investment Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>Invesco Private Capital, Inc.</li> </ul>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>
<b>METHUEN</b>	<ul style="list-style-type: none"> <li>BlackRock Investment Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>	
<b>MIDDLESEX COUNTY</b> <ul style="list-style-type: none"> <li><b>Custodian:</b> State Street Bank &amp; Trust</li> </ul>	<ul style="list-style-type: none"> <li>Ares Management, LLC</li> <li>Ascent Venture Partners</li> <li>Auda Private Equity, LLC</li> </ul>	<ul style="list-style-type: none"> <li>Boston Millennia Partners</li> <li>Global Forest Partners, LP</li> <li>Globespan Capital Management, Inc.</li> </ul>	<ul style="list-style-type: none"> <li>Hunt Investment Management, LLC</li> <li>North Atlantic Venture Fund</li> <li>PRIT</li> </ul>
<b>MILFORD</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>MILTON</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>MINUTEMAN REGIONAL</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>MONTAGUE</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>NATICK</b> <ul style="list-style-type: none"> <li><b>Custodian:</b> People's United Bank</li> <li><b>Consultant:</b> Fiduciary Investment Advisors, LLC</li> </ul>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>	<ul style="list-style-type: none"> <li>SEI Investments Management Corp.</li> </ul>	<ul style="list-style-type: none"> <li>SL Capital Partners, LLP</li> </ul>
<b>NEEDHAM</b>	<ul style="list-style-type: none"> <li>PRIT</li> </ul>		
<b>NEW BEDFORD</b> <ul style="list-style-type: none"> <li><b>Custodian:</b> State Street Bank &amp; Trust</li> <li><b>Consultant:</b> Segal Marco Advisors</li> </ul>	<ul style="list-style-type: none"> <li>Aberdeen Asset Management, Inc.</li> <li>Acadian Asset Management, LLC</li> <li>Blackrock Realty Advisors, Inc.</li> <li>Boston Company Asset Management, LLC</li> <li>Hamilton Lane</li> <li>Hancock Natural Resource Group, Inc.</li> <li>Hunt Investment Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>Intercontinental Real Estate Corp.</li> <li>Invesco Private Capital, Inc.</li> <li>Lexington Advisors, Inc.</li> <li>Loomis Sayles &amp; Company</li> <li>Mesirow Private Equity Advisors, Inc.</li> <li>Neuberger Berman Management</li> <li>Pacific Investment Management Company, LLC</li> </ul>	<ul style="list-style-type: none"> <li>SEI Trust Company</li> <li>State Street Global Advisors Limited</li> <li>TA Realty</li> <li>UBS Realty Investors, LLC</li> <li>Wellington Management Company, LLP</li> <li>Westfield Capital Management Company, LP</li> <li>Wilton Asset Management, LLC</li> </ul>

RETIREMENT BOARD	INVESTMENT VENDORS		
<b>NEWBURYPORT</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>NEWTON</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>NORFOLK COUNTY</b> ▶ <b>Custodian:</b> State Street Bank & Trust ▶ <b>Consultant:</b> Wainwright Investment Counsel, LLP	<ul style="list-style-type: none"> <li>• Allianz Global Investors Fund Management, LLC</li> <li>• ArcLight Capital Partners, LLC</li> <li>• Ariel Investments</li> <li>• Ascend Ventures Group, LLC</li> <li>• Boston Millennia Partners</li> <li>• Centersquare Investment Management Holdings, Inc.</li> <li>• Centre Lane Partners, LLC</li> <li>• CHL Medical Partners</li> <li>• Clarion Partners</li> <li>• Collier Investments</li> <li>• Constitution Capital Partners, LLC</li> <li>• Corsair Capital LLC</li> <li>• D.E. Shaw Investment Management, LLC</li> <li>• DSF Group</li> <li>• EnTrust Partners, LLC</li> <li>• Gamco Asset Management, Inc.</li> </ul>	<ul style="list-style-type: none"> <li>• Gerding Edlen Investment Management, LLC</li> <li>• Globespan Capital Management, Inc.</li> <li>• Goldentree Asset Management, LP</li> <li>• Halpern Denny</li> <li>• Hamilton Lane</li> <li>• HarbourVest Partners, LLC</li> <li>• Hunt Investment Management, LLC</li> <li>• Income Research &amp; Management</li> <li>• Intercontinental Real Estate Corporation</li> <li>• Invesco Private Capital, Inc.</li> <li>• Lazard Asset Management, LLC</li> <li>• LLM Capital Partners</li> <li>• LMCG Investments</li> <li>• Loomis, Sayles &amp; Company</li> <li>• Mesirow Capital Partners IX, LP</li> <li>• Mesirow Financial Institutional Real Estate</li> <li>• MFS International Advisors, Inc.</li> </ul>	<ul style="list-style-type: none"> <li>• Monitor Venture Management</li> <li>• Northern Trust</li> <li>• Preferred Investors</li> <li>• PRIT</li> <li>• PRISM Venture Partners</li> <li>• RhumbLine Advisers</li> <li>• Seizert Capital Partners, LLC</li> <li>• Siguler Guff Advisors, LLC</li> <li>• SL Capital Partners, LLP</li> <li>• State Street Global Advisors</li> <li>• TerraCap Management</li> <li>• Victory Capital Management</li> <li>• Wellesley Advisors Corporation</li> <li>• Wellington Management Company, LLP</li> <li>• Wilshire Associates, Inc.</li> <li>• Windmill Investments</li> </ul>
<b>NORTH ADAMS</b> ▶ <b>Custodian:</b> People's United Bank	<ul style="list-style-type: none"> <li>• De Burlo Group, Inc.</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>	
<b>NORTH ATTLEBORO</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Dahab Associates, Inc.	<ul style="list-style-type: none"> <li>• AmSouth Bank</li> <li>• Aristotle Capital Management, LLC</li> <li>• Atlanta Capital</li> <li>• Axiom International Investors, LLC</li> <li>• Blackrock Realty Advisors, Inc.</li> </ul>	<ul style="list-style-type: none"> <li>• Brandes Investment Partners, LP</li> <li>• Chicago Equity Partners, LLC</li> <li>• Davenport &amp; Company, LLC</li> <li>• Intercontinental Real Estate Corporation</li> </ul>	<ul style="list-style-type: none"> <li>• Lazard Asset Management, LLC</li> <li>• Loomis Sayles &amp; Company</li> <li>• RhumbLine Advisers</li> <li>• Vontobel Asset Management, Inc.</li> </ul>
<b>NORTHAMPTON</b> ▶ <b>Custodian:</b> People's United Bank	<ul style="list-style-type: none"> <li>• De Burlo Group, Inc.</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>	
<b>NORTHBRIDGE</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>NORWOOD</b> ▶ <b>Custodian:</b> State Street Bank & Trust ▶ <b>Consultant:</b> Meketa Investment Group, Inc.	<ul style="list-style-type: none"> <li>• Aberdeen Asset Management, Inc.</li> <li>• American Funds</li> <li>• Atlanta Capital</li> <li>• Boston Company Asset Management, LLC</li> <li>• Columbia Management Investment Advisors, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• Constitution Capital Partners</li> <li>• Dimensional Fund Advisors, LP</li> <li>• HarbourVest Partners, LLC</li> <li>• IFM Investors Advisor</li> </ul>	<ul style="list-style-type: none"> <li>• Landmark Partners, LLC</li> <li>• PRIT</li> <li>• RhumbLine Advisers</li> <li>• State Street Global Advisors</li> </ul>
<b>PEABODY</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>PITTSFIELD</b>	<ul style="list-style-type: none"> <li>• Hunt Investment Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• SL Capital Partners, LLP</li> </ul>
<b>PLYMOUTH</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Fiduciary Investment Advisors, LLC	<ul style="list-style-type: none"> <li>• Acadian Asset Management</li> <li>• Babson Capital Management</li> <li>• BlackRock Advisors, LLC</li> <li>• Boston Advisors, LLC</li> <li>• Boston Trust Investment Management, Inc.</li> </ul>	<ul style="list-style-type: none"> <li>• Columbia Management Investment Advisors</li> <li>• Invesco Trust Company</li> <li>• PRIT</li> <li>• Rhumbline Advisers</li> </ul>	<ul style="list-style-type: none"> <li>• Robeco Institutional Asset Management Inc.</li> <li>• Templeton Investment Counsel</li> <li>• Wellington Management Company, LLP</li> <li>• Westfield Capital Management Company, LP</li> </ul>

RETIREMENT BOARD		INVESTMENT VENDORS	
<b>PLYMOUTH COUNTY</b> ▶ <b>Custodian:</b> State Street Bank & Trust ▶ <b>Consultant:</b> Meketa Investment Group	<ul style="list-style-type: none"> <li>• ABS Investment Management, LLC</li> <li>• AEW Capital Management, LP</li> <li>• Akina Limited</li> <li>• Ascend Venture Group</li> <li>• Ascent Venture Partners</li> <li>• Audax Management Company (NY), LLC</li> <li>• Basalt Infrastructure Partners</li> <li>• Berkshire Property Advisors, LLC</li> <li>• Boston Company Asset Management, LLC</li> <li>• BTG Pactual Timberland Investment Group</li> <li>• Carlyle Investment Management</li> <li>• Charles River Ventures</li> <li>• Constitution Capital Partners, LLC</li> <li>• Copper Rock Capital Partners</li> <li>• Denver Investments</li> <li>• DN Partners</li> <li>• DSF Group</li> <li>• Eaton Vance Investment Counsel</li> </ul>	<ul style="list-style-type: none"> <li>• EnTrust Partners Offshore, LP</li> <li>• Fisher Investments</li> <li>• First Eagle Investment Management</li> <li>• Franklin Templeton Investment Management</li> <li>• Global Infrastructure Management, LLC</li> <li>• Globespan Capital Management, Inc.</li> <li>• HGK Asset Management, Inc.</li> <li>• Hunt Investment Management, LLC</li> <li>• IFM Investors Advisor</li> <li>• Income Research &amp; Management</li> <li>• Invesco Trust Company</li> <li>• J.P. Morgan Investment Management, Inc.</li> <li>• KBI Global Investors (North America Ltd.)</li> <li>• Kopernik Global Investors</li> <li>• Landmark Partners, LLC</li> <li>• Leeds Equity Partner</li> <li>• Lexington Partners, LP</li> <li>• LLR Management</li> <li>• LMCg Investments</li> </ul>	<ul style="list-style-type: none"> <li>• Mesirow Financial Capital Partners IX, LP</li> <li>• Mesirow Financial Institutional Real Estate</li> <li>• Multi Employer Property Trust</li> <li>• Munder Capital Management</li> <li>• New Boston Fund, Inc.</li> <li>• Old Farm Partnership</li> <li>• Prudential Real Estate Investors</li> <li>• RhumbLine Advisers</li> <li>• Rohatyn Group</li> <li>• SEI Trust Company</li> <li>• Siguler Guff Advisers, LLC</li> <li>• Summit Partners, LP</li> <li>• TA Realty</li> <li>• THL Credit Advisors, LLC</li> <li>• TimberVest, LLC</li> <li>• Trilantic Capital Management L.P.</li> <li>• Wellesley Advisors Corporation</li> <li>• Wellington Management</li> <li>• Wellspring Capital Management, LLC</li> </ul>
	<b>QUINCY</b> ▶ <b>Custodian:</b> State Street Bank & Trust ▶ <b>Consultant:</b> Meketa Investment Group, Inc.	<ul style="list-style-type: none"> <li>• Aberdeen Asset Management, Inc.</li> <li>• Acadian Asset Management, LLC</li> <li>• Adams Street Partners, LLC</li> <li>• AEW Capital Management, LP</li> <li>• Beach Point Capital Management, LP</li> <li>• Brookfield Asset Management</li> <li>• Brown Advisory, LLC</li> <li>• Colony Realty Partners</li> <li>• Columbia Management Investment Advisors, LLC</li> <li>• Copper Rock Capital Partners, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• Goldman Sachs Asset Management, LP</li> <li>• Hancock Timber Resource Group, Inc.</li> <li>• IFM Investors Advisor</li> <li>• J.P. Morgan Investment Management</li> <li>• LLR Management</li> <li>• Loomis Sayles &amp; Company</li> <li>• Oppenheimer Alternative Investment Management</li> <li>• PRIT</li> <li>• RhumbLine Advisers</li> </ul>
<b>READING</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>REVERE</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>SALEM</b>	<ul style="list-style-type: none"> <li>• Ascent Venture Partners</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>	
<b>SAUGUS</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>SHREWSBURY</b> ▶ <b>Consultant:</b> Dahab Associates, Inc.	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>SOMERVILLE</b> ▶ <b>Custodian:</b> Comerica Securities	<ul style="list-style-type: none"> <li>• Congress Asset Management Company, LLP</li> <li>• Lazard Asset Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• Loomis Sayles &amp; Company</li> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• RhumbLine Advisers</li> <li>• UBS Realty Investors, LLC</li> </ul>
<b>SOUTHBRIDGE</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>SPRINGFIELD</b> ▶ <b>Custodian:</b> PeoplesBank	<ul style="list-style-type: none"> <li>• Boston Millennia Partners</li> </ul>	<ul style="list-style-type: none"> <li>• Crescendo Ventures Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>
<b>STATE</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>STONEHAM</b> ▶ <b>Custodian:</b> SEI Private Trust Company ▶ <b>Consultant:</b> Fiduciary Investment Advisors, LLC	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• SEI Investments Management Corp.</li> </ul>	

RETIREMENT BOARD	INVESTMENT VENDORS		
<b>SWAMPSCOTT</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Dahab Associates	<ul style="list-style-type: none"><li>• Aristotle Capital Management, LLC</li><li>• Intercontinental Real Estate Corporation</li></ul>	<ul style="list-style-type: none"><li>• LMCG Investments, LLC</li><li>• North Sky Capital, LLC</li></ul>	<ul style="list-style-type: none"><li>• PRIT</li></ul>
<b>TAUNTON</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Dahab Associates, Inc.	<ul style="list-style-type: none"><li>• Aberdeen Asset Management</li><li>• BlackRock Investment Management, LLC</li><li>• Boston Millennia Partners</li><li>• Brandywine Global Investment Management, LLC</li><li>• Ceres Partners, LLC</li><li>• C.S. McKee, LP</li><li>• Earnest Partners, LLC</li><li>• Frontier Capital Management Co., LLC</li><li>• GAM International Management Limited</li></ul>	<ul style="list-style-type: none"><li>• Glovista Investments, LLC</li><li>• Intercontinental Real Estate Corporation</li><li>• Invesco Core Real Estate USA, LP</li><li>• Invesco Trust Company</li><li>• Invesco Private Capital, Inc.</li><li>• LMCG Investments, LLC</li><li>• Manulife Asset Management, LLC</li><li>• Molpus Woodlands Group, LLC</li><li>• Polen Capital Management, LLC</li></ul>	<ul style="list-style-type: none"><li>• Quantitative Management Association</li><li>• Segall Bryant &amp; Hamill</li><li>• Systemic Financial Management</li><li>• State Street Global Advisors</li><li>• TimberVest, LLC</li><li>• Vontobel Asset Management, Inc.</li><li>• Weaver C. Barksdale &amp; Associates</li><li>• Wells Capital Management, Inc.</li></ul>
<b>WAKEFIELD</b>	<ul style="list-style-type: none"><li>• PRIT</li></ul>		
<b>WALTHAM</b> ▶ <b>Custodian:</b> SEI Private Trust Company ▶ <b>Consultant:</b> Fiduciary Investment Advisors, LLC	<ul style="list-style-type: none"><li>• Ascent Venture Partners</li><li>• Hunt Investment Management, LLC</li><li>• Invesco Private Capital, Inc.</li></ul>	<ul style="list-style-type: none"><li>• Precision Capital Advisors, LLC</li><li>• PRIT</li></ul>	<ul style="list-style-type: none"><li>• RCP Advisors, LLC</li><li>• SEI Investments Management Corporation</li><li>• VSS Messanine Partners</li></ul>
<b>WATERTOWN</b> ▶ <b>Custodian:</b> State Street Bank & Trust ▶ <b>Consultant:</b> Fiduciary Investment Advisors, LLC	<ul style="list-style-type: none"><li>• Acadian Asset Management, LLC</li><li>• American Realty Advisors</li><li>• Arsenal Real Estate Funds, LLC</li><li>• Auda Private Equity, LLC</li><li>• Brandywine Global Investment Management, LLC</li><li>• Columbia Management Investment Advisors, LLC</li></ul>	<ul style="list-style-type: none"><li>• Earnest Partners, LLC</li><li>• Eaton Vance Management</li><li>• Guggenheim Partners</li><li>• Income Research &amp; Management</li><li>• Lee Munder Capital Group, LLC</li><li>• Massachusetts Financial Services Company</li><li>• PRIT</li></ul>	<ul style="list-style-type: none"><li>• RCP Advisors, LLC</li><li>• SEI Trust Company</li><li>• TA Realty</li><li>• TerraCap Management, LLC</li><li>• Wellington Management Company, LLP</li></ul>
<b>WEBSTER</b> ▶ <b>Custodian:</b> People's United Bank ▶ <b>Consultant:</b> Wainwright Investment Counsel, LLC	<ul style="list-style-type: none"><li>• HGK Asset Management Inc.</li><li>• Lee Munder Capital Group, LLC</li><li>• LMCG Investments</li></ul>	<ul style="list-style-type: none"><li>• Loomis Sayles &amp; Company</li><li>• PRIT</li></ul>	<ul style="list-style-type: none"><li>• RhumbLine Advisers</li><li>• SEI Trust Company</li></ul>
<b>WELLESLEY</b>	<ul style="list-style-type: none"><li>• PRIT</li></ul>		
<b>WEST SPRINGFIELD</b> ▶ <b>Custodian:</b> Comerica	<ul style="list-style-type: none"><li>• AmSouth Bank</li></ul>	<ul style="list-style-type: none"><li>• De Burlo Group, Inc.</li></ul>	
<b>WESTFIELD</b>	<ul style="list-style-type: none"><li>• Addenda Capital</li><li>• Boston Company Asset Management, LLC</li><li>• Columbia Management Investment Advisers, LLC</li><li>• Constitution Capital Partners, LLC</li><li>• Fisher Investments</li><li>• Hamilton Lane</li><li>• Income Research &amp; Management</li></ul>	<ul style="list-style-type: none"><li>• Intercontinental Real Estate Corporation</li><li>• Lazard Asset Management, LLC</li><li>• LMCG Investments</li><li>• Long Wharf Real Estate Partners, LLC</li><li>• Loomis Sayles &amp; Company</li><li>• Polaris Capital Management, LLC</li><li>• PRIT</li></ul>	<ul style="list-style-type: none"><li>• RBC Global Asset Management (U.S.), Inc.</li><li>• SEI Trust Company</li><li>• State Street Global Advisors</li><li>• TerraCap Management</li><li>• Wasatch Advisors, Inc.</li><li>• Wells Capital Management, Inc.</li><li>• WisdomTree Asset Management Inc.</li></ul>

RETIREMENT BOARD	INVESTMENT VENDORS		
<b>WEYMOUTH</b> ► <b>Custodian:</b> Comerica ► <b>Consultant:</b> Fiduciary Investment Advisors, LLC	<ul style="list-style-type: none"> <li>• Aberdeen Asset Management, Inc.</li> <li>• Acadian Asset Management, LLC</li> <li>• Adams Street Partners</li> <li>• Ashmore Investment Advisors</li> <li>• BlackRock Advisors, LLC</li> <li>• Boston Company Asset Management, LLC</li> <li>• Brandywine Global Investment Management, LLC</li> <li>• Constitution Capital Partners, LLC</li> <li>• Harbor Capital Advisors Inc.</li> </ul>	<ul style="list-style-type: none"> <li>• HarbourVest Partners, LLC</li> <li>• Intercontinental Real Estate Corporation</li> <li>• Invesco Private Capital, Inc.</li> <li>• Landmark Partners, LLC</li> <li>• Loomis Sayles &amp; Company</li> <li>• OFI Global Institutional, Inc.</li> <li>• Principal Global Investors LLC</li> <li>• Pioneer Institutional Asset Management Inc.</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> <li>• RhumbLine Advisers</li> <li>• RS Investment Management Company, LLC</li> <li>• Singular Guff Advisers, LLC</li> <li>• State Street Global Advisors</li> <li>• Stockbridge Core and Value Advisors</li> <li>• TerraCap Management, LLC</li> <li>• Wasatch Advisors</li> </ul>
<b>WINCHESTER</b> ► <b>Custodian:</b> State Street Bank & Trust	<ul style="list-style-type: none"> <li>• Guggenheim Partners</li> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• Wellington Management Company, LLP</li> </ul>	
<b>WINTHROP</b>	<ul style="list-style-type: none"> <li>• PRIT</li> </ul>		
<b>WOBURN</b> ► <b>Custodian:</b> State Street Bank & Trust ► <b>Consultant:</b> Wainwright Investment Counsel, LLC	<ul style="list-style-type: none"> <li>• Alliance Bernstein, LP</li> <li>• Charlesbank Capital Partners, LLC</li> <li>• Earnest Partners, LLC</li> <li>• Hunt Investments, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• Invesco Private Capital, Inc.</li> <li>• Loomis Sayles &amp; Company</li> <li>• PRIT</li> <li>• RhumbLine Advisers</li> </ul>	<ul style="list-style-type: none"> <li>• Stafford Private Equity Inc.</li> <li>• State Street Global Advisors</li> <li>• Wilshire Associates, Inc.</li> <li>• Victory Capital Management</li> </ul>
<b>WORCESTER</b> ► <b>Custodian:</b> State Street Bank & Trust ► <b>Consultant:</b> Meketa Investment Group	<ul style="list-style-type: none"> <li>• Acadian Asset Management, LLC</li> <li>• AEW Capital Management, LP</li> <li>• American Securities, LLC</li> <li>• Ascent Venture Partners</li> <li>• Boston Capital Ventures</li> <li>• Boston Millenia Partners</li> <li>• BTG Pactual Timberland Investment Group, LLC</li> <li>• Capital International, Inc.</li> <li>• Charlesbank Capital Partners, LLC</li> <li>• Global Infrastructure Management, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• Hancock Natural Resource Group, Inc.</li> <li>• Harvest Partners, LP</li> <li>• IFM Investors (US) Advisor, LLC</li> <li>• income research &amp; Management</li> <li>• Invesco Private Capital, Inc.</li> <li>• Lazard Asset Management, LLC</li> <li>• Lee Munder Capital Group, LLC</li> <li>• Loomis Sayles &amp; Company</li> <li>• Newstone Capital Partners, LLC</li> <li>• Northstar Company, LLC</li> </ul>	<ul style="list-style-type: none"> <li>• PRIT</li> <li>• Ridgmont Equity Partners</li> <li>• Riverside Company</li> <li>• SL Capital Partners, LLP</li> <li>• State Street Global Advisors</li> <li>• TA Associates Management</li> <li>• Vitruvian Partners, LLP</li> <li>• White Deer Energy</li> <li>• William Blair &amp; Company, LLC</li> </ul>
<b>WORCESTER REGIONAL</b>	<ul style="list-style-type: none"> <li>• AEW Capital Management, LP</li> <li>• Ascent Venture Partners</li> </ul>	<ul style="list-style-type: none"> <li>• Hunt Investments, LLC</li> <li>• PRIT</li> </ul>	<ul style="list-style-type: none"> <li>• SL Capital</li> </ul>

RETIREMENT BOARD	INVESTMENT VENDORS		
<p><b>PRIM</b></p> <p>► <b>Custodian:</b> BNY Mellon</p> <p>► <b>Consultants:</b> Aberdeen Asset Management, Callan Associates, Hamilton Lane, NEPC, Townsend</p>	<ul style="list-style-type: none"> <li>• 400 Capital Management</li> <li>• Acadian Asset Management, LLC</li> <li>• Access Capital</li> <li>• Acon Investments</li> <li>• Advent International</li> <li>• AEW Capital Management</li> <li>• AFL-CIO Housing Investment Trust</li> <li>• AgIS Capital, LLC</li> <li>• Alchemy Partners</li> <li>• Alta Communications</li> <li>• American Securities Capital Partners</li> <li>• Anchorage Capital, LLC</li> <li>• Angelo Gordon</li> <li>• APAX Partners &amp; Co.</li> <li>• Apollo Management Co.</li> <li>• AQR Capital</li> <li>• Arden Asset Management</li> <li>• Ascent Venture Partners</li> <li>• Ashmore Investment Management, Ltd.</li> <li>• Austin Ventures</li> <li>• Avenue Capital Group</li> <li>• Baillie Gifford</li> <li>• Bain Capital</li> <li>• Battery Ventures</li> <li>• Berkshire Partners</li> <li>• Blackrock Financial Management, Inc.</li> <li>• Blackstone Capital Partners</li> <li>• Boston Ventures</li> <li>• Brandywine Global Investment Management</li> <li>• Bridgepoint Capital Limited</li> <li>• Brigade Capital G.P., LLC</li> <li>• Brookfield Investment Management</li> <li>• Campbell Group, LLC</li> <li>• Candover</li> <li>• Cantab Capital Partners, LP</li> <li>• Canvas Capital</li> <li>• Canyon Johnson II</li> <li>• Capula Management Limited</li> <li>• Carlyle Group</li> <li>• Carlyle Partners</li> <li>• Castille</li> <li>• Catalyst Investors</li> <li>• Centerbridge</li> <li>• Centerbridge Special Credit Partners</li> <li>• CenterSquare Investment Management</li> <li>• Charlesbank Capital Partners</li> <li>• Charles River Ventures</li> <li>• Charterhouse Group</li> <li>• Chequers</li> <li>• City of London Investment Management Co.</li> <li>• Clifton Group</li> <li>• Code, Hennessey &amp; Simmons</li> <li>• Commonwealth Capital Ventures</li> <li>• Community Capital Management</li> <li>• Complus Asset Management Limited</li> <li>• Contrarian Capital</li> <li>• Crescent Capital Group</li> <li>• CVC Capital</li> <li>• Cypress Merchant Banking Partners</li> <li>• Davidson Kempner Advisors, Inc.</li> <li>• Denham Capital Management</li> <li>• DivcoWest</li> </ul>	<ul style="list-style-type: none"> <li>• DLJ Merchant Banking Partners</li> <li>• Driehaus Capital Management, LLC</li> <li>• East Lodge Capital</li> <li>• Eaton Vance Institutional Funds</li> <li>• El Dorado Ventures</li> <li>• Elliot Capital Advisors, LP</li> <li>• Equitable Capital Management Corporation</li> <li>• Essex Woodlands Health Ventures</li> <li>• Ethos Private Equity</li> <li>• Exponent Private Equity Partners</li> <li>• Fidelity Management Trust Company</li> <li>• FIS Group, Inc.</li> <li>• First Reserve Corporation</li> <li>• Flagship Ventures</li> <li>• Forest Investment Associates</li> <li>• Frontier Capital Management</li> <li>• Freeman Spogli Equity Partners</li> <li>• GENSTAR Capital</li> <li>• Gilde Buy Out Partners AG</li> <li>• Goldman Sachs Investment Management</li> <li>• Gores Capital</li> <li>• GSO Capital Partners</li> <li>• GTCR Golder Rauner</li> <li>• Harding Loevner</li> <li>• Hellman &amp; Friedman Capital Partners</li> <li>• H.I.G. Capital Partners</li> <li>• Highfields Associates, LLC</li> <li>• Highland Capital Partners</li> <li>• Hony Capital</li> <li>• Index Ventures</li> <li>• Informed Portfolio Management</li> <li>• Insight Venture Partners</li> <li>• Institutional Venture Partners</li> <li>• Intercontinental IV</li> <li>• InterWest Partners</li> <li>• Invesco Realty Advisors</li> <li>• Investec Asset Management</li> <li>• JEN Partners</li> <li>• Kainos Capital, LLC</li> <li>• Kelso &amp; Company</li> <li>• Kepha Partners</li> <li>• Keytone Ventures</li> <li>• Kohlberg Kravis Roberts and Co.</li> <li>• KPS Capital Partners</li> <li>• Land and Buildings Investment Management</li> <li>• Landmark Equity Partners</li> <li>• LaSalle Investment Management</li> <li>• Loomis, Sayles &amp; Company</li> <li>• Lord Abbett</li> <li>• Lovell Minnick Partners</li> <li>• Madison Dearborn Capital Partners</li> <li>• Marathon — London</li> <li>• M/C Venture Partners</li> <li>• Mexixi Ventures</li> <li>• Menlo Ventures</li> <li>• Mondrian Investment Partners Ltd.</li> <li>• Montagu</li> <li>• Montreux Equity Partners</li> <li>• Mudrick Capital Management, LP</li> <li>• Nautic Partners</li> <li>• New Boston Urban Fund I</li> </ul>	<ul style="list-style-type: none"> <li>• New Enterprise Associates</li> <li>• Nordic Capital</li> <li>• Oaktree Capital Management</li> <li>• Odyssey Investment Partners</li> <li>• Olympus Partners</li> <li>• Onex Capital Partners</li> <li>• OZ Advisors, LP</li> <li>• Pacific Alternative Asset Management Co. 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**Walter Kloc**  
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**Regina Manning**  
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**K-Lone Steele**  
Senior Systems Engineer

**John C. Philley**  
.NET Developer

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**Charles Hoyt**  
Senior Programmer/Analyst

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**Doreen Duane**  
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