EMPLOYEES' RETIREMENT SYSTEM OF THE STATE OF HAWAII

COMPREHENSIVE ANNUAL FINANCIAL REPORT

FOR THE FISCAL YEAR ENDED JUNE 30, 2018

EMPLOYEES'
RETIREMENT SYSTEM
OF THE
STATE OF HAWAII

COMPREHENSIVE ANNUAL FINANCIAL REPORT

FOR THE FISCAL YEAR ENDED JUNE 30, 2018

Prepared by the Staff of the:
Employees' Retirement System of the State of Hawaii
201 Merchant Street, Suite 1400
Honolulu, Hawaii 96813
(808) 586-1735 • (808) 586-1650
Facsimile (808) 586-1677 • http://ers.ehawaii.gov/

THOMAS WILLIAMS, Executive Director
KANOE MARGOL, Deputy Executive Director
ELIZABETH BURTON, Chief Investment Officer

Table of Contents

INTRODUCTORY SECTION

Letter of Transmittal 5
Board of Trustees 9
Organizational Structure 10
Plan Summary 11
Summary of Retirement Benefit Plan Provisions 12
Retirement Options 24
Legislative Highlights 2018 26

FINANCIAL SECTION

Independent Auditors' Report 28
Management's Discussion and Analysis (Unaudited) 31
Financial Statements
Combining Statement of Fiduciary Net Position 38
Statement of Changes in Fiduciary Net Position 39
Notes to Financial Statements 40
Required Supplementary Information (Unaudited)
Schedule of Changes in the Employers' Net Pension Liability and Related Ratios 75
Schedule of Employers' Net Pension Liability 76
Schedule of Employer Contributions 77
Schedule of Investment Returns 77
Notes to Required Supplementary Information - Unaudited 78
Supplementary Information
Schedule 1 – Combining Schedule of Changes in Fiduciary Net Position – All Trust Funds 85
Schedule 2 - Social Security Contribution Fund, Statement of Changes in Assets and Liabilities 86
Schedule 3 – Schedule of Administrative Expenses 87
Schedule 4 – Schedule of Investment Expenses 88

INVESTMENT SECTION

Letter from Chief Investment Officer 91
Letter from Investment Consultant 97
Report on Investment Activity by Investment Consultant
Outline of Investment Policies 100
Investment Results as of June 30, 2018 103
Strategic Allocation as of June 30, 2018 106
Investment Professionals 107
Investment Schedules
List of Assets Directly Held (by fair value) 109
Investments Summary 110
Schedule of Investment Fees 111
Schedule of Broker Commissions 112

ACTUARIAL SECTION

GASB Statement No. 67 Report from GRS 120
Summary of 2018 Actuarial Valuation
Letter from the Actuary (Valuation) 125
Executive Summary (Valuation) 130
Actuarial Certification Statement 131
Exhibit 1 – Development of Employer Cost 133
Exhibit 2 – Actuarial Present Value of Future Benefits 134
Exhibit 3 – Analysis of Normal Cost 135
Exhibit 4 – Development of Actuarial Value of Assets 136
Exhibit 5 – Total Experience Gain or Loss 137
Exhibit 6 – Investment Experience Gain or Loss 138
Exhibit 7 – Projection Results Based on the June 30, 2018 Actuarial Valuation 139
Exhibit 8 – Highlights of Last Five Annual Actuarial Valuations 140
Summary of Actuarial Methods and Assumptions 141
Summary of Plan Changes 154
Ten Year Actuarial Schedules, 2009 to 2018
Retirement System Membership 158
2018 Membership Data 159
Historical Summary of Active Member Data 159
Pensioners, Average Annual Pension, and Active Member/Pensioner Comparison 160
Number of Retirants and Beneficiaries 160
Solvency Test 161
Employer Contribution Rates as a Percentage of Payroll 161
Employer Appropriations to Pension Accumulation Fund 161
Years 2008-2009 to 2017-2018 163
Aggregated Funded Ratios for States 164

STATISTICAL SECTION

Summary 166
Changes in Fiduciary Net Position 166
Contributions 167
Deductions from Fiduciary Net Position for Benefit Payments by Type 168
Participating Employers and Membership in ERS 169
Benefit Payments by Retirement Type and Option 170
Average Monthly Service Pension by Year of Credited Services 171
Retirees and Beneficiaries – Tabulated by Fiscal Year of Retirement 172
Total Benefits Payable – Tabulated by Attained Ages of Benefit Recipients 173

Employees' Retirement System
of the State of Hawaii

INTRODUCTORY SECTION

This page intentionally left blank.

Letter of Transmittal

DAVID Y. IGE
GOVERNOR

THOMAS WILLIAMS
EXECUTIVE DIRECTOR

KANOE MARGOL
DEPUTY EXECUTIVE DIRECTOR

STATE OF HAWAII
EMPLOYEES' RETIREMENT SYSTEM

September 24, 2019

Board of Trustees
Employees' Retirement System of the State of Hawaii

Dear Board Members:

We present the Comprehensive Annual Financial Report (CAFR) of the Employees' Retirement System for the fiscal year ended June 30, 2018. Responsibility for both the accuracy of the data, as well as the completeness and fairness of the presentation, rests with the management of the ERS. We trust that you and the members of the ERS will find this report useful in understanding your retirement system.

BACKGROUND

The ERS was established by the Legislature in 1925 to administer a retirement, disability, and survivor benefits program for State and county employees including teachers, professors, police officers, firefighters, judiciary employees, judges, and elected officials. The ERS is a qualified defined benefit public pension plan covered under Section 401(a) of the Internal Revenue Code. Hawaii Revised Statutes Chapter 88 and Hawaii Administrative Rules Title 6, Chapters 20 – 29 contain the language governing the pension trust. The ERS covers all eligible full-time and part-time State and county employees in the State of Hawaii. The ERS uses the entry age normal funding method to determine its current and future costs and appropriateness of its funding requirements. Funding for benefit payments comes from employer and member contributions, and investments.

Members of the Pension Trust belong to either the Contributory, Hybrid (a contributory class), or Noncontributory Class. Contributory and Hybrid Members make employee contributions to the Pension Trust and employers make contributions for employees of all three classes. Since 2006 most new employees of participating employers in the Pension Trust are required to join the Hybrid Class, except for certain employee groups that are required to be members of the Contributory Class. New benefit structures were established in 2011 for new members hired after June 30, 2012.

On March 31, 2018 the ERS' total membership of 141,908 was comprised of 66,271 active members, 48,569 retirees and beneficiaries 9,249 inactive vested members and 17,819 inactive non-vested members. This compares to 124,089 under historical methodology used in the actuarial valuation that excludes inactive non-vested members. Participating employers include the State of Hawaii, City and County of Honolulu, and the counties of Hawaii, Maui, and Kauai.

Employees' Retirement System
of the State of Hawaii

City Financial Tower • 201 Merchant Street, Suite 1400 • Honolulu, Hawaii 96813-2980
Telephone (808) 586-1735 • Fax (808) 586-1677 • http://ers.ehawaii.gov

The ERS is also responsible for the custody of the Social Security Contribution Fund for the State of Hawaii. The Social Security contributions withheld from employees are remitted directly to the Internal Revenue Service by the State. As an agency type fund that is custodial in nature, the ERS has limited discretion in the management of this fund.

MAJOR ACCOMPLISHMENTS AND INITIATIVES IN FY 2018

During FY 2018, the ERS continued to focus on reforms to better structure the pension plan to meet its long-term pension obligations for current and future members, retirees and beneficiaries. In the investment area, the ERS continued with the transition the portfolio to the risk-based methodology adopted by the Board in October 2014 that the that provides ERS's ability to react to world events that affect the investment portfolio. This is the first full year of the Crisis Risk Offset (CRO) program that helps the reduces investment losses in severe market downturns. The investment program continues transitioning assets to global strategies, building out the private growth portfolio and implementing a risk management system to help measure and report on risks of the entire portfolio. The risk based long-term asset allocation policy will be implemented through fiscal year 2020 to help position the portfolio over the long-term to weather any potential economic downturns, achieve higher returns, and overall help improve the pension plan's sustainability. Overall, the portfolio pays lower fees and has higher income, lower volatility, and more diverse sources of return–from both capital appreciation and income–than ever before. The ERS ended the fiscal year with net assets at $16.6 billion based on ERS' investment portfolio returns (combination of gross and net of fees, time weighted rate of return) 7.7% for the fiscal year.

The 2018 legislative session proved strongly positive for the ERS. As noted in greater detail later in this section, we were successful ensuring that plan benefits will be extended only to true members of the ERS (Act 69), thereby upholding our fiduciary obligation to manage our program assets solely in our members' best interest. Similarly, we were successful in establishing advance funding options for our employers statewide (Act 19). Though modest, this represents another means whereby we might more quickly lower our unfunded liability and reduce long-term costs. An important technical bill, Act 30, clarified permissible means applicable to the purchase of service, thereby protecting the plan's tax exempt status. And, importantly, Act 70 will afford us the time and expenditure of funds necessary to properly implement Hawaii Domestic Relations Orders (HiDRO's) beginning July 1, 2020. On the budget front, our primary requests were treated favorable with expenditures allowed for technology and software enhancements, internal audit services and compliance staff.

We are thankful for the support on the following of the Governor, Legislature and department for bills that protect the benefits and allow for continued funding for the 2018 legislation session that included four laws that affect the ERS.

- Act 19 (HB2336): Relating to Employer Contributions to the Employees' Retirement System allows the State and Counties to pay employer contributions to the ERS in advance of the fiscal year in which the contributions are required and receive credit against future required payments. Future generations of taxpayers will benefit as the Plan increases its sustainability. Effective: July 1, 2018.
- Act 30 (HB2341): Relating to Qualified Domestic Relations Orders amends Act 263, SLH 2016 which provides authority for the ERS to make direct payments to the spouse (or former spouse) of an ERS member or retirant in order to make more consistent the benefits payable to an alternate payee–whether the qualified domestic relations order is certified prior to, or after, the member or former member with vested benefit status retires. This Act delays the effective date until July 1, 2020 to allow the ERS to program and upgrade its computer system; develop policies, procedures and model forms; and educate members and other affected parties on the benefits provided by the Act. Effective: June 29, 2018.

- Act 69 (SB2766): Relating to the Employees' Retirement reduces and controls the unfunded liability of the ERS. It prevents future retirement contribution increases by clarifying that accidental death and service- related disability benefits are limited to members who are employed in positions for which all employee and/or employer contributions are made as required (by the statutes relating to the ERS). As a trust fund, this Act clarifies that ERS benefits related to service-connected disability and accidental death are limited to members who are beneficiaries of the Trust. Effective June 29, 2018.
- Act 70 (SB2767): Relating to the Employees' Retirement System repeals certain provisions relating to a member's purchase of additional service credits by pre-tax contributions in order to ensure that the ERS maintains its status as a tax-qualified retirement plan under the Internal Revenue Code, effective for new purchases entered into after June 30, 2020. Act 86, SLH 2015 prospectively changed the cost to purchase membership service after June 30, 2020 to an actuarially-neutral cost to the ERS. The election of service purchase by payroll deduction might in some instances result in greater deferral of pre-tax retirement contributions than was previously approved by the IRS. Therefore, after June 30, 2020, purchase of membership service by payroll deduction will no longer be available. This amendment is necessary to maintain the tax-qualified status of the ERS. Effective June 29, 2018.

ACCOUNTING SYSTEM AND REPORTS

The accrual basis of accounting is used to record financial transactions. Expenses are recorded when the liability is incurred, and revenues are recorded in the accounting period in which they are earned and become measurable. Interest earned is accrued on a monthly basis. Accounts receivable at year end, in addition to accrued interest receivable, reflect accrued employer charges and investment proceeds due on sales that have not yet settled. Investments are recorded at fair value. Fixed assets are recorded at cost less accumulated depreciation.

The *Notes to the Financial Statements (Notes)* contain additional detailed information on the statutory provisions under which the ERS operates. In addition, the Notes include a summary of significant accounting policies, and provide explanatory information to help readers better understand the data contained in the financial statements.

The management of the ERS is responsible for and has implemented systems of internal accounting controls designed to provide reasonable assurances for the safeguarding of assets and the reliability of financial records. We believe that the internal accounting controls currently in place are adequate to meet the purpose for which they were intended. To the best of our knowledge and belief, the enclosed data, including the financial statements, supporting schedules and statistical tables is accurate in all material respects and is reported in a manner that fairly presents the financial position and results of the ERS' operations.

INVESTMENTS

The primary goal of the ERS investment strategy is the preservation of capital. The Board of Trustees seeks preservation of capital with a consistent, positive return for the investment portfolio. As discussed above, the ERS adopted a risk-based, functional framework for allocating capital within the investment portfolio. This framework makes use of strategic/functional classes that in-turn utilize underlying asset classes and strategies will be implemented in several phases through June 30, 2020. A summary of the ERS' long-term asset allocation strategy for the fiscal year may be found in the Investment Section of this report. The full Investment Policies, Guidelines, and Procedures Manual is available on the ERS website at http://ers.ehawaii.gov.

Professional investment managers have been retained to execute the Board's investment strategies and have full discretion within statutory provisions, Board policies and their respective guidelines. The investment managers retained by the Board as of June 30, 2018 are listed in the Investment Section

Net investment income, including dividends, interest, other investment earnings, and gains/losses on the sale of investments resulted in a gain of $1,225.6 million in FY2018. This translates to an investment return of approximately 7.9% for the year, using rate of return methodologies that are generally accepted by the Global Investment Performance Standards (GIPS).

FUNDING AND ACTUARIAL OVERVIEW

In the June 30, 2018 report of the Fund's valuation our actuaries, Gabriel Roeder Smith & Company noted that that our unfunded actuarial accrued liability (UAAL) increased to $13.4 billion from $12.9 billion on June 30, 2017 based on the previous GASB reporting standards. Under the current market-based GASB standards effective in FY 2015, the Net Pension Liability increased to $13.3 billion on June 30, 2018 from $13.0 billion on June 30, 2017. On the market basis, this represents an increase in funded position to 55.5% for FY 2018 from 54.8% for FY 2017. The ERS full funding period decreased to 25 at June 30, 2018 from 26 years at June 30, 2017, primarily from the FY 2018 investment returns exceeding the 7% benchmark and increased future employer contribution rates.

PROFESSIONAL SERVICES

Professional consultants are appointed by the Board of Trustees to perform professional services that are essential to the effective and efficient operation of the ERS. Opinions from KPMG LLP, the auditors for the ERS, and the actuary, Gabriel, Roeder, Smith & Company, are included in this report. Meketa Investment Group (as a result of a merger with Pension Consulting Alliance, LLC) is the ERS' investment consultant, and their report on the ERS' investment program and performance results is also included in this report.

ACKNOWLEDGEMENTS

This report is from the collaborative efforts of the ERS staff and consultants to provide extensive and reliable information as a basis for making management decisions, determining compliance with legal provisions, and for determining responsible stewardship of the assets contributed by the ERS' members and their employers. This report will be provided to the Governor, legislators, State and county departments and other interested parties.

Aloha,

Thomas Williams

Thomas Williams
Executive Director

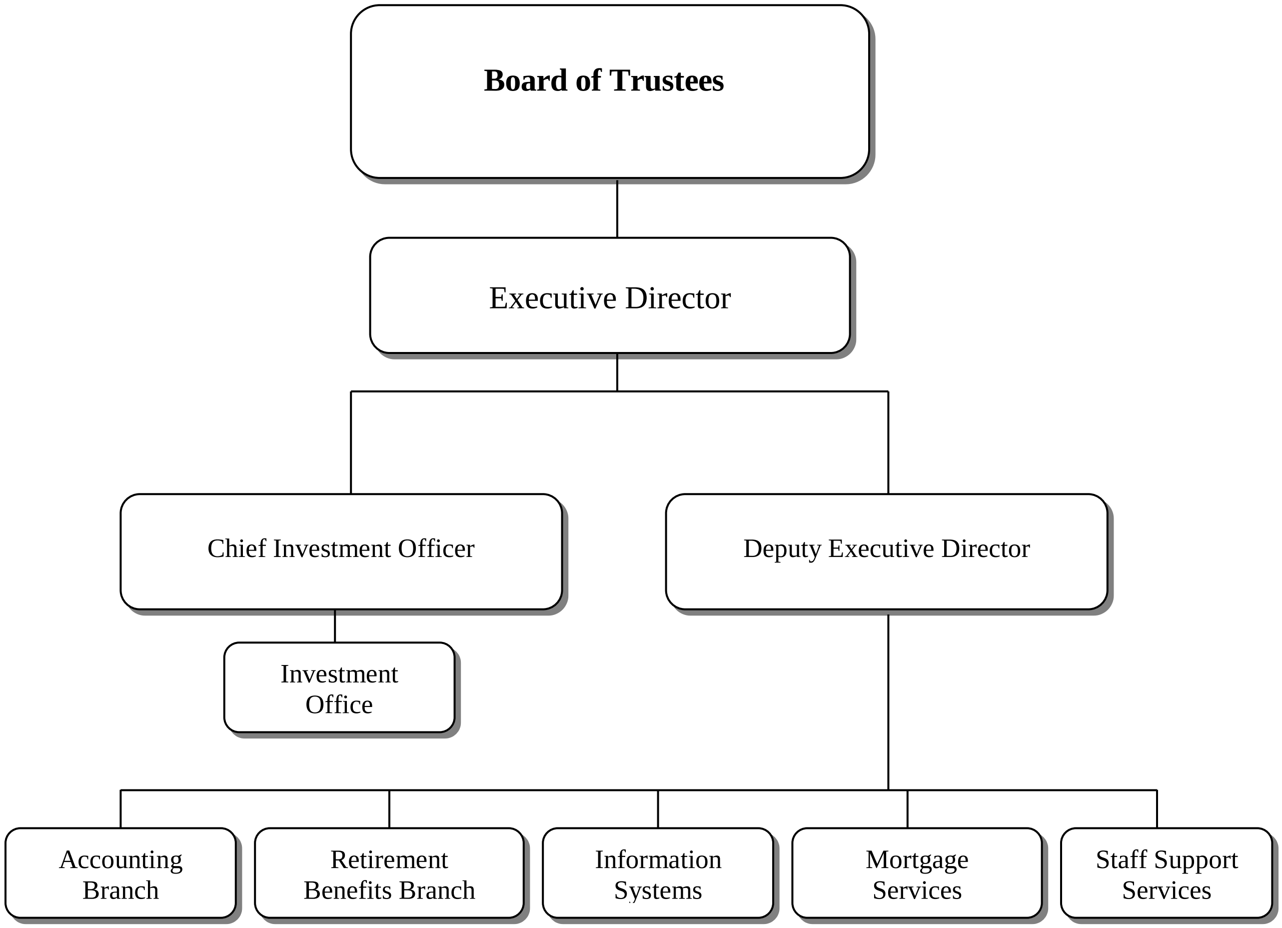
Board of Trustees

The Board of Trustees is the governing body of the Employees' Retirement System of the State of Hawaii, with certain areas of administrative control vested in the State Department of Budget and Finance.

Four of the eight members on the Board are elected by the membership: two general employees, a teacher and a retiree. Three members are citizens of the State, one of whom is an officer of a bank authorized to do business in the State or a person of similar experience, who are not employees and are appointed by the Governor. The State Director of Finance is an ex-officio member by statute.

	Date Current Term Began	**Date Term Ends**
Elected:		
Ms. Jackie Ferguson-Miyamoto	January 2, 2014	January 1, 2020
Mr. Emmit A. Kane, Board Chair	January 2, 2014	January 1, 2020
Dr. Catherine Chan	January 2, 2016	January 1, 2022
Ms Genevieve Ley	January 2, 2018	January 1, 2024
Appointed:		
Mr. Wesley K. Machida	January 16, 2018	January 1, 2019
Mr. Jerry E. Rauckhorst	January 2, 2014	January 1, 2020
Mr. Vincent Barfield	January 2, 2017	January 1, 2023
Ex-Officio:		
Ms. Laurel Johnston	January 1, 2018	December 3, 2018

Organizational Structure



Executive Director Thomas Williams
Deputy Executive Director Kanoe Margol
Chief Investment Officer Elizabeth Burton

Actuary
Gabriel, Roeder, Smith and Company

Auditors
State of Hawaii, Office of the Auditor
KPMG LLP

Legal Advisor
Attorney General of the State of Hawaii

Medical Board
Dr. Patricia L. Chinn, Chair
Dr. Howman Lam, Member
Dr. Gerald J. McKenna, Member

** A list of investment professionals is located in the *Investment Section* of this CAFR.

Plan Summary

The Employees' Retirement System (ERS) of the State of Hawaii was established by the Legislature in 1925 to provide retirement, disability and survivor benefits for State employees, teachers, professors, county employees, police officers, firefighters, judges and elected officials.

The ERS is a qualified defined benefit pension plan under Section 401(a) of the Internal Revenue Code. As such, the ERS is exempt from federal income taxation on its investment earnings. Since January 1, 1988, member contributions have been tax deferred under Section 414(h) of the Internal Revenue Code.

Members are covered by the provisions of the Contributory, Hybrid or Noncontributory retirement class. Except for employees in certain positions who are required to be Contributory members, most new employees from July 1, 2006 are enrolled as Hybrid Members.

Those in the Contributory Class are required to make contributions to the ERS and may also be covered by Social Security. Employees in the following occupational groups are required to be members of the Contributory Class: police officers, firefighters, judges, elected officials, legislative officers, attorney general investigators, narcotics enforcement investigators, and public safety investigations staff investigators. As of March 31, 2018, 5,647 active employees were enrolled in the Contributory Class, or about 8.5% of our active members.

On July 1, 2006, the Hybrid Class became effective pursuant to Act 179/2004. Members in the Hybrid Class (a contributory benefit structure) must also contribute to the ERS and are generally covered by Social Security. The Hybrid Class covers most employees hired from July 1, 2006, as well as certain employees hired before July 1, 2006 who elected to change to Hybrid Membership. The Hybrid membership will continue to increase going forward as most new employees hired from July 1, 2006 will be required to become a Hybrid member. As of March 31, 2018, the Hybrid Class had 47,783 members or about 72.1% of the ERS' active membership.

Noncontributory Members do not make contributions to the ERS and are covered by Social Security. The Noncontributory Class covers employees hired from July 1, 1984 to June 30, 2006, as well as employees hired before July 1, 1984 who elected to join the Noncontributory Class. As of March 31, 2018, there were 12,841 active employees in the Noncontributory Class, which represents over 19.4% of all active members on this date.

Most employees hired after June 30, 2012 fall under the new tier of benefits, contributions and vesting requirements as a result of legislation passed in 2011.

A summary of the general retirement benefits, including retirement options, for Contributory, Hybrid and Noncontributory members are on the following pages. For more detailed and current information on the contributions, benefits, eligibility and other plan details please visit the ERS website at http://ers.ehawaii.gov/.

Membership for employees hired prior to July 1, 2012 [a]

	Noncontributory	Contributory	Hybrid
Employee Contributions	No employee contributions	7.8% of salary	6.0% of salary
Normal Retirement			
Eligibility	Age 62 and 10 years credited service; ***or*** Age 55 and 30 years credited service	Age 55 and 5 years credited service	Age 62 and 5 years credited service; ***or*** Age 55 and 30 years credited service
Benefit	1-1/4% of average final compensation* times years of credited service	2% of average final compensation* times years of credited service	2% of average final compensation* times years of credited service, with a split formula for Noncontributory service at 1-1/4%

* Average final compensation (AFC) is an average of the highest salaries during any three years of credited service, excluding any salary paid in lieu of vacation or if ERS membership occurred prior to 1/1/71, AFC may be an average of the highest salaries during any five years of credited service including any salary paid in lieu of vacation.

	Noncontributory	Contributory	Hybrid
Early Retirement			
Eligibility	Age 55 and 20 years credited service	Any age and 25 years credited service	Age 55 with 20 years credited service
Benefit	Maximum allowance reduced 6% per year under age 62	Maximum allowance reduced 5% per year under age 55 plus 4% per year under age 50	Maximum allowance reduced 5% per year under age 62
Deferred Vesting			
Eligibility	10 years credited service	5 years credited service and contributions left in the ERS	5 years credited service and contributions left in the ERS
Benefit	Accrued maximum allowance payable as early as age 55 or at age 65 with 10 but less than 20 years of credited service	Accrued maximum allowance payable at age 55	Accrued maximum allowance payable as early as age 55 or at age 62 with 5 but less than 20 years of credited service

[a] Per Act 163/2012, SLH, the major changes to membership requirements, contribution amounts, and benefits structures for employees hired after June 30, 2012 are discussed on pages 17-21.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired prior to July 1, 2012 (continued) [(a)]

	Noncontributory	**Contributory**	**Hybrid**
Annuity Savings Account			
Interest	Not applicable	4.5% per annum on employee contributions and accrued interest, ***or*** If hired after June 30, 2011, 2.0% per annum on employee contributions and accrued interest	4.5% per annum on employee contributions and accrued interest, ***or*** If hired after June 30, 2011, 2.0% per annum on employee contributions and accrued interest
Refund Eligibility	Not applicable	Contributions may be withdrawn upon retirement or termination of employment; upon refund, all service and any future retirement benefit will be forfeited	Contributions may be withdrawn upon retirement or termination of employment; upon refund, all service and any future retirement benefit will be forfeited
Refund Benefit			
- Terminates with less than 5 years credited service	Not applicable	Return of member's contributions and accrued interest	Return of member's contributions and accrued interest
- Terminates with 5 or more years of credited service	Not applicable	Return of member's contributions and accrued interest	Return of member's Hybrid contributions and accrued interest, times 150%; plus any non-Hybrid contributions and accrued interest
Ordinary Disability			
Eligibility	10 years credited service	10 years credited service	10 years credited service
Benefit	1-1/4% of AFC times years of credited service, unreduced for age (Minimum is 12.5% of AFC)	1-3/4% of AFC times years of credited service, unreduced for age (Minimum is 30% of AFC)	2% of AFC times years of credited service, unreduced for age; split formula for Noncontributory service at 1-1/4% (Minimum is 25% of AFC)

[(a)] Per Act 163/2012, SLH, the major changes to membership requirements, contribution amounts, and benefits structures for employees hired after June 30, 2012 are discussed on pages 17-21.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired prior to July 1, 2012 (continued) [(a)]

	Noncontributory	Contributory	Hybrid
Service-Connected Disability			
Eligibility	Any age or credited service	Any age or credited service	Any age or credited service
Benefit	Lifetime pension of 35% of AFC ** For accidents occurring before July 1, 2004, accrued maximum allowance, but not less than 15% of AFC	Lifetime pension of 50% of AFC plus refund of member's contributions and accrued interest ** For accidents occurring before July 7, 1998, a different benefit is used	Lifetime pension of 35% of AFC plus refund of member's contributions and accrued interest
Ordinary Death			
Eligibility	Active employee at time of death with at least 10 years of credited service	Active employee at time of death with at least 1 year of service	Active employee at time of death with at least 5 years of service
Benefit	Surviving spouse/reciprocal beneficiary (until remarriage or reentry into a new reciprocal beneficiary relationship) and dependent children (up to age 18) receive a benefit equal to a percentage of member's accrued maximum allowance unreduced for age; ***or*** Option B (100% Joint and Survivor) lifetime pension for surviving spouse/reciprocal beneficiary if member was eligible for retirement at time of death.	Lump sum payment of member's contributions and accrued interest plus a percentage of the salary earned in the 12 months preceding death; ***or*** Option 3 (50% Joint and Survivor) lifetime pension if member was not eligible for retirement at the time of death, credited with at least 10 years of service, and one beneficiary designated; ***or*** Option 2 (100% Joint and Survivor) lifetime pension if member was eligible for retirement at the time of death and one beneficiary designated; ***or*** If less than 1 year of service, return of member's contributions and accrued interest.	Lump sum payment of member's Hybrid contributions and accrued interest (times 150%) plus return of non-Hybrid contributions and accrued interest; ***or*** Option 3 (50% Joint Survivor) lifetime pension if member was not eligible for retirement at the time of death, credited with at least 10 years of service and one beneficiary designated; ***or*** Option 2 (100% Joint Survivor) lifetime pension if member was eligible for retirement at the time of death, and one beneficiary designated; ***or*** If less than 5 years of service, return of member's contributions and accrued interest.

[(a)] Per Act 163/2012, SLH, the major changes to membership requirements, contribution amounts, and benefits structures for employees hired after June 30, 2012 are discussed on pages 17-21.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired prior to July 1, 2012 (continued) [(a)]

	Noncontributory	**Contributory**	**Hybrid**
Service-Connected Death			
Eligibility	Any age or service	Any age or service	Any age or service
Benefit	Surviving spouse/reciprocal beneficiary receives monthly benefit equal to 30% of AFC (until remarriage or re-entry into a new reciprocal beneficiary relationship); additional benefits payable to surviving dependent children (up to age 18). If there is no spouse/reciprocal beneficiary or dependent children, no benefit is payable.	Lump sum payment of member's contributions and accrued interest to designated beneficiary, plus monthly benefit of 50% of AFC to surviving spouse/reciprocal beneficiary (until remarriage or re-entry into a new reciprocal beneficiary relationship). If there is no surviving spouse or reciprocal beneficiary, surviving dependent children (up to age 18) or dependent parents shall be eligible for a monthly benefit. If there is no spouse/reciprocal beneficiary or dependent children/parents, the ordinary death benefit shall be payable to the designated beneficiary.	Lump sum payment of member's contributions and accrued interest to designated beneficiary, plus monthly benefit of 50% of AFC to surviving spouse/reciprocal beneficiary (until remarriage or re-entry into a new reciprocal beneficiary relationship). If there is no surviving spouse or reciprocal beneficiary, surviving dependent children (up to age 18) or dependent parents shall be eligible for a monthly benefit. If there is no spouse/reciprocal beneficiary or dependent children/parents, the ordinary death benefit shall be payable to the designated beneficiary.
Post Retirement Benefit - For all types of retirements (service, disability or death)	Each retiree's original retirement allowance is increased by 2.5% on each July 1 beginning the calendar year after retirement. This cumulative benefit is not compounded and increases each year by another 2.5% of the original retirement allowance without a ceiling (i.e., 2.5% of the original retirement allowance the first year, 5% the second year, 7.5% the third year, etc.).		

[(a)] Per Act 163/2012, SLH, the major changes to membership requirements, contribution amounts, and benefits structures for employees hired after June 30, 2012 are discussed on pages 17-21.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired prior to July 1, 2012 (continued) [a]

The plan provisions summarized in the preceding pages apply to teachers and most State and County employees, hired before July 1, 2012. Special provisions applicable to other groups of employees, hired by July 1, 2012, are summarized in Item A to D below:

A) Police officers, firefighters, investigators of the Department of the Attorney General, narcotic enforcement investigators, and public safety investigations staff investigators contribute 12.2% of their monthly salary to the ERS instead of 7.8%. These members may retire at age 55 with 5 years of credited service or at any age with 25 years of credited service and receive a retirement benefit of 2-1/2% of average final compensation (AFC) for each year of such service up to a maximum of 80% AFC, provided the last 5 years is credited service in any of these occupations.

B) Judges, elected officials, and legislative officers may retire at age 55 with at least 5 years of credited service, or at any age with at least 10 years of credited service and receive a pension of 3-1/2% of AFC for each year of such service plus an annuity from their contributions allocable to the period of such service. This benefit cannot exceed 75% of the AFC. Judges hired after June 30, 1999 need 25 years of credited service in order to retire before age 55.

C) Sewer workers in specified classifications and water safety officers may retire at any age if they are credited with 25 years of such service with the last 5 or more years in these occupations. Hybrid members in this job category are required to contribute 9.75% of their salary to the ERS.

D) Emergency medical technicians (EMT) may retire at any age if they are credited with 30 years of such service with the last 5 or more years in these occupations effective June 30, 2003. The years of service to qualify for early retirement is gradually being reduced through June 30, 2008 when 25 years of EMT service will qualify these members for early retirement. Hybrid members in this job category are required to contribute 9.75% of their salary to the ERS.

[a] Per Act 163/2012, SLH, the major changes to membership requirements, contribution amounts, and benefits structures for employees hired after June 30, 2012 are discussed on pages 17-21.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired after June 30, 2012 [(b)]

	Noncontributory	**Contributory**	**Hybrid**
Employee Contributions	No employee contributions	9.8% of salary	8.0% of salary
Normal Retirement			
Eligibility	Age 62 and 10 years credited service; ***or*** Age 55 and 30 years credited service	Age 60 and 10 years credited service	Age 65 and 10 years credited service; ***or*** Age 60 and 30 years credited service
Benefit	1-1/4% of average final compensation* times years of credited service	1.75% of average final compensation* times years of credited service	1.75% of average final compensation* times years of credited service, with a split formula for Noncontributory service at 1-1/4%

* Average final compensation (AFC) is an average of the highest salaries (limited to base pay and shortage differentials) during any five years of credited service, excluding any salary paid in lieu of vacation.

	Noncontributory	**Contributory**	**Hybrid**
Early Retirement			
Eligibility	Age 55 and 20 years credited service	Age 55 with 25 years credited service	Age 55 with 20 years credited service
Benefit	Maximum allowance reduced 6% per year under age 62	Maximum allowance reduced 5% per year under age 60 plus 4% per year under age 55	Maximum allowance reduced 5% per year under age 65
Deferred Vesting			
Eligibility	10 years credited service	10 years credited service and contributions left in the ERS	10 years credited service and contributions left in the ERS
Benefit	Accrued maximum allowance payable as early as age 55 or at age 65 with 10 but less than 20 years of credited service	Accrued maximum allowance payable at age 60, or at age 55 with 25 years of service with age reduction	Accrued maximum allowance payable as early at age 65 or at age 60 with 30 years of service, or at age 55 with 20-29 years of credited service with age reduction

[(b)] Membership requirements, contribution amounts, and benefits structures for employees hired before July 1, 2012 are discussed on pages 12-16.

Membership for employees hired after June 30, 2012 (continued) [(b)]

	Noncontributory	Contributory	Hybrid
Annuity Savings Account			
Interest	Not applicable	2.0% per annum on employee contributions and accrued interest	2.0% per annum on employee contributions and accrued interest
Refund Eligibility	Not applicable	Contributions may be withdrawn upon retirement or termination of employment; upon refund, all service and any future retirement benefit will be forfeited	Contributions may be withdrawn upon retirement or termination of employment; upon refund, all service and any future retirement benefit will be forfeited
Refund Benefit			
- Terminates with less than 10 years credited service	Not applicable	Return of member's contributions and accrued interest	Return of member's contributions and accrued interest
- Terminates with 10 or more years of credited service	Not applicable	Return of member's contributions and accrued interest	Return of member's Hybrid contributions and accrued interest, times 120%; plus any non-Hybrid contributions and accrued interest
Ordinary Disability			
Eligibility	10 years credited service	10 years credited service	10 years credited service
Benefit	1-1/4% of AFC times years of credited service, unreduced for age (Minimum is 12.5% of AFC)	1-3/4% of AFC times years of credited service, unreduced for age (Minimum is 30% of AFC)	1-3/4% of AFC times years of credited service, unreduced for age (Minimum is 25% of AFC)

[(b)] Membership requirements, contribution amounts, and benefits structures for employees hired before July 1, 2012 are discussed on pages 12-16.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired after June 30, 2012 (continued) [(b)]

	Noncontributory	Contributory	Hybrid
Service-Connected Disability			
Eligibility	Any age or credited service	Any age or credited service	Any age or credited service
Benefit	Lifetime pension of 35% of AFC	Lifetime pension of 50% of AFC plus refund of member's contributions and accrued interest	Lifetime pension of 35% of AFC plus refund of member's contributions and accrued interest
Ordinary Death			
Eligibility	Active employee at time of death with at least 10 years of credited service	Active employee at time of death with at least 1 year of service	Active employee at time of death with at least 10 years of service
Benefit	Surviving spouse/reciprocal beneficiary (until remarriage or reentry into a new reciprocal beneficiary relationship) and dependent children (up to age 18) receive a benefit equal to a percentage of member's accrued maximum allowance unreduced for age; ***or*** Option B (100% Joint and Survivor) lifetime pension for surviving spouse/reciprocal beneficiary if member was eligible for retirement at time of death.	Lump sum payment of member's contributions and accrued interest plus a percentage of the salary earned in the 12 months preceding death; ***or*** Option 3 (50% Joint and Survivor) lifetime pension if member was not eligible for retirement at the time of death, credited with at least 10 years of service, and one beneficiary designated; ***or*** Option 2 (100% Joint and Survivor) lifetime pension if member was eligible for retirement at the time of death and one beneficiary designated; ***or*** If less than 1 year of service, return of member's contributions and accrued interest.	Lump sum payment of member's Hybrid contributions and accrued interest (times 120%) plus return of non-Hybrid contributions and accrued interest; ***or*** Option 3 (50% Joint Survivor) lifetime pension if member was not eligible for retirement at the time of death, credited with at least 10 years of service and one beneficiary designated; ***or*** Option 2 (100% Joint Survivor) lifetime pension if member was eligible for retirement at the time of death, and one beneficiary designated; ***or*** If less than 10 years of service, return of member's contributions and accrued interest.

[(b)] Membership requirements, contribution amounts, and benefits structures for employees hired before July 1, 2012 are discussed on pages 12-16.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired after June 30, 2012 (continued) [(b)]

	Noncontributory	**Contributory**	**Hybrid**
Service-Connected Death			
Eligibility	Any age or service	Any age or service	Any age or service
Benefit	Surviving spouse/reciprocal beneficiary receives monthly benefit equal to 30% of AFC (until remarriage or re-entry into a new reciprocal beneficiary relationship); additional benefits payable to surviving dependent children (up to age 18). If there is no spouse/reciprocal beneficiary or dependent children, no benefit is payable.	Lump sum payment of member's contributions and accrued interest to designated beneficiary, plus monthly benefit of 50% of AFC to surviving spouse/reciprocal beneficiary (until remarriage or re-entry into a new reciprocal beneficiary relationship). If there is no surviving spouse or reciprocal beneficiary, surviving dependent children (up to age 18) or dependent parents shall be eligible for a monthly benefit. If there is no spouse/reciprocal beneficiary or dependent children/parents, the ordinary death benefit shall be payable to the designated beneficiary.	Lump sum payment of member's contributions and accrued interest to designated beneficiary, plus monthly benefit of 50% of AFC to surviving spouse/reciprocal beneficiary (until remarriage or re-entry into a new reciprocal beneficiary relationship). If there is no surviving spouse or reciprocal beneficiary, surviving dependent children (up to age 18) or dependent parents shall be eligible for a monthly benefit. If there is no spouse/reciprocal beneficiary or dependent children/parents, the ordinary death benefit shall be payable to the designated beneficiary.

Post Retirement Benefit - For all types of retirements (service, disability or death)

Each retiree's original retirement allowance is increased by 1.5% on each July 1 beginning the calendar year after retirement. This cumulative benefit is not compounded and increases each year by another 1.5% of the original retirement allowance without a ceiling (i.e., 1.5% of the original retirement allowance the first year, 3% the second year, 4.5% the third year, etc.).

[(b)] Membership requirements, contribution amounts, and benefits structures for employees hired before July 1, 2012 are discussed on pages 12-16.

Summary of Retirement Benefit Plan Provisions (continued)

Membership for employees hired after June 30, 2012 (continued) [(b)]

The plan provisions summarized in the preceding pages apply to teachers and most State and County employees, hired after June 30, 2012. Special provisions applicable to other groups of employees, hired after June 30, 2012, are summarized in Item A to D below:

A) Police officers, firefighters, investigators of the Department of the Attorney General, narcotic enforcement investigators, and public safety investigations staff investigators contribute 14.2 % of their monthly salary to the ERS instead of 9.8%. These members may retire at age 60 with 10 years of credited service or at age 55 with 25 years of credited service and receive a retirement benefit of 2-1/4% of average final compensation (AFC) for each year of such service up to a maximum of 80% AFC, provided the last 5 years is credited service in any of these occupations.

B) Judges may retire at age 60 with at least 10 years of credited service, or at age 55 with at least 25 years of credited service and receive a pension of 3% of AFC for each year of such service plus an annuity from their contributions allocable to the period of such service. Similarly, elected officials and legislative officers may retire at any age with 10 years of elected, legislative or mixed service and receive a pension of 3% of AFC for each year of service plus an annuity from their contributions allocable to the period of such service. These benefits cannot exceed 75% of the AFC.

C) Contributory Class sewer workers in specified classifications, water safety officers and emergency medical technicians may retire at age 60 with 10 years of credited service or at age 55 with 25 years of such service with the last 5 or more years in these occupations.

D) Hybrid Class sewer workers in specified classifications, water safety officers and emergency medical technicians may retire at age 65 with 10 years of credited service or at age 55 with 25 years of such service with the last 5 or more years in these occupations. They are required to contribute 11.75% instead of 8% of their salary to the ERS.

[(b)] Membership requirements, contribution amounts, and benefits structures for employees hired before July 1, 2012 are discussed on pages 12-16.

Taxation of Benefits

All retirement benefits are subject to Federal income tax but are exempt from Hawaii State income tax. Certain occupational (work related) disability benefits are exempt from Federal income tax. Arrangements to initiate voluntary withholding of Federal income tax can be made at any time. The ERS provides retirees with a 1099-R tax form on or before January 31 of each year.

Additional Benefits

Retirees, their spouses and dependent children under age 19 are eligible to receive life insurance, medical, dental, vision, and prescription drug coverage from the Employer-Union Health Benefits Trust Fund (EUTF) if they were hired before July 1, 1996, and retire with at least 10 years of continuous credited service. If they were first hired after June 30, 1996, health benefits are available on a cost-sharing basis as long as the member retires with at least 10 years of continuous service. A dependent of a retiree who is a full-time student at an accredited college, university or technical school and who is 19 through 26 years old is also eligible for coverage. A retiree with a hire date after July 1, 2001 will only receive coverage for him or herself on a cost sharing basis.

Unused sick leave is excluded from credited service in determining health benefit coverage.

Retirees are responsible for premiums in excess of the amount of employer contributions. Retirees and their spouses are eligible to receive a reimbursement of the Medicare Part B medical insurance premium. More information is available on the EUTF's website at www.eutf.hawaii.gov.

Applying for Retirement

A service retirement application can be filed with the ERS 150 days but no less than 30 days prior to the effective date of retirement. Once the application has been filed, cancellation prior to the effective date of retirement is permitted; however, the law requires mandatory retirement upon the third application. Members may obtain retirement information and application forms at the following locations:

Oahu Office
City Financial Tower
201 Merchant Street, Suite 1400
Honolulu, HI 96813
Phone: (808) 586-1735
Fax: (808) 587-5766

Kauai Office
3060 Eiwa Street, Room 302
Lihue, Hawaii 96766
Phone: (808) 274-3010
Fax: (808) 241-3193

Hawaii Office
101 Aupuni Street, Suite 208
Hilo, Hawaii 96720
Phone: (808) 974-4076
Fax: (808) 974-4078

Maui Office
54 S. High Street, Room 218
Wailuku, Hawaii 96793
Phone: (808) 984-8181
Fax: (808) 984-8183

Molokai and Lanai
Toll-free to Oahu:
1-800-468-4644, ext 61735

Continental U.S. only
Toll free to Oahu
1-888-659-0708

Counseling Service

It is the policy of the ERS to render every possible service to its members; however, as thousands of inquiries are received and answered annually, in addition to the actual processing of claims and benefits, present staff and appropriations restrict this service to those members whose immediate welfare is dependent upon the prompt settlement of benefits. Members who are definite about retirement should contact the ERS to request formal retirement estimates. For members who are not planning immediate retirement and interested in their benefit status a retirement benefit calculator and other retirement information are available on the ERS' website at http://ers.ehawaii.gov/.

Retirement Options

CONTRIBUTORY AND HYBRID MEMBERS

Maximum Allowance: The member receives a lifetime maximum allowance; at death, the difference between the value of the member's contributions at the time of retirement and the retirement allowance paid prior to death is paid to the designated beneficiary(ies) or estate.

Option One: The member receives a reduced lifetime allowance based on age; at death, the difference between the initial insurance reserve and the retirement allowance paid prior to death is paid to the designated beneficiary(ies) or estate. In lieu of the lump-sum balance, the beneficiary may elect to receive an allowance for life based on the value of the balance; provided that the allowance is not less than $100 per month.

Option Two (100% Joint and Survivor): The member receives a reduced lifetime allowance based on ages of both the member and the sole beneficiary and at death; the same allowance is paid to the designated beneficiary for life. Should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease at the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree's reduced pension "pops up" or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Option Three (50% Joint and Survivor): This option is similar to Option Two. The member receives a reduced lifetime allowance which is higher than Option Two and is based on ages of both the member and the sole beneficiary; however, at death one-half of the allowance is paid to the designated beneficiary for life. Like Option Two, should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease at the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree's reduced pension "pops up" or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Option Four: This option allows the member to devise a plan that will provide a benefit according to the member's specifications. It requires certification by the Actuary and approval of the Board of Trustees. The following Option Four plans have been approved:

Combination of Options Five and Maximum Allowance: The member receives a reduced lifetime allowance and is allowed to withdraw the pre-1987 nontaxable contributions, 50% of accumulated contributions, or 75% of accumulated contributions (Hybrid members are not allowed the 75% option); at death, the difference between the value of the member's contributions at the time of retirement and the retirement allowance paid prior to death is paid to the designated beneficiary(ies) or estate.

Combination of Options Five and One: The member receives a reduced lifetime allowance and is allowed to withdraw the pre-1987 nontaxable contributions, 50% of accumulated contributions, or 75% of accumulated contributions (Hybrid members are not allowed the 75% option); at death, the difference between the initial insurance reserve and the retirement allowance paid prior to death is paid to the designated beneficiary(ies) or estate.

Combination of Options Five and Two: The member receives a reduced lifetime allowance based on ages of both the member and the sole beneficiary, and is allowed to withdraw the pre-1987 nontaxable contributions, 50% of accumulated contributions, or 75% of accumulated contributions (Hybrid members are not allowed the 75% option); at death, the same allowance is paid to the designated beneficiary for life. As in the case of Option Two, should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease at the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree's reduced pension "pops up" or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Retirement Options (continued)

CONTRIBUTORY AND HYBRID MEMBERS (continued)

Combination of Options Five and Three: The member receives a reduced lifetime allowance based on ages of both the member and the sole beneficiary, and is allowed to withdraw the pre-1987 nontaxable contributions, 50% of accumulated contributions, or 75% of accumulated contributions (Hybrid members are not allowed the 75% option); at death, one-half of the allowance is paid to the designated beneficiary for life. As in the case of Option Three, should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease at the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree's reduced pension "pops up" or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Option Five: The member receives a reduced lifetime allowance and is allowed to withdraw all accumulated contributions; at death, there is no further benefits payable.

Option Four and Option Five are restricted to those members with at least ten years of credited service excluding unused sick leave credit.

Regardless of the option selected, should death of the Contributory or Hybrid member occur during the first year of retirement, the designated beneficiary may elect to receive benefits as if death had occurred immediately prior to retirement in lieu of the death benefits described above.

NONCONTRIBUTORY MEMBERS

Maximum Allowance: The member receives a lifetime pension and at death, there is no further benefit payable.

Option A (50% Joint and Survivor): The member receives a reduced lifetime pension and at death, one-half of the pension is paid to the sole designated beneficiary for life. Should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease upon the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree's reduced pension "pops up" or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Option B (100% Joint and Survivor): The member receives a reduced lifetime pension and at death, the same pension is paid to the sole designated beneficiary for life. Like Option A, should the designated beneficiary predecease the retiree, another beneficiary cannot be named and all payments will cease upon the retiree's death. For retirements on or after December 1, 2004, should the beneficiary predecease the retiree, the retiree's reduced pension "pops up" or increases to the corresponding Maximum Allowance instead of remaining at the reduced amount.

Option C (Ten-Year Guarantee): The member receives a reduced lifetime pension. Should death occur within ten years of retirement, the same pension will be paid to the designated beneficiary, or otherwise to the retiree's estate for the balance of the ten-year period. Should the designated beneficiary predecease the retiree, another beneficiary can be named.

Regardless of the option selected, should death occur during the first year of retirement, the designated beneficiary may elect to receive benefits under Option B in lieu of the death benefits described above, provided that if the retiree would not have been permitted by applicable law or the rules of the Board to name the designated beneficiary under Option B, the designated beneficiary may elect to receive the death benefit under Option A.

Legislative Highlights 2018

The following Acts were passed by the 2018 Legislature and approved by the Governor. For more information on these and other legislation, you may visit the website at www.capitol.hawaii.gov.

Act 19 (HB2336): Relating to Employer Contributions to the Employees' Retirement System
This Act Allows the State and Counties to pay employer contributions to the ERS in advance of the fiscal year in which the contributions are required and receive credit against future required payments. Currently, the ERS is not able to accept employer contributions in advance of the fiscal year in which the contributions are required. Over time, the ERS will benefit from advanced employer contributions as funds may be invested by the ERS and serve to reduce the Plan's unfunded liabilities. Future generations of taxpayers will benefit as the Plan increases its sustainability.
Effective: July 1, 2018

Act 30 (HB2341): Relating to Qualified Domestic Relations Orders
This Act amends Act 263, SLH 2016 which provides authority for the ERS to make direct payments to the spouse (or former spouse) of an ERS member or retirant in order to make more consistent the benefits payable to an alternate payee–whether the qualified domestic relations order is certified prior to, or after, the member or former member with vested benefit status retires.

- This Act delays the effective date of Act 263 until July 1, 2020 when the ERS will have expended such funds and resources as are necessary to support implementation. The delayed effective date will allow the ERS to program and upgrade its computer system; develop policies, procedures and model forms; and educate members and other affected parties on the benefits provided by the Act.

Effective: June 29, 2018

Act 69 (SB2766): Relating to the Employees' Retirement System
This Act reduces and controls the unfunded liability of the ERS. It prevents future retirement contribution increases by clarifying that accidental death and service- related disability benefits are limited to members who are employed in positions for which all employee and/or employer contributions are made as required (by the statutes relating to the ERS). As a trust fund, this Act clarifies that ERS benefits related to service-connected disability and accidental death are limited to members who are beneficiaries of the trust.
Effective: June 29, 2018

Act 70 (SB2767): Relating to the Employees' Retirement System
This Act repeals certain provisions relating to a member's purchase of additional service credits by pre-tax contributions in order to ensure that the ERS maintains its status as a tax-qualified retirement plan under the Internal Revenue Code, effective for new purchases entered into after June 30, 2020.

- Act 86, SLH 2015 prospectively changed the cost to purchase membership service after June 30, 2020 to an actuarially-neutral cost to the ERS. The election of service purchase by payroll deduction might in some instances result in greater deferral of pre-tax retirement contributions than was previously approved by the IRS. Therefore, after June 30, 2020, purchase of membership service by payroll deduction will no longer be available. This amendment is necessary to maintain the tax-qualified status of the ERS.

Effective: June 29, 2018

Employees' Retirement System
of the State of Hawaii

Submitted by

THE AUDITOR
STATE OF HAWAII

FINANCIAL SECTION

Independent Auditors' Report

KPMG LLP
Suite 2100
1003 Bishop Street
Honolulu, HI 96813-6400

The Auditor
State of Hawaii:

Report on the Financial Statements

We have audited the accompanying financial statements of the Employees' Retirement System of the State of Hawaii (the ERS) as of and for the year ended June 30, 2018 and the related notes to the financial statements, which collectively comprise the ERS' basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

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

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement.

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

KPMG

The Auditor
State of Hawaii:

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

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the Employees' Retirement System of the State of Hawaii as of June 30, 2018, and the changes in fiduciary net position for the year then ended, in conformity with U.S. generally accepted accounting principles.

Other Matters

Required Supplementary Information

U.S. generally accepted accounting principles require that the management's discussion and analysis on pages 31 through 37 and required supplementary information including the schedule of changes in the employers' net pension liability and related ratios, employers' net pension liability, employer contributions and investment returns on pages 75 through 84 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Supplementary Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise the ERS' basic financial statements. The supplementary information including the combining schedule of changes in fiduciary net position, social security contribution fund – statement of changes in assets and liabilities, schedules of administrative expenses and

The Auditor
State of Hawaii

investment expenses, and the Introductory, Investment, Actuarial and Statistical sections are presented for purposes of additional analysis and are not a required part of the basic financial statements. The combining schedule of changes in fiduciary net position, social security contribution fund – statement of changes in assets and liabilities, and schedules of administrative expenses and investment expenses are the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the combining schedule of changes in fiduciary net position, social security contribution fund – statement of changes in assets and liabilities, and the schedules of administrative expenses and investment expenses and fairly stated in all material respects in relation to the basic financial statements taken as a whole.

The information contained in the Introductory, Investment, Actuarial, and Statistical sections have not been subjected to the auditing procedures applied in the audit of the basic financial statements, and accordingly, we do not express an opinion or provide any assurance on them.

Other Reporting Required by *Government Auditing Standards*

In accordance with *Government Auditing Standards*, we have also issued our report dated September 24, 2019 on our consideration of the ERS' internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the ERS' internal control over financial reporting and compliance.

KPMG LLP

Honolulu, Hawaii
September 24, 2019

Management's Discussion and Analysis (Unaudited)

This Management's Discussion and Analysis (MD&A) of the Employees' Retirement System of the State of Hawaii (the ERS) provides highlights and comparisons of the financial position and performance of the ERS as of and for the year ended June 30, 2018. The MD&A is presented as a narrative overview and analysis in conjunction with the Letter of Transmittal, which is included in the Introductory Section of the ERS Comprehensive Annual Financial Report (CAFR). For more detailed information pertaining to the ERS' financial activities, the reader should also review the actual financial statements, including the notes and supplementary schedules.

Overview of the Financial Statements

The ERS is responsible for administering a defined-benefit pension plan for state government, local government, and public education employees in the State of Hawaii (the State). The ERS also oversees the short-term investments of the federal Social Security employer contributions for the State in the Social Security Contribution Fund (Contribution Fund).

The ERS' financial statements include fiduciary type funds that are used to account for resources held for the benefit of parties outside of the ERS. The primary fund is defined as a Pension Trust Fund as these assets are held for the benefit of its members and their beneficiaries for the payment of pension benefits, while the Contribution Fund is an agency type fund that is custodial in nature. Throughout this discussion and analysis, units of measure (i.e., billions, millions, and thousands) are approximate, being rounded up or down to the nearest tenth of the respective unit value.

This discussion and analysis is intended to serve as an introduction to the ERS' financial reporting, which comprises the following components:

- The two main basic financial statements include the statement of fiduciary net position as of June 30, 2018, and the related statement of changes in fiduciary net position during the fiscal year from July 1, 2017 to June 30, 2018 (FY 2018). These provide a snapshot of the resources available at the end of the fiscal year and a summary of changes in resources available to pay pension benefits to members, retirees, and beneficiaries.
- The related notes to financial statements are an integral part of the basic financial statements and include detailed information that is essential to a full understanding of the data provided in the basic financial statements.
- The Required Supplementary Schedules of Changes in the Employers' Net Pension Liability and Related Ratios, Employers' Net Pension Liability, Employer Contributions and Investment Returns, and the related Notes to Required Supplementary Information, are required to be presented to supplement the basic financial statements for placing the financial statements in an appropriate operational, economic, or historical context.

- The remaining supplementary information are derived from and relate directly to the underlying accounting and other records used to prepare the financial statements, and provides additional detailed information concerning the changes in operating reserves established by legislation, and the operating and investment related expenses of the ERS.

Financial Highlights

- The fiduciary net position restricted for pension benefits (or net assets) increased during FY 2018 to $16.6 billion resulting in an increase of the funded status of ERS to 55.5% as of June 30, 2018. This represents an increase of $0.9 billion, 5.7%, from the fiduciary net position restricted for pension benefits of $15.7 billion as of June 30, 2017.

- The ERS investment return (net and gross of fees) was 7.9% for the 2018 fiscal year compared to a 13.7% return during the 2017 fiscal year, using the time-weighted rate of return methodologies that are generally accepted by the Global Investment Performance Standards (GIPS) (that is shown in the *Investment Section* of this CAFR). The investment program outperformed its actuarial and investment goal of 7.00% that was effective June 30, 2017. Under GASB Statement No. 67, Financial Reporting for Pension Plans – an amendment of GASB Statement No. 25, pension reporting standards, the annual money-weighted return on ERS' pension plan investments, net of pension plan investment expense, was 7.8% and 13.7% for FY 2018 and FY 2017, respectively.

  Effective October 1, 2014, the Board of Trustees of the System approved the adoption of a change in its asset allocation policy from the asset-class policy to a new risk-based asset allocation framework within the categories of Broad Growth, Principal Protection, Real Estate and Real Return, that is expected to be implemented through 2020. This is the second year that the results of operations for these FY 2018 financial statements are prepared on the risk-based investment strategy since the portfolio was transitioned to the new policy during the 2017 fiscal year. Please refer to Note F1 later in Notes to Financial Statements and the Investment Section of this CAFR for more detailed information on the asset allocation policy.

- During 2018, there was no significant legislation passed that significantly affects the operations or provisions of the pension trust. This was the first of four years that will have significant increases in employer contribution rates from 2017 legislation that is discussed below.

- Total pension liability as of June 30, 2018 increased to $29.9 billion from $28.6 billion as of June 30, 2017, while the corresponding net pension liability was $13.3 billion and $13.0 billion for June 30, 2018 and 2017, respectively. Covered payroll for the ERS increased in FY 2018 to $4.3 billion from the FY 2017 total of $4.2 billion, for a 0.3% increase.

- The fiduciary net position as a percentage of total pension liability was 55.5% and 54.8% as of June 30, 2018 and June 30, 2017, respectively, while the funded ratio on an actuarial basis increased to 55.2% from 54.9%, respectively. The main difference between the two methods is under GASB Statement No. 67 for financial reporting purposes the fiduciary net position is based only on the market value of assets while under actuarial value for the net assets for funding purposes allows for a four-year market smoothing of assets of net appreciation.
- Contributions from members and employers increased by a total of $75.1 million during FY 2018, or 7.3%. The increase is due to an increase in the statutory employer contribution rate, member pay increases, more active members being required to contribute, and new employees contributing at higher contribution rates. The historical summary of legislation impacting the ERS actuarial valuations is discussed in more detail in the "Summary of Plan Changes" in the Actuarial Section.
- Total retirement benefit payments increased by $89.1 million, or 6.8%, to $1,395.9 million in FY 2018 from $1,306.8 million in FY 2017. Pension benefits continues to increase due to 3.5% more retirees and beneficiaries (48,569 in 2018 compared to 46,927 in 2017), an increase in the average pension benefit for new retirees, and the annual 2.5% postretirement increase.
- Administrative expenses increased by $0.8 million to $15.8 million in FY 2018 from $15.0 million in FY 2017. Increases in payroll and fringe benefits expenses, one-time computer related costs, and annual repairs and maintenance service costs were offset by a reduction in internal audit, and legal expenses. Administrative expenses for all years were within the ERS' budgeted amounts.

Analysis of Fiduciary Net Position Restricted for Pension Trust

Summary of Fiduciary Net Position
June 30, 2018 and 2017
(Dollars in millions)

	2018	2017	FY 2018 % change
Assets:			
Cash and cash equivalents and short-term investments	$ 2,697.2	$ 2,390.1	12.8 %
Receivables	214.4	287.8	(25.5)
Investments	13,970.9	13,492.5	3.5
Invested securities lending collateral	1,097.5	1,039.9	5.5
Equipment	5.5	5.2	5.8
Total assets	17,985.5	17,215.5	4.5
Liabilities			
Securities lending liability	1,097.5	1,039.9	5.5
Investment accounts and other payables	289.6	477.3	(39.3)
Total liabilities	1,387.1	1,517.2	(8.6)
Fiduciary net position restricted for pensions	$ 16,598.4	$ 15,698.3	5.7

Summary of Changes in Fiduciary Net Position
June 30, 2018 and 2017
(Dollars in millions)

	2018	2017	FY 2018 % change
Additions:			
Contributions	$ 1,107.0	$ 1,031.9	7.3 %
Net investment income	1,225.6	1,934.5	(36.6)
Total additions	2,332.6	2,966.4	(21.4)
Deductions:			
Retirement benefit payments	1,395.9	1,306.8	6.8
Refund of contributions	20.8	16.3	27.6
Administrative expenses	15.8	15.0	5.3
Total deductions	1,432.5	1,338.1	7.1
Increase in fiduciary net position	$ 900.1	$ 1,628.3	(44.7)

Investments, Investment Income, and Investment Expense

The ERS is a long-term investor and manages its pension assets with long-term objectives in mind. A primary element of the ERS' investment philosophy is diversification among various asset classes. The ERS makes estimates of long-term market returns and establishes an asset allocation strategy taking into account the risks associated with each asset class.

The rate of return (gross of fees time-weighted rate of returns) on the ERS investment portfolio during FY 2018 was 7.9% lead by returns in private equity market and traditional growth stock markets while there was underperformance in the crisis risk offset program and fixed income investments, down from 13.7% in FY 2017. Total net investment income was $1,225.6 million in FY 2018 versus $1,934.5 million in FY 2017.

The outperformance was led by positive returns for each asset class: broad growth (+9.8%), real return (+6.6%), crisis risk offset (+4.2%) and principal protection (1.0%). Within the broad growth class, the traditional growth strategies (up 12.5%) sub-components outperformed its benchmark, while the private growth strategies (up 15.4%), and stabilized growth strategies (up 5.2%) underperformed the respective sub-component benchmark. Real return posted a return of 6.6% exceeding its CPI+3% benchmark for the fiscal year by 0.7%. The crisis risk offset program outperformed it benchmark by 2.6% on the strong performance within the alternative return capture segment (+13.6%), and the principal protection portfolio exceeded its benchmark by 0.3%. A summary of investment returns (by sub-component of the risk-based allocation) is included within the *Report on Investment Activity by Investment Consultant* that is located in Investment Section of this CAFR.

The ERS participates in a securities lending program through its global custodian as a way to earn incremental income to enhance the investment portfolio yield.

The asset distribution of the ERS' investment securities for the pension trust, excluding pending trade settlements and securities lending collateral, at June 30, 2018 and 2017 is presented below at fair value. Investment balances between the asset classes will change over time based on market sectors' performance and our rebalancing efforts to maintain asset allocation targets. Changes will also occur for financial reporting since certain real estate and alternative investments are reported on the consolidated method of accounting using the value of the underlying investments since ERS is the majority owner of the business organization. Please refer to the Investment Section of the CAFR for a discussion on asset allocation plan targets and investments by investment strategy.

Investments for the risk-based allocation policy approved in 2015 based on the type of security for financial reporting are listed below. These amounts reported on the financial statements also include cash requirements used by ERS to fund pension benefits and transition amounts between individual investments. Fluctuations will occur based on the trading activity and timing of the settlements.

Asset Class
June 30, 2018 and 2017
(Dollars in millions)

	2018	%	2017	%
Short term investments and cash	$ 2,697.2	16.2 %	$ 2,390.1	15.0 %
Equity securities	7,300.8	43.8	7,190.5	45.3
Fixed income	4,096.6	24.6	3,930.6	24.7
Real estate	1,060.9	6.4	1,112.4	7.0
Alternative investments	1,512.6	9.0	1,259.0	8.0
Total investment assets	16,668.1	100.0	15,882.6	100.0
Less loans on real estate and alternative investments	111.5		174.5	
	$ 16,556.6		$ 15,708.1	

Investment expenses includes (a) investment management fees paid to external investment advisor firms that oversee the ERS' investment portfolio and (b) operational activities of certain real estate and alternative investments since these assets are reported on the consolidated method of accounting using the activity of the underlying investments since ERS is the majority owner of the business organization.

Total investment management fees earned by external investment advisors increased approximately 60.1% during FY 2018 compared to FY 2017 due to significant outperformance of an Alpha-Equity Manager over the index and the first full year of investment advisor fees paid on the Crisis Risk Offset program. Investment advisor fees may fluctuate each year due to certain real estate investment managers may receive an incentive fee for superior investment returns by the manager above their corresponding benchmark, while maintaining an acceptable level of investment risk. Incentive fees are recognized on the accrual basis of accounting for the increase or decrease of the change in real estate values during the year, and are only paid upon the sale of the asset if the asset has "excess earnings" when the real estate asset is actually sold. The ERS requires external managers to provide the ERS with a "most favored nations" contract clause that guarantees the ERS with the lowest management fees the managers offer their clients for investment accounts with similar investment mandates and similar account size.

During FY 2018, the ERS continued transitioning the portfolio to a risk-based process approved by the Board of Trustees in FY 2015 that makes use of strategic/functional classes that in-turn utilize underlying asset classes and strategies. This framework shifts the portfolio asset allocation from a return-based process to a risk-based process that makes use of strategic/functional classes that in-turn utilize underlying asset classes and strategies. Each of these classes is designed to achieve a certain goal (e.g., Real Return class) and/or be exposed to a specific set of macroeconomic risks that are common among the different strategy types and/or assets within the class (e.g., Broad Growth class). As a result of this structure, each strategic class is expected to be exposed to a set of major and minor macroeconomic risks. The effect of the new risk-based methodology is discussed in the *Investment Section* of this CAFR.

Contributions

Contributions from employers and employees totaled $1,107.0 and $1,031.9 million in FY 2018 and FY 2017, respectively. During FY 2018, total contributions increased by $75.1 million, or 7.3%, mainly due to an increase in the statutory employer contribution rate, member pay increases, more active members being required to contribute, and new employees contributing at higher contribution rates. Employer contribution rates will continue to increase over the next three years as a result of 2017 legislation discussed below. Please refer to the Financial Section in the ERS 2018 and 2017 CAFR for more information.

Pension Plan Benefits and Expenses

Pension benefit payments continue to be the primary expense of the ERS with payments increasing to $1,395.9 in FY 2018 from $1,306.8 million in FY 2017. The pension benefits increase is attributed to the continued net increase in the number of retirees being paid, higher pension benefits for recent retirees, and the annual postretirement increase for ERS' retirees.

Refunds to terminating Hybrid and Contributory Class members increased from $16.3 million in FY 2017 to $20.8 million in FY 2018.

Administrative expenses increased to $15.8 million in FY 2018 from $15.0 million in FY 2017. Payroll related costs increased due to pay raises and an increase in the fringe benefit assessment. Non-personnel related increases include increases in annual computer system maintenance requirements, a one-time charge for computer data requirements, and increased postage costs. These increases were offset by a decrease in professional services for accounting, internal audit and legal services used during the fiscal year.

Pension Plan Changes

There was no significant legislation passed in 2018 that affects pension plan provisions. Pension plan changes, including legislative and Board of Trustees' actions, are summarized in the Introductory Section and Actuarial Section of the CAFR.

Actuarial Valuations and Measurement of Net Pension Liability

The positive investment returns over the past two fiscal years, combined with the first year of scheduled contribution rate increases (of a four-year phase in period), have continued to improve the financial outlook for ERS. The investment portfolio based on the market value of assets earned 7.9% in FY 2018 following 13.7% earned during FY 2017. This compares to rate of return for the actuarial value was 7.2% in FY 2018, which is different than the market return due to the smoothing methodology used in the determination of the actuarial value of assets.

The total pension liability for fiscal year ended June 30, 2018 is based on the actuarial valuation performed as of June 30, 2018 and a measurement date of June 30, 2018.

Per the valuation as of June 30, 2018, the ERS' total pension liability was $29.9 billion, covered payroll totaled $4.3 billion, and the ERS' fiduciary net position was $16.6 billion resulting in a net pension liability of $13.3 billion. The June 30, 2017 valuation results include the ERS' total pension liability of

$28.6 billion, covered payroll at $4.2 billion, and the ERS' fiduciary net position of $15.7 billion resulting in a net pension liability of $13.0 billion. The ERS' fiduciary net position as a percentage of total pension liability was 55.5% and 54.8% on June 30, 2018 and 2017, resulting in the net pension liability as a percentage of covered payrolls of 312.9% and 305.2%, respectively. The increase in pension liabilities is overall payroll growth and individual salary increases.

Based on the results of the actuarial valuation as of June 30, 2018, including existing statutory employer contribution rates, the ERS actuary determined the funding period for paying off the unfunded actuarial accrued liability (UAAL) of the ERS Pension Trust is 25 years. Because this period is less than the 30 years, the objectives set in Hawaii Revised Statutes (HRS) are currently being realized. (HRS§88-122(e)(1) state that the employer contribution rates are subject to adjustment when the funding period is in excess of 30 years.)

Increase in Statutory Employer Contribution Rates – Future State and counties employer contributions are expected to increase pursuant to a phased-in contribution rate increase over four years beginning July 1, 2017. Per Act 17 (SLH 2017), the rate for Police and Fire employees increases to 28.00% on July 1, 2017; 31.00% on July 1, 2018; 36.00% on July 1, 2019; and 41.00% on July 1, 2020 and the rate for All Other Employees increases to 18.00% on July 1, 2017; 19.00% on July 1, 2018; 22.00% on July 1, 2019; and 24.00% on July 1, 2020. These employer contribution rates are applied to the total covered payroll in each respective category to determine the required employer contributions.

Requests for Information

This financial report is designed to provide a general overview of the Employees' Retirement System of the State of Hawaii's finances. For questions concerning any information in this report or for additional information, contact the Employees' Retirement System of the State of Hawaii, 201 Merchant Street, Suite 1400, Honolulu, Hawaii 96813.

Financial Statements

Combining Statement of Fiduciary Net Position

June 30, 2018

Assets		
Cash and cash equivalents and short-term investments		
Cash and cash equivalents	$	685,522,717
Short-term investments		2,011,722,629
		2,697,245,346
Receivables		
Accounts receivable and others		4,660,591
Investment sales proceeds		106,100,490
Accrued investment income		54,932,158
Employer and member contributions		48,713,407
		214,406,646
Investments, at fair value		
Equity securities		7,300,826,045
Fixed income securities		4,096,606,113
Real estate investments		1,060,893,051
Alternative investments		1,512,559,223
		13,970,884,432
Other		
Invested securities lending collateral		1,097,510,629
Equipment, at cost, net of depreciation		5,510,268
		1,103,020,897
Total assets		17,985,557,321
Liabilities		
Accounts and other payables		42,903,869
Payable for securities purchased		135,189,850
Securities lending collateral		1,097,510,629
Notes payable		111,545,000
Total liabilities		1,387,149,348
Commitments and contingencies		
Fiduciary net position restricted for pensions	$	16,598,407,973

See accompanying notes to financial statements

Financial Statements (continued)

Statement of Changes in Fiduciary Net Position

Year ended June 30, 2018

Additions		
Contributions		
Employers contributions	$	847,595,466
Members contributions		259,427,934
Total contributions		1,107,023,400
Investment income		
From investing activities:		
Net appreciation in fair value of investments		839,411,536
Interest on fixed income securities		126,273,874
Dividends on equity securities		141,739,327
Income on real estate investments		69,184,795
Interest on short-term investments		3,632,904
Alternative investment income		130,585,673
Miscellaneous		1,709,425
		1,312,537,534
Less investment expenses		92,837,672
Net investment income from investing activities		1,219,699,862
From securities lending activities:		
Securities lending income		19,662,948
Less: securities lending expenses, net		13,790,211
Net investment income from securities lending		5,872,737
Total net investment income		1,225,572,599
Total additions, net		2,332,595,999
Deductions		
Benefit payments		1,395,881,342
Refunds of member contributions		20,846,500
Administrative expenses		15,784,490
Total deductions		1,432,512,332
Net increase in fiduciary net position		900,083,667
Fiduciary net position restricted for pensions		
Beginning of year		15,698,324,306
End of year	$	16,598,407,973

See accompanying notes to financial statements.

June 30, 2018

Note A – Description of the ERS

1. General

The Employees' Retirement System of the State of Hawaii (the ERS) began operations on January 1, 1926, having been established by the Territorial Legislature in the preceding year. The provisions of the ERS are contained in Chapter 88 of the Hawaii Revised Statutes (HRS) and applicable provisions of the federal Internal Revenue Code. The ERS is a cost-sharing, multiple-employer public employee retirement system established as a defined benefit pension plan to administer a pension benefits program for all State and county employees, including teachers, professors, police officers, firefighters, correction officers, judges, and elected officials.

The ERS is a qualified defined-benefit pension plan under Section 401(a) of the Internal Revenue Code. Since January 1, 1988, member contributions have been tax deferred under Section 414(h)(2) of the Internal Revenue Code, and Chapter 88 mandates that employers pick up the employee contributions. These contributions are classified as member contributions in the financial statements. As a public entity, the ERS is not required to file a federal income tax return with the Internal Revenue Service. As a defined-benefit pension plan, the ERS is required to withhold federal income tax from member and benefit recipient payments in accordance with the Internal Revenue Code.

The ERS Pension Trust is comprised of three pension classes for membership purposes and considered to be a single plan for accounting purposes because all assets of the ERS may legally be used to pay the benefits of any of the ERS members or beneficiaries, as defined by the terms of the ERS. The ERS provides retirement, survivor, and disability benefits for three membership classes known as the contributory, hybrid, and noncontributory members.

Generally, all full-time employees of State and counties of Hawaii are required to be members of the ERS. Some positions of the State and counties of Hawaii are not eligible for ERS membership and may be covered by another separate retirement program. Membership of the plan and the benefits provided are based on the individual's employment group and ERS membership date. A member may belong to only one class based on their latest employment. A member may change classes in certain situations due to a change in their employment date or job classification. If a member earns service in different classes or benefit structures, the member's retirement benefit is bifurcated based on the applicable membership service earned (such as service credits and benefit multiplier percentage of such service).

The two major employment groups applicable to employer and member contribution rates, vesting requirements, and benefit provisions are (a) Police and Firefighters and (b) All Other Employees. There are four major benefit structures for contributory class members based on employment group and membership date while there are two benefit structures for hybrid class members based on their membership date as discussed below. The noncontributory class has one benefit structure.

Note A – Description of the ERS (continued)

1. General (continued)

Employer, pensioner, and employee membership data as of March 31, 2018 are as follows:

Employers:	
State	1
County	4
Total employers	5
Pensioners and beneficiaries currently receiving benefits:	
Pensioners currently receiving benefits:	
Police and firefighters	3,758
All other employees	40,547
Total pensioners	44,305
Beneficiaries currently receiving benefits:	
Police and firefighters	312
All other employees	3,952
Total beneficiaries	4,264
Total pensioners and beneficiaries	48,569
Terminated vested members entitled to benefits but not yet receiving benefits:	
Police and firefighters	382
All other employees	8,867
Total terminated vested members	9,249
Inactive members	
Police and firefighters	666
All other employees	17,153
Total inactive members	17,819
Total terminated vested and inactive members	27,068
Active members:	
Vested:	
Police and firefighters	4,092
All other employees	43,770
Total vested members	47,862
Nonvested:	
Police and firefighters	798
All other employees	17,611
Total nonvested members	18,409
Total active members	66,271
Total membership	141,908

Note A – Description of the ERS (continued)

2. The Financial Reporting Entity

As required by U.S. generally accepted accounting principles, these financial statements present the ERS (the primary government) as a separate reporting entity from the State of Hawaii (the State). The ERS is not part of the State's financial reporting entity because it is a separate legal entity that is fiscally independent of the State. The ERS was established by Chapter 88 of the HRS and is governed by a Board of Trustees (the Board) as discussed below.

The Board administers the ERS on behalf of public employees of both the State and county governments. Except for limited administrative functions, the State does not have the power to supervise or control the Board in the exercise of its functions, duties, and powers. The Board consists of eight members. The State Director of Finance is a statutory member of the Board. Four members of the Board are elected by members and retirants of the ERS and the other three members of the Board are appointed by the Governor. Decisions are made with the concurring vote of five members of the Board. The Board appoints the Executive Director and Chief Investment Officer and engages actuarial and other services required to transact the business of the ERS.

3. Class Descriptions and Funding Policy

Members of the ERS are contributory, hybrid, or noncontributory members. All assets of the ERS (in the Pension Trust) may be used to pay benefits to any member of the ERS. Contribution rates are determined by state law as a percentage-of-payroll.

The statutory employer contribution rate includes the normal cost and accrued liability contribution and is determined separately for two groups of employees: (a) police officers and firefighters and (b) all other employees. Employer contribution rates are subject to adjustment in certain situations based on the plan's funded status or actuarial investigations. The ERS performs an actuarial investigation of the experience at least once every five years, plus an annual actuarial valuation of the assets and liabilities of the funds of the pension trust. The Board of Trustees adopts mortality, service, and other assumptions, factors, and tables as deemed appropriate and necessary, based on the actuarial investigation and actuary recommendation. Generally, actuarial assumptions and methods were adopted by Board of Trustees on December 12, 2016 as recommended by Gabriel, Roeder, Smith and Company (GRS) (from the 2015 Experience Study for the five-year period from June 30, 2010 through June 30, 2015) while the investment return assumption was adopted beginning with the 2016 valuation. See the Actuarial Section for all actuarial assumptions used.

Note A – Description of the ERS (continued)

3. Class Descriptions and Funding Policy (continued)

Effective July 1, 2008, the statutory employer contribution rate for employees in the Police and Fire category increased from 15.75% to 19.70%, and the rate for employees in the All Other category increased from 13.75% to 15.00%. Per legislation passed in 2011, the rate for Police and Fire employees increased to 22.00% on July 1, 2012; 23.00% on July 1, 2013; 24.00% on July 1, 2014; and 25.00% on July 1, 2015 and the rate for All Other Employees increased to 15.50% effective July 1, 2012; 16.00% effective July 1 2013; 16.50% effective July 1, 2014; and 17.00% effective July 1, 2015. These employer contribution rates are applied to the total covered payroll in each respective category to determine the required employer contributions. Administration of the Pension Trust is financed through contributions from the employers and employees (if applicable) and investment earnings.

Per Act 17 (SLH 2017), employer contribution rates from State and counties are expected to increase pursuant to a phased-in contribution rate increase over four years beginning July 1, 2017. The rate for Police and Fire employees increases to 28.00% on July 1, 2017; 31.00% on July 1, 2018; 36.00% on July 1, 2019; and 41.00% on July 1, 2020 and the rate for All Other Employees increases to 18.00% on July 1, 2017; 19.00% on July 1, 2018; 22.00% on July 1, 2019; and 24.00% on July 1, 2020.

Note A – Description of the ERS (continued)

3. Class Descriptions and Funding Policy (continued)

Effective July 1, 2012, employers may be required to make additional employer contributions to the ERS in certain situations. This legislation requires employers to pay additional contributions if a retiring employee, who was first employed prior to July 1, 2012 and who was last employed by the employer, has significant non-base pay increases included in their average final compensation. The additional contribution is equal to the actuarial present value of the additional benefits earned due to the "excessive" non-base pay increases.

Until June 30, 1984, all employees were required to be contributory members. Employees covered by Social Security on June 30, 1984 were given the option of changing to a noncontributory member or remain a contributory member. All new employees hired after June 30, 1984 and before July 1, 2006, who are covered by Social Security, were generally required to be noncontributory members. Qualified employees that were contributory or noncontributory members were given the option to change to Hybrid Class benefits structure effective July 1, 2006, or remain in their existing class. Starting July 1, 2006, all new employees covered by Social Security are required to be Hybrid Members, unless they are required to be Contributory members. Most employees not covered by Social Security (primarily Police and Fire employees) are required to be Contributory members.

The three membership classes provide a monthly retirement allowance (maximum allowance) equal to the benefit multiplier % (generally 1.25% or 2%), multiplied by the average final compensation (AFC), multiplied by years of credited service. The benefit multiplier decreased by 0.25% for new hybrid and contributory members hired after June 30, 2012. If a member earns service in a different benefit structure, the member's retirement benefit is bifurcated based on the applicable membership service earned (such as service credits and benefit multiplier percentage of such service). In lieu of the maximum allowance, the member may elect to receive an actuarially equivalent alternate retirement option with a reduced lifetime allowance (such as survivor benefit).

The AFC is the average salary earned during the five highest paid years of service, including the payment of salary in lieu of vacation, or three highest paid years of service, excluding the payment of salary in lieu of vacation, if the employee became a member prior to January 1, 1971. The AFC for members hired on or after this date, and before July 1, 2012, is based on the three highest paid years of service excluding the payment of salary in lieu of vacation. For new members hired after June 30, 2012, the AFC is based on the five highest paid years of service excluding the payment of salary in lieu of vacation.

For postretirement increases, every retiree's original retirement allowance is increased by 2.5% on each July 1 following the calendar year of retirement, if the retiree became an ERS member prior to July 1, 2012. This cumulative benefit is not compounded and increases each year by 2.5% of the original retirement allowance without a ceiling (2.5% of the original retirement allowance the first year, 5.0% the second year, 7.5% the third year, etc.). For new members hired after June 30, 2012, the postretirement annuity increase was decreased to 1.5% per year of the original retirement allowance without a ceiling (1.5% of the original retirement allowance the first year, 3.0% the second year, 4.5% the third year, etc.).

Note A – Description of the ERS (continued)

3. Class Descriptions and Funding Policy (continued)

The following summarizes the provisions relevant to the largest employee groups of the respective membership class. Retirement benefits for certain groups, such as sewer workers, judges, and elected officials, vary from general employees.

All contributions, benefits, and eligibility requirements are governed by Chapter 88 of the Hawaii Revised Statutes. For a more detailed summary of benefits for employees and a description of special provisions to groups of employees, refer to the Summary of Retirement Benefit Plan Provisions contained in the *Introductory Section* of this report. All of the statutory member contributions discussed in this section are classified as “member contributions” with the adoption of GASB Statement No. 82, Pension Issues – an amendment of GASB Statements No. 67, No. 68, and No. 73.

Contributory

Police officers, firefighters, and certain other members that are not covered by Social Security first hired prior to July 1, 2012 contribute 12.2% of their salary and receive a retirement benefit using the benefit multiplier of 2.5% for qualified service, up to a maximum of 80% of AFC. These members may retire at age 55 with 5 years of credited service or at any age with 25 years of credited service, provided the last 5 years of credited service is any of the qualified occupations.

Police officers, firefighters and certain other members that are not covered by Social Security first hired after June 30, 2012 contribute 14.2% of their salary and receive a retirement benefit using the benefit multiplier of 2.25% for qualified service, up to a maximum of 80% of AFC. These members may retire at age 60 with 10 years of credited service or at age 55 with 25 years of credited service, provided the last 5 years of credited service is any of the qualified occupations.

All other employees hired prior to July 1, 2012 are required to contribute 7.8% of their salary and are fully vested for benefits upon receiving 5 years of credited service. Contributory members may retire with full benefits at age 55 and 5 years of credited service. They may take early retirement at any age with at least 25 years of credited service and receive benefits reduced 5% per year under age 55 plus 4% per year under age 50. The benefit multiplier is 2% for employees covered by Social Security.

All other employees in the contributory class hired after June 30, 2012 are required to contribute 9.8% of their salary and are fully vested for benefits upon receiving 10 years of credited service. These members may retire with full benefits at age 60 and 10 years of credited service. Members may take early retirement at age 55 with 25 years of credited service and receive benefits reduced by 5% per year under age 60. The benefit multiplier is 1.75% for employees covered by Social Security.

Note A – Description of the ERS (continued)

3. Class Descriptions and Funding Policy (continued)

Hybrid

All other employees hired before July 1, 2012 are required to contribute 6% of their salary and are fully vested for benefits upon receiving 5 years of credited service. Employees may retire with full benefits at age 62 and 5 years of credited service or at age 55 and 30 years of credited service. Early retirement benefits are available at age 55 and 20 years of credited service with benefits reduced by 5% per year under age 62. The benefit multiplier used to calculate retirement benefits is 2%. Hybrid members are covered by Social Security.

All other employees hired after June 30, 2012 are required to contribute 8% of their salary and are fully vested for benefits upon receiving 10 years of credited service. Employees may retire with full benefits at age 65 and 10 years of credited service or at age 60 and 30 years of credited service. Early retirement is available at age 55 and 20 years of credited service with benefits reduced 5% per year under age 65. The benefit multiplier used to calculate retirement benefits is 1.75%. Hybrid members are covered by Social Security.

Noncontributory

All other employees are fully vested upon receiving 10 years of credited service. The employer is required to make all contributions for these members. Employees may retire with full benefits at age 62 years and 10 years of credited service or age 55 and 30 years of credited services. Early retirement is available at age 55 years and 20 years of credited service with benefits reduced by 6% per year under age 62. The benefit multiplier used to calculate retirement benefits is 1.25%.

Ordinary disability retirement benefits require a minimum of 10 years of service, whereas service-connected disability resulting from a job-related accident does not have any service requirement. There is no age requirement to qualify for disability benefits.

Ordinary death benefits for contributory and noncontributory members require at least one year and ten years of service, respectively. Ordinary death benefits for hybrid members require five years of service if hired prior to July 1, 2012 or ten years of service if hired after June 30, 2012. There is no service requirement to qualify for service-connected death benefits.

4. The ERS as Employer

As an employer, the ERS participates in its pension benefits program, through the State. The ERS provides benefits for all of its full-time employees as contributory, hybrid, or noncontributory membership. Contributions are calculated as part of the State's total contribution requirements and are reimbursed to the State's General Fund as part of the fringe benefit rate on the ERS' employees' actual salaries.

Note A – Description of the ERS (continued)

5. **Other Post Employment Benefits (OPEB)**

In addition to the retirement benefits provided by the ERS Pension Trust, the participating employers, pursuant to HRS Chapter 87A, provide certain healthcare and life insurance benefits for State and county qualified employees and retirees. The Hawaii Employer-Union Health Benefits Trust Fund (EUTF) was established on July 1, 2003 to design, provide, and administer health benefits plans and a group life insurance benefits program for State and county employees and retirees.

Under Section 87A-33 of the HRS, the participating employers pay the EUTF a base monthly contribution for the health benefits plans of certain retired employees, including those who were hired before July 1, 1996 and retired after June 30, 1984, with ten or more years of credited service.

Under Section 87A-34 of the HRS, the participating employers pay the EUTF one-half of the base monthly contribution for the health benefits plans of retired employees who were hired before June 30, 1996, and retired after June 30, 1984, with fewer than ten years of credited service.

Under Sections 87A-35 and 87A-33(a)(6) of the HRS, the participating employers pay the EUTF for the health benefits plans of retired employees who were hired after June 30, 1996 but before July 1, 2001: (a) one-half of the base monthly contribution if the employee retired with between ten and fifteen years of credited service; (b) seventy-five percent of the base monthly contribution if the employee retired with between fifteen and twenty-five years of credited service; and (c) one hundred percent of the base monthly contribution if the employee retired with twenty-five or more years of credited service.

Under HRS § 87 A-36, the participating employers pay the EUTF for the health benefits plans of retired employees who were hired after June 30, 2001: (a) one-half of the base monthly contribution for a self-only plan if the employee retired with between ten and fifteen years of credited service; (b) seventy-five percent of the base monthly contribution for a self-only plan if the employee retired with between fifteen and twenty-five years of credited service; and (c) one hundred percent of the base monthly contribution for a self-only plan if the employee retired with twenty-five or more years of credited service.

Under Section 87A-37 of the HRS, the participating employers pay the EUTF a base monthly contribution (currently $4.16) for each retired employee enrolled in the EUTF group life insurance plan.

The net assets of the EUTF are not included in the ERS plan net assets. The EUTF issues a financial report that includes financial statements and required supplementary information.

Note B – Social Security Contribution Fund

The Social Security Contribution Fund (Contribution Fund) was established under Section 88-224 of the HRS for the following purposes:

1. To receive all federal Social Security employers' contributions from the State and interest and penalties on unpaid amounts;

2. To receive any appropriations to the Contribution Fund;

3. To pay amounts required to be paid to the Internal Revenue Service (IRS); and

4. To invest and collect income on resources held by the Contribution Fund.

All other non-State governmental agencies remit Social Security contributions directly to the IRS. Social Security contributions withheld from employees are remitted directly to the IRS by the employers. The Contribution Fund is considered an agency fund for financial reporting purpose. At June 30, 2018, the ERS held no amounts in the Contribution Fund as all amounts deposited into the Contribution Fund were paid directly to the IRS.

Note C – Summary of Significant Accounting Policies

A summary of the significant accounting policies consistently applied in the preparation of the accompanying financial statements follows:

1. Basis of Accounting

Fiduciary funds are used to account for assets held by the ERS in a trustee capacity or as an agent for individuals, private organizations, other governments, and/or other funds. The fiduciary fund types used by the ERS are a Pension Trust Fund and the Social Security Fund as an agency fund. Each of the fiduciary funds is considered a separate fiscal and accounting entity with a self-balancing set of accounts that comprise its assets, liabilities, equity, revenues and expenditures, or expenses, as appropriate. The accounting and reporting treatment applied to a fund is determined by its measurement focus. The Pension Trust Fund is accounted for on a flow of economic resources measurement focus. As an agency fund, the Contribution Fund is custodial in nature and does not measure results of operations.

The financial statements are prepared in conformity with U.S. generally accepted accounting principles (GAAP) using the accrual basis of accounting. Administrative expenses are financed exclusively with investment income.

Note C – Summary of Accounting Policies (continued)

2. Method Used to Value Cash and Investments

The ERS' investment policy for cash and investments, including the legal authority, are discussed below in Note F. Notes C and F below include a comprehensive discussion on fair value including the disclosure requirements of fair value required by GASB Statement No. 72.

Cash, investments and notes payable in the Pension Trust are reported at fair value. The definition of fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Unrealized gains and losses are included as investment income in the statement of changes in fiduciary net position. The investments of the Pension Trust Fund and Contribution Fund (the Retirement Funds) are valued on a monthly basis.

3. Revenue Recognition

Interest and dividend income is recognized when earned. Capital gains and losses are recognized on a trade-date basis. Purchases and sales of investments are also recorded on a trade-date basis.

Employers and members contributions are recognized in the period in which the contributions are legally due.

4. Payment of Benefits

Benefits and refunds are recognized when due and payable in accordance with the terms of the plan.

5. Securities Lending

The ERS records collateral received under securities lending agreements where the ERS has the ability to spend, pledge, or sell the collateral without borrower default. Liabilities resulting from these transactions are also recorded. Additionally, costs associated with securities transactions, broker commissions paid, and lending agent management fees are reported as investment expenses in the accompanying financial statements. The statement of fiduciary net position does not include detailed holdings of securities lending collateral by investment classification.

Note C – Summary of Accounting Policies (continued)

6. Interest and Earnings Allocation

Pursuant to Sections 88-21 and 88-107 of the HRS, the Board shall annually allocate interest and other earnings of the Pension Trust Fund to the funds of the Pension Trust Fund, as follows:

a. Annuity Savings Reserve – Fixed at 4-1/2% regular interest rate for employees hired before July 1, 2011 and 2% regular interest rate for employees hired after June 30, 2011.

b. Expense Reserve – To be credited with all money to pay the administrative expenses of the ERS.

c. Pension Accumulation Reserve – To be credited with any remaining investment earnings.

7. Risk Management

The ERS reports liabilities, as discussed in note H, related to certain types of losses (including torts, theft of, damage to, or destruction of assets, errors or omissions, natural disasters, and injuries to employees) when it is probable that the losses have occurred and the amount of those losses can be reasonably estimated.

8. Use of Estimates

In preparing financial statements in conformity with accounting principles generally accepted in the United States, management is required to make estimates and assumptions that affect certain reported amounts and disclosures. Actual results could differ from those estimates.

Investments in limited partnerships and other alternative investments are illiquid and the underlying assets are generally not publicly traded companies. Because of the inherent uncertainty in valuing privately held securities, the fair value may differ from the values that would have been used had a ready market for such securities existed, and the difference can be material. Accordingly, the realized value received upon the sale of the asset may differ from the recorded fair value.

The total pension liability is based on calculations that incorporate various actuarial and other assumptions, including discount rate, mortality, investment rate of return, inflation and payroll growth. The actuarial assumptions were based on the results of an experience study for the period from July 1, 2010 through June 30, 2015.

9. Recently Issued Accounting Policies

In January 2017, GASB issued Statement No. 84, Fiduciary Activities. Statement No. 84 establishes criteria for identifying fiduciary activities and guidance on reporting those activities. This Statement provides guidance on four fiduciary funds that should be reported, if applicable: pension (and other employee benefit) trust funds, investment trust funds, private-purpose trust funds, and custodial funds. GASB Statement No. 84 will be effective for periods beginning after December 15, 2018. ERS has not yet determined the impact of this standard on its financial statements and disclosures.

Note D – Description of Reserves

Section 88-109 of the HRS requires the establishment and maintenance of specific reserves within the ERS. The reserves in the Pension Trust Fund and their purposes are described hereunder:

1. **Pension Accumulation Reserves**

   To accumulate contributions made by the State and counties (except member contributions "picked up" as employer contributions under pursuant to IRC Section 414(h)(2)), transfers of retired members' contributions plus related interest income from the Annuity Savings Reserve and income from investments. All pension benefits, including the pensioners' bonus, are paid through this reserve.

2. **Annuity Savings Reserves**

   To accumulate members' contributions (including member contributions "picked up" as employer contributions under pursuant to IRC Section 414(h)(2)) and related interest income. Upon a member's retirement, the accumulated contributions and related interest income are transferred to the Pension Accumulation Reserve or refunded to the member upon termination.

3. **Expense Reserves**

   To pay all the expenses necessary in connection with the administration and operation of the ERS, the Board estimates the amount of money necessary to be paid into the expense reserve for the ensuing biennium to provide for the expense of operation of the ERS, and pays that amount into the expense account from the investment earnings of the ERS, subject to review by the legislature and approval by the Governor.

Fiduciary net position restricted for pensions as of June 30, 2018 are as follows:

		2018
Pension Accumulation Reserve	$	13,796,540,427
Annuity Savings Reserve		2,785,429,388
Expense Reserve		16,438,158
Total fiduciary net position restricted for pensions	$	16,598,407,973

Note E – Contributions

The ERS' funding policy provides for periodic employer contributions expressed as a percentage of annual covered payrolls. The funding method used to calculate the total employer contribution required is the entry age normal actuarial cost method. Employer contributions are governed by Chapter 88 of the HRS. The actuarially determined contribution rates may differ from the statutory contribution rates.

Employer rates are set by statute based on the recommendation of the ERS actuary resulting from an experience study conducted every five years. Since July 1, 2005, employer contribution rates are a fixed percentage of compensation, including the normal cost plus amounts required to pay for the unfunded actuarial accrued liability. See note A.3 Class Descriptions and Funding Policy for the effective statutory employer contribution rates.

The employer normal cost is the level percentage of payroll contribution required to pay all benefits. Actuarial gains and losses resulting from differences between actual and assumed experience are reflected in the employer unfunded accrued liability.

Effective July 1, 2012, the last employer is required to make "additional contributions" to the ERS for employees that first became ERS members before July 1, 2012 and retire after June 30, 2012, if the member has "excessive" non-base pay during the last 10 years of employment. The additional contributions are based on the increased costs of the actuarial equivalent increase in pension benefits the member will be paid in retirement compared to the pension benefits that would be paid if the member did not have excess non-base pay in their Average Final Compensation amount.

Member contributions rates are statutorily established in accordance with Chapter 88 of the HRS, and are discussed in note A.3, Class Descriptions and Funding Policy above. Since 1989, participating employers "pick up" ERS member contributions made by payroll deduction as "employer contributions" for tax purposes under IRC section 414(h)(2). These contributions are classified as member contributions being paid by the member for ERS purposes.

Note F – Deposit and Investment Disclosures

1. **Investment Policy**

Investments are governed pursuant to Sections 88-119 and 88-119.5 of the HRS. The Pension Trust Fund may invest in real estate loans and mortgages; preferred and common stocks; government obligations; corporate obligations; certain other debt obligations (such as obligations secured by collateral of certain other authorized securities listed here, obligations issued or guaranteed by certain development banks, and insurance company obligations); real property; alternative investments; and other securities and futures contracts. Investments in the Securities Lending Collateral Pool and the Contribution Fund are limited to investment grade, short-term marketable securities.

The investment decision is further dictated by internal investment policies and asset allocation established by the Board. As a long-term investor, the ERS has established through its investment policy that preservation of capital is the primary goal of the ERS. Preservation of capital is to be attained with a consistent, positive return for the fund by diversifying the investment portfolio. The ERS recognizes risk associated for individual securities or asset classes may be reduced through diversification. Investments will be prudent and consistent with the best investment practices, in accordance with the Board's asset allocation strategy, assigned investment mandate, and in compliance with Chapter 88, HRS, as amended.

Use of leverage is restricted to certain asset classes in order to enhance yields of approved investments and/or to facilitate diversification of the portfolio. The use of debt must result in positive leverage where cash flow is in excess of debt service. Plan assets are managed on a total return with the long-term objective of achieving and maintaining a fully funded status basis (when combined with receiving the required employer and member contribution requirements) for the benefits provided through the Pension Trust. As part of the investment policy, the Board reviews the asset allocation annually and should perform a formal asset allocation study at least every three years to verify or amend the targets.

The ERS will strategically invest in the following strategic asset classes:

Strategic Allocation (risk-based classes)	Strategic Class Weights	Expected Long-term Geometric Average Return	Expected Long-term Real Return[1]	Expected Annual Standard Deviation
Broad Growth	63%	7.10%	4.85%	17.35%
Principal Protection	7%	2.50%	0.25%	3.50%
Real Return	10%	4.10%	1.85%	6.10%
Crisis Risk Offset	20%	4.60%	2.35%	9.45%
Total Portfolio	**100%**			

[1] Uses an expected inflation of 2.25%

The Broad Growth strategic asset class includes sub-asset classes or components of Active Public Equity, Passive Public Equity, Core Real Estate, Extended Global Credit, Low Volatility Equity, Options-based Equity, Non-Core Real Estate, and Private Equity. The Principal Protection asset class includes the Global Intermediate Fixed Income. The Real Return asset class includes components of Inflation-linked Fixed Income, Infrastructure, and Timber. The Crisis Risk Offset sub-asset classes are Alternative Return Capture Strategies, Trend Following Strategies, and Long Duration Fixed Income. The ERS may also hold Opportunities and Other Investments.

Note F – Deposit and Investment Disclosures (continued)

1. Investment Policy (continued)

It is expected that the ERS's implementation of the new long-term strategic allocation approved in FY 2016 will be completed by the end of the 2020 fiscal year as follows.

Implementation Plan for Long-term Strategic Policy				
	Current (6/30/2018)	1/1/2019	1/1/2020	Long-Term 7/1/2020
Broad Growth	72%	68%	64%	**63%**
Principal Protection	8%	8%	7%	**7%**
Real Return	7%	8%	9%	**10%**
Crisis Risk Offset	13%	16%	20%	**20%**
Opportunities	0%	0%	0%	**0%**
Total Portfolio	100%	100%	100%	**100%**

Rate of Return

For the year ended June 30, 2018, the annual money-weighted return on pension plan investments, net of pension plan investment expense, was 7.8%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for changing amounts actually invested.

2. Deposits

Cash includes amounts in demand deposits for operations and invested funds held by ERS investment managers. The deposits are held in several financial institutions, including the custodian bank for processing investment transactions. Per State statute, deposits, held by banks located in the State, in excess of Federal Deposit Insurance Corporation (FDIC) coverage are guaranteed by securities pledged as collateral by the bank with the State Director of Finance. Uninsured and uncollateralized amounts are primarily cash held by the investment custodian for settlement of investment transactions. Deposits are presented in the basic financial statements at cost, which represent market or fair value.

Custodial Credit Risk for Deposits is the risk that in the event of a bank failure, the ERS' deposits may not be returned to them. The ERS has not adopted a formal policy specific to custodial credit risk. The ERS' policy is to deposit cash in excess of operating requirements in income producing investments to maximize investment income.

At June 30, 2018, the carrying amount of deposits totaled approximately $685,522,717 and the corresponding bank balance was $694,830,256, all of which was exposed to custodial credit risk

Note F – Deposit and Investment Disclosures (continued)

3. Investments and fair value

The following table shows the investments of the ERS by investment type as of June 30, 2018.

Investments at fair value		
Cash and short-term instruments		
Cash and cash equivalents	$	685,522,717
Short-term bills and notes		1,463,079,223
Pooled and others		526,317,910
Fixed income securities		
U.S. Treasury bonds and notes		2,230,691,559
U.S. government agencies bonds		15,732,705
U.S. government agency mortgage backed		304,989,486
U.S. government-sponsored agency mortgage backed		10,580,681
Commercial mortgage backed securities		8,082,920
U.S. corporate bonds		532,110,430
Non-U.S. government / agency bonds		719,807,410
Non-U.S. corporate bonds		228,359,350
Pooled and Others		6,917,366
Derivatives		
Forwards - Cash and short-term instruments		22,306,396
Forwards - Debt securities		6,798,745
Futures - Debt securities		33,863,139
Options - Cash and short-term instruments		19,100
Options - Equities		(44,037,501)
Options - Debt securities		1,209,168
Swaps - Equity securities		(702,395)
Swaps - Debt securities		(2,536,846)
Equities		7,345,565,941
Real estate		1,060,893,051
Alternative investments		1,512,559,223
Total investments	$	16,668,129,778
Short-term instruments for securities lending collateral pool	$	1,097,510,629

Note F – Deposit and Investment Disclosures (continued)

3. Investments and fair value (continued)

Investments are measured at fair value. The ERS categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. Fair value is a market-based measurement of the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. A fair value measurement assumes that a transaction to sell an asset or transfer a liability takes place in either the principal market or most advantageous market (after taking into account transaction costs and transportation costs).

The fair value hierarchy categorizes the inputs to valuation techniques used to measure fair value into three levels. The hierarchy is based on the valuation inputs used to measure the fair value of the asset and give the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (level 1 measurements) and the lowest priority to unobservable inputs (level 3 measurements).

- Level 1—Unadjusted quoted prices for identical instruments in active markets.
- Level 2—Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations in which all significant inputs are observable.
- Level 3—Valuations derived from valuation techniques in which significant inputs are unobservable.

If the fair value of an asset or a liability is measured using inputs from more than one level of the fair value hierarchy, the measurement is considered to be based on the lowest priority level input that is significant to the entire measurement. The categorization of investments within the hierarchy is based upon the pricing transparency of the instrument and should not be perceived as the particular investment's risk.

Fair value hierarchy levels
Equity securities classified in level 1 of the fair value hierarchy are valued using prices quoted in active markets for those securities based on published market prices, quotations from national security exchanges, and security pricing services as of each month-end closing of the New York Stock Exchange. Fixed income securities classified as Level 1 include U.S. Treasuries. Fixed income pooled funds classified in Level 1 of the hierarchal framework are mutual funds with instruments which trade on a national exchange and the fund's NAV is the basis for the fund's transactions. Derivative securities classified in Level 1 include certain options and futures are valued using prices quoted in active markets for those securities.

Short-term, fixed income securities, and invested securities lending collateral classified in level 2 have non-proprietary information that was readily available to market participants from multiple independent sources, which are known to be actively involved in the market. Pricing inputs may include market quotations, yields, maturities, call features and ratings. Derivative securities classified in level 2 are securities whose values are derived daily from associated traded securities.

Note F – Deposit and Investment Disclosures (continued)

3. Investments and fair value (continued)

Fixed income securities classified in level 3 are mortgaged backed term loans and bonds where input data is sourced from instruments whose values are estimated, out of necessity, using unobservable inputs due to lack of comparable securities in the market place or are valued using discounted cash flows.

Real Estate and Alternative Investments Limited Partnerships and Limited Liability Companies classified as level 3 are considered to be directly held: The ERS has a controlling interest in certain real estate and alternative investment partnerships and limited liability companies. These investment companies provide quarterly valuations based on the most recent capital account balance to ERS management and are audited annually. Individual properties are valued internally by the investment companies at least annually, in accordance with standard industry practice, and are adjusted as frequently as quarterly if material market or operational changes have occurred. Properties are generally valued every one to three years by external third-party appraiser(s). Alternative investments are valued using their respective NAV, and are generally audited annually. The most significant element of NAV is the fair value of the investment holdings. These holdings are valued by the general partners in conjunction with management, investment advisors, and valuation specialists. The valuation techniques vary based on investment type and involve a certain degree of expert judgment. The fair value for these investments could differ significantly if a readily accessible market values for these assets existed. Annual audits of most partnerships and limited liability companies include a review of compliance with the investment company's valuation policies.

Notes Payable: Notes payable are shown at estimated fair values. Notes payable, classified as level 3, consists of mortgage notes within the limited liability companies and limited partnerships of real estate (direct investment) that are secured by real estate of the respective company.

Investments measured at the net asset value (NAV)
Short-Term Investment Funds and Pooled Equity (not publicly traded) are reported on their respective net asset value (NAV). Fair value are based on the ERS' pro rata ownership percentage of the fund reported by the fund manager based on the fair value of the underlying assets that is determined by published market prices, or quotations from national security exchanges. Annual audits the pooled funds include a review of compliance with the investment company's valuation policies.

Real estate and alternative investments measured at their respective NAV and are generally audited annually. The most significant element of NAV is the fair value of the investment holdings. These holdings are valued by the general partners using valuation assumptions based on both market and property specific inputs, which are not observable and involve a certain degree of expert judgment. The valuation techniques vary based on investment type and involve a certain degree of expert judgment. The fair value for these investments could differ significantly if a readily accessible market values for these assets existed.

Investments measured at NAV are not required to be categorized in the fair value hierarchy levels.

Note F – Deposit and Investment Disclosures (continued)

3. Investments and fair value (continued)

The following table shows the fair value hierarchy by investment type as of June 30, 2018.

Investments, Derivative Instruments and Invested Securities Lending Collateral Measured at Fair Value

		Fair Value Measurement Using		
	Total	Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investments by Fair Value Level 6/30/2018				
Short-term investments		-		
Short-term bills and notes	$ 1,463,079,223	$ 1,461,214,399	$ 1,864,824	$ -
Equity securities				
Common stocks	5,525,796,022	5,524,832,177	-	963,845
Preferred shares and other	306,596,374	301,520,221	5,062,050	14,103
Total equity securities	5,832,392,396	5,826,352,398	5,062,050	977,948
Fixed income securities				
U.S. Treasury bonds and notes	2,230,691,559	2,230,691,559	-	-
U.S. government agencies bonds	15,732,705	-	15,732,705	-
U.S. government agency mortgage backed	304,989,486	-	304,989,486	-
U.S. government-sponsored agency mortgage	10,580,681	-	10,580,681	-
Commercial mortgage backed securities	8,082,920	-	8,082,920	-
U.S. corporate bonds	532,110,430	-	374,553,148	157,557,282
Non-U.S. government / agency bonds	719,807,410	-	719,807,410	-
Non-U.S. corporate bonds	228,359,350	-	204,696,853	23,662,497
Pooled and Others	6,917,366	-	6,870,850	46,516
Total fixed income securities	4,057,271,907	2,230,691,559	1,645,314,053	181,266,295
Real estate (direct investment)	488,255,736	-	-	488,255,736
Alternative investments (direct investment)	185,190,084	-	-	185,190,084
Total assets at fair value level	$ 12,026,189,346	$ 9,518,258,356	$ 1,652,240,927	$ 855,690,063
Liabilities				
Notes payable (on real estate-direct)	$ 111,545,000	$ -	$ -	$ 111,545,000
Total investments (excluding derivatives), net of notes payable measured by fair value level	$ 11,914,644,346	$ 9,518,258,356	$ 1,652,240,927	$ 744,145,063
Investment derivative instruments				
Currency purchases forwards	$ 22,306,396	$ -	$ 22,306,396	$ -
To Be Announced (TBAs) forwards	6,798,745	-	6,798,745	-
Bond futures	12,476,096	12,476,096	-	-
Commodity futures	19,912,400	19,912,400	-	-
Currency futures	12,437,682	12,437,682	-	-
Index fixed income futures	(10,464,157)	(10,464,157)	-	-
Interest rate futures	(498,882)	(498,882)	-	-
Options	(44,037,501)	(12,961,622)	(31,075,879)	-
Options on currency	19,100	-	19,100	-
Options on debt securities	1,209,168	(1,750)	1,210,918	-
Credit default swaps	(712,148)	-	(712,148)	-
Equity variance swaps	(702,395)	-	(702,395)	-
Interest rate swaps	(1,824,698)	-	(1,824,698)	-
Total investment derivative instruments	$ 16,919,806	$ 19,075,069	$ (2,155,263)	$ -

Note F – Deposits and Investment Disclosures (continued)

3. Investments and fair value (continued)

Investments, Derivative Instruments and Invested Securities Lending Collateral Measured at Fair Value (contnued)

	Total	Fair Value Measurement Using: Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Invested securities lending collateral				
Short-term instruments				
Repurchase agreements	$ 449,124,170	$ -	$ 449,124,170	$ -
Global asset backed notes	22,472,295	-	22,472,295	-
Global corporate notes	625,914,164	-	625,914,164	-
Total invested securities lending collateral	$ 1,097,510,629	$ -	$ 1,097,510,629	$ -

Investments and Derivative Instruments Measured at Fair Value (contnued)

Investments measured at net asset value (NAV)	
Short-term investments	$ 526,317,910
Equity securities	1,513,173,545
Real estate	572,637,315
Alternative investments	1,327,369,139
Total investments measured at NAV	3,939,497,909

	June 30, 2018	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period (Days)
Short-term investments (a)	$ 526,317,910	$ -	Daily	1 day
Equity securities (b)	1,513,173,545	-	Daily	2 days
Real estate (c)	572,637,315	766,905,000	Not eligible	n/a
Alternative investments (d)	1,327,369,139	1,631,836,000	Not eligible	n/a
Total investments measured at NAV	$ 3,939,497,909	$ 2,398,741,000		

(a) Short-term investments primarily consist of three pooled funds to invest excess cash at the ERS' custodian, The Bank of New York Mellon and over 20 other accounts. NAV is based on the ERS' pro rata ownership percentage of the fund reported by the fund manager based on the fair value of the underlying assets that is determined by published market prices, or quotations from national security exchanges.

Note F – Deposits and Investment Disclosures (continued)

3. Investments and fair value (continued)

(b) Equity securities consist of one fund that invests based on the all country world index. NAV is based on the ERS' pro rata ownership percentage of the fund reported by the fund manager based on the fair value of the underlying assets that is determined by published market prices, or quotations from national security exchanges.

(c) Real estate consists of 39 limited partnerships or limited liability companies that primarily invest in U.S. real estate. The most significant element of NAV is the fair value of the investment holdings. These holdings are valued by the general partners using valuation assumptions based on both market and property specific inputs, which are not observable and involve a certain degree of expert judgment, and are generally audited annually.

(d) Alternative investments consist of 194 limited partnerships or limited liability companies that invest in venture capital, growth equity, corporate finance/buyout, special situations, mezzanine debt, distressed debt, or co/direct investments. The most significant element of NAV is the fair value of the investment holdings. These holdings are valued by the general partners using valuation assumptions based on both market and property specific inputs, which are not observable and involve a certain degree of expert judgment, and are generally audited annually.

Reconciliation of Investment Level Disclosure to the Statement of Fiduciary Net Position

	Investments by Fair Value Level	Investments Measured by the NAV	Derivative Investments by Fair Value Level	Invested Securities Lending Collateral by Fair Value Level	Statement of Fiduciary Net Postion
Assets					
Short-term investments	$ 1,463,079,223	$ 526,317,910	$ 22,325,496	$ -	$ 2,011,722,629
Equity securities	5,832,392,396	1,513,173,545	(44,739,896)	-	7,300,826,045
Fixed income securities	4,057,271,907	-	39,334,206	-	4,096,606,113
Real estate investments	488,255,736	572,637,315	-	-	1,060,893,051
Alternative investments	185,190,084	1,327,369,139	-	-	1,512,559,223
Invested securities lending collateral	-	-	-	1,097,510,629	1,097,510,629
	$ 12,026,189,346	$ 3,939,497,909	$ 16,919,806	$ 1,097,510,629	$ 17,080,117,690
Liabilities					
Notes payable	$ 111,545,000	$ -	$ -	$ -	$ 111,545,000
	$ 111,545,000	$ -	$ -	$ -	$ 111,545,000

Note F – Deposits and Investment Disclosures (continued)

4. Credit Risk

Credit risk is defined as the risk that an issuer or other counterparty to an investment will not fulfill its obligations. Information regarding ERS' credit risk on derivative investments is discussed below in derivative disclosures note F10 while policies related to credit risk for securities lending program are discussed in note F9 below.

Risk Based Asset Class - The fixed income mandate was transitioned to the new risk-based asset allocation methodology. Authorized security types are the same as the Asset-type based allocation guidelines. Investment managers were assigned to:

- Extended Global Credit component of the Broad Growth risk-based asset class, or
    - Benchmark: 50% BC Global Credit (Hedged) + 33.34% BC Global High Yield (Hedged) + 16.66% S&P LSTA Leveraged Loan
- Principal Protection risk-based asset class.
    - Benchmark: BC U.S. Intermediate Aggregate ex-Credit
- Summary of Concentration Limits for debt securities are:
    - Principal protection managers may invest in specific Issue or Issuer of 5% (without limit in supranationals, U.S. Treasuries, U.S. agencies, CMOs and asset-backed securities with minimum of AAA rating, sovereign debt and equivalently rated agencies of Organisation for Economic Co-operation and Development (OECD) governments). These managers are limited to (i) 10% in emerging markets (local currency and debt); (ii) 10% in private placements; (iii) 10% in preferred stocks and converted common stocks (common stock holdings not to exceed 180 days); (iv) 10% in non-U.S. Agency CMOs; and (v) 10% of Non-U.S. Dollar denominated securities (excludes money market securities and money market futures
    - Extended Global Credit managers may invest in specific Issue or Issuer of 5% (without limit in supranationals, U.S. Treasuries, U.S. agencies, CMOs and asset-backed securities with minimum of AAA rating, sovereign debt and equivalently rated agencies of Organisation for Economic Co-operation and Development (OECD) governments). They are limited to: (i) 10% in preferred stocks and converted common stocks (common stock holdings not to exceed 180 days); (iii) 75% in non-investment grade / Unrated; (iv) in Non-Benchmark markets up to 40% of non-benchmark non-government supported and up to 40% of non-benchmark government supported. Foreign currency is limited to (i) a 40% net foreign currency exposure (as measured by net amount of currency's outstanding long and short positions versus the U.S. Dollar); and (ii) a 80% gross foreign currency exposure (as measured by absolute value of all country-level currency long and short currency positions versus the U.S. Dollar)

Note F – Deposits and Investment Disclosures (continued)

4. Credit Risk (continued)

A table of the ERS' fixed income securities as of June 30, 2018 is below. Securities below investment grade of Baa and non-rated issues (average rating by S&P, Moody's and/or Fitch) amounted to $494,709,290 or 12.1% of total fixed income investments. All short-term investments, not held in a pooled investment, are rated A1/P1or better.

Credit Ratings - Average rating by S&P, Moodys and Fitch as of June 30, 2018

Ratings	US Govt Agency	US Govt sponsored-agency mortgage backed	US corporate bonds	Commercial mortgage backed securities	Non-US corporate bonds	Non US-govt/agencies bonds	Pooled & others	Total
AAA	$ 15,732,705	$ 304,742,021	$ 2,944,860	$ -	$ 15,127,432	$ 209,717,857	$ -	$ 548,264,875
AA1	-	247,465	1,250,995	-	-	1,260,282	-	$ 2,758,742
AA2	-	-		-	-	110,723,041	-	$ 110,723,041
AA3	-	-	1,788,175	-	497,390	1,057,953	-	$ 3,343,518
A1	-	-	6,115,506	-	3,275,818	49,985,432	-	$ 59,376,756
A2	-	-	27,848,421	-	9,733,762	6,556,108	-	$ 44,138,291
A3	-	-	40,862,037	-	14,860,126	184,265,444	-	$ 239,987,607
BAA1	-	-	41,797,617	-	18,866,208	56,149,676	-	$ 116,813,501
BAA2	-	-	44,068,978	-	22,216,816	28,184,434	434,120	$ 94,904,348
BAA3	-	-	65,803,570	-	25,787,146	9,388,982	-	$ 100,979,698
BA1	-	-	32,937,280	-	20,245,087	1,893,033	-	$ 55,075,400
BA2	-	-	46,499,217	-	22,222,286	787,568	-	$ 69,509,071
BA3	-	-	47,678,812	1,760,359	17,441,085	9,277,213	-	$ 76,157,469
B1	-	-	37,842,299	-	11,101,462	3,538,408	918,453	$ 53,400,622
B2	-	-	59,510,810	473,097	17,424,623	7,774,593	-	$ 85,183,123
B3	-	-	31,435,054	4,569,241	16,129,251	6,178,865	-	$ 58,312,411
CAA1	-	-	23,924,713	-	3,142,783	-	477,656	$ 27,545,152
CAA2	-	-	5,485,163	-	1,809,268	-	-	$ 7,294,431
CAA3	-	-	1,912,775	-	-	-	-	$ 1,912,775
CA	-	-	676,750	-	-	-	-	$ 676,750
C	-	-	-	1,280,223	-	-	-	$ 1,280,223
Not rated	-	-	11,727,398	-	8,478,807	33,068,521	5,087,137	$ 58,361,863
	$ 15,732,705	$ 304,989,486	$ 532,110,430	$ 8,082,920	$ 228,359,350	$ 719,807,410	$ 6,917,366	1,815,999,667

US Treasury Bonds and Notes	2,230,691,559
US Government agency - Government National Mortgage Association (GNMAs) mortgage backed	10,580,681
subtotal	$ 4,057,271,907
Derivatives	39,334,206
Total fixed income securities in Investments	$ 4,096,606,113

5. Custodial Credit Risk

Custodial credit risk for investments is the risk that, in the event of a failure of the counterparty, the ERS will not be able to recover the value of the investment or collateral securities that are in the possession of an outside party. All securities, except certain pooled funds, are registered in the name of the ERS and are held in the possession of the ERS' custodial bank, The Bank of New York Mellon. Pooled funds not held by the custodial bank, such as certain equity investments, are registered in the name of the ERS. The ERS had $685,522,717 in cash and securities exposed to custodial credit risk.

Note F – Deposits and Investment Disclosures (continued)

6. Concentrations of Credit Risk

The ERS' debt securities managers are expected to maintain diversified portfolios by sector, quality, and maturity as discussed above in Credit Risk.

Equity securities shall be diversified by industry and in number. An investment manager may not hold more than 5% of an individual company's stock if that company's securities represent less than 3% of the investment manager's respective benchmark. (If those securities constitute more than 3% of the respective benchmark the manager shall not hold more than the benchmark weight plus 2 percentage points.)

At June 30, 2018, there was no single issuer exposure within the ERS' portfolio that comprises over 5% of the overall portfolio, or an investment that exceeded the above manager guidelines, and therefore, there is no concentration of credit risk to report.

7. Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. The ERS has not adopted a formal policy that limits investment maturities as a means of managing its exposure to fair value changes arising from changing interest rates. External investment managers are given full discretion within their operational guidelines and are expected to maintain a diversified portfolio between and within sectors, quality, and maturity.

Duration is a measure of a debt investment's exposure to fair value changes arising from changes in interest rates. It uses the present value of cash flows, weighted for those cash flows as a percentage of the investment's full price. At June 30, 2018, the table below shows fixed income investment securities by investment type, amount, and the effective weighted duration for the ERS' total portfolio. Interest rate risk associated with swaps and other derivative instruments are discussed in the derivatives disclosure below:

Effective duration of fixed income assets by security type (excluding derivatives)

		Fair Value	Weighted Modified Duration (years)
Fixed Income Securities			
U.S. Treasury bonds and notes	$	2,230,691,559	8.0
U.S. government agencies bonds		15,732,705	1.6
U.S. government agency mortgage backed		304,989,486	23.1
U.S. government-sponsored agency mortgage backed		10,580,681	21.1
Commercial mortgage backed securities		8,082,920	18.5
U.S. corporate bonds		532,110,430	7.1
Non-U.S. government / agency bonds		719,807,410	7.6
Non-U.S. corporate bonds		228,359,350	8.3
Pooled and Others		6,917,366	12.2
Total	$	4,057,271,907	9.0

Note F – Deposits and Investment Disclosures (continued)

8. Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely impact the fair value of an investment. The foreign currency risk exposure to the ERS arises from the international fixed income and international equity investment holdings. Board policy limits the use of foreign currency as a defensive measure to protect the portfolio value of non-U.S. equity and non-U.S. fixed income investments. External investment managers authorized to invest in these securities are given full discretion regarding their respective portfolio's foreign currency exposures, including using currency forward contracts, as established by their investment mandate. Cross-hedging is only allowed in non-U.S. fixed income portfolios. Counterparties for foreign currency derivatives must be rated A or equivalent. Derivatives investments are discussed in more detail in Note F.10.

The following table summarizes the ERS' exposure to foreign currency risk in U.S. dollars as of June 30, 2018. (Securities denominated in U.S. dollars are not presented.)

	Cash and Short Term Instruments	Debt Securities	Derivatives	Equities	Alternative	Real Estate	Grand Total
Argentine peso	$ 796,101	$ 3,562,239	$ 3,102,672	$ -	$ -	$ -	$ 7,461,012
Australian dollar	(72,337,488)	32,424,108	(122,747,367)	71,211,638	-	-	(91,449,109)
Brazilian real	282,471	7,338,381	(15,647,392)	44,943,031	-	-	36,916,491
Canadian dollar	(20,966,360)	6,622,073	(125,052,390)	186,153,816	-	-	46,757,139
Chilean peso	-	-	(7,831,400)	646,723	-	-	(7,184,677)
Chinese Yuan Renminbi	(28,532,608)	-	58,916,802	-	-	-	30,384,194
Colombian peso	-	-	2,339,574	-	-	-	2,339,574
Czech koruna	75,906	-	(7,996,818)	1,631,601	-	-	(6,289,311)
Danish krone	106,870	607,022	(516,223)	30,655,868	-	-	30,853,537
Egyptian pound	1,949,560	-	-	2,533,769	-	-	4,483,329
Euro currency unit	160,294,413	98,674,074	(392,178,331)	468,695,980	-	-	335,486,136
Hong Kong dollar	472,474	-	592,260	182,876,237	-	-	183,940,971
Hungarian forint	(20,544,362)	-	(32,802,006)	6,321,064	-	-	(47,025,304)
Indian Rupee	-	-	(37,434,105)	-	-	-	(37,434,105)
Indonesian rupiah	174,406	8,117,624	2,793,439	14,987,605	-	-	26,073,074
Israeli shekel	(3,068,739)	-	(13,238,723)	15,765,361	-	-	(542,101)
Japanese yen	43,280,522	7,778,207	(157,977,659)	341,704,754	-	-	234,785,824
Malaysian ringgit	(58,827)	-	8,088	18,447,336	-	-	18,396,597
Mexican peso	(7,864,018)	2,410,058	22,320,745	27,937,495	-	-	44,804,280
New Taiwan dollar	750,005	-	(12,516,059)	71,949,143	-	-	60,183,089
New Zealand dollar	(32,392,655)	33,922,787	(75,268,122)	14,859,057	-	-	(58,878,933)
Norwegian krone	23,364,575	81,666,623	44,434,188	51,144,093	-	-	200,609,479
Peruvian sol	-	-	(1,032,392)	-	-	-	(1,032,392)
Philippine peso	653	-	(7,159,175)	4,791,717	-	-	(2,366,805)
Polish zloty	(5,321,286)	91,557,438	(105,735,405)	5,814,175	-	-	(13,685,078)
Pound sterling	18,730,760	97,152,714	(212,496,634)	277,914,195	-	-	181,301,035
Russian ruble (new)	(6,498,477)	5,571,267	1,943,817	9,500,023	-	-	10,516,630
Singapore dollar	32,135,374	30,600,814	(23,719,882)	12,457,942	-	-	51,474,248
South African rand	1,653,544	60,451,284	(56,667,221)	17,325,094	-	-	22,762,701
South Korean won	297,894	-	26,677,240	79,615,402	-	-	106,590,536
Swedish krona	(77,072,267)	2,320,181	(150,165,826)	54,855,979	-	-	(170,061,933)
Swiss franc	(101,126,711)	-	(8,247,537)	34,044,184	-	-	(75,330,064)
Thai baht	36,684	-	3,414,922	40,238,136	-	-	43,689,742
Turkish lira	(10,552,317)	-	(6,081,322)	25,843,156	-	-	9,209,517
Urugayan peso	-	802,501	-	-	-	-	802,501
Various Countries	-	-	-	1,513,173,574	-	-	1,513,173,574
Total	$ (101,933,903)	$ 571,579,395	$ (1,405,968,242)	$ 3,628,038,148	$ -	$ -	$ 2,691,715,398

Note F – Deposits and Investment Disclosures (continued)

9. Securities Lending

The ERS participates in a securities lending program administered by its bank custodian, The Bank of New York Mellon. Under this program, which is permissible under Chapter 88 of the HRS, certain equity and fixed-income securities of the ERS are lent to participating broker-dealers and banks (borrowers). In return, the ERS receives cash, securities issued or guaranteed by the U.S. government, securities issued or guaranteed by OECD (Organization for Economic Cooperation and Development) member states or their local authorities, Canadian Provincial debt, equity securities that are part of the U.S. and non U.S. indices, and/or letters of credit as collateral. The ERS does not have the ability to pledge or sell collateral securities absent of borrower default, thus only cash received as collateral is reported on the financial statements in accordance with accounting standards. Risk is mitigated by the investment policies and operational procedures regarding issuer, credit, exposure and rating limits utilized in the securities lending program. Borrowers are required to deliver collateral for each loan equal to: (a) in the case of loaned fixed-income securities and loaned equity securities denominated in U.S. dollars or whose primary trading market was located in the U.S., 102% of the market value of the loaned securities; and (b) in the case of loaned equity securities not denominated in U.S. dollars or whose primary trading market was not located in the U.S., 105% of the market value of the loaned securities. The collateral is marked to market daily. If the market value of the collateral falls below the minimum collateral requirements, additional collateral is provided. In addition, the bank custodian indemnifies the ERS by agreeing to purchase replacement securities or return cash collateral in the event the borrower fails to return the loaned security or fails to pay the ERS for income distributions by the securities' issuers while the securities are on loan.

The ERS does not impose any restrictions on the amount of loans the bank custodian made on behalf of the ERS. Also, the ERS and the borrowers maintain the right to terminate securities lending transactions on demand. The Bank of New York Mellon invests the cash collateral related to the ERS' loaned securities in a separate account, according to the ERS investment policies and procedures as discussed above in notes C2 and F1. As such, the maturities of the investments made with cash collateral generally do not match the maturities of the securities loans. The extent of such mismatch as of June 30, 2018 was 116 days.

At June 30, 2018, there was no credit risk exposure to borrowers since the ERS was collateralized as discussed above. The total securities on loan and collateral received are shown below.

Securities lent for collateral	Fair value of underlying securities	Cash	Noncash
U.S. fixed income	$ 435,670,635	$ 387,495,424	$ 100,531,683
U.S. equities	722,404,711	636,766,278	60,816,520
International equities	289,607,884	71,480,960	271,028,911
International fixed income	19,250,792	1,767,967	19,446,376
	$ 1,466,934,022	$ 1,097,510,629	$ 451,823,490

Note F – Deposits and Investment Disclosures (continued)

10. Derivative Financial Instruments

Derivatives are instruments (securities or contracts) whose value is dependent on such things as stock or bond prices, interest rate levels, or currency exchange rates. These are financial arrangements between two parties whose payments are based on or "derived" from the performance of some agreed-upon benchmark. As with any investment, derivative contracts are subject to various types of credit and market risks. Notably, these would include the possible inability of the counterparty to meet the terms of the contract, changes in the market value of the underlying collateral, changes in the interest rate environment, and fluctuation in foreign currency rates. The ERS enters into various derivative investment contracts to hedge, for the minimization of transaction costs and as a means of implementing value added strategies to enhance returns as authorized by Board policy.

Generally, derivatives are subject both to market risk and counterparty risk. The derivatives utilized by the ERS typically have no greater risk than their physical counterparts, and in many cases are offset by exposures elsewhere in the portfolio. Counterparty risk, the risk that the "other party" to a contract will default, is managed by utilization of exchange-traded futures and options where practicable (in which case the futures exchange is the counterparty and guarantees performance) and by careful screening of counterparties where use of exchange-traded products is impractical or uneconomical. ERS investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, posting collateral, and exposure monitoring procedures. The ERS anticipates that counterparties will be able to satisfy their obligations under the contracts.

Derivative securities are priced and accounted for at their fair value. For exchange-traded securities such as futures and options, closing prices from the securities exchanges are used. Foreign exchange contracts are valued at the price at which the transaction could be settled by offset in the forwards markets.

The tables below summarize the ERS' investments in derivative securities and contracts held at June 30, 2017 and their associated risks. The various risks associated with these investments are included in the tables expressed in terms of market values, summarized by the type of contract as follows: credit, equity, foreign exchange, interest, and other. Due to the level of risk associated with certain derivative investment securities, it is reasonably possible that changes in the values of investment securities will occur in the near term, and such changes could affect the amounts reported in the financial statements. ERS could be exposed to risk if the counterparties to the contracts are unable to meet the terms of the contracts. ERS investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, posting collaterals, and exposure monitoring procedures.

The notional amount is the nominal or the underlying face amount that is used to calculate payments made on that instrument or contract. Changes in the market value of all derivative contracts are recorded as net appreciation (depreciation) in fair value of investments in the Statement of Changes in Fiduciary Net Position.

The following table summarizes the ERS' investments in derivative securities and contracts held at June 30, 2018 with the related maturity information:

Note F – Deposits and Investment Disclosures (continued)

10. Derivative Financial Instruments (continued)

Asset categories		Notional values	Market value	Maturity (Range from)
Forwards	Currency purchases	$ -	$ 22,306,396	0.0 yrs
	To Be Announced (TBAs)	-	6,798,745	30.0 yrs to 30.1 yrs
	Total forwards	-	29,105,141	
Futures	Bond contracts	1,658,246,913	12,476,096	0.3 yrs
	Commodity contracts	11,001,688	19,912,400	0.0 yrs to 1.5 yrs
	Currency contracts	(1,183,967,898)	12,437,682	0.3 yrs
	Index contracts	925,939,754	(10,464,157)	0.1 yrs to 1.5 yrs
	Interest rate contracts	1,381,459,071	(498,882)	0.2 yrs to 3.0 yrs
	Futures total	2,792,679,528	33,863,139	
Options	Options	-	(44,037,501)	0.0 yrs to 0.2 yrs
	Options on debt securities	-	1,209,168	0.0 yrs to 4.6 yrs
	Options on currency	-	19,100	0.0 yrs to 0.3 yrs
	Options total	-	(42,809,233)	
Swaps	Credit default swaps	-	(712,148)	1.0 yrs to 44.9 yrs
	Equity variance swaps	-	(702,395)	0.0 yrs to 1.0 yrs
	Interest rate swaps	-	(1,824,698)	1.5 yrs to 30.2 yrs
	Swaps total	-	(3,239,241)	
	Grand Total	$ 2,792,679,528	$ 16,919,806	

Forward Currency Exchange Contracts and To-Be-Announced (TBA) Securities

The ERS enters into various forward currency exchange contracts to manage exposure to changes in foreign currency exchange rates and to facilitate the settlement of foreign security transactions. A forward contract is an agreement to buy or sell a specific amount of currency at a specific delivery or maturity date for an agreed-upon price. Risks associated with such contracts include movements in the value of the foreign currency relative to the U.S. dollar and the ability of the counterparty to perform in accordance with the terms of the contract.

The TBA market that ERS invests in as part of its toolkit to manage interest rates and liquidity includes the forward trading of mortgage-backed securities (MBS) issued by federal agencies and federally sponsored agencies (commonly known as pass-through securities issued by Freddie Mac, Fannie Mae, and Ginnie Mae). The TBA market is one of the most liquid, and consequently the most important secondary market for mortgage loans as one MBS pool can be considered to be interchangeable with another pool.

Note F – Deposits and Investment Disclosures (continued)

10. Derivative Financial Instruments (continued)

Futures

Futures represent commitments to purchase (asset) or sell (liability) securities at a future date and at a specified price. Futures contracts are traded on organized exchanges (exchange traded) thereby minimizing the ERS' credit risk. The net change in the futures contracts value is settled daily in cash with the exchanges. Net gains or losses arising from the daily settlements are included in the net appreciation in fair value of securities in the Statement of Changes in Fiduciary Net Position. Refer to the table above for the net notional value of futures contracts at June 30, 2018.

Options

Options represent or give the buyers the right, but not the obligation, to buy or sell an asset at a preset price over a specified period. The option's price is usually a small percentage of the underlying asset's value. As a writer of financial options, the ERS receives a premium at the outset of the agreement and bears the risk of an unfavorable change in the price of the financial instrument underlying the option. As a purchaser of financial options, the ERS pays a premium at the outset of the agreement and the counterparty bears the risk of an unfavorable instrument underlying the option.

Swaps

Swaps represent an agreement between two or more parties to exchange sequences of cash flows over a period in the future. At June 30, 2018, the ERS had currency, equity variance, inflation, interest rate, and credit default swaps as allowed by Board policy. In the most common type of interest rate swap arrangement, one party agrees to pay fixed-interest payments on designated dates to a counterparty who, in turn, agrees to make return interest payments that float with some reference rate. Currency swaps allow an investor to exchange the principal and/or interest payments of a loan in one currency for equivalent amounts, in net present value terms, to another currency. Credit default swaps are the most common global credit market derivative that allows flexibility as an active portfolio management tool based on its ability to customize the exposure to corporate credit such as credit spreads and default risks. Credit default spreads and total return swaps are also used to gain access to global markets that do not have the transparency or efficiency of the U.S. credit markets. Variance swaps allow the investor to offset risks associated with the magnitude of movement of some underlying product (such as stock index price). Gains and losses from swaps are determined on market values and are included in the net appreciation in fair value of securities in the Statement of Changes in Fiduciary Net Position.

Derivatives, such as interest rate swaps, inflation swaps, and credit default swaps, are a tool or instrument used to manage inflation, interest rate, credit quality, and yield curve exposures of the investments. In certain situations, derivatives may result in a lower overall cost to the portfolio than owning individual securities underlying the derivatives. When evaluating securities, risk, and return are measured at the security and portfolio levels.

Note F – Deposits and Investment Disclosures (continued)

10. Derivative Financial Instruments (continued)

On June 30, 2018, credit ratings of the counterparty for ERS' investments in derivatives were as follows:

Counterparty	S&P's Rating	Moody's Rating	Fair Value
Bank of America Corp	A-	A3	1,325,281
Bank of America Merrill Lynch	BBB+	A3	4,003,255
BNP Paribas SA	A	Aa3	(58,906)
Citibank NA	BBB+	Baa1	(184,020)
Citigroup Inc	BBB+	Not Rated	(286,625)
CME Group Inc	AA-	Aa3	(1,784,585)
Credit Suisse Group AG	BBB+	Not Rated	(10,374)
Credit Suisse Securities (USA) LLC	A	Not Rated	15,854,284
Deutsche Bank AG	BBB+	Baa2	(141,889)
Deutsche Bank Securities Inc	BBB+	Baa2	(631,269)
Goldman Sachs & Co LLC	BBB+	A3	(62,037)
HSBC Holdings PLC	A	Not Rated	(95,385)
Intercontinental Exchange Inc	A	A2	(144,340)
JP Morgan	A-	A3	2,481,137
JPMorgan Chase & Co	A-	A3	(33,203)
London Stock Exchange Group PLC	A-	A3	(45,153)
Morgan Stanley	BBB+	A3	5,747,003
SG Americas Securities LLC	A	A1	3,058,019
UBS Securities	A-	Not Rated	14,469,976
Exchange traded derivatives			(26,541,363)
Total			$ 16,919,806

Note G – Pension Liability

1. Net Pension Liability

The components of the net pension liability of the ERS at June 30, 2018 were as follows:

Total Pension Liability	$29,917,401,383
Plan Fiduciary Net Position	16,598,407,973
Net Pension Liability	$13,318,993,410
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	55.5%
Net Pension Liability as a Percentage of Covered Payroll	312.9%

Multi-year trend information regarding whether the actuarial value of plan assets is increasing or decreasing over time relative to the actuarial accrued liabilities for benefits can be found in the required supplementary information following the *Notes to the Financial Statements.*

Note G – Pension Liability (continued)

2. Summary of Actuarial Assumptions

The total pension liability was determined using the provisions of the GASB Statements No. 67 and No. 82 actuarial valuation as of June 30, 2017. These GASB rules only define pension liability for financial reporting purposes. The actuarial assumptions were based on the results of an experience study for the period from July 1, 2010, through June 30, 2015. When measuring the total pension liability, GASB uses the same actuarial cost method, all actuarial assumptions, and the same discount rate as the ERS uses for funding which can be found in the Notes to Required Supplementary Information.

Summary of Actuarial Valuation as of June 30, 2018 follows:

Valuation date	June 30, 2018
Actuarial cost method	Entry Age Normal
Amortization method	Level percent, open
Actuarial assumptions:	
Inflation assumption	2.50%
Investment rate of return, including inflation at 2.50%	7.00%
Payroll growth rate:	3.50%
Projected salary increases, including inflation at 2.50%	
- Police and Fire Employees	5.00% to 7.00%
- General Employees	3.50% to 6.50%
- Teachers	3.75% to 5.75%
Cost of living adjustments (COLAs)	
- COLAs are not compounded; and are based on original pension amounts.	
- Membership date prior to July 1, 2012	2.5%
- Membership date after June 30, 2012	1.5%

Mortality rate assumptions include the effects of the retirement status of members.

Pre-retirement mortality rates are:

Multiples of the RP 2014 mortality table for active employees based on the occupation of the member as follows:

	General Employees	Teachers	Police and Fire
	Male & Female	Male & Female	Male & Female
Ordinary	75%	55%	58%
% of Ordinary Chosing Annuity	41%	52%	24%
Duty Related	5%	5%	12%

Note G – Pension Liability (continued)

2. Summary of Actuarial Assumptions

Post-Retirement Mortality rates are:

Healthy Retirees: The 2016 Public Retirees of Hawaii mortality table, generational projection using the BB projection table from the year 2016 and with multipliers based on plan and group experience. The following are sample rates of the base table as of 2016 with the corresponding multipliers:

Healthy Annuitant Mortality Rates Before Projection (Multiplier Applied)

	General Employees		Teachers		Police and Fire	
Age	Males	Females	Males	Females	Males	Females
50	0.1626%	0.1140%	0.1463%	0.1012%	0.1951%	0.1140%
55	0.3963%	0.1937%	0.3567%	0.1720%	0.4756%	0.1937%
60	0.6301%	0.2735%	0.5671%	0.2428%	0.7561%	0.2735%
65	0.9489%	0.3532%	0.8540%	0.3136%	1.1387%	0.3532%
70	1.3733%	0.7404%	1.2360%	0.6574%	1.6480%	0.7404%
75	2.1071%	1.3116%	1.8964%	1.1645%	2.5285%	1.3116%
80	3.6268%	2.2573%	3.2641%	2.0041%	4.3522%	2.2573%
85	6.6210%	4.1830%	5.9589%	3.7138%	7.9452%	4.1830%
90	12.1005%	8.2371%	10.8905%	7.3133%	14.5206%	8.2371%
Multiplier	100%	107%	90%	95%	120%	107%
Setback	0	0	0	0	0	0

The following table provides the life expectancy for individuals retiring in future years based on the assumption with full generational projection:

Life Expectancy for an Age 65 Retiree in Years

	Year of Retirement			
Gender	2020	2025	2030	2035
General Retirees				
Male	23.2	23.7	24.2	24.7
Female	26.4	26.8	27.2	27.5
Teachers				
Male	24.0	24.5	25.0	25.5
Female	27.3	27.7	28.0	28.3
Police and Fire				
Male	21.8	22.3	22.8	23.3
Female	26.4	26.8	27.2	27.5

Disabled retirees: Base Table for healthy retiree’s occupation, set forward 5 years, generational projection using the BB projection table from the year 2016. Minimum mortality rate of 3.5% for males and 2.5% for females.

Note G – Pension Liability (continued)

2. Summary of Actuarial Assumptions (continued)

The long-term expected rate of return on pension plan investments was determined using a "top down approach" of the Client-Constrained Simulation-based Optimization Model (a statistical technique known as "re-sampling with replacement" that directly keys in on specific plan-level risk factors as stipulated by the ERS Board) in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are then combined to produce the long-term expected rate of return by weighting the expected future nominal rates of return (real returns + inflation) by the target asset allocation percentage. The rate of returns based on ERS's investment consultant, Meketa Investment Group, Inc.'s 2018 capital market projections for the target asset allocation as of June 30, 2018, are summarized in the following table:

Strategic Allocation (risk-based classes)	Long-term Expected geometric rate of return
Broad Growth	7.10%
Principal Protection	2.50%
Real Return	4.10%
Crisis Risk Offset	4.60%

Single Discount Rate

A single discount rate of 7.00% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 7.00%. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

3. Sensitivity of the Net Pension Liability to Changes in the Single Discount Rate

The following presents the ERS' net pension liability calculated using a single discount rate of 7.00%, as well as what the ERS' net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower (6.00%) or 1–percentage-point higher (8.00%) than the current rate.

1% Decrease (6.00%)	Current Discount Rate (7.00%)	1% Increase (8.00%)
$ 17,398,642,004	$ 13,318,993,410	$ 9,955,950,246

Note H – Risk Management

The ERS is exposed to various risks of loss related to torts; theft of, damage to, or destruction of assets; errors or omissions; natural disasters; and injuries to employees. As required by state law, the ERS participates in coverage with the State. The State retains various risks and insures certain excess layers with commercial insurance policies. The excess layers are consistent with the prior fiscal year. Settled claims for the State did not exceed the coverage provided by commercial insurance policies during the year ended June 30, 2018. Losses not covered by insurance are generally paid from legislative appropriations.

1. Torts

The ERS is involved in various litigation and claims, including claims regarding retirement benefits, the outcome of which cannot be presently determined. In the opinion of management, the outcome of these actions will not have a material adverse effect on the ERS' financial position.

2. Property and Liability Insurance

The ERS also purchased property and liability insurance for all real estate owned from outside carriers. During the past three fiscal years, no loss settlements exceeded insurance coverages.

3. Workers' Compensation Policy

The State has a self-insured workers' compensation policy. Workers' compensation claims are paid from legislative appropriations.

Note I – Commitments

In the normal course of business, the ERS enters into commitments with associated risks. The ERS adheres to the same credit policies, financial and administrative controls, and risk limiting and monitoring procedures for these commitments as for all investments.

The ERS has future financial commitments of up to $2,398,741,000 as of June 30, 2018, consisting of $766,905,000 in real estate investments, and $1,631,836,000 in alternative investments.

Note J – Deferred Compensation Plan

The ERS does not sponsor a deferred compensation program. The ERS' employees are eligible to participate in the deferred compensation plan sponsored by the State. The State-sponsored plan was created in accordance with Internal Revenue Code Section 457. The plan, available to all ERS employees, permits them to defer a portion of their salaries. The deferred compensation is not available to the employees until termination, retirement, death, or an unforeseeable emergency. All compensation deferred under the plan is held in trust by a custodian for the exclusive benefit of participants and beneficiaries.

Schedule of Changes in the Employers' Net Pension Liability and Related Ratios
Fiscal Years Ended June 30, 2018, 2017, 2016, 2015 and 2014

	2014	2015	2016	2017	2018
A. Total pension liability					
1. Service Cost	$421,956,129	$437,901,029	$484,278,499	$576,724,568	$584,470,193
2. Interest on the Total Pension Liability	1,618,917,776	1,693,252,684	1,748,619,873	1,894,622,190	1,976,275,120
3. Changes of benefit terms	-	-	-	-	-
4. Difference between expected and actual experienceof the Total Pension Liability	66,400,876	(192,816,757)	297,534,219	61,179,390	124,753,379
5. Changes of assumptions	-	261,213,541	2,915,922,677	-	-
6. Benefit payments, including refunds of employee contributions	(1,130,921,611)	(1,181,252,658)	(1,245,517,025)	(1,323,129,244)	(1,416,727,842)
7. Net change in total pension liability	$976,353,170	$1,018,297,839	$4,200,838,243	$1,209,396,904	$1,268,770,850
8. Total pension liability – beginning	21,243,744,377	22,220,097,547	23,238,395,386	27,439,233,629	28,648,630,533
9. Total pension liability – ending	$22,220,097,547	$23,238,395,386	$27,439,233,629	$28,648,630,533	$29,917,401,383
B. Plan fiduciary net position					
1. Contributions – employer	$653,127,697	$717,792,981	$756,558,222	$781,244,218	$847,595,466
2. Contributions – employer (picked-up employee contributions)	204,821,010	221,909,859	235,079,968	249,211,751	257,294,033
2. Contributions – employee	1,306,327	1,595,560	1,721,893	1,492,316	2,133,901
3. Net investment income	2,175,479,961	556,436,475	(169,368,110)	1,934,512,507	1,225,572,599
4. Benefit payments, including refunds of employee contributions	(1,130,921,611)	(1,181,252,658)	(1,245,517,025)	(1,323,129,244)	(1,416,727,842)
5. Pension Plan Administrative Expense	(12,626,030)	(14,032,964)	(13,960,587)	(14,986,159)	(15,784,490)
6. Other	-	-	-	-	-
7. Net change in plan fiduciary net position	$1,891,187,354	$302,449,253	($435,485,639)	$1,628,345,389	$900,083,667
8. Fiduciary net position – beginning	12,311,827,949	14,203,015,303	14,505,464,556	14,069,978,917	15,698,324,306
9. Fiduciary net position – ending	$14,203,015,303	$14,505,464,556	$14,069,978,917	$15,698,324,306	$16,598,407,973
C. Net pension liability	$8,017,082,244	$8,732,930,830	$13,369,254,712	$12,950,306,227	$13,318,993,410
D. Fiduciary net position as a percentage of the total pension liability	63.92%	62.42%	51.28%	54.80%	55.48%
E. Covered-employee payroll	$3,829,002,983	$3,995,447,345	$4,112,227,306	$4,243,521,876	$4,256,052,840
F. Net pension liability as a percentage of covered employee payroll	209.38%	218.57%	325.11%	305.18%	312.94%

* Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

Schedule of the Employers' Net Pension Liability
Fiscal Year Ended June 30, 2013 to June 30, 2018*

Fiscal year ended June 30,:	Total Pension Liability	Fiduciary Net Position	Net Pension Liability	Fiduciary Net Position as a % of Total Pension Liability	Covered Payroll	Net Pension Liability as a Percentage of Covered Payroll
2013	$21,243,744,377	$12,311,827,949	$8,931,916,428	57.96%	$3,720,809,962	240.05%
2014	$22,220,097,547	$14,203,015,303	$8,017,082,244	63.92%	$3,829,002,983	209.38%
2015	$23,238,395,386	$14,505,464,556	$8,732,930,830	62.42%	$3,995,447,345	218.57%
2016	$27,439,233,629	$14,069,978,917	$13,369,254,712	51.28%	$4,112,227,306	325.11%
2017	$28,648,630,533	$15,698,324,306	$12,950,306,227	54.80%	$4,243,521,876	305.18%
2018	$29,917,401,383	$16,598,407,973	$13,318,993,410	55.48%	$4,256,052,840	312.94%

* Schedule is intended to show information for 10 years. Additional years will be built prospectively as data becomes available.

Schedule of Employer Contributions
2009 to 2018
(In thousands)

Fiscal year ended June 30,:	Statutory Contributions	Covered Employee Payroll	Contributions as a Percentage of Covered Payroll
2009	$578,672	$3,838,000	15.1%
2010	547,670	3,713,593	14.7%
2011	538,692	3,731,383	14.4%
2012	548,353	3,706,137	14.8%
2013	581,447	3,720,810	15.6%
2014	653,128	3,829,003	17.1%
2015	717,793	3,995,447	18.0%
2016	756,558	4,112,227	18.4%
2017	781,244	4,243,522	18.4%
2018	847,595	4,256,053	19.9%

Notes: All contributions shown reflect statutory employer-paid contributions only. Employer contributions (picked-up employee/member contributions) and member contributions are excluded.

Schedule of Investment Returns
2014 to 2018

For fiscal year ended June 30,:	Annual Money-Weighted Rate of Return
2014	17.9%
2015	4.0%
2016	-1.2%
2017	13.7%
2018	7.8%

* Schedule is intended to show information for 10 years. Additional years will be built prospectively as data becomes available.

June 30, 2018

Note A - Description

There have been no changes in benefit terms or actuarial assumptions since the last valuation.

Future employer contribution rates will increase due to legislation passed in 2017.

Per Act 17 (SLH 2017), future employer contributions from State and counties are expected to increase pursuant to a phased-in contribution rate increase over four years beginning July 1, 2017. The rate for Police and Fire employees increases to 28.00% on July 1, 2017; 31.00% on July 1, 2018; 36.00% on July 1, 2019; and 41.00% on July 1, 2020 and the rate for All Other Employees increases to 18.00% on July 1, 2017; 19.00% on July 1, 2018; 22.00% on July 1, 2019; and 24.00% on July 1, 2020.

Methods and Assumptions Used in Calculations of Actuarially Determined Contributions

The actuarially determined contribution rates in the schedule of contributions are calculated as of June 30, 2018. The following significant actuarial methods and assumptions were used to determine contribution rates reported in that schedule. Please refer to the Actuarial Section for additional information on actuarial assumptions.

Valuation date	June 30, 2018
Actuarial cost method	Entry Age Normal
Amortization method	Level percent, open
Asset valuation method	4-year smoothed market
Assumed inflation rate	2.5%
Investment rate of return	7.00% (including 2.5% for inflation and a 4.50% net real rate of return)
Cost-of-living adjustments (COLAs)	
- COLAs are not compounded; and are based on original pension amount.	
- Membership date prior to July 1, 2012	2.5% (not compounded)
- Membership date after June 30, 2012	1.5% (not compounded)
Payroll growth rate assumption	3.50%

Projected salary increases are comprised of the following components:

	General Employees	Teachers	Police and Fire
Service component by year of credited service (a)	0.0% to 3.0%	0.0% to 2.0%	0.0% to 2.0%
General increase (b)	1.0%	1.25%	2.5%
Inflation (c)	2.5%	2.5%	2.5%
Total increase (a + b +c)	3.5% to 6.5%	3.75% to 5.75%	5.0% to 7.0%

Notes to Required Supplementary Information - Unaudited

Detailed salary increase rates by years of service are shown below:

	General Employees		Teachers	
Years of Service	Service-related Component (a)	Total Annual Rate of Increase (a + b +c)	Service-related Component (a)	Total Annual Rate of Increase (a + b +c)
1	3.00%	6.50%	2.00%	5.75%
2	3.00%	6.50%	1.75%	5.50%
3	2.00%	5.50%	1.75%	5.50%
4	1.50%	5.00%	1.50%	5.25%
5	1.50%	5.00%	1.00%	4.75%
6	1.25%	4.75%	1.00%	4.75%
7	1.25%	4.75%	0.75%	4.50%
8	1.00%	4.50%	0.75%	4.50%
9	1.00%	4.50%	0.50%	4.25%
10	1.00%	4.50%	0.50%	4.25%
11	0.75%	4.25%	0.50%	4.25%
12	0.75%	4.25%	0.50%	4.25%
13	0.50%	4.00%	0.25%	4.00%
14	0.50%	4.00%	0.25%	4.00%
15	0.50%	4.00%	0.25%	4.00%
16	0.50%	4.00%	0.25%	4.00%
17	0.50%	4.00%	0.25%	4.00%
18	0.50%	4.00%	0.25%	4.00%
19	0.50%	4.00%	0.25%	4.00%
20	0.25%	3.75%	0.25%	4.00%
21	0.25%	3.75%	0.25%	4.00%
22	0.25%	3.75%	0.25%	4.00%
23	0.25%	3.75%	0.25%	4.00%
24	0.25%	3.75%	0.25%	4.00%
25 or more	0.00%	3.50%	0.00%	3.75%

	Police and Fire	
Years of Service	Service-related Component (a)	Total Annual Rate of Increase (a + b +c)
1	2.00%	7.00%
2	2.00%	7.00%
3 or more	0.00%	5.00%

Mortality rates used in the valuation are:

Pre-retirement mortality rates are:

Multiples of the RP 2014 mortality table based on the occupation of the member.
The following factors are used in conjunction with the described above to derive the death rates:

	General Employees	Teachers	Police and Fire
Ordinary	75%	55%	58%
% of Ordinary Choosing Annuity	41%	52%	24%
Duty Related	5%	5%	12%

Post-retirement mortality rates are:

Healthy Retirees:

The 2016 Public Retirees of Hawaii mortality table, generational projection using the BB projection table from the year 2016 and with multipliers based on plan and group experience.

The following are sample rates of the base table as of 2016 with the corresponding multipliers:

Healthy Annuitant Mortality Rates Before Projection (Multiplier Applied)

	General Employees		Teachers		Police and Fire	
Age	Males	Females	Males	Females	Males	Females
50	0.1626%	0.1140%	0.1463%	0.1012%	0.1951%	0.1140%
55	0.3963%	0.1937%	0.3567%	0.1720%	0.4756%	0.1937%
60	0.6301%	0.2735%	0.5671%	0.2428%	0.7561%	0.2735%
65	0.9489%	0.3532%	0.8540%	0.3136%	1.1387%	0.3532%
70	1.3733%	0.7404%	1.2360%	0.6574%	1.6480%	0.7404%
75	2.1071%	1.3116%	1.8964%	1.1645%	2.5285%	1.3116%
80	3.6268%	2.2573%	3.2641%	2.0041%	4.3522%	2.2573%
85	6.6210%	4.1830%	5.9589%	3.7138%	7.9452%	4.1830%
90	12.1005%	8.2371%	10.8905%	7.3133%	14.5206%	8.2371%
Multiplier	100%	107%	90%	95%	120%	107%
Setback	0	0	0	0	0	0

The following are life expectancy for individuals retiring in future years based on the assumption with full generational projection:

Life Expectancy for an Age 65 Retiree in Years				
	Year of Retirement			
Gender	2020	2025	2030	2035
General Retirees				
Male	23.2	23.7	24.2	24.7
Female	26.4	26.8	27.2	27.5
Teachers				
Male	24.0	24.5	25.0	25.5
Female	27.3	27.7	28.0	28.3
Police and Fire				
Male	21.8	22.3	22.8	23.3
Female	26.4	26.8	27.2	27.5

Disabled Retirees:

Base Table for healthy retiree's occupation, set forward 5 years, generational projection using the BB projection table from the year 2016. Minimum mortality rate of 3.5% for males and 2.5% for females.

Change of Assumptions

There was no change in the 2018 assumptions.

Prior year trends including changes in assumptions are discussed below in Note B.

Note B – Significant Factors Affecting Trends in Actuarial Information

2016 Changes in Actuarial Assumptions

The following changes were made to the actuarial assumptions as of June 30, 2015 to June 30, 2016:

- The investment rate of return assumption was decreased from 7.65% to 7.00 %.
- Change the investment return assumption from net of all expenses to net of only investment expenses, add explicit charge for administrative expenses (0.35% of pay)
- The inflation assumption was decreased from 3.00% to 2.50 %
- Decrease the wage inflation (or employer budget growth) assumption from 4.00% to 3.50%
- The inflation component of salary increase rates decreased for all groups. The salary increase rates were changed to reflect a smaller productivity component for Teachers and Police & Fire. The service based component generally increased for most General Employees, decreased for most Teachers, and remain unchanged for most Police and Fire. The overall impact decreased assumed salary rate increase rates for all General Employees and Teachers, while remaining unchanged for almost all Police and Fire.
- The rates of mortality for active employees were decreased.
- The rates of mortality for healthy retirees and beneficiaries for most employee groups were decreased, adding an explicit assumption for continued future mortality improvement (generational approach).
- The rates of mortality for disabled retirees for most employee groups were decreased.
- The rates of disability of active employees increased for all General Employees, for Police and Fire from duty-related reasons and for Teachers from non-duty-related reasons.
- The rates of termination assumption for all employee groups was changed from separate male and female by employee group to a combined male & female by employee group. The rate of terminations for Police & Fire was increased. The rate of terminations for General Employees in the first six years of service decreased, and remains unchanged for other General Employees. After six years of service, the rates of termination generally increased Teachers, and remain unchanged for other Teachers.

2015 Changes in Actuarial Assumptions

The investment rate of return assumption was decreased from 7.75% as of June 30, 2014 to 7.65 % as of June 30, 2015.

2011 Changes in Plan Provisions Since 2010

The following changes were made to the actuarial assumptions:

- The investment rate of return assumption decreased from 8.00% to 7.75%.
- The salary increase rates were changed to reflect a larger productivity component for Police & Fire. Small changes also made to service-based components for all groups. The overall impact increased assumed salary increase rates for all employees.
- The rates of mortality for healthy retirees and beneficiaries for most employee groups were decreased.
- The rates of mortality for disabled retirees for most employee groups were increased.
- The rates of mortality for active employees for most employee groups were increased.
- The rates of disability for active employees for most general employees and teachers were decreased.
- The rates of retirement for most employees were increased.
- The rates of termination in the first six years of service for males generally increased, and remained mostly unchanged for females. After six years of service, the rates of termination generally increased for younger employees and decreased for employees from the age of 50.

Other Supplementary Information

Schedule 1

Combining Schedule of Changes in Fiduciary Net Position – All Trust Funds

Year ended June 30, 2018

	2018			
	Pension Accumulation Reserves	**Annuity Savings Reserves**	**Expense Reserves**	**Total**
Additions				
Appropriations and contributions:				
Employers	$ 847,595,466	$ -	$ -	$ 847,595,466
Members	-	259,427,934	-	259,427,934
Net investment income	1,225,572,599	-	-	1,225,572,599
Total additions	2,073,168,065	259,427,934	-	2,332,595,999
Deductions				
Benefit payments	1,395,881,342	-	-	1,395,881,342
Refunds of member contributions	-	20,846,500	-	20,846,500
Administrative expenses	-	-	15,784,490	15,784,490
Total deductions	1,395,881,342	20,846,500	15,784,490	1,432,512,332
Other changes in net position restricted for pension benefits:				
Transfer due to retirement of members	198,448,083	(198,448,083)	-	-
Transfer of interest allocation	(109,772,490)	109,772,490	-	-
Transfer to pay administrative expenses	(17,279,607)	-	17,279,607	-
Return of unrequired funds due to savings in administrative expenses	-	-	-	-
	71,395,986	(88,675,593)	17,279,607	-
Net increase	748,682,709	149,905,841	1,495,117	900,083,667
Fiduciary net position restricted for pensions:				
Beginning of year	13,047,857,718	2,635,523,547	14,943,041	15,698,324,306
End of year	$ 13,796,540,427	$ 2,785,429,388	$ 16,438,158	$ 16,598,407,973

See accompanying independent auditors’ report.

Schedule 2

Social Security Contribution Fund

Statement of Changes in Assets and Liabilities

Year ended June 30, 2018

	2018			
	Beginning Balance	**Additions**	**Deductions**	**Ending Balance**
Assets				
Receivable from employers	$ -	$ 235,947,194	$ 235,947,194	$ -
Total assets	$ -	$ 235,947,194	$ 235,947,194	$ -
Liabilities				
Due to employers	$ -	$ 235,947,194	$ 235,947,194	$ -
Total liabilities	$ -	$ 235,947,194	$ 235,947,194	$ -

See accompanying independent auditors' report.

Schedule 3

Schedule of Administrative Expenses

Year ended June 30, 2018

		2018
Personnel services		
Salaries and wages	$	6,185,629
Fringe benefits		3,267,520
Net change in unused vacation credits		71,474
Total personnel services		9,524,623
Professional services		
Actuarial		147,750
Auditing and tax consulting		155,396
Disability hearing expenses		19,907
Legal services		449,314
Medical		319,182
Other services		70,364
Total professional services		1,161,913
Communication		
Postage		244,332
Printing and binding		70,138
Telephone		78,020
Travel		153,944
Total communication		546,434
Rentals		
Rental of equipment		93,801
Rental of premises		19,913
Total rentals		113,714
Other		
Armored car service		8,003
Computer and office automation systems		665,504
Repairs and maintenance		2,341,102
Stationery and office supplies		27,421
Miscellaneous		101,213
Total other		3,143,243
Depreciation		1,294,563
	$	15,784,490

See accompanying independent auditors' report.

Schedule 4

Schedule of Investment Expenses

Year ended June 30, 2018

		2018
Real estate and alternative investment expenses		
Operating expenses	$	31,242,079
Mortgage interest		4,406,545
Total real estate and alternative investment expenses		35,648,624
Investment expenses		
Investment manager/advisor fees	$	56,353,218
Bank custodian fees		520,337
Other investment expenses		315,493
Total investment expenses		57,189,048
Securities lending expenses		
Borrower rebates		12,989,777
Management fees		800,434
Total securities lending expenses		13,790,211
	$	106,627,883

See accompanying independent auditors' report.

Employees' Retirement System

of the State of Hawaii

INVESTMENT SECTION

This page intentionally left blank.

Letter from Chief Investment Officer

DAVID Y. IGE
GOVERNOR

THOMAS WILLIAMS
EXECUTIVE DIRECTOR

KANOE MARGOL
DEPUTY EXECUTIVE DIRECTOR

STATE OF HAWAII
EMPLOYEES' RETIREMENT SYSTEM

September 24, 2019

Board of Trustees
201 Merchant Street, Suite 1400
Honolulu, HI 96813

Dear Members of the Board:

I am pleased to present investment highlights and performance for the Investment Section of the Comprehensive Annual Financial Report ("CAFR") for the fiscal year ending June 30, 2018.

- ERS's Fiduciary net position was valued at $16.6 billion as of June 30, 2018. The portfolio increased by $0.9 billion over the fiscal year.

- The ERS investment portfolio outperformed its one-year, three-year, and five-year Policy Benchmark returns by an annualized 0.2%, 0.4% and 0.6%, respectively.[1] The portfolio's gross return for the year was 7.9%, exceeding the 7.0 % target rate of return by approximately 90 basis points. This reduces the unfunded liability by approximately $125 million more than if the ERS had exactly achieved its 7.0 % target.

- The outperformance performance for the fiscal year was led by positive returns for each asset class: broad growth (+9.8%), principal protection (0.9%), real return (+6.6%), and crisis risk offset (+4.2%).

    - On an asset class basis, crisis risk offset contributed the most to total portfolio outperformance over the policy benchmark, driven primarily by strong performance within the alternative return capture segment (+ 13.6%) which outperformed its benchmark by 7.2%. Systematic trend following was also positive for the year (+1.7%), outperforming its benchmark by 2.6%, while treasury duration capture contributed negatively (-2.4%). Overall, crisis risk offset added about 16 basis points of outperformance over the policy benchmark.

[1] Outperformance is based on a mix of gross and net returns.

- The broad growth class (+9.8%) also contributed to outperformance, driven by traditional growth (+12.5%) which beat its benchmark by 1.4%. The outperformance in traditional growth was primarily attributable to overweighting U.S. equities and favorable stock selection by our asset managers. While private growth and stabilized growth exhibited positive fiscal year returns (+15.4% and +5.2% respectively) both underperformed their respective benchmarks. The underperformance in private growth is within expectations due to private growth's public market benchmark2; when public equity markets exhibit strong returns in the short-term there is a lagged effect in private company valuations. The stabilized growth underperformance of 0.5% relative to its benchmark was due to the portfolio's global credit exposure and equity index option-writing strategies.

- The principal protection portfolio (+0.9%) exceeded its benchmark by 0.3% during a difficult year for global government bonds as the combination of low to negative yields in developed international countries and rising interest rates in the U.S., made it a challenging year for this asset class.

- Real return posted a return of 6.6% exceeding its CPI+3% benchmark for the fiscal year by 0.7%. Real return portfolio performance was driven by strong returns in infrastructure (+10.3%) and timber (+9.6%), both of which outperformed their respective benchmarks by wide margins.

- The capital allocation among the risk classes on June 30, 2018 was close to the policy allocations with broad growth accounting for 74.7%, crisis risk offset 12.9%, principal protection 8.3%, real return 3.1%, and opportunities 0.2%; from a risk allocation standpoint, growth risk accounted for about 95% of the volatility in the portfolio.

ECONOMIC & CAPITAL MARKET CONDITIONS

Markets were complacent throughout the first seven months of fiscal-year 2018 with very little volatility and a remarkably consistent "risk-on" sentiment that propelled global equity markets to new highs until late January. In late January, rising interest rate expectations and concerns about U.S. inflation resulted in a repricing of risk assets in the U.S. that ended a record streak of over 300 trading days of less than 2.0% changes in the S&P 500 index, dating back to the day of the 2016 U.S. presidential election. As a result, global equity markets also experienced their first correction (10% or more decline in value) in two years and volatility remained through the end of February as the market wrestled with the additional threat of possible policy mistakes by the Fed and Trump administration. Equity volatility and stock-to-stock correlations spiked in February to about three times the level experienced in January, reaching their highest points since August 2015. The VIX averaged 22% for February, double the level experienced during 2017, hitting an intraday peak of 50%. Despite the repricing of risk assets and heightened volatility, there was no meaningful flight to quality, as the 10-year Treasury yield finished February at 2.87%, up 15 bps during the month and 47 bps year to date. For the ERS and most other portfolios, bonds and stocks falling together is about the worst drawdown scenario possible, especially after a sustained increase in equity valuations.

[2] MSCI All Country World Index Investable Market Index Net Dividends plus 200 Basis Points

Letter from Chief Investment Officer (continued)

March was notable for the emergence of four dominant market themes that persisted through the end of the fiscal year: (1) higher volatility and correlations in global equity markets consistent with the late stages of an economic expansion, (2) higher U.S. short-term interest rates with the Fed increasing the Fed Funds Rate by 25 bps in March for the sixth time since the financial crisis and indicating that it will keep on its course of three more 25 basis point increases in 2018, consistent with an expanding U.S. economy and muted inflation fears, (3) concerns expressed in the capital markets over personnel changes in the White House and the ramifications of U.S. trade policy -- particularly the possibility of a trade war -- and other economic policies on the global economic expansion and future corporate earnings, and (4) robust U.S. economic growth with unemployment hitting a low of 3.8% by the end of the fiscal year and first quarter 2018 corporate earnings announcements coming in strong (26% SP500 year-over-year earnings growth) reflecting the added boost from tax reduction taking effect. Notably during the April earnings announcements, the market did not seem to focus on the strong U.S,economic and corporate earnings data and record-low unemployment figures as would normally be expected, but remained concerned about trade, fiscal and monetary policies. Over the fiscal year, the interplay of stimulative U.S. fiscal policy and contractionary monetary policy left the U.S. Treasury curve only about 15 bps higher, but remarkably 100 bps flatter.

Internationally, many macro risks persisted, and the markets took notice creating sporadic market volatility interspersed with complacency during the final five months of the fiscal year. Most notably, concerns in Europe revolved around political turmoil in the European Union (EU) related to Brexit, the financial health of European banks--particularly Deutsche Bank and Italian banks, the absorption of migrants into the EU, high unemployment in Southern EU, monetary policy and low interest rates in Northern EU, the potential for increased Russian aggression, and Greece's ability to succeed with its domestic fiscal reforms. In Asia fears over the global economic impact of the Chinese economic slowdown, the health of Chinese financial institutions, further Chinese currency devaluations, the imposition of trade sanctions with the U.S., and tensions related to North Korea's aggressive actions affected Asian capital markets, while the impact of U.S. trade policies on emerging market economies weighed on their capital markets.

Also of interest during the fiscal year was the one-day "flight to quality" on May 29th when U.S. long-term interest rates fell about 14 bps triggered by fears related to Italy's ability to form a new government, resulting in 2% rally in long-term U.S. Treasury bonds. It's important to note that a normal year consists of one 10% correction and four 5% drawdowns; and a typical business cycle experiences a bear market of 20% or more decline in equity values. Overall, despite all of these macro risks, the market correction and the higher volatility, the 2018 fiscal year proved to be a favorable time to take risk in the capital markets, and the markets ended the year poised for continued strength with no recession in sight.

PORTFOLIO RESTRUCTURING ACTIVITY

Fiscal year 2018 was another year of transition for the portfolio to the new risk-based methodology adopted by the Board in October 2014 as well as investment office making significant strides in enhancing the risk culture within the ERS investment office. Highlights included:

- Increasing the Crisis Risk Offset allocation to $2.1 billion from $1.5 billion at the end of 2017 and adding two new investment managers to the seven existing managers.
- Transitioning the large/midcap equity traditional growth mandate to global strategies rather than distinct buckets based on geographic location and style, resulting in the hiring of two managers and transitioning $1.4 billion from ten managers from the old segmented equity mandates to the new global mandate.
- Transitioning the Principal Protection class to two domestic managers and one global manager, resulting in the hiring of a new U.S. government bond manager, terminating two existing managers and retaining two existing managers.
- Committing $0.7 billion of capital to build out the private equity and credit program.
- Committing $0.4 billion of capital to build out the real estate and infrastructure program.[3]

By the end of the fiscal year, the Traditional Growth component of the Broad Growth class restructuring was completed, representing 31% of the ERS Strategic Target Portfolio, while the Stabilized Growth component of the Broad Growth class was about 80% completed, also representing about 31% of the ERS Strategic Target Portfolio, with only the Credit component and Core Real Estate component restructuring still in progress. The Private Growth component, which consists of private equity/credit and non-core real estate, currently represents about 10% of the ERS Strategic Target Portfolio and is expected to double in size by 2021 in line with the pacing plan for private investments that has been underway since the new risk-based methodology was approved in late 2014. The CRO class and Principal Protection class restructuring are complete, but CRO is expected to increase from 13% to 20% of the ERS Strategic Target Portfolio in 2020. The Real Return class restructuring is only 30% completed, as assets are expected to grow from 3% to 10% of the ERS Strategic Target Portfolio by 2020, with addition of investments in agriculture, commodities and infrastructure. The ERS Portfolio is now roughly 70% of the way from the complete remaking of the former traditional asset class portfolio into the new "risk aware' portfolio. By risk aware, we mean that the portfolio is employing dynamic strategies like those in CRO that automatically adjust to changing market conditions by increasing the exposure to risk assets when market conditions are favorable and reduce exposure to risk assets when market conditions are unfavorable. This restructuring along with ongoing professional management of the trust's assets will greatly increase the potential for the overall pension plan to remain a sustainable program.

[3] Between July 1, 2017 and June 30, 2018, $360 million in real estate investments and $50 million in infrastructure investments were recommended for investment. Actual closing dates on commitments may be outside of that window.

Letter from Chief Investment Officer (continued)

PORTFOLIO ANALYSIS & CONCEPTUAL REDESIGN

The ERS investment portfolio is steadily becoming more robust because it has lower fees, less risk, greater transparency, and better risk-adjusted performance than ever before. Lower fees come from more passive strategies and renegotiation of contracts and searches. Less risk is from a more diversified set of strategies, focus on income (over capital appreciation), and systematically gaining exposures to a more diverse set of return premia. Greater transparency comes in the form of improved analytics and measurement of exposures from two new risk systems that came online in late 2016 (Aladdin) and early 2017 (RiskMetrics), and in a functional risk class portfolio that provides greater insights into the risk relative to return of the underlying strategies. Better performance is demonstrated on both an absolute (e.g., higher nominal compounding returns) and a relative (e.g. outperforming the assumed rate of return and policy benchmark; outperforming peers and other institutional investors) basis using a variety of metrics including standard measures of risk-adjusted returns. The redesigned functional risk class portfolio provides for the increased probability that the plan will be sustainable. The ERS also became a signatory to the U.N. Principles for Responsible Investment and the Board retained Glass Lewis to vote our stock proxies in alignment with Glass Lewis' Public Pension Policy guidelines and consistent with our investment principles regarding environmental, social and corporate governance. The majority of our redesign has been completed and we are currently in the process of making improvements and adjustments as needed.

Office Development

The 2018 fiscal year was the fourth complete year for the investment team in the Investment Office. The team consists of three Investment Offices, two Investment Specialists, one Chief Investment Officer (CIO), and one Administrative Assistant. In February, the CIO resigned and the Board appointed an internal Acting CIO until a permanent replacement can be found, leaving the Office downone staff member for the last five months of the fiscal year. The new CIO will be charged with creating a business plan for the Investment Office that will allow the ERS to achieve its long-term risk and return goals; this plan will involve the Office taking on new responsibilities, hiring additional staff and acquiring necessary investment tools. It is expected that the actions taken during the next few years to build out the Investment Office will greatly increase the potential for the overall pension plan to remain a sustainable program.

Letter from Chief Investment Officer (continued)

OUTLOOK

Unlike like the fiscal year outlook for 2018, the capital market outlook for 2019 is less favorable. The US economy is poised for slower—although not negative—growth stemming from dwindling financial stimulus, trade ambiguity, and geopolitical uncertainty. Firms are now facing greater uncertainty, slowing investment and hiring. Given this backdrop, we should expect higher volatility and corresponding consumer skittishness as the markets react to new data. Changes in durable goods orders and manufacturing orders will be important to watch as signs of impending weakness. Unemployment, a lagging indicator, is likely to stay in the same range. The Federal Reserve would likely require several quarters of negative data (e.g., employment numbers) to change course, so there is uncertainty stemming from Fed action as well.

Market volatility is not in and of itself a negative—volatility often provides opportunities for active management and liquidity providers. Volatility in and of itself is not a negative. Our portfolio, like most institutional portfolios, is strongly tilted towards global economic growth (re: equities). In a period of declining growth, we will be considering diversifiers and maintaining some “dry powder” to take advantage of opportunities that will provide positive returns during a difficult time for U.S. equities.

The investment office continues to seek critical tools and staff to fulfill all its responsibilities and capabilities, particularly in light of impending market turbulence. While we are an experienced and talented office, tools that can enhance our analysis and expand our efficiency will be crucial. The opportunity cost of not getting these resources remains significant—most likely in the hundreds of millions of dollars annually. Out of necessity for the specific needs of our Plan the staff, with the oversight of the Trustees and assistance of the three ERS consultants, has constructed a “risk aware” will be better able to withstand the episodic market downturns we are sure to face in the future. Our goal is also to position the ERS to take advantage of the valuation displacements that these crises create by allowing staff to redeploy ERS capital to these opportunities. We have a sophisticated, intricate plan that requires sophisticated tool and analysis for proper execution.

It is an honor to serve the members and beneficiaries of the System as your Chief Investment Officer. I would like to thank the Board of Trustees and Staff for their support and dedication as we endeavor to manage the assets of the plan as prudently and efficiently as possible.

Respectfully yours,

Elizabeth T. Burton

Elizabeth T. Burton
Chief Investment Officer

Letter from Investment Consultant

MEMORANDUM

March 27, 2019

Board of Trustees
Employees' Retirement System of the State of Hawaii
City Financial Tower
201 Merchant Street, Suite 1400
Honolulu, HI 96813-2980

Dear Trustees:

Enclosed is our report on the investment activity for the Employees' Retirement System of the State of Hawaii (ERS) for periods ending June 30, 2018, as requested by the Government Financial Officers' Association (GFOA).

Hawaii ERS-Total Fund Performance

The total assets of the Retirement System were approximately $16.6 billion as of June 30, 2018, an increase of roughly $0.9 billion for the fiscal year. The ERS Total Fund generated solid absolute and relative returns throughout the majority of the portfolio. The investment return for the Total Fund, expressed as a time-weighted total rate of return, was +7.9% for the 2018 fiscal year compared to the benchmark's return of +7.7% and the BNY Mellon Public Funds Greater than $1 Billion Database peer median return of +8.7%. For the three-year period ending June 30, 2018, the Total Fund returned 6.8% per annum versus the benchmark's return of +6.4% and the BNY Mellon Public Funds Greater than $1 Billion Database peer median return of +7.2%. For the trailing five-year period ending June 30, 2018, the Total Fund returned +8.4% per annum versus the benchmark's return of +7.8% and the BNY Mellon Public Funds Greater than $1 Billion Database peer median return of +8.1%. The Total Fund's returns over all examined periods were consistent with the global capital markets, and in particular, were primarily driven by the public global equity markets.

Strategic Class Performance

In 2014, the ERS adopted a risk-based, functional framework for allocating capital within the Total Fund. This framework makes use of strategic / functional classes that in-turn utilize underlying asset classes and strategies. As of June 30, 2018, nearly all the ERS's existing asset classes have been remapped to various risk-based, functional strategic classes. Based on these changes, the verbiage below highlights the performance of the ERS's risk-based strategic classes.

M E K E T A I N V E S T M E N T G R O U P
411 NW PARK AVENUE SUITE 401 PORTLAND OR 97209
503 226 1050 fax 503 226 7702 www.meketagroup.com

Memorandum
March 27, 2019
Page 2 of 10

As calculated by BNY Mellon, the ERS's custodial bank, the Broad Growth class produced a +9.8% return for the fiscal year versus the Broad Growth benchmark's return of +9.5%. The Broad Growth class utilizes three sub-components: 1) Traditional Growth, 2) Stabilized Growth, and 3) Private Growth. The Traditional Growth sub-component generated a +12.5% return for the fiscal year, the Stabilized Growth sub-component produced a +5.2% return for the fiscal year, and the Private Growth sub-component generated an +15.4% return for the fiscal year. The Principal Protection class produced a +0.9% return for the fiscal year. The Real Return class produced a return of +6.6% for the year ending June 30, 2018. The Crisis Risk Offset ("CRO") class produced a return of +4.2% for the fiscal year.

The four major strategic classes above utilize seventeen underlying sub-asset classes. These classes are (in order of size): Passive Public Equity, Options-based Equity, Active Public Equity, Global Intermediate Fixed Income, Private Equity, Low Volatility Equity, Trend Following Strategies, Extended Global Credit, Alternative Return Capture Strategies, Long Duration Fixed Income, Core Real Estate, Non-Core Real Estate, Inflation-linked Fixed Income, Timber, Other Investments, Infrastructure, and Opportunities. Performance of these various classes is provided in the Investment Results section of this letter.

Furthermore, as a result of the 2015 Asset-Liability Study that was finalized in the 2016 fiscal year, it is expected that the ERS's implementation of the its long-term strategic allocation will be completed by the end of the 2020 fiscal year.

Market Conditions

The fiscal year was largely a story of two environments. In calendar year 2017, we saw synchronized global growth, low volatility, tax cuts in the U.S. at year-end, and a weak U.S. dollar. During the last two quarters of 2017, most asset classes were up, particularly riskier ones. Emerging market stocks led the way in Q3 (+7.9%) and Q4 (+7.4%). U.S. and developed international equities also posted strong returns over both quarters, while fixed income assets were largely up but with more modest returns in the "risk on" environment.

The trends of 2017 persisted into early calendar year 2018, but the environment quickly changed. In 2018, we saw volatility increase from its very low levels, interest rates and inflation rise, the U.S. dollar rebound, and trade tensions between the U.S. and others heat-up. In this environment, U.S. equities were one of the few asset classes to perform well, while international equities and most fixed income asset classes fell. High yield bonds did post a modest gain (+0.2%) in the first two quarters of 2018.

The net result of the two environments on the fiscal year returns ending June 2018 was that equities increased, particularly in the U.S., while TIPS and high yield bonds posted relatively modest gains. Emerging market bonds fell and the broad U.S. bond market slightly declined.

Memorandum
March 27, 2019
Page 3 of 10

For the fiscal year, U.S. equities, as represented by the Russell 3000, rose by +14.8%. The trend of U.S. growth stocks outperforming value stocks persisted and small capitalization stocks (+17.6%) outperformed large capitalization (+14.5%) and mid-capitalization (+12.3%) stocks. The MSCI EAFE, representing foreign developed markets, increased at less than half the rate of U.S. equities, up +6.8%. Emerging market equities' strong returns in 2017 were balanced by an -8.0% decline in the second quarter of 2018 as a stronger dollar and trade tensions weighed on results. The MSCI Emerging Markets Equity Index gained +8.2% for the full fiscal year.

Within fixed income, positive returns in the final two quarters of 2017 moved to concerns over rising interest rates and inflation, creating headwinds in 2018. In the U.S., the Federal Reserve increased short-term interest rates for the seventh time in June to a range of 1.75% to 2.00% and continued to reduce its balance sheet. The rate increases contributed to the flattening of the U.S. yield curve during the fiscal year. Over the trailing year, TIPS (+2.1%) and high yield bonds (+2.6%) increased, while the broad U.S. bond market, represented by the Bloomberg Barclays Aggregate Index, fell -0.4%. Similar to emerging market equities, returns for emerging market bonds in the second quarter of 2018 weighed on the fiscal year results. In this case, the impact was more dramatic, as the -10.4% decline in the second quarter for emerging market bonds (as represented by JPM GBI-EM Global Diversified – Local Currency) led to a -2.3% return for the trailing year.

Within other asset classes, natural resource stocks (S&P Global Natural Resources Index) rose +24.8%, commodities (Bloomberg Commodity Index) gained +7.4%, and REITs (MSCI U.S. REIT Index) gained +3.6%. Oil prices finished the fiscal year at over $60/barrel, representing a dramatic increase from their recent lows. Cuts from OPEC and strong growth globally contributed to the rise in oil prices.

Throughout the complicated market conditions of the past few years, with its constant review and oversight, the Board continues to position the Employees' Retirement System of the State of Hawaii for competitive long-term performance consistent with its objectives.

Sincerely,

Neil Rue, CFA
Managing Principal

Colin Bebee, CFA
Executive Vice President

Memorandum
March 27, 2019
Page 4 of 10

Report on Investment Activity for the
Employees' Retirement System of the State of Hawaii
Prepared by Meketa Investment Group, Inc.
June 2018

Outline of Investment Policies

The primary goal of the Plan is the preservation of capital. The Board of Trustees seeks preservation of capital with a consistent, positive return for the Fund. Although pure speculation is to be avoided, the Board appreciates the fact that an above-average return is associated with a certain degree of risk. Risk to be assumed must be considered appropriate for the return anticipated and consistent with the total diversification of the Fund.

Strategic Asset Allocation Policy

A formal asset-liability study is conducted every three-to-five years to verify or amend the Plan's policy targets. The targets are designed to achieve a certain level of return, and associated level of risk, that is aligned with the Plan's goals and objectives. The targets are evaluated on the basis of assets designated to each strategic class by the Board, rather than on a current invested position. The targets are pursued primarily by cash flow on a long-term basis and if significant changes occur within the economic and/or capital market environment according to the rebalancing guidelines. The targets are to be reviewed annually for reasonableness relative to significant economic and market changes. The Board of Trustees initiated a new asset-liability study during fiscal year 2015 that was completed during fiscal year 2016. As a result of the 2015 Asset-Liability Study, the Board adopted a new long-term strategic allocation policy which included evolving policy targets designed to efficiently transition the Plan to the new long-term strategic allocation over time. It is expected that the ERS's implementation of the new long-term strategic allocation will be completed by the end of the 2020 fiscal year. The 2015 Asset-Liability Study, and the approved long-term strategic allocation, fully incorporated a risk-based, functional allocation framework. The strategic allocation policy highlighted below, coupled with the actual ERS portfolio, reflect the multiple stages of decisions associated with the 2015 Asset-Liability Study.

Strategic Asset Allocation Policy (as of 6/30/2018)

At the end of the fiscal year, the Plan was strategically invested in the following classes:

	Strategic Allocation (functional/risk-based classes)
Broad Growth	**72%**
Principal Protection	**8%**
Real Return	**7%**
Crisis Risk Offset	**13%**
Total	**100%**

The above strategic allocation is supported by seventeen underlying sub-asset class (see supporting pages).

Report on Investment Activity by Investment Consultant (continued)

Memorandum
March 27, 2019
Page 5 of 10

Long-Term Strategic Allocation Policy

As a result of the formal asset-liability study that began in fiscal year 2015 and was completed in fiscal year 2016, the Board adopted a new long-term strategic allocation policy. It is expected that final implementation and allocations across the new long-term strategic allocation policy will be completed by the end of the 2020 fiscal year

Expected Annualized Return and Risk

Based on custom 2018 capital market assumptions, the target allocation classes are expected to achieve the long-term geometric average returns as shown in the following table. The annual nominal returns will vary on a year-by-year basis but are expected to approach the long-term annualized return expectations over time.

Long-Term Strategic Allocation Targets

The ERS will strategically invest in the following asset classes:

Strategic Allocation (risk-based classes)	**Strategic Class Weights**	**Expected Long-term Geometric Average Return**	**Expected Long-term Real Return[1]**	**Expected Annual Standard Deviation**
Broad Growth	63%	7.10%	4.85%	17.35%
Principal Protection	7%	2.50%	0.25%	3.50%
Real Return	10%	4.10%	1.85%	6.10%
Crisis Risk Offset	20%	4.60%	2.35%	9.45%
Total Portfolio	**100%**			

[1] Uses an expected inflation of 2.25%

Evolving Strategic Allocation Policy

Implementation Plan for Long-term Strategic Policy				
	Current (6/30/2018)	1/1/2019	1/1/2020	Long-Term 7/1/2020
Broad Growth	72%	68%	64%	**63%**
Principal Protection	8%	8%	7%	**7%**
Real Return	7%	8%	9%	**10%**
Crisis Risk Offset	13%	16%	20%	**20%**
Opportunities	0%	0%	0%	**0%**
Total Portfolio	*100%*	*100%*	*100%*	***100%***

Memorandum
March 27, 2019
Page 6 of 10

Manager Evaluation

Public markets managers are measured against relevant indices and/or their respective peer groups of managers. Market indices and peer group benchmarks (when applicable) are assigned to each manager and are intended to serve as a guide for the investment manager to understand the risk/reward posture of their portfolio. Real Estate managers are measured against the median performance of the BNY Mellon Real Estate Database and the appropriate NCREIF Real Estate Index. Private Equity managers are measured against public market proxies and relevant peer groups. Managers have full discretion to manage the risk posture of their portfolios relative to their designated market index and may, with conviction and appropriate expertise, execute security strategies not reflected by their market index as long as they conform to the investment guidelines and the laws of the State of Hawaii.

Investment Practices

The full Employees' Retirement System of the State of Hawaii Investment Policy, Guidelines, and Procedures Manual (Manual) describes, in detail, acceptable investment practices, manager reporting requirements, manager performance guidelines, distribution of brokerage commissions, and securities lending guidelines. Material revisions to the Manual occurred during each of the last six fiscal years and will continue to transpire throughout the evolution of the Plan. A current version of the Manual is located on the ERS's website.

All rates of return are calculated using methodologies that are generally in-line with the Global Investment Performance Standards (GIPS). All public markets manager returns are time-weighted rates of return based on daily or monthly custodial data. All private markets manager returns seek to accurately represent cash flows and appraisal values. The ERS's custodian bank is the primary entity responsible for performance reporting.

Report on Investment Activity by Investment Consultant (continued)

Memorandum
March 27, 2019
Page 7 of 10

Investment Results as of June 30, 2018 (Risk-based Classes):

	Performance - Year Ended June 30,					3 Years Ended	5 Years Ended
	2018	2017	2016	2015	2014	6/2018	6/2018
Broad Growth *	**9.76%**	**17.42%**	**(2.62%)**	---	---	**7.87%**	---
Broad Growth Blended Index[1]	**9.50%**	**14.39%**	**(2.17%)**	---	---	**7.01%**	---
Principal Protection	**0.94%**	**1.94%**	**3.11%**	**2.78%**	**6.28%**	**1.99%**	**2.99%**
Principal Protection Blended Index[2]	0.63%	(-0.02%)	4.24%	1.73%	5.28%	1.60%	2.35%
Crisis Risk Offset**	**4.20%**	**15.06%**	**15.06%**	---	---	---	---
Crisis Risk Offset Blended Index[3]	1.58%	11.84%	11.84%	---	---	---	---
Real Return	**6.63%**	**2.60%**	**5.33%**	**5.37%**	**7.96%**	**4.84%**	**5.56%**
CPI + 3%	5.88%	4.70%	4.05%	3.17%	5.08%	4.88%	4.58%
Total Fund	**7.85%**	**13.68%**	**(0.78%)**	**4.23%**	**17.77%**	**6.75%**	**8.35%**
Composite Benchmark[4]	7.67%	11.87%	(0.04%)	2.75%	17.51%	6.38%	7.77%
Median Fund***	8.68%	12.63%	0.43%	3.11%	17.14%	7.24%	8.13%

* Per BNY Mellon data, the Broad Growth composite was incepted 10/1/2014. Contains lagged and non-lagged components.

** Per BNY Mellon data, the Crisis Risk Offset composite was incepted 4/1/2017.

*** Universe data provided by BNY Mellon. Total Fund universe is the BNY Mellon: Public Funds > $1 billion.

[1] 78.0% MSCI ACWI IMI ND, 6.8% CBOE BXM Index, 5.1% BBg BC Global Credit (hedged) Index, 3.4% BBg BC Global High Yield (hedged) Index, 1.7% S&P LSTA Leveraged Loan Index, and 5.0% MSCI ACWI IMI ND (quarter lagged) + 2% through 12/31/15;

77.0% MSCI ACWI IMI ND, 6.8% CBOE BXM Index, 5.1% BBg BC Global Credit (hedged) Index, 3.4% BBg BC Global High Yield (hedged) Index, 1.7% S&P LSTA Leveraged Loan Index, and 6.0% MSCI ACWI IMI ND (quarter lagged) + 2% through 6/30/16;

45.0% Stabilized Growth Blended Benchmark, 45.0% Traditional Growth Blended Benchmark, and 10.0% Private Growth Blended Benchmark through 12/31/17;

43.0% Stabilized Growth Blended Benchmark, 43.0% Traditional Growth Blended Benchmark, and 14.0% Private Growth Blended Benchmark thereafter.

[2] BC Aggregate Index through 6/30/08;

85% BC US Universal Index and 15% Multiverse Non-US Hedged Index through 9/30/14;

BC Global Intermediate Aggregate ex. Credit (hedged) Index through 12/31/17;

55% BBg BC US Intermediate Aggregate ex. Credit Index and 45% BBg BC Global Intermediate Aggregate ex. Credit (hedged) Index thereafter.

[3] 30.0% 90-Day T-Bill +5%, 45.0% MLM Global Index LT 15V, and 25.0% BBg BC US Treasury Long Term Index.

[4] 34.9% S&P 500 Index, 4.5% S&P 400 Mid Cap Index, 4.5% Russell 2000 Index, 14.5% MSCI EAFE Free ND Index, 2.5% MSCI Emg Mkts ND Index, 7.5% NCREIF Property Index lagged, 3.6% Alternative Investments, 21.0% BC Aggregate Index, and 7.0% CG WGBI ex US Index through 12/31/08;

41.0% Russell 3000 Index, 14.5% MSCI EAFE Free ND Index, 2.5% MSCI Emg Mkts ND Index, 9.0% NCREIF Property Index lagged, 5.0% Alternative Investments, 21.0% BC Universal Index, and 7.0% BC Multiverse ex US Hedged Index through 6/30/11;

41.0% Russell 3000 Index, 14.5% MSCI World ex US ND Index, 2.5% MSCI Emg Mkts ND Index, 9.0% NCREIF Property Index lagged, 5.0% Alternative Investments, 21.0% BC Universal Index, and 7.0% BC Multiverse ex US Hedged Index through 9/30/11;

35.0% Russell 3000 Index, 18.0% MSCI World ex US ND Index, 3.0% MSCI Emg Mkts ND Index, 7.0% NCREIF Property Index lagged, 5.0% Private Equity, 5.0% Real Return, 18.0% BC Universal Index, 6.0% BC Multiverse ex US Hedged Index, and 3.0% CBOE BXM Index through 6/30/12;

30.0% Russell 3000 Index, 26.0% MSCI ACWI ex US ND Index, 7.0% NCREIF Property Index lagged, 6.0% Private Equity, 5.0% Real Return, 15.75% BC Universal Index, 5.25% BC Multiverse ex US Hedged Index, and 5.0% CBOE BXM Index through 6/30/13;

30.0% Russell 3000 Index, 26.0% MSCI ACWI ex US ND Index, 7.0% NCREIF Property Index lagged, 7.0% Private Equity, 5.0% Real Return, 15.0% BC Universal Index, 5.0% BC Multiverse ex US Hedged Index, and 5.0% CBOE BXM Index through 9/30/14;

76% Broad Growth Blended Benchmark, 12% BC Global Intermediate Aggregate ex. Credit (hedged) Index, 5% CPI + 3%, and 7% NCREIF Property Index (quarter lagged) through 6/30/16;

83.0% Broad Growth Blended Benchmark, 12.0% BC Global Intermediate Aggregate ex. Credit (hedged) Index, and 5.0% CPI + 3%, through 3/31/17;

76.0% Broad Growth Blended Benchmark, 9.0% BC Global Intermediate Aggregate ex. Credit (hedged) Index, 5.0% CPI + 3%, and 10% Crisis Risk Offset Blended Benchmark through 12/31/17;

72.0% Broad Growth Blended Benchmark, 8.0% Principal Protection Blended Benchmark, 7.0% CPI + 3%, and 13% Crisis Risk Offset Blended Benchmark thereafter

Memorandum
March 27, 2019
Page 8 of 10

Investment Results as of June 30, 2018 (Risk-Based Classes – Sub-Components):

	Performance - Year Ended June 30,					3 Years Ended	5 Years Ended
	2018	2017	2016	2015	2014	6/2018	6/2018
Broad Growth*	**9.76%**	**17.42%**	**(2.62%)**	**---**	**---**	**7.87%**	**---**
Broad Growth Blended Index[1]	9.50%	14.39%	(2.17%)	---	---	7.01%	---
Traditional Growth	**12.46%**	**21.98%**	**(4.82%)**	**2.67%**	**24.07%**	**9.30%**	**10.71%**
Traditional Growth Blended Index[2]	11.14%	19.01%	(3.87%)	1.20%	23.64%	8.34%	9.73%
Active Public Equity******	12.50%	23.68%	---	---	---	---	---
Active Public Equity Index[3]	11.67%	19.31%	---	---	---	---	---
Median Fund***	11.05%	19.77%	---	---	---	---	---
Passive Public Equity******	12.10%	19.87%	---	---	---	---	---
MSCI ACWI ND	10.73%	18.78%	---	---	---	---	---
Median Fund***	11.05%	19.77%	---	---	---	---	---
Stabilized Growth*	5.24%	10.85%	4.24%	---	---	6.74%	---
Stabilized Growth Blended Index[4]	5.60%	9.21%	4.56%	---	---	6.44%	---
Core Real Estate**	6.19%	8.68%	14.86%	18.78%	5.26%	9.85%	10.63%
NCREIF Blended Index[8]	7.11%	7.27%	11.84%	12.72%	11.18%	8.72%	10.00%
Extended Global Credit*	0.69%	8.06%	4.74%	---	---	4.45%	---
Ext Global Credit Blended Index[5]	1.53%	7.12%	4.83%	---	---	4.47%	---
Low Volatility Equity******	8.99%	---	---	---	---	---	---
MSCI ACWI Min Volatility Index	7.33%	---	---	---	---	---	---
Options-Based Equity*	5.24%	12.19%	3.57%	---	---	6.94%	---
Options-Based Blended Index[6]	5.82%	11.51%	4.76%	---	---	7.06%	---
Private Growth	15.36%	18.60%	5.17%	12.83%	20.39%	12.90%	14.35%
Private Growth Blended Index[7]	17.03%	17.37%	(2.36%)	7.64%	26.11%	10.28%	12.73%
Non-Core Real Estate**	10.86%	12.09%	14.98%	18.91%	18.31%	12.63%	14.98%
Private Growth Blended Index[7]	17.03%	17.37%	(2.36%)	7.64%	26.11%	10.28%	12.73%
Private Equity**	20.29%	20.29%	5.26%	12.70%	20.39%	13.86%	14.90%
Private Growth Blended Index[7]	17.03%	17.37%	(2.36%)	7.64%	26.11%	10.28%	12.73%

*Per BNY Mellon data, the composite was incepted 10/1/2014. The Broad Growth and Stabilized Growth composites contain lagged and non-lagged components.
**Lagged one quarter.
*** Universe data provided by BNY Mellon.
****Per BNY Mellon data, the Active and Passive Public Equity composites were incepted 7/1/2016 and the Low Volatility Equity composite was incepted 9/1/2016.

[1] 78.0% MSCI ACWI IMI ND, 6.8% CBOE BXM Index, 5.1% BBg BC Global Credit (hedged) Index, 3.4% BBg BC Global High Yield (hedged) Index, 1.7% S&P LSTA Leveraged Loan Index, and 5.0% MSCI ACWI IMI ND (quarter lagged) + 2% through 12/31/15;
77.0% MSCI ACWI IMI ND, 6.8% CBOE BXM Index, 5.1% BBg BC Global Credit (hedged) Index, 3.4% BBg BC Global High Yield (hedged) Index, 1.7% S&P LSTA Leveraged Loan Index, and 6.0% MSCI ACWI IMI ND (quarter lagged) + 2% through 6/30/16;
45.0% Stabilized Growth Blended Benchmark, 45.0% Traditional Growth Blended Benchmark, and 10.0% Private Growth Blended Benchmark through 12/31/17;
43.0% Stabilized Growth Blended Benchmark, 43.0% Traditional Growth Blended Benchmark, and 14.0% Private Growth Blended Benchmark thereafter.

[2] 7.4% Russell 2000 Index, 7.4% S&P Mid Cap 400 Index, 57.3% S&P 500 Index, 23.8% MSCI EAFE Free ND, and 4.1% MSCI EM ND through 12/31/08;
70.7% Russell 3000 Index, 4.3% MSCI EM ND, and 25.0% MSCI ACWI ex US ND through 9/30/11;
62.5% Russell 3000 Index, 5.4% MSCI EM ND, and 32.1% MSCI ACWI ex US ND through 6/30/12;
53.6% Russell 3000 Index and 46.4% MSCI ACWI ex US ND though 9/30/14;
100% MSCI ACWI IMI ND thereafter.

[3] 30.0% MSCI ACWI Small Cap ND and 70.0% MSCI ACWI ND.

[4] 30.0% BBg BC Global Credit (hedged) Index, 10.0% S&P LSTA Leveraged Loan Index, 40.0% CBOE BXM Index, 20.0% BBg BC Global High Yield (hedged) Index through 6/30/16;
15.0% NCREIF Property Index (quarter lagged); 8.5% BBg BC Global Credit (hedged) Index, 2.8% S&P LSTA Leveraged Loan Index, 8.5% ICE ML 3-month Treasury Bill, 8.5% MSCI ACWI ex US ND, 17.0% CBOE BXM Index, 5.7% BBg BC Global High Yield (hedged) Index, 17.0% MSCI ACWI Minimum Volatility ND, and 17.0% CBOE Put-Write Index through 12/31/18; NCREIF Property Index (quarter lagged) replaced with NCREIF ODCE Net (quarter lagged) thereafter.

[5] 50.0% BBg BC Global Credit (hedged) Index, 16.7% S&P LSTA Leveraged Loan Index, and 33.3% BBg BC Global High Yield (hedged) Index.

[6] 100% CBOE BXM Index though 9/30/16; 6.7% ICE ML 3-month Treasury Bill, 16.7% MSCI ACWI ex US ND, 33.3% CBOE BXM Index, and 33.3% CBOE Put-Write Index thereafter.

[7] 100.0% Russell 3000 (quarter lagged) +3.5% through 9/30/14; 100.0% MSCI ACWI IMI (quarter lagged) +2% thereafter.

[8] 100.0% NCREIF Property Index (quarter lagged); through 12/31/18; NCREIF ODCE Net (quarter lagged) thereafter

Memorandum
March 27, 2019
Page 9 of 10

Investment Results as of June 30, 2018 (Risk-Based Classes – Sub-Components) [continued]:

	Performance - Year Ended June 30,					3 Years Ended	5 Years Ended
	2018	2017	2016	2015	2014	6/2018	6/2018
Principal Protection (Global Int. Fixed Income)	**0.94%**	**1.94%**	**3.11%**	**2.78%**	**6.28%**	**1.99%**	**2.99%**
Principal Protection Blended Index[1]	0.63%	-0.02%	4.24%	1.72%	5.28%	1.60%	2.35%
Crisis Risk Offset*	4.20%	---	---	---	---	---	---
Crisis Risk Offset Blended Index[2]	1.58%	---	---	---	---	---	---
Alternative Return Capture*	13.62%	---	---	---	---	---	---
90-Day T-Bill + 5%	6.43%	---	---	---	---	---	---
Systematic Trend Following*	1.74%	---	---	---	---	---	---
MLM Global Index LT 15V	-0.87%	---	---	---	---	---	---
Long Duration Fixed Income*	-2.36%	---	---	---	---	---	---
BBg BC US Treasury Long Term	-0.13%	---	---	---	---	---	---
Real Return	**6.63%**	**2.60%**	**5.33%**	**5.37%**	**7.96%**	**4.84%**	**5.56%**
CPI + 3%	5.88%	4.70%	4.05%	3.17%	5.08%	4.88%	4.58%
Global Inflation-Linked Securities	4.37%	2.20%	6.42%	3.10%	4.58%	4.32%	4.12%
BBg BC World Govt Inflation-Linked	3.44%	1.93%	7.39%	3.34%	4.39%	4.23%	4.08%
Infrastructure**	10.26%	12.29%	11.13%	---	---	11.23%	---
CPI + 4%	6.91%	5.71%	5.06%	---	---	5.90%	---
Timber**	9.63%	2.66%	2.92%	11.12%	16.63%	5.02%	8.46%
NCREIF Timberland Index**	3.79%	3.64%	2.90%	10.64%	9.77%	3.44%	6.10%
Opportunities**	**1.02%**	**6.04%**	**---**	**---**	**---**	**---**	**---**
Other[3]	**6.13%**	**6.29%**	**(1.19%)**	**0.18%**	**2.89%**	**3.68%**	**2.81%**

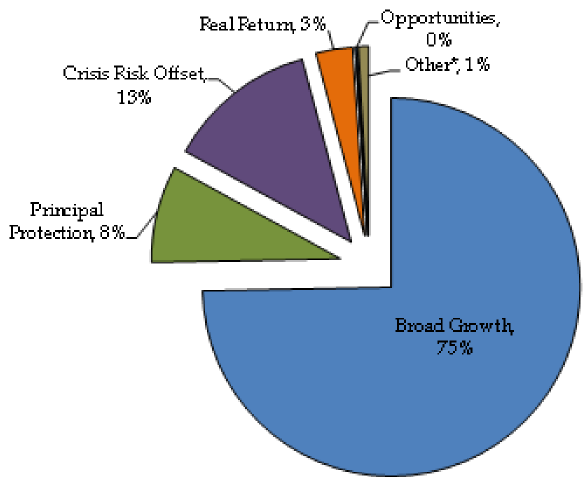
*Per BNY Mellon data, the Crisis Risk Offset composite was incepted 4/1/2017.
**Lagged one quarter.

[1] 100% BBg BC Aggregate Index through 6/30/08;
85.0% BBg BC US Universal Index and 15.0% Multiverse Non-US (hedged) Index through 9/30/14;
100% BBg BC Global Intermediate Aggregate ex. Credit (hedged) Index
55% BBg BC US Intermediate Aggregate ex. Credit Index and 45% BBg BC Global Intermediate Aggregate ex. Credit (hedged) Index thereafter.
[2] 30.0% 90-Day T-Bill +5%, 45.0% MLM Global Index LT 15V, and 25.0% BBg BC US Treasury Long Term Index.
[3] Includes Board of Trustees Discretionary Managed Assets and transition activity/accounts that were in-process at the end of the fiscal year.

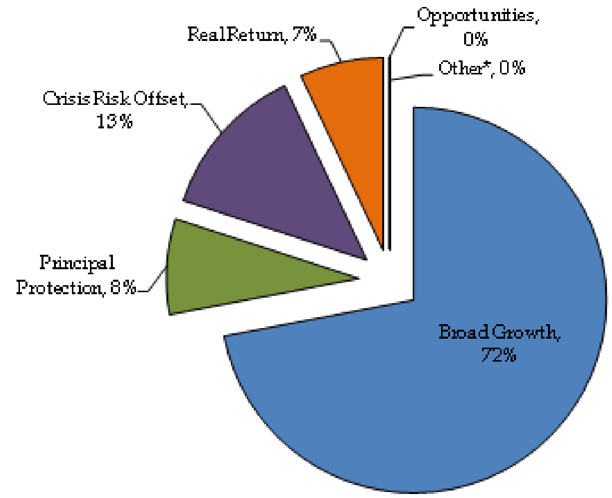
Memorandum
March 27, 2019
Page 10 of 10

Strategic Allocation as of June 30, 2018 (Risk-based Classes):

Actual Allocation



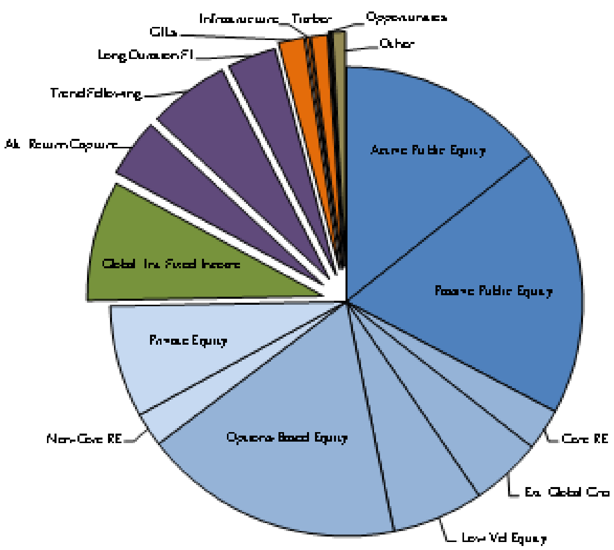
Target Allocation



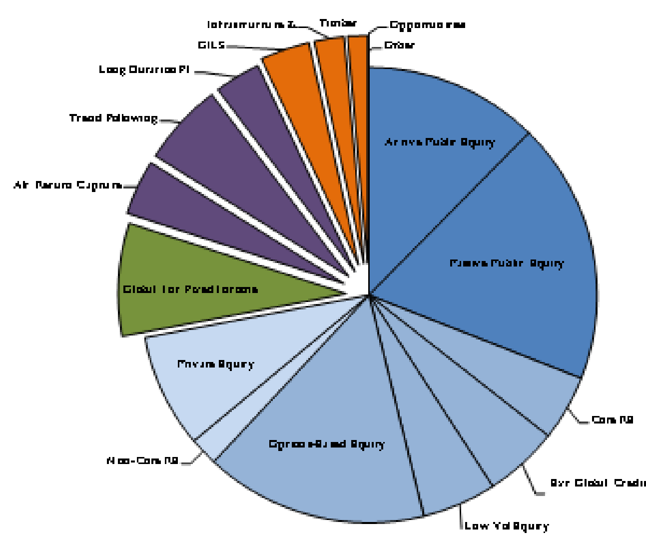
*Includes Board of Trustees Discretionary Managed Assets, and transition activity/accounts that were in-process at the end of the fiscal year

Strategic Allocation as of June 30, 2018 (Risk-based Classes - Sub-Components):

Actual Allocation



Target Allocation



INVESTMENT MANAGERS

ACTIVE PUBLIC EQUITY (BROAD GROWTH)
Fidelity Institutional
Longview
Quantitative Management Associates (QMA)
Wellington

PASSIVE PUBLIC EQUITY (BROAD GROWTH)
Blackrock
Legal and General Investment Management

CORE REAL ESTATE (BROAD GROWTH)
Cabot Industrial
H/2
Heitman Capital Management
Invesco Realty Advisors

EXTENDED GLOBAL CREDIT (BROAD GROWTH)
Pacific Investment Management Company
Tortoise Credit
Western Asset Management Company

LOW VOLATILITY EQUITY (BROAD GROWTH)
Robeco
TOBAM

GLOBAL INTERMEDIATE FIXED INCOME (PRINCIPAL PROTECTION)
Eaton Vance
First Hawaiian Bank
Pacific Investment Management Company

OPTIONS-BASED EQUITY (BROAD GROWTH)
Gateway
Neuberger Berman
UBS

NON-CORE REAL ESTATE (BROAD GROWTH)
Angelo Gordon
Almanac
Blacksand Capital
Blackrock
Blackstone Realty
CB Richard Ellis
Cerebus
DRA
Fortress Japan
H/2
ISquared
Kayne Anderson
Kohlberg Kravis Roberts
LaSalle Investment Management
Lone Star
Mesa Capital
Prudential
Torchlight

PRIVATE EQUITY (BROAD GROWTH)
Hamilton Lane
I Squared
Landmark
Stafford Partners

Continued on next page

Investment Professionals (Continued)

INVESTMENT MANAGERS *(CONTINUED)*

INFLATION-LINKED FIXED INCOME (REAL RETURN)
Blackrock

INFRASTRUCTURE (REAL RETURN)
Kohlberg Kravis Roberts

TIMBER (REAL RETURN)
Hancock Timber Resource Group

OPPORTUNITIES (OPPORTUNITIES)
Lowe Enterprises

ALTERNATIVE RETURN CAPTURE STRATEGIES (CRO)
Bank of New York Mellon
Graham Capital Management
P E Global
Welton Investment Partners

TREND FOLLOWING STRATEGIES (CRO)
AlphaSimplex
Aspect Capital
Campbell & Company Investment Adviser
Crabel Capital Management

LONG DURATION FIXED INCOME (CRO)
Ryan Labs Asset Management

OTHER SERVICE PROVIDERS

INVESTMENT ADVISOR
Meketa Investment Group
(Pension Consulting Alliance, LLC merge with)
AON Hewitt
Hamilton Lane

CUSTODIAL BANK
Bank of New York Mellon

PLATFORM SERVICE MANAGER (CRO)
FRM Investment Management (USA) LLC

Investment Schedules

List of Assets Directly Held (by fair value)*

as of June 30, 2018 (excludes investments in pooled vehicles and index funds)

** A complete list of holdings is available for review upon request.*

	Par / Shares	Security	Coupon	Maturity	Average Issue Rating	Fair Value
Domestic Fixed Income						
1	70,000,000	U.S. Treasury Note	0.875%	6/15/2019	AAA	$ 69,021,400
2	70,000,000	U.S. Treasury Note	1.625%	3/15/2020	AAA	68,961,200
3	70,000,000	U.S. Treasury Note	1.375%	12/15/2019	AAA	68,903,800
4	70,000,000	U.S. Treasury Note	1.500%	6/15/2020	AAA	68,624,500
5	70,000,000	U.S. Treasury Note	1.375%	9/15/2020	AAA	68,228,300
6	59,500,000	U.S. Treasury Note	1.000%	3/15/2019	AAA	58,981,755
7	59,500,000	U.S. Treasury Note	0.875%	9/15/2019	AAA	58,407,580
8	36,800,000	U.S. Treasury Note	1.625%	11/15/2022	AAA	35,155,408
9	31,723,000	U.S. Treasury Note	2.875%	4/30/2025	AAA	31,847,037
10	31,956,600	U.S. Treasury Note	1.250%	5/31/2019	AAA	31,642,147
International Fixed Income						
1	238,640,000	Norway Government Bond 144A	3.750%	5/25/2021	AAA	31,477,033
2	255,683,000	Norway Government Bond 144A	1.500%	2/19/2026	AAA	31,096,429
3	42,860,000	Singapore Government Bond	1.250%	10/1/2021	-	30,600,814
4	115,554,000	Republic of Poland Government Bond	2.500%	7/25/2026	A3	29,509,256
5	37,972,000	European Investment Bank	6.500%	8/7/2019	AAA	29,339,549
6	96,328,000	Republic of Poland Government Bond	5.750%	10/25/2021	A3	28,788,151
7	40,211,000	Kreditanstalt Fuer Wiederaufba	3.750%	5/29/2020	AAA	27,912,966
8	15,626,000	Spain Government Bond 144A	1.600%	4/30/2025	BAA1	19,239,573
9	155,000,000	Norway Government Bond 144A	1.750%	2/17/2027	AAA	19,093,161
10	73,426,000	Republic of Poland Government Bond	2.750%	4/25/2028	A3	18,876,461
Domestic Equities						
1	351,852	Apple Inc				65,131,324
2	617,661	Microsoft Corp				60,907,551
3	1,430,550	Pfizer Inc				51,900,354
4	241,783	Facebook Inc				46,983,273
5	26,730	Amazon.Com Inc				45,435,654
6	374,113	Johnson & Johnson				45,394,871
7	148,265	UnitedHealth Group Inc				36,375,335
8	335,545	Fidelity National Information				35,577,836
9	712,389	Intel Corp				35,412,857
10	107,013	Humana Inc				31,850,279
International Equities						
1	576,594	Swedish Match AB				28,597,670
2	1,102,230	Compass Group PLC				23,552,722
3	183,571	Henkel Ag & Co KGAA				23,468,951
4	513,100	Nippon Telegraph & Telephone				23,328,413
5	255,179	Sanofi				20,453,186
6	24,494,202	Lloyds Banking Group PLC				20,389,405
7	88,808	Continental AG				20,276,145
8	387,067	Whitbread PLC				20,231,488
9	328,150	Toronto Dominion Bank				18,981,287
10	1,193,883	Wpp PLC				18,804,353

Investment Schedules (continued)

Investments Summary

- excludes cash and cash equivalents and short-term investments

(Dollar values expressed in thousands)		**Fair Value as of June 30, 2018**	**Percentage**
Equity securities			
Common stock	$	5,525,796	39.43%
Pooled funds		1,768,805	12.62%
Preferred shares and others		50,965	0.36%
		7,345,566	52.41%
Fixed income securities			
US treasury / government / agencies		2,257,005	16.10%
US mortgage-backed		313,072	2.23%
US corporate		532,110	3.80%
Non-US government / agencies		719,807	5.14%
Non-US corporate		228,359	1.63%
Pooled and others		46,253	0.33%
		4,096,606	29.23%
Others			
Real estate investments		1,060,893	7.57%
Alternative investments		1,512,559	10.79%
		2,573,452	18.36%
Total, investments at fair value	$	14,015,624	100.00%

Investment Schedules (continued)

Schedule of Investment Fees
by Asset Class Allocation

(Dollar values expressed in thousands)

	Fair value as of June 30, 2018	Total FY 2018 Investment Fees	Basis Points
Broad Growth			
Active Public Equity	$ 2,348,644	$ 9,744	41 bp
Passive Public Equity	3,050,458	15,583	51
Core Real Estate	475,291	2,975	63
Extended Global Credit	802,357	1,794	22
Low Volatility Equity	1,033,347	2,311	22
Options-based Equity	2,943,553	4,802	16
Non-Core Real Estate	387,617	-	-
Private Equity	1,271,894	1,500	12
	12,313,161	38,709	31
Principal Protection			
Intermediate Fixed Income	1,363,483	1,312	10
Crisis Risk Offset			
Alternative Return Capture Strategies	658,519	5,814	88
Trend Following Strategies	912,119	6,457	71
Long Duration Fixed Income	549,662	287	5
	2,120,300	12,558	59
Real Return			
Inflation-linked Fixed Income	289,825	508	18
Infrastructure	38,046	-	-
Timber	186,962	1,680	90
	514,833	2,188	
Opportunities	28,612	131	46
Other	146,705	-	-
Subtotal on investments	16,487,094	54,898	33
Other Investment Services			
Custodian fees	n/a	520	n/a
Investment consultant fees	n/a	1,456	n/a
Total including consultant and custodian	$ 16,487,094	$ 56,874	34

Schedule of Broker Commissions

The following is a list of brokers who received commissions from equity trades during Fiscal Year 2018.

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
ABN AMRO CLEARING BANK N.V, AMSTERDAM	13,402	$ 51,146	$ 44	$ 0.003
BAIRD, ROBERT W & CO INC, MILWAUKEE	217,658	9,579,358	7,475	0.034
BANCO ITAU, SAO PAULO	149,500	1,151,404	1,763	0.012
BANCO SANTANDER, NEW YORK	411,300	737,254	850	0.002
BANK OF BOSTON/ SHAREHOLDER SVCS, BOSTON	758,700	1,204,735	602	0.001
BANK OF NEW YORK MELLON, NEW YORK	719	108,223	81	0.113
BANQUE PARIBAS, PARIS	214,245	6,115,480	1,659	0.008
BARCLAYS CAPITAL INC, NEW YORK	4,788	22,622	48	0.010
BARCLAYS CAPITAL INC./LE, NEW JERSEY	2,120,098	142,502,821	37,972	0.018
BARCLAYS CAPITAL SECS LTD, LONDON	2,562	103,285	88	0.034
BARCLAYS CAPITAL, LONDON (BARCGB33)	428,603	2,970,964	2,125	0.005
BERENBERG GOSSLER & CIE, HAMBURG	1,250,422	10,212,048	11,877	0.009
BERNSTEIN SANFORD C & CO, NEW YORK	4,056,758	159,111,515	22,858	0.006
BLOOMBERG TRADEBOOK LLC, NY	80,129	3,103,052	464	0.006
BLOOMBERG TRADEBOOK,NEW YORK	89,900	3,049,142	1,043	0.012
BMO CAPITAL MARKETS CORP, NEW YORK	645,847	32,438,300	12,426	0.019
BNP PARIBAS PEREGRINE SEC LTD, HONG KONG	83,800	1,802,685	1,835	0.022
BNP PARIBAS SEC SRVS SA, SINGAPORE	625,900	10,041,902	5,400	0.009
BNP PARIBAS SEC SVCS, LONDON (PARBGB2L)	16,318	373,235	187	0.011
BNP PARIBAS SECS SERVS, SYDNEY	68,759	442,697	319	0.005
BNP PARIBAS SECURITIES SVCS, HONG KONG	857,000	2,506,266	1,805	0.002
BNY CONVERGEX, NEW YORK	752	78,612	11	0.015
BRADESCO S.A. CTVM, SAO PAULO	224,173	2,556,312	3,951	0.018
BROCKHOUSE AND COOPER, MONTREAL	25,714	1,212,867	155	0.006
BTIG LLC, NEW YORK	408,713	8,068,373	17,041	0.042
CALYON SECURITIES, NEW YORK	4,231,000	3,267,540	5,435	0.001
CANACCORD GENUITY CORP, MONTREAL (CCAM)	80,807	3,971,029	607	0.008
CANACCORD GENUITY LTD, LONDON	4,200	42,878	26	0.006
CANADIAN DEPOSITORY, TORONTO	2,681	248,614	32	0.012
CANTOR FITZGERALD & CO INC, NEW YORK	72,922	4,247,537	1,458	0.020
CANTOR FITZGERALD EUROPE, LONDON	562,000	356,934	257	0.000
CARNEGIE ASA, OSLO	20,250	215,220	129	0.006
CHINA INTL CAP CORP HK SECS, HONG KONG	118,000	67,009	60	0.001
CIBC WORLD MKTS INC, TORONTO	125,646	6,344,654	686	0.005
Amounts carried forward	17,973,266	418,305,713	140,769	

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	17,973,266	$ 418,305,713	$ 140,769	
CIBC WORLD MKTS INC, TORONTO (WGDB)	169,338	8,051,014	871	$ 0.005
CICC US SECURITIES INC, NEW YORK	50,000	24,579	18	0.000
CIMB SECURITIES (USA), INC, NEW YORK	1,970,000	868,063	866	0.000
CITIBANK NY (MER)	77,300	189,747	131	0.002
CITIGROUP GBL MKTS INC, NEW YORK	4,686,191	333,615,476	56,952	0.012
CITIGROUP GBL MKTS INC, TAIPEI	1,723,000	5,196,843	4,586	0.003
CITIGROUP GBL MKTS/SALOMON, NEW YORK	8,794,371	53,592,466	22,645	0.003
CITIGROUP GLOBAL MARKETS LTD, LONDON	6,634,925	39,066,499	24,097	0.004
CLSA AUSTRALIA PTY LTD, SYDNEY	1,048,882	8,854,236	2,464	0.002
CLSA SINGAPORE PTE LTD (CHV), SINGAPORE	44,304	22,589	7	0.000
CORMARK SECURITIES INC., TORONTO	216,184	11,554,804	2,804	0.013
COWEN AND CO LLC, NEW YORK	2,933,446	250,286,317	47,669	0.016
COWEN AND COMPANY LLC, NEW YORK	1,315	116,765	20	0.015
CREDIT LYONNAIS CAPITAL, JAKARTA	188,520	487,549	625	0.003
CREDIT LYONNAIS SEC, SEOUL	19,964	1,424,545	632	0.032
CREDIT LYONNAIS SECS (ASIA), HONG KONG	4,678,370	8,291,638	4,034	0.001
CREDIT LYONNAIS SECS ASIA LTD, TAIPEI	2,160,095	3,444,750	2,861	0.001
CREDIT LYONNAIS SECS, SINGAPORE	2,157,807	29,318,619	10,120	0.005
CREDIT SUISSE (EUROPE), LONDON	57,008,549	392,275,115	95,778	0.002
CREDIT SUISSE (EUROPE), SEOUL	260,782	14,261,250	7,111	0.027
CREDIT SUISSE (HK) LIMITED, HONG KONG	516,604	8,931,218	6,148	0.012
CREDIT SUISSE AUSTRALIA EQ, MELBOURNE	283,696	2,727,434	682	0.002
CREDIT SUISSE, NEW YORK (CSUS)	7,631,495	146,677,533	57,745	0.008
CREDIT SUISSE, SAO PAULO	472,032	1,713,615	1,382	0.003
CREDIT SUISSE, TAIPEI	3,363,300	9,399,809	4,688	0.001
DAIWA SEC SMBC EUROPE LTD, LONDON	121,300	2,799,675	1,227	0.010
DAIWA SECS (HK) LTD, HONG KONG	1,600	53,934	35	0.022
DAIWA SECS AMER INC, NEW YORK	773,400	6,597,055	6,787	0.009
DAVIDSON(D A) & CO INC, NEW YORK	52,137	594,185	1,043	0.020
DAVY STOCKBROKERS, DUBLIN	3,835	152,271	128	0.033
DEN DANSKE BANK, COPENHAGEN	1,918	224,026	190	0.099
DEN NORSKE CREDITBANK, OSLO	2,689	24,150	21	0.008
DEUTSCHE BK INTL EQ, LONDN (DEUTGB22EEQ)	4,675,908	33,207,833	13,923	0.003
DEUTSCHE BK SECS INC, NY (NWSCUS33)	15,636,295	407,318,861	106,443	0.007
DEUTSCHE MORGAN GRENFELL SEC, SYDNEY	19,171	46,843	94	0.005
DEUTSCHE SEC ASIA LTD, HONG KONG	27,236,271	35,083,096	15,367	0.001
DEUTSCHE SEC ASIA LTD, TAIPEI	1,273,000	667,659	407	0.000
DEXIA BK (FORMERLY KEMPEN), AMSTERDAM	1,800	36,001	22	0.012
EQUITA SIM SPA, MILAN	63,523	440,178	617	0.010
ERSTE GROUP BANK AG, VIENNA	13,220	320,942	513	0.039
EXANE, PARIS (EXANFRPP)	792,262	9,560,986	4,893	0.006
FIDELITY CAPITAL MARKETS, NEW YORK	779,200	60,323,940	6,178	0.008
Amounts carried forward	176,511,265	2,306,149,821	653,593	

Investment Schedules (continued)

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	176,511,265	$ 2,306,149,821	$ 653,593	
FIDELITY CLEARING CANADA ULC, TOR (FIDC)	72,898	3,094,959	1,057	$ 0.014
FRIEDMAN, BILLINGS AND RAMSEY, NEW YORK	134,663	6,757,605	3,949	0.029
FX- CHASE MANHATTAN BK, ISTANBUL	68,351	262,878	79	0.001
FX- MORGAN STANLEY CO, NEW YORK	5,334,000	246,330	74	0.000
GLOBAL SEC INC, INSTANBUL	584,030	1,308,244	915	0.002
GMP SECURITIES L.P. TORONTO (GMPT)	490,401	4,530,577	7,187	0.015
GOLDMAN SACHS & CO (GBL CUST ONLY), NY	3,165,000	213,020	3,679	0.001
GOLDMAN SACHS & CO, NY	103,049,099	643,893,533	180,917	0.002
GOLDMAN SACHS DO BRASIL, SAO PAULO	589,900	4,780,975	8,766	0.015
GOLDMAN SACHS EXECUTION & CLEARING, NY	15,100	960,865	227	0.015
GOLDMAN SACHS INTL, LONDON (GSILGB2X)	9,019,181	67,984,395	28,426	0.003
GOLDMAN SACHS INTL, NY	67,047	3,447,929	517	0.008
GOODBODY STOCKBROKERS, DUBLIN	37,628	454,893	450	0.012
GUGGENHEIM CAPITAL MARKETS LLC, NEW YORK	67,547	1,594,090	719	0.011
GUZMAN AND COMPANY, NEW YORK	70,731	7,916,808	283	0.004
HAITONG INTL SEC CO LTD, HONG KONG	68,100	889,122	1,741	0.026
HANWHA SECS CO LTD, SEOUL	8,518	731,204	202	0.024
HONG KONG & SHANGHAI BKG CORP, HONG KONG	36,229	289,512	223	0.006
HSBC BANK PLC (MIDLAND BK)(JAC), LONDON	326,831	750,797	252	0.001
HSBC BANK PLC (MIDLAND BK)(XXX), LONDON	638,558	6,611,988	11,513	0.018
HSBC BANK USA, NEW YORK	1,313	58,425	35	0.027
HSBC SECS INC, NEW YORK	1,555,431	2,719,869	4,093	0.003
HSBC SECURITIES (USA) INC, NEW YORK	57,894	4,634,217	1,227	0.021
ICAP DO BRASIL DTVM LTDA, RIO DE JANEIRO	3,600	36,398	18	0.005
ICBC FINCL SVCS, NEW YORK	220,566	10,096,510	1,391	0.006
ING BANK N V, LONDON	14,641	58,469	94	0.006
INSTINET AUSTRALIA CLEARING SERV, SYDNEY	48,429	241,438	237	0.005
INSTINET CLEARING SER INC, NEW YORK	591,822	24,523,033	4,741	0.008
INSTINET CORP, NEW YORK	1,101,127	69,430,372	11,961	0.011
INSTINET EUROPE LIMITED, LONDON	3,208,944	48,559,529	14,831	0.005
INSTINET PACIFIC LTD, HONG KONG	844,906	1,973,890	938	0.001
INVESTEC SECURITIES (331), LONDON	3,395,846	5,766,391	3,450	0.001
INVESTMENT TECH GROUP INC, NEW YORK	878,519	39,471,093	8,964	0.010
INVESTMENT TECHNOLOGY GROUP LTD,DUBLIN	4,041,772	51,996,528	24,257	0.006
INVESTMENT TECHNOLOGY GROUP, NEW YORK	9,000	780,173	113	0.013
ISI GROUP INC, NEW YORK	491,563	13,315,193	4,554	0.009
ITG AUSTRALIA LTD, MELBOURNE	1,933,412	27,844,473	9,004	0.005
ITG CANADA CORP, TORONTO	185,562	6,584,268	1,753	0.009
ITG HONG KONG LIMITED, HONG KONG	434,821	1,624,156	739	0.002
ITG INC, NEW YORK	652,254	37,490,645	6,915	0.011
ITG INC, NY	421,300	1,135,596	662	0.002
J P MORGAN SEC LTD/STOCK LENDING, LONDON	1,153,314	34,903,020	8,160	0.007
Amounts carried forward	321,601,113	3,446,113,231	1,012,906	

Investment Schedules (continued)

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	321,601,113	$ 3,446,113,231	$ 1,012,906	
J P MORGAN SEC, SYDNEY	1,101,562	9,013,951	2,309	$ 0.002
J P MORGAN SECS LTD, LONDON	6,076,214	125,193,484	38,965	0.006
J P MORGAN SECURITIES INC, BROOKLYN	10,700	962,867	80	0.007
J P MORGAN SECURITIES LTD, LONDON	88,700	1,002,352	1,486	0.017
J.P MORGAN SECURITIES INC, NEW YORK	1,056,928	60,741,148	21,182	0.020
J.P. MORGAN CLEARING CORP, NEW YORK	8,608,956	574,519,271	89,049	0.010
J.P. MORGAN SECURITIES, HONG KONG	9,420,820	7,480,846	4,130	0.000
JEFFERIES & CO INC, NEW YORK	1,195,777	63,685,904	18,455	0.015
JEFFERIES & CO LTD, LONDON	2,180,814	48,207,127	12,543	0.006
JONES & ASSOC, WESTLAKE VILLAGE	27,004	766,022	223	0.008
JONESTRADING INST SVCS LLC, NEW YORK	12,700	432,346	528	0.042
JP MORGAN SECS (FAR EAST) LTD, SEOUL	7,467	531,980	213	0.029
JP MORGAN SECS (TAIWAN) LTD, TAIWAN	3,886,895	6,785,875	5,064	0.001
JP MORGAN SECS, SINGAPORE	13,800	68,012	31	0.002
JPMORGAN SECURITIES INC, NEW YORK	2,717,715	15,293,710	13,411	0.005
KEB SALOMON SMITH BARNEY SECS, SEOUL	6,257	235,780	71	0.011
KEPLER EQUITIES, PARIS	245,157	4,454,529	1,515	0.006
KEYBANC CAPITAL MARKETS INC, NEW YORK	83,385	3,498,273	2,682	0.032
KIM ENG SEC LTD, HONG KONG	490,000	346,503	682	0.001
KNIGHT CAPITAL EUROPE LTD, LONDON	390,652	8,129,862	1,633	0.004
KNIGHT SECS, NEW JERSEY	59,845	3,255,738	356	0.006
LARRAIN VIAL, SANTIAGO	8,812,910	3,661,819	1,304	0.000
LEK SECURITIES CORP, NEW YORK	37,526	1,605,307	751	0.020
LIQUIDNET ASIA LTD, HONG KONG	2,254,100	1,833,173	1,059	0.000
LIQUIDNET EUROPE LIMITED, LONDON	789,674	8,287,571	5,460	0.007
LIQUIDNET INC, NEW YORK	1,323,852	63,573,156	13,699	0.010
LONGBOW SECURITIES LLC, NEW YORK	5,400	325,337	108	0.020
MACQUARIE BANK LIMITED, SYDNEY	906,354	5,867,531	1,435	0.002
MACQUARIE BANK LTD, HONG KONG	6,351,755	31,770,830	19,717	0.003
MACQUARIE CAPITAL (USA) INC., NEW YORK	50,800	1,995,370	1,473	0.029
MACQUARIE SECS (SINGAPORE), SINGAPORE	1,847,600	4,339,346	1,837	0.001
MACQUARIE SECURITIES LTD, AUCKLAND	101,902	230,741	462	0.005
MAINFIRST BANK AG,FRANKFURT AM MAIN	140,427	3,222,696	1,932	0.014
MERRILL LYNCH GILTS LTD, LONDON	2,095,400	20,986,874	8,288	0.004
MERRILL LYNCH INTL (2L), LONDON	3,400	34,694	52	0.015
MERRILL LYNCH INTL LONDON EQUITIES	95,720,630	277,011,255	105,978	0.001
MERRILL LYNCH PIERCE FENNER SMITH INC NY	9,481,834	516,338,064	142,428	0.015
MERRILL LYNCH PIERCE FENNER, WILMINGTON	8,401,313	42,321,903	24,259	0.003
MERRILL LYNCH PROFESSIONAL CLRG, PURCHAS	296,831	14,856,738	5,937	0.020
MIRAE ASSET SECURITIES, SEOUL	187,664	4,683,282	2,516	0.013
MITSUBISHI UFJ SECS INTL PLC, LONDON	9,300	359,111	267	0.029
MITSUBISHI UFJ SECURITIES, NEW YORK	261,370	5,502,870	5,401	0.021
Amounts carried forward	498,362,503	5,389,526,479	1,571,877	

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	498,362,503	$ 5,389,526,479	$ 1,571,877	
MIZUHO INTERNATIONAL PLC, LONDON	652,300	8,902,770	2,249	$ 0.003
MIZUHO SECURITIES USA INC, NEW YORK	24,185	1,286,166	808	0.033
MIZUHO SECURITIES USA INC. NEW YORK	729,177	3,709,533	4,272	0.006
MORGAN STANLEY & CO INC, NY	73,518,505	796,721,278	205,488	0.003
MORGAN STANLEY & CO INTL LTD, SEOUL	501,353	8,322,909	2,740	0.005
MORGAN STANLEY & CO INTL LTD, TAPEI	3,689,000	4,648,845	2,894	0.001
MORGAN STANLEY & CO, LONDON (MSLNGB2X)	28,397,658	353,633,944	80,883	0.003
MORGAN STANLEY AND CO INC, NEW YORK	6,022,800	688,053	497	0.000
MORGAN STANLEY-INTERNATIONAL, BROOKLYN	4,681,765	247,600,891	49,446	0.011
MULLER & CO, NEW YORK	100	8,609	1	0.010
NATIONAL FINL SVCS CORP, NEW YORK	1,529,497	88,795,876	19,641	0.013
NBCN CLEARING INC, MONTREAL	127,200	317,029	2,029	0.016
NBCN INC, TORONTO (NBCS)	467,819	11,659,650	6,584	0.014
NESBITT BURNS, TORONTO (NTDT)	362,766	18,502,264	2,911	0.008
NESSUAH, ISRAEL	9,400	909,157	1,092	0.116
NOMURA FINANCIAL & INVESTMENT, SEOUL	986	66,535	146	0.148
NOMURA SECS INTL INC, NEW YORK	40,700	1,164,655	1,302	0.032
NOMURA SECS INTL, LONDON	1,352,530	22,333,857	4,836	0.004
NORDEA BK PLC, HELSINKI (NDEAFIHH030)	368,451	7,124,987	2,308	0.006
OPPENHEIMER & CO INC, NEW YORK	26,925	850,933	832	0.031
PAREL, PARIS	345,773	9,201,719	3,870	0.011
PEEL HUNT LLP, LONDON	2,127	140,085	140	0.066
PERSHING LLC, JERSEY CITY	436,123	21,103,630	7,612	0.017
PERSHING SECURITIES LTD, LONDON	1,500	195,172	291	0.194
PETERS & CO, CALGARY (PECC)	108,600	592,729	1,640	0.015
PIPER JAFFRAY & CO., JERSEY CITY	63,939	4,031,851	2,113	0.033
RAYMOND JAMES & ASSOC INC, ST PETERSBURG	91,471	4,146,949	2,421	0.026
RAYMOND JAMES LTD, TORONTO (MSLT)	24,052	1,200,440	265	0.011
RBC CAPITAL MARKETS LLC, NEW YORK	2,810,921	152,270,266	26,392	0.009
RBC DOMINION SECS INC, TORONTO (DOMA)	389,717	19,101,126	4,920	0.013
REDBURN PARTNERS LLP, LONDON	3,457,426	4,666,246	1,948	0.001
RENAISSANCE MACRO SEC, LLC, NEW YORK, NY	7,400	108,831	259	0.035
ROYAL BANK OF CANADA EUROPE LTD, LONDON	689	41,331	34	0.049
S G WARBURG, SEOUL	282,273	14,712,659	8,604	0.030
SAMSUNG SECS, SEOUL	37,679	1,393,048	3,316	0.088
SANFORD C BERNSTEIN & CO INC, LONDON	455,425	5,026,300	1,424	0.003
SCOTIA CAPITAL INC, NEW YORK	1,079,368	3,463,393	2,189	0.002
SCOTIA CAPITAL MKTS, TORONTO	167,996	7,548,767	1,257	0.007
SG AMERICAS SECURITIES LLC, NEW YORK	3,206,080	81,190,711	15,164	0.005
SG SEC (LONDON) LTD, LONDON	7,094,412	69,848,913	23,371	0.003
SG SECURITIES, HONG KONG	12,511,752	42,275,489	12,016	0.001
SMBC NIKKO SECURITIES LTD, WAN CHAI	725,800	15,308,391	3,505	0.005
Amounts carried forward	654,166,143	7,424,342,466	2,085,587	

Investment Schedules (continued)

Schedule of Broker Commissions (continued)

Brokerage Firms	Shares Traded	Dollar Volume of Trades	Commission Dollar Amount	Commission Per Share
Amounts brought forward	654,166,143	$ 7,424,342,466	$ 2,085,587	
SMBC SECURITIES, INC NEW YORK	100,725	3,211,930	2,717	$ 0.027
SOCIETE GENERALE LONDON BRANCH, LONDON	2,325,922	28,406,117	16,967	0.007
STANDARD BANK, LONDON	16,206	183,475	201	0.012
STATE STREET GLOBAL MARKETS LLC, BOSTON	10,019	984,594	150	0.015
STEPHENS INC, LITTLE ROCK	53,123	2,209,577	1,051	0.020
STIFEL NICOLAUS	1,031,894	24,523,051	33,946	0.033
SUNTRUST CAPITAL MARKETS INC, NEW YORK	179,310	5,657,394	6,305	0.035
SVENSKA HANDELSBANKEN, STOCKHOLM	65,239	454,616	663	0.010
TELSEY ADVISORY GROUP LLC, DALLAS	16,177	128,852	566	0.035
TORONTO DOMINION SEC, TORONTO	375,058	11,760,548	5,768	0.015
UBS AG LONDON INTL GILTS, LONDON	2,113	83,416	50	0.024
UBS EQUITIES, LONDON	16,468,854	52,209,410	20,947	0.001
UBS SECS SINGAPORE PTE LTD	835,306	3,173,747	1,435	0.002
UBS SECURITIES CANADA, TORONTO (BWIT)	356,783	12,689,056	3,385	0.009
UBS SECURITIES LLC, STAMFORD	13,650,122	457,459,047	114,408	0.008
UBS WARBURG ASIA LTD, HONG KONG	49,808,717	83,216,396	27,310	0.001
UBS WARBURG AUSTRALIA EQUITIES, SYDNEY	915,096	9,160,413	3,560	0.004
UBS WARBURG LLC, STAMFORD	341,400	3,260,037	1,199	0.004
UBS WARBURG SEC,TAIWAN	2,874,000	4,320,927	2,520	0.001
UBS WARBURG, LONDON	21,787,188	97,010,925	41,656	0.002
UNION BANK SWITZERLAND SECS, LONDON	142,700	146,386	59	0.000
VALEURS MOBILIERES, MONTREAL (VMDM)	57,634	3,168,936	460	0.008
VIRTU AMERICAS LLC, JERSEY CITY	588,619	43,095,793	5,795	0.010
WEDBUSH MORGAN SECS INC, LOS ANGELES	7,630	652,491	114	0.015
WEEDEN & CO, NEW YORK	468,127	32,674,108	7,439	0.016
WELLS FARGO SECURITIES LLC, CHARLOTTE	435,512	30,468,873	3,746	0.009
WILLIAM BLAIR & CO, CHICAGO	74,706	3,491,188	1,756	0.024
WINTERFLOOD SECS, LONDON	595	37,999	38	0.064
WOORI INVESTMENT & SECURITIES, SEOUL	8,454	365,082	701	0.083
XP INVESTIMENTOS CCTVM SA,RIO DE JANEIRO	91,300	832,061	473	0.005
OTHERS	4,635,150	12,183,689	98,110	0.021
Total trades	771,889,822	$ 8,351,562,600	$ 2,489,082	$ 0.003

This page intentionally left blank.

Employees' Retirement System

of the State of Hawaii

ACTUARIAL SECTION

GASB STATEMENT NO. 67 REPORT

GRS Retirement Consulting

P: 469.524.0000 | F: 469.524.0003 | www.grsconsulting.com

February 15, 2019

Board of Trustees
Employees' Retirement System of
the State of Hawaii
City Financial Tower
201 Merchant St., Ste. 1400
Honolulu, HI 96813-2980

Dear Trustees:

This report provides information required by the Employees' Retirement System of the State of Hawaii ("ERS") in connection with the Governmental Accounting Standards Board (GASB) Statement No. 67 "Financial Reporting for Pension Plans."

Our calculation of the liability associated with the benefits described in this report was performed for the purpose of satisfying the requirements of GASB Statement Nos. 67. The calculation of the plan's liability for this report may not be applicable for funding purposes of the plan. A calculation of the plan's liability for purposes other than satisfying the requirements of GASB No. 67 may produce significantly different results. This report may be provided to parties other than the ERS only in its entirety and only with the permission of ERS.

This report is based upon information, furnished to us by ERS, concerning retirement and ancillary benefits, active members, deferred vested members, retirees and beneficiaries, and financial data. This information was checked for internal consistency, but it was not otherwise audited.

GRS provided the following information for the ERS to fulfill the GASB 67 reporting requirements that are included in the notes to the financial statements and the Required Supplementary Information located in the Financial Section of this CAFR.

- Single Discount Rate
- Required Discount Rate Sensitivity Information for the ERS providing the ratio of the Fiduciary Net Position to Total Pension Liability and the Net Pension Liability at a discount rate that is one percentage point lower and one percentage point higher that the discount rate at Meaturement Date
- Service Cost; Interest; Changes of Benefit Terms; Differences between Expected and Actual Experience; Changes in Assumptions.
- Required Supplementary Information – Schedule of Changes in Net Pension Liability.
- Required Supplementary Information – Schedule of Net Pension Liability.
- Required Supplementary Information – Schedule of Employer Contributions
- Actuarial components of Governmental Accounting and Standards Board (GASB) 67 requirements.

5605 North MacArthur Boulevard | Suite 870 | Irving, Texas 75038-2631

GASB STATEMENT NO. 67 REPORT (continued)

Certain tables included in the Required Supplementary Information should include a 10-year history of information. As provided for in GASB No. 67, this historical information is only presented for the years in which the information was measured in conformity with the requirements of GASB No. 67. The historical information in this report will begin with the information presented for the fiscal year ending June 30, 2014.

This report complements the actuarial valuation report, issued on January 14, 2019, that was provided to ERS and should be considered in conjunction with that report. Please see the significant actuarial valuation report information as of June 30, 2018 (located later in this section of the ERS' CAFR) for additional discussion of the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions. (The entire actuarial valuation report, as of June 30, 2018, is available on the ERS' website at ers.ehawaii.gov.)

To the best of our knowledge, this report is complete, accurate, and in accordance with generally recognized actuarial methods. One or more of the undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the Academy of Actuaries to render the actuarial opinion herein.

The signing actuaries are independent of the plan sponsor.

Respectfully submitted,

By Lewis Ward

Lewis Ward
Consultant

By J. Newton

Joseph P. Newton
FSA, EA, MAAA

GABRIEL, ROEDER, SMITH & COMPANY

GASB STATEMENT NO. 67 REPORT (continued)

EXECUTIVE SUMMARY ***
as of June 30, 2018

	2018	2017
Actuarial Valuation Date	June 30, 2018	June 30, 2017
Pension Plan's Fiscal Year Ending Date		
(Measurement Date & Reporting Date)	June 30, 2018	June 30, 2017
Membership		
Number of		
- Retirees and beneficiaries	48,569	46,927
- Inactive, nonretired members **	27,068	25,723
- Active members	66,271	65,911
- Total	141,908	138,561
Reported Payroll for Fiscal Year	$4,256,052,840	$4, 243,521,876
Net Pension Liability		
Total Pension Liability	$ 29,917,401,383	$28,648,630,533
Plan Fiduciary Net Position	16,598,407,973	15,698,324,306
Net Pension Liability	$ 13,318,993,410	$12,950,306,227
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	55.48%	54.80%
Net Pension Liability as a Percentage of Covered Payroll	312.94%	305.18%
Development of the Single Discount Rate		
Single Discount Rate	7.00%	7.00%
Long-Term Expected Rate of Return	7.00%	7.00%
Long-Term Municipal Bond Rate*	3.62%	3.56%
Last year ending June 30 in the 2018 to 2117 projection period for which projected benefit payments are fully funded (and 2018 to 2117)	None	None

*Source: Fixed-income municipal bonds with 20 years to maturity that include only federally tax-exempt municipal bonds as reported in Fidelity's Index's "20-year Municipal GO AA Index" as of June 29, 2018 and June 30, 2017. In describing this index, Fidelity notes that the municipal curves are constructed using option-adjusted analytics of a diverse population of over 10,000 tax exempt securities.

** Inactive, nonretired members for GASB 67 reporting includes terminated vested members entitled to benefits but not yet receiving benefits plus inactive members (that while currently not vested for benefits may become vested in the future should they return to service and fulfill the additional service and contribution requirements applicable to their respective membership). The inactive membership counts used in the previous reporting method under GASB Statement No. 25 only included terminated vested members.

*** This information should be considered with the June 30, 2018 Actuarial Valuation Report information that follows this section beginning on page 125.

GASB STATEMENT NO. 67 REPORT (continued)

Discussion on GASB Statement No. 67.

Accounting Standard

For pension plans that are administered through trusts or equivalent arrangements, Governmental Accounting Standards Board (GASB) Statement No. 67, "Financial Reporting for Pension Plans," replaces the requirements of GASB Statement No. 25, "Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans," and GASB Statement No. 50, "Pension Disclosures." GASB Statement No. 67 establishes standards of financial reporting for separately issued financial reports and specifies the required approach for measuring the pension liability of employers and non-employer contributing entities for benefits provided through the pension plan.

The following discussion provides a summary of the information that is required to be disclosed under these accounting standards. A number of these disclosure items are incorporated in the Financial Section of this CAFR. However, certain information, such as notes regarding accounting policies and investments, are not provided by GRS since the retirement system is responsible for preparing and disclosing that information to comply with these accounting standards.

Financial Statements

GASB Statement No. 67 requires defined benefit pension plans to present two financial statements, notes of the plan's financial statements and required supplementary information (RSI):

- The *statement of fiduciary net position* presents the following items as of the end of the pension plan's reporting period, such as: assets; deferred inflows and outflows of resources; liabilities; and fiduciary net position (assets, plus deferred outflows, minus liabilities, minus deferred inflows).
- The *statement of changes in fiduciary net position* presents the following for the plan's reporting period: additions, such as contributions and investment income; deductions, such as benefit payments and expenses; and net increase or decrease in the fiduciary net position (the difference between additions and deductions).
- The notes of the plan's financial statements include: a description of the types of benefits provided by the plan, as well as automatic or ad hoc COLAs; the number and classes of employees covered by the benefit terms; the composition of the pension plan's Board and the authority under which benefit terms may be amended; a description of the plan's funding policy, which includes member and employer contribution requirements; the pension plan's investment policies; a description of how fair value is determined; concentrations of investments greater than or equal to 5%; annual money-weighted rate of return on pension plan investments; the portion of the present value of benefits to be provided through the pension plan to current active and inactive plan members; the pension plan's fiduciary net position; the net pension liability; the pension plan's fiduciary net position as a percentage of the total pension liability; significant assumptions and methods used to calculate the total pension liability; inputs to the discount rates; and certain information about mortality assumptions and the dates of experience studies.
- The RSI requires a 10-year fiscal history of: sources of changes in the net pension liability; information about the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percent of covered-employee payroll; a comparison of the actual employer contributions to the actuarially determined contributions based on the plan's funding policy; and the annual money-weighted rate of return on pension plan investments for each year.

Measurement of the Net Pension Liability

The net pension liability is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the market value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

Timing of the Valuation

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. The net pension liability and pension expense should be measured as of the pension plan's fiscal year end (measurement date) on a date that is within the employer's prior fiscal year. If the actuarial valuation used to determine the total pension liability is not calculated as of the measurement date, the total pension liability is required to be rolled forward from the actuarial valuation date to the measurement date.

The total pension liability shown in this report is based on an actuarial valuation performed as of June 30, 2018 and a measurement date of June 30, 2018.

Single Discount Rate

Projected benefit payments are required to be discounted to their actuarial present values using a single discount rate that reflects (1) a long-term expected rate of return on pension plan investments (to the extent that the plan's fiduciary net position is projected to be sufficient to pay benefits) and (2) tax-exempt municipal bond rate based on an index of 20-year general obligation bonds with an average AA credit rating (which is published by the Federal Reserve) as of the measurement date (to the extent that the contributions for use with the long-term expected rate of return are not met).

For the purpose of this valuation, the expected rate of return on pension plan investments is 7.00% the municipal bond rate is 3.62% (based on the daily rate closest to but not later than the measurement date of the Fidelity "20-Year Municipal GO AA Index"); and the resulting single discount rate is 7.00%.

Letter from the Actuary

GRS Retirement Consulting

P: 469.524.0000 | F: 469.524.0003 | www.grsconsulting.com

January 14, 2019

Board of Trustees
Employees' Retirement System of
the State of Hawaii
City Financial Tower
201 Merchant St., Ste. 1400
Honolulu, HI 96813-2980

Dear Trustees:

Subject: Actuarial Valuation as of June 30, 2018

We certify that the information contained in the 2018 actuarial valuation report is accurate and fairly presents the actuarial position of the Employees' Retirement System of the State of Hawaii (ERS) as of June 30, 2018. There have been no adjustments for events which occurred after this date.

All calculations have been made in conformity with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, the results presented comply with the requirements of the Hawaii statutes and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board. The undersigned are independent actuaries. One or more of them are an Enrolled Actuary and/or a Member of the American Academy of Actuaries. All are experienced in performing valuations for large public retirement systems.

Actuarial valuations

The primary purpose of the valuation report is to determine the adequacy of the current employer contribution rate through measuring the resulting funding period, to describe the current financial condition of ERS, and to analyze changes in ERS's condition. In addition, the report provides various summaries of the data. This report may not be appropriate for other purposes. The information required by ERS in connection with Governmental Accounting Standards Board Statement No. 67 (GASB No.67) will be provided in a separate report. (A summary of the GASB Statement No. 67 is presented immediately before this section.)

Valuations are prepared annually, as of June 30th of each year, the last day of ERS's plan year and fiscal year.

5605 North MacArthur Boulevard | Suite 870 | Irving, Texas 75038-2631

Letter from the Actuary (continued)

Board of Trustees
January 14, 2019
Page 2

Financing objectives

Contribution rates are established by Law that, over time, are intended to remain level as a percent of payroll. The employee and employer contribution rates have been set by Law and are intended to provide for the normal cost plus the level percentage of payroll required to amortize the unfunded actuarial accrued liability (UAAL) over a reasonable amount of time, which will ensure benefit security and intergenerational equity.

Progress toward realization of financing objectives

We have determined that the funding period for paying off the UAAL of the System (in aggregate) is 25 years. Because this period is less than 30 years, the objectives set in State statute are currently being realized. (Hawaii Revised Statutes §88-122(e)(1) state that the employer contribution rates are subject to adjustment when the funding period is in excess of 30 years.)

The 2017 Legislature passed legislation in 2017 that made significant changes to the future employer contribution rates. This is the 2nd year of four scheduled increases. The employer contribution rate for Police and Fire employees are scheduled to increase to 31% in FY2019, 36% in FY2020, and 41% for FY2021, and the employer contribution rate for All Other Employees are scheduled to increase to 19% in FY2019, 22% in FY2020, and 24% for FY2021. Under current law, the contribution rates are expected to stay at these levels until the System is fully funded.

The 25 year funding period assumes all of the currently scheduled contribution increases occur and remain in effect throughout the period. It is imperative that the increases occur as scheduled to meet the current projected obligations of the System.

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) is a standard measure of a plan's funded status. The funded status alone is not appropriate for assessing the need for future contributions nor assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. However, the trend (historical and projected) of the funded ratio is a strong metric to use for assessing the dependability of the current funding policy and its ability to accumulate assets to pay benefits when due. The funded ratio is currently 55.2% and this is slightly larger than the funded ratio from the previous valuation and consistent with the expectations from the funding plan.

The 2011 Legislature made changes to the benefits and member contribution rates for employees hired after June 30, 2012. Because these changes result in significantly higher contributions towards the unfunded liability in the future than in the current year, we believe it is more appropriate to determine the funding period using an open group projection rather than a static mathematical formula, which assumes that all amortization payments in the future will be the same percentage of pay as in the current year.

The actuarial accrued liability, the unfunded actuarial accrued liability (UAAL), and the determination of the resulting funding period illustrate the progress toward the realization of financing objectives. The System had a liability experience loss which was caused by individual salary increases being larger than expected by the assumptions. The System also experienced negative interest amortization as the higher scheduled contribution increases needed to produce the 26 year funding period are being phased into and

Board of Trustees
January 14, 2019
Page 3

will not be in full effect for three more years. As a result, the UAAL grew based on this actuarial valuation as of June 30, 2018 and ERS's underfunded status as measured by the UAAL is now $13.405 billion.

Because of the favorable investment performance in FY2017 and FY2018, the System is now deferring $86 million in investment gains, compared with $22 million in deferred losses last year and $900 million in deferred losses two years ago. If there are no significant investment losses or other actuarial losses, the funded status of the System would be expected to increase in the near future and over the long term.

Thus, given the plan's current contribution rates and the new tier of benefits, if all actuarial assumptions are met (including the assumption of the plan earning 7.00% on the actuarial valuation of assets), it is expected that:

1. The employer normal cost as a percentage of pay will decrease to the level of the newest tier as the old tier population declines and is replaced by new tier members,
2. The employer contribution will remain level throughout the amortization period,
3. Thus, the net amount available to amortize the UAAL will increase over time,
4. The unfunded actuarial accrued liability will increase in nominal dollars until the net amount for amortization is large enough to cover the interest charges, or approximately 2023, and then begin to decrease,
5. The unfunded actuarial accrued liability will be fully amortized after 25 years, and
6. In the absence of benefit improvements and in consistent financial markets, the funded ratio should increase steadily until it reaches 100%.

However, it is important to note that these statements are based on the current assumptions which could change in the future. Also, these statements depend upon the employers meeting the contribution requirements established by the 2017 Legislature. Future changes to the actuarial assumptions or future changes to reduce the contribution requirements could significantly change the outlook of the System and the expectation on when the System will reach a 100% funded level.

Benefit provisions and Legislative changes

This is the sixth valuation with members covered under the new benefit tier.

There have been no changes in the benefit provisions since the prior valuation. See the *Summary of Retirement Benefit Plan Provisions* in the Introductory Section of this CAFR for more details on the benefit provisions for members of the System. However, the Legislature passed Act 017 which contains significant increases to the employer contribution rates over a 4-year period. These increases have improved the outlook of ERS. As long as the contributions are made the System's funded status should improve and the System should be able to absorb moderate adverse experience without a need to further increase the contribution rates.

Letter from the Actuary (continued)

Board of Trustees
January 14, 2019
Page 4

Assumptions and methods

The actuarial assumptions used were adopted by the Board in December of 2016 based on the recommendations provided by an Experience Study performed by GRS.

There have been no changes to the assumptions or methods since the prior valuation.

There was no change to the use of a 4-year smoothing technique to determine the actuarial value of assets, used for determining the funding period.

There was no change to the actuarial funding method. The Entry Age Normal cost method (EAN) is the current funding method being used to allocate the actuarial costs of the System. The Entry Age Normal method will generally produce relatively level contribution amounts as a percentage of payroll from year to year, and allocates costs among various generations of taxpayers in a reasonable manner. It is by far the most commonly used actuarial cost method for large public retirement systems.

Further detail on the assumptions and methods may be found in the *Summary of Actuarial Methods and Assumptions* in this section of this CAFR.

The actuarial assumptions represent estimates of future experience and are not market measures. The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. Based on the scope of this engagement, we have not performed analysis on the potential range of future measurements based on other factors. The actuarial calculations are intended to provide information for rational decision making.

In our opinion, the assumptions are internally consistent and are reasonably based on the actual experience of ERS.

Data

Member data for retired, active, and inactive participants was supplied as of March 31, 2018, by ERS's staff. We have not subjected this data to any auditing procedures, but have examined the data for reasonableness and consistency with the prior year's data. Asset information was supplied by ERS's staff.

Letter from the Actuary (continued)

Board of Trustees
January 14, 2019
Page 5

Responsibility for Tables and Schedules

The actuary is responsible for the information with respect to years after 1999 in the Required Supplementary Information, and the Notes to Required Supplementary Information in the Financial Section of the ERS's Comprehensive Annual Financial Report (CAFR). Information with respect to years prior to 2000 was supplied by ERS.

Tables and schedules in the Actuarial Section of the CAFR were generally prepared directly by the Actuary. However, certain of these tables were prepared by ERS utilizing information from this report. When the tables were prepared by ERS from our report, they are so noted.

The undersigned are independent actuaries and consultants. Mr. Newton is an Enrolled Actuary, a Member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries. Finally, all of the undersigned are experienced in performing valuations for large public retirement systems.

Sincerely,

Joe Newton, FSA, EA	Lewis Ward	Linna Ye, ASA, MAAA
Pension Market Leader & Actuary	Consultant	Actuary

Executive Summary

The following table summarizes the key results of the June 30, 2018 actuarial valuation of the Employees' Retirement System of the State of Hawaii (ERS).

Item	**2018**	**2017**
Membership		
• Number of		
- Active members	66,271	65,911
- Retirees and beneficiaries	48,569	46,927
- Inactive, vested	9,249	9,241
- Total	124,089	122,079
• Covered payroll for active members	$4,257 million	$4,134 million
• Actual benefit payments and refunds	$1,417 million	$1,323 million
Assets		
• Actuarial (smoothed) value	$16,513 million	$15,721 million
• Market value	$16,598 million	$15,698 million
• Return on actuarial value	7.2%	6.9%
• Return on market value	7.9%	13.9%
• Employer contributions during fiscal year	$847,595,466	$781,244,218
• External cash flow %	(2.0%)	(2.0%)
Actuarial Information		
• Total normal cost % (employee + employer)	13.90%	13.96%
• Unfunded actuarial accrued liability (UAAL)	$13,405 million	$12,928 million
• Funded ratio (based on smoothed assets)	55.2%	54.9%
• Funded ratio (based on market assets)	55.5%	54.8%
• Funding period (years) *	25.0	26.0
• Employer contribution rate % of projected payroll ** For FY beginning July 1	20.36%	19.16%

* Funding Period based on actuarial value of assets, scheduled increases in employer contribution rates, and an open group projection reflecting changes in benefits and future member contribution rates.

** Weighted average of 31.00% Contribution Rate for Police and Firefighters and 19.0% Contribution Rate for All Other Employees for fiscal year beginning July 1, 2018.

Weighted average of 28.00% Contribution Rate for Police and Firefighters and 18.0% Contribution Rate for All Other Employees for fiscal year beginning July 1, 2017.

Actuarial Certification Statement

		Police and Firefighters June 30, 2018		All Other Employees June 30, 2018		All Employees June 30, 2018
1. Gross normal cost as a percentage of pay		25.46%		12.38%		13.90%
2. Present value of future benefits						
a. Active employees	$	3,750,123,235	$	14,346,308,740	$	18,096,431,975
b. Inactive members		72,307,171		829,683,339		901,990,510
c. Pensioners and beneficiaries		2,979,119,168		13,029,728,632		16,008,847,800
d. Total	$	6,801,549,574	$	28,205,720,711	$	35,007,270,285
3. Present value of future employee and employer contributions						
a. Present value of future normal costs	$	1,163,653,981	$	3,926,214,921	$	5,089,868,902
b. Present value of future employee contributions		600,305,287		1,824,873,397		2,425,178,684
c. Present value of future employer normal cost (Item 3a - Item 3b)	$	563,348,694	$	2,101,341,524	$	2,664,690,218
4. Actuarial accrued liability (Item 2d - Item 3a)	$	5,637,895,593	$	24,279,505,790	$	29,917,401,383
5. Actuarial value of assets						
a. Annuity Savings Fund	$	1,056,634,488	$	1,728,794,900	$	2,785,429,388
b. Pension Accumulation Fund		2,268,733,411		11,458,581,675		13,727,315,086
c. Total	$	3,325,367,899	$	13,187,376,575	$	16,512,744,474
6. Unfunded actuarial accrued liability	$	2,312,527,694	$	11,092,129,215	$	13,404,656,909
7. Adequacy of contribution rates						
a. Statutory Contribution Rate for Fiscal Year 2019		31.00%		19.00%		20.36%
B. Funding period in years as of June 30, 2018 *		26		25		25

*The Funding Period is calculated using an open group projection which reflects the impact of both the new employer contribution rates schedule and the benefits and member contribution rates for employees hired after June 30, 2012.

Gabriel Roeder Smith & Company

Actuarial Certification Statement (continued)

The actuarial valuation as of June 30, 2018 is based on the provisions of Chapter 88 of the Hawaii Revised Statutes, as amended. The assumptions used in the cost calculations were those adopted by the Board of Trustees on December 12, 2016 based on the actuary's actuarial experience investigation report covering the five-year period July 1, 2010 – June 30, 2015. The actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures.

In our opinion, the comparison of the current contribution policies to ERS's liabilities were calculated in accordance with the provisions of Chapter 88 regarding the funding of the Employees' Retirement System on an actuarial reserve basis.

All of our work conforms with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of state law and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board. The undersigned is an independent actuary and consultant. Mr. Newton is an Enrolled Actuary, a Member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries. Finally, he is experienced in performing valuations for large public retirement systems.

Joseph P Newton,, FSA, EA, MAAA
Pension Market Leader & Actuary

Summary of 2018 Actuarial Valuation

Exhibit 1
Development of Employer Cost

	Police and Firefighters June 30, 2018	All Other Employees June 30, 2018	All Employees June 30, 2018
1. Projected FY 2018 payroll for contribution purposes	$ 497,115,143	$ 3,886,572,864	$ 4,383,688,007
2. Gross normal cost (Exhibit 3)	25.46%	12.38%	13.90%
3. Employer normal cost rate (Exhibit 3)	12.97%	7.14%	7.82%
4. Present value future benefits (Exhibit 2)	$ 6,801,549,574	$ 28,205,720,711	$ 35,007,270,285
5. Present value future employer normal cost	$ 563,348,694	$ 2,101,341,524	$ 2,664,690,218
6. Present value future employee contributions	$ 600,305,287	$ 1,824,873,397	$ 2,425,178,684
7. Actuarial accrued liability (Item 4 - Item 5 - Item 6)	$ 5,637,895,593	$ 24,279,505,790	$ 29,917,401,383
8. Actuarial value of assets	$ 3,325,367,899	$ 13,187,376,575	$ 16,512,744,474
9. Unfunded actuarial accrued liability (UAAL)			
(Item 7 - Item 8)	$ 2,312,527,694	$ 11,092,129,215	$ 13,404,656,909
10. Funding period *	26	25	25

	Police and Firefighters June 30, 2017	All Other Employees June 30, 2017	All Employees June 30, 2017
1. Projected FY 2018 payroll for contribution purposes	$ 495,136,855	$ 3,769,901,933	$ 4,265,038,788
2. Gross normal cost (Exhibit 3)	25.56%	12.39%	13.93%
3. Employer normal cost rate (Exhibit 3)	13.13%	7.33%	8.02%
4. Present value future benefits (Exhibit 2)	$ 6,497,892,795	$ 27,109,584,743	$ 33,607,477,538
5. Present value future employer normal cost	$ 571,250,728	$ 2,104,478,399	$ 2,675,729,127
6. Present value future employee contributions	$ 589,938,887	$ 1,693,178,991	$ 2,283,117,878
7. Actuarial accrued liability (Item 4 - Item 5 - Item 6)	$ 5,336,703,180	$ 23,311,927,353	$ 28,648,630,533
8. Actuarial value of assets	$ 3,106,633,478	$ 12,613,993,642	$ 15,720,627,120
9. Unfunded actuarial accrued liability (UAAL)			
(Item 7 - Item 8)	$ 2,230,069,702	$ 10,697,933,711	$ 12,928,003,413
10. Funding period *	26	26	26

*The Funding Period is calculated using an open group projection which reflects the impact of both the new employer contribution rates schedule and the benefits and member contribution rates for employees hired after June 30, 2012.
Please refer to Exhibit 7 for the full projection.

Summary of 2018 Actuarial Valuation (continued)

Exhibit 2
Actuarial Present Value of Future Benefits

	Police and Firefighters June 30, 2018	All Other Employees June 30, 2018	All Employees June 30, 2018
1. Active members			
a. Service retirement benefits	$ 3,599,756,675	$ 13,124,340,425	$ 16,724,097,100
b. Termination benefits	106,097,780	827,255,506	933,353,286
c. Survivor benefits	19,768,611	145,139,966	164,908,577
d. Disability retirement benefits	24,500,169	249,572,843	274,073,012
e. Total	$ 3,750,123,235	$ 14,346,308,740	$ 18,096,431,975
2. Retired members			
a. Service retirement	$ 2,800,532,024	$ 12,064,140,944	$ 14,864,672,968
b. Disability retirement	30,563,426	251,324,987	281,888,413
c. Beneficiaries	148,023,718	714,262,701	862,286,419
d. Total	$ 2,979,119,168	$ 13,029,728,632	$ 16,008,847,800
3. Inactive members			
a. Vested terminations	$ 67,739,133	$ 732,682,607	$ 800,421,740
b. Nonvested terminations	4,568,038	97,000,732	101,568,770
c. Total	$ 72,307,171	$ 829,683,339	$ 901,990,510
4. Total actuarial present value of future benefits	$ 6,801,549,574	$ 28,205,720,711	$ 35,007,270,285

	Police and Firefighters June 30, 2017	All Other Employees June 30, 2017	All Employees June 30, 2017
1. Active members			
a. Service retirement benefits	$ 3,605,472,878	$ 12,733,560,754	$ 16,339,033,632
b. Termination benefits	105,091,726	797,543,978	902,635,704
c. Survivor benefits	19,810,420	141,612,493	161,422,913
d. Disability retirement benefits	23,745,824	238,799,709	262,545,533
e. Total	$ 3,754,120,848	$ 13,911,516,934	$ 17,665,637,782
2. Retired members			
a. Service retirement	$ 2,502,019,362	$ 11,448,616,086	$ 13,950,635,448
b. Disability retirement	29,297,997	234,759,723	264,057,720
c. Beneficiaries	141,002,143	664,908,301	805,910,444
d. Total	$ 2,672,319,502	$ 12,348,284,110	$ 15,020,603,612
3. Inactive members			
a. Vested terminations	$ 67,233,586	$ 763,256,731	$ 830,490,317
b. Nonvested terminations	4,218,859	86,526,968	90,745,827
c. Total	$ 71,452,445	$ 849,783,699	$ 921,236,144
4. Total actuarial present value of future benefits	$ 6,497,892,795	$ 27,109,584,743	$ 33,607,477,538

Gabriel Roeder Smith & Company

Summary of 2018 Actuarial Valuation (continued)

Exhibit 3
Analysis of Normal Cost

	Police and Firefighters June 30, 2018	All Other Employees June 30, 2018	All Employees June 30, 2018
1. Normal cost as a percent of pay			
a. Service retirement benefits	22.55%	9.23%	10.77%
b. Deferred termination benefits	1.15%	0.90%	0.93%
c. Refunds	0.90%	1.37%	1.32%
d. Disability retirement benefits	0.32%	0.38%	0.38%
e. Survivor benefits	0.19%	0.15%	0.15%
f. Administrative expenses	0.35%	0.35%	0.35%
g. Total	25.46%	12.38%	13.90%
2. Employee contribution rate	12.49%	5.24%	6.08%
3. Effective employer normal cost rate (Item 1g – Item 2)	12.97%	7.14%	7.82%

	Police and Firefighters June 30, 2017	All Other Employees June 30, 2017	All Employees June 30, 2017
1. Normal cost as a percent of pay			
a. Service retirement benefits	22.66%	9.27%	10.87%
b. Deferred termination benefits	1.15%	0.91%	0.94%
c. Refunds	0.89%	1.33%	1.28%
d. Disability retirement benefits	0.32%	0.38%	0.37%
e. Survivor benefits	0.19%	0.15%	0.15%
f. Administrative expenses	0.35%	0.35%	0.35%
g. Total	25.56%	12.39%	13.96%
2. Employee contribution rate	12.43%	5.06%	5.94%
3. Effective employer normal cost rate (Item 1g – Item 2)	13.13%	7.33%	8.02%

Gabriel Roeder Smith & Company

Summary of 2018 Actuarial Valuation (continued)

Exhibit 4
Development of Actuarial Value of Assets

1. Actuarial value of assets, beginning of year	$	15,720,627,120
2. Net new investments		
a. Contributions	$	1,107,023,400
b. Benefits paid and Refunds	$	(1,416,727,842)
c. Administrative expenses	$	(15,784,490)
d. Subtotal	$	(325,488,932)
3. Market value of assets at end of year	$	16,598,407,973
4. Expected return on actuarial value of assets	$	1,089,051,786
5. Expected actuarial value of assets, end of year	$	16,484,189,974
6. Excess/(shortfall) return (Item 3-Item 5)	$	114,217,999

7. Development of amounts to be recognized as of June 30, 2018:

Fiscal Year End	Remaining Deferrals of Excess (Shortfall) of Investment Income	Offsetting of Gains/(Losses)	Net Deferrals Remaining	Years Remaining	Recognized for this valuation	Remaining after this valuation
	(1)	(2)	(3) = (1) + (2)	(4)	(5) = (3) / (4)	(6) = (3) - (5)
2015	$ -	$ -	$ -	1	$ -	$ -
2016	(22,302,814)	22,302,814	-	2	-	-
2017	-	-	-	3	-	-
2018	136,520,813	(22,302,814)	114,217,999	4	28,554,500	85,663,499
Total	$ 114,217,999	$ -	$ 114,217,999		$ 28,554,500	$ 85,663,499

8. Actuarial value of assets as of June 30, 2018 (Item 3 - Item 7)	$	16,512,744,474
9. Ratio of actuarial value to market value		99.5%
10. Asset gain/(loss) for year (Item 8 - Item 5)	$	28,554,500

Summary of 2018 Actuarial Valuation (continued)

Exhibit 5
Total Experience Gain or Loss

Item	Police and Firefighters	All Other Employees	All Employees
A. Calculation of total actuarial gain or loss			
1. Unfunded actuarial accured liability (UAAL), as of June 30, 2017	$ 2,230,069,702	$ 10,697,933,711	$ 12,928,003,413
2. Normal cost for the year (employer and employee)	$ 129,662,827	$ 470,591,856	$ 600,254,683
3. Less: contributions and assessments for the year	$ (218,239,356)	$ (888,784,044)	$ (1,107,023,400)
4. Interest at 7.00%			
a. On UAAL	$ 156,104,879	$ 748,855,360	$ 904,960,239
b. On normal cost	4,538,199	16,470,715	21,008,914
c. On contributions	(7,638,377)	(31,107,442)	(38,745,819)
d. Total	$ 153,004,701	$ 734,218,633	$ 887,223,334
5. Expected UAAL as of June 30, 2018 (Sum of Items 1– 4)	$ 2,294,497,874	$ 11,013,960,156	$ 13,308,458,030
6. Actual UAAL as of June 30, 2018	$ 2,312,527,694	$ 11,092,129,215	$ 13,404,656,909
7. Total gain (loss) for the year (Item 5 – Item 6)	$ (18,029,820)	$ (78,169,059)	$ (96,198,879)
B. Source of gains and losses			
8. Asset gain (loss) for the year (Exhibit 6)	$ 5,750,360	$ 22,804,140	$ 28,554,500
9. Gain (loss) due to change in payment timing	-	-	-
10. Other liability gain (loss)	$ (23,780,180)	$ (100,973,199)	$ (124,753,379)
11. Change in benefit provisions	-	-	-
12. Total gain (loss) for the year	$ (18,029,820)	$ (78,169,059)	$ (96,198,879)

Summary of 2018 Actuarial Valuation (continued)

Exhibit 6
Investment Experience Gain or Loss

Item	June 30, 2018	June 30, 2017
1. Actuarial assets, beginning of year	$ 15,720,627,120	$ 14,998,749,060
2. Total contributions during year	$ 1,107,023,400	$ 1,031,948,285
3. Benefits and refunds paid	$ (1,416,727,842)	$ (1,323,129,244)
4. Administrative expenses paid	$ (15,784,490)	$ (14,986,159)
5. Assumed net investment income at 7.00%		
a. Beginning of year assets	$ 1,100,443,898	$ 1,049,912,435
b. Contributions	$ 38,745,819	$ 36,118,190
c. Benefits and refunds paid	$ (49,585,474)	$ (46,309,524)
d. Benefits and refunds paid	$ (552,457)	$ (524,516)
e. Total	$ 1,089,051,786	$ 1,039,196,585
6. Expected actuarial assets, end of year (Sum of Items 1 through 5)	$ 16,484,189,974	$ 15,731,778,527
7. Actual actuarial assets, end of year	$ 16,512,744,474	$ 15,720,627,120
8. Asset gain (loss) for year (Item 7– Item 6)	$ 28,554,500	$ (11,151,407)
9. Asset gain (loss) as a percent of actuarial value of		

Summary of 2018 Actuarial Valuation (continued)

Exhibit 7
Projection Results Based on June 30, 2018 Actuarial Valuation

Valuation as of June 30,	Employer Contribution Rate for Fiscal Year Following Valuation Date	Compensation (in Millions)	Employer Contributions (in Millions)	Actuarial Accrued Liability (AAL, in Millions)	Actuarial Value of Assets (AVA, in Millions)	Unfunded Actuarial Accrued Liability (UAAL, in Millions)	Funded Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2018	20.36%	$ 4,384	$ 893	$ 29,917	$ 16,513	$ 13,404	55.2%
2019	23.58%	4,495	1,060	30,983	17,208	$ 13,775	55.5%
2020	25.92%	4,619	1,197	32,152	18,157	$ 13,995	56.5%
2021	25.91%	4,750	1,231	33,325	19,238	$ 14,087	57.7%
2022	25.91%	4,885	1,266	34,502	20,349	$ 14,153	59.0%
2023	25.90%	5,026	1,302	35,681	21,494	$ 14,187	60.2%
2024	25.90%	5,172	1,339	36,861	22,675	$ 14,186	61.5%
2025	25.89%	5,325	1,379	38,040	23,894	$ 14,146	62.8%
2026	25.89%	5,485	1,420	39,216	25,153	$ 14,063	64.1%
2027	25.89%	5,652	1,463	40,391	26,458	$ 13,933	65.5%
2028	25.89%	5,827	1,509	41,566	27,816	$ 13,750	66.9%
2029	25.89%	6,011	1,556	42,740	29,233	$ 13,507	68.4%
2030	25.89%	6,202	1,606	43,918	30,716	$ 13,202	69.9%
2031	25.89%	6,401	1,657	45,098	32,273	$ 12,825	71.6%
2032	25.89%	6,608	1,711	46,283	33,912	$ 12,371	73.3%
2033	25.89%	6,824	1,767	47,473	35,641	$ 11,832	75.1%
2034	25.89%	7,048	1,825	48,670	37,468	$ 11,202	77.0%
2035	25.89%	7,281	1,885	49,876	39,407	$ 10,469	79.0%
2036	25.89%	7,524	1,948	51,093	41,467	$ 9,626	81.2%
2037	25.89%	7,777	2,013	52,325	43,662	$ 8,663	83.4%
2038	25.89%	8,040	2,082	53,577	46,006	$ 7,571	85.9%
2039	25.89%	8,316	2,153	54,853	48,517	$ 6,336	88.4%
2040	25.89%	8,602	2,227	56,159	51,212	$ 4,947	91.2%
2041	25.89%	8,901	2,304	57,501	54,111	$ 3,390	94.1%
2042	25.89%	9,211	2,385	58,886	57,233	$ 1,653	97.2%
2043	4.32%	9,533	412	60,321	60,602	$ (281)	100.5%
2044	4.28%	9,868	422	61,813	62,114	$ (301)	100.5%
2045	4.24%	10,215	433	63,369	63,691	$ (322)	100.5%
2046	4.20%	10,575	444	64,993	65,338	$ (345)	100.5%
2047	4.18%	10,949	458	66,694	67,062	$ (368)	100.6%

Projection assumes all assumptions exactly met, including a 7.00% annual return on the current actuarial value of assets.

Summary of 2018Actuarial Valuation (continued)

Exhibit 8
Highlights of Last Five Annual Actuarial Valuations
2014 through 2018

Item	Valuation Date: June 30				
	2014	2015	2016	2017	2018
Number of active members	67,206	67,310	67,377	65,911	66,271
Number of inactive members	8,105	7,413	7,741	9,241	9,249
Number of pensioners	39,680	40,657	41,654	42,857	44,305
Number of beneficiaries	3,407	3,626	3,852	4,070	4,264
Average monthly contributory plan pension amount	$ 2,508	$ 2,621	$ 2,730	$ 2,854	$ 2,994
Average monthly noncontributory plan pension amount	$ 1,585	$ 1,611	$ 1,637	$ 1,669	$ 1,702
Average monthly hybrid plan pension amount	$ 2,088	$ 2,114	$ 2,139	$ 2,178	$ 2,238
Average monthly beneficiary amount	$ 1,304	$ 1,361	$ 1,419	$ 1,472	$ 1,515
Total actuarial value of assets ($millions)	$ 13,642	$ 14,464	$ 14,999	$ 15,721	$ 16,513
Unfunded actuarial accrued liability ($millions)	$ 8,578.3	$ 8,774.7	$ 12,440.5	$ 12,928.0	$ 13,404.7
Funding Period (in years) (1)	26.0	26.0	66.0	26.0	25.0

Item	Fiscal Year				
(Dollar amounts in millions(2))	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Employers contributions(2)	$ 653.1	$ 717.8	$ 756.6	$ 781.2	$ 847.6

(1) Beginning with the 2011 valuation, the funding period was determined using and open group projection. Prior valuations determined the remaining amortization based on the assumption that the amortization payment would remain constant as a percentage of pay.

(2) Beginning July 1, 2013, the percentages increased to 23.0% for Police and Fire, 16.0% for All Others.
Beginning July 1, 2014, the percentages increased to 24.0% for Police and Fire, 16.5% for All Others.
Beginning July 1, 2015, the percentages increased to 25.0% for Police and Fire, 17.0% for All Others.
Beginning July 1, 2017, the percentages increased to 28.0% for Police and Fire, 18.0% for All Others.

Summary of Actuarial Methods and Assumptions (Adopted on December 12, 2016)

Basis for assumption setting: The actuarial assumptions were adopted by the Board on December 12, 2016. Rationale for the recommendations are in the most recent experience study dated July 5, 2016.

I. *Valuation Date*

The valuation date is June 30th of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. *Actuarial Cost Method*

The normal cost and actuarial accrued liability are determined using the Entry Age Actuarial Cost Method. The actuarial accrued liability is assigned to years prior to the valuation, and the normal cost is assigned to the year following the valuation. The remaining costs are assigned to future years. The normal cost and accrued liability are determined on an individual basis.

The normal cost is the level percentage of payroll contribution required to accumulate the needed funds to pay all expected benefits. This percentage of payroll is then applied to the total compensation for the prior year for all active members, and is then adjusted for the payroll growth assumption.

The actuarial accrued liability is the difference between the total present value of future benefits and the actuarial present value of future normal costs. The unfunded actuarial accrued liability (UAAL) is the excess of the actuarial accrued liability over the actuarial value of assets.

III. *Funding of Unfunded Actuarial Accrued Liability*

Since the State statutes governing the System establish the employee and employer contribution rates, the actuarial valuation determines the number of years required to amortize (or fund) the UAAL. Because of the legislated increases in future employer contribution rates and the new tier of benefits for employees hired after June 30, 2012, an open group projection of liabilities and assets was used to determine the length of time until the UAAL is eliminated. The open group projection assumed that the number of active members would remain static (i.e. each active employee who leaves employment due to termination, retirement, death or disability, would be replaced by exactly one new employee.

Because of this methodology for determining the funding period, any change in the unfunded actuarial accrued liability due to (i) actuarial gains and losses, (ii) changes in actuarial assumptions, or (iii) amendments, affects the funding period.

Please see Section V of these *Assumptions* for a description of the new entrant profile used in the open group projection.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

IV. Actuarial Value of Assets

The actuarial value of assets is based on the market value of assets with a four-year phase-in of actual investment return in excess of (less than) expected investment income. Offsetting unrecognized gains and losses are immediately recognized, with the shortest remaining bases recognized first and the net remaining bases continue to be recognized on their original timeframe. The expected actuarial value of assets is calculated net of investment expenses, and the expected investment return is equal to the assumed investment return rate multiplied by the prior year's actuarial value of assets, adjusted for contributions, benefits paid, and refunds.

V. New Entrant Profile

For the purposes of determining the funding period, an open group projection is used which replaces on a one-to-one basis each active member who leaves employment with an average new hire. The average new hire is determined based on a new entrant profile, which is created from the valuation data by determining the entry age and entry pay for anyone with seven or less years of service as of the valuation date. Each group of new hires' salaries is assumed to grow at the General Wage Inflation of 3.50% over the salaries of the previous year's group.

The new entrant profile for members assumed to be hired during the year following the valuation date for the Police and Fire Employees and the All Other Employees are shown in the table below.

New Entrant Profile for Police and Fire Employees

Entry Age	# of Employees	Average Salary
20-24	199	$42,080
25-29	421	41,841
30-34	286	41,807
35-39	136	42,273
40-44	47	42,310
45-49	17	43,503
50-54	6	45,708
55-59	1	40,632
Total	1,113	41,993

It is assumed that 92.7% of new hires will be male.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

New Entrant Profile for All Other Employees

Entry Age	# of Employees	Average Salary
15-19	19	$26,410
20-24	1,433	37,250
25-29	3,459	40,108
30-34	2,759	42,208
35-39	2,388	43,097
40-44	1,954	41,537
45-49	1,785	40,980
50-54	1,449	42,278
55-59	1,169	45,146
60-64	484	46,511
65-69	52	47,971
Total	16,951	41,610

It is assumed that 40.0% of new hires will be male.

VI. *Actuarial Assumptions*

A. Economic Assumptions

1. Investment return: 7.00% per year, compounded annually, composed of an assumed 2.50% inflation rate and a 4.50% net real rate of return (net of investment expenses).
2. General Wage Inflation: 3.50% per annum.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

3. Salary increase rates: As shown below

	General Employees		Teachers	
Years of Service	Service-related Component	Total Rate Including 2.50% Inflation Component and 1.00% Productivity Component	Service-Related Component	Total Rate Including 2.50% Inflation Component and 1.25% Productivity Component
1	3.00%	6.50%	2.00%	5.75%
2	3.00%	6.50%	1.75%	5.50%
3	2.00%	5.50%	1.75%	5.50%
4	1.50%	5.00%	1.50%	5.25%
5	1.50%	5.00%	1.00%	4.75%
6	1.25%	4.75%	1.00%	4.75%
7	1.25%	4.75%	0.75%	4.50%
8	1.00%	4.50%	0.75%	4.50%
9	1.00%	4.50%	0.50%	4.25%
10	1.00%	4.50%	0.50%	4.25%
11	0.75%	4.25%	0.50%	4.25%
12	0.75%	4.25%	0.50%	4.25%
13	0.50%	4.00%	0.25%	4.00%
14	0.50%	4.00%	0.25%	4.00%
15	0.50%	4.00%	0.25%	4.00%
16	0.50%	4.00%	0.25%	4.00%
17	0.50%	4.00%	0.25%	4.00%
18	0.50%	4.00%	0.25%	4.00%
19	0.50%	4.00%	0.25%	4.00%
20	0.25%	3.75%	0.25%	4.00%
21	0.25%	3.75%	0.25%	4.00%
22	0.25%	3.75%	0.25%	4.00%
23	0.25%	3.75%	0.25%	4.00%
24	0.25%	3.75%	0.25%	4.00%
25 or more	0.00%	3.50%	0.00%	3.75%

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

3. Salary increase rates (continued):

	Police & Firefighters	
Years of Service	Service-related Component	Total Annual Rate of Increase Including 2.50% Inflation Component and 2.50% General Increase Rate
1	2.00%	7.00%
2	2.00%	7.00%
3 or more	0.00%	5.00%

Salary increases are assumed to occur once a year, on July 1. Therefore the pay used for the period between the valuation date and the first anniversary of the valuation date is equal to the reported pay for the prior year, annualized if necessary, and then increased by the salary increase assumption. To adjust the pays received as of March 31st to the June 30th valuation date, the reported pay for each member is increased by 1%.

B. Demographic Assumptions

1. Mortality rates

Active Members: Multiples of the RP 2014 mortality table for active employees based on the occupation of the member as follows:

	General Employees	Teachers	Police and Fire
	Male & Female	Male & Female	Male & Female
Ordinary	75%	55%	58%
% of Ordinary Chosing Annuity	41%	52%	24%
Duty Related	5%	5%	12%

Healthy Retirees: The 2016 Public Retirees of Hawaii mortality table, generational projection using the BB projection table from the year 2016 and with multipliers based on plan and group experience. The following are sample rates of the base table as of 2016 with the corresponding multipliers:

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

Healthy Annuitant Mortality Rates Before Projection (Multiplier Applied)

	General Employees		Teachers		Police and Fire	
Age	Males	Females	Males	Females	Males	Females
50	0.1626%	0.1140%	0.1463%	0.1012%	0.1951%	0.1140%
55	0.3963%	0.1937%	0.3567%	0.1720%	0.4756%	0.1937%
60	0.6301%	0.2735%	0.5671%	0.2428%	0.7561%	0.2735%
65	0.9489%	0.3532%	0.8540%	0.3136%	1.1387%	0.3532%
70	1.3733%	0.7404%	1.2360%	0.6574%	1.6480%	0.7404%
75	2.1071%	1.3116%	1.8964%	1.1645%	2.5285%	1.3116%
80	3.6268%	2.2573%	3.2641%	2.0041%	4.3522%	2.2573%
85	6.6210%	4.1830%	5.9589%	3.7138%	7.9452%	4.1830%
90	12.1005%	8.2371%	10.8905%	7.3133%	14.5206%	8.2371%
Multiplier	100%	107%	90%	95%	120%	107%
Setback	0	0	0	0	0	0

The following table provides the life expectancy for individuals retiring in future years based on the assumption with full generational projection:

Life Expectancy for an Age 65 Retiree in Years

	Year of Retirement			
Gender	2020	2025	2030	2035
		General Retirees		
Male	23.2	23.7	24.2	24.7
Female	26.4	26.8	27.2	27.5
		Teachers		
Male	24.0	24.5	25.0	25.5
Female	27.3	27.7	28.0	28.3
		Police and Fire		
Male	21.8	22.3	22.8	23.3
Female	26.4	26.8	27.2	27.5

Disabled retirees: Base Table for healthy retiree's occupation, set forward 5 years, generational projection using the BB projection table from the year 2016. Minimum mortality rate of 3.5% for males and 2.5% for females.

2. Disability rates – The assumed total disability rates at select ages are multiples of the client specific table that follows:

Age	Male & Female
25	0.000%
30	0.001%
35	0.008%
40	0.026%
45	0.064%
50	0.146%
55	0.198%
60	0.217%

Note: The disability rates project the percentage of employees at each age that is assumed to become disabled before retiring. Multiples of the rates above are assumed to be ordinary disability or accidental disability, and varies by employee group as follows:

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

	General Employees	Teachers	Police & Fire
Type	Male & Female	Male & Female	Male & Female
Ordinary	210%	75%	70%
Accidental	30%	5%	75%

3. Termination Rates -Same male and female rates, based solely on the member's service. Rates reflect terminations for causes other than death, disability or retirement. Employees eligible for retirement are assumed to have no probability of termination. Sample rates are shown below:

	Expected Terminations per 1000 Lives (Male & Female)		
Years of Service	General Employees	Teachers	Police & Fire
0	185.9	243.6	110.0
1	152.5	200.8	95.0
2	124.6	164.7	37.0
3	101.6	134.4	30.1
4	82.9	109.4	26.1
5	67.9	89.0	23.3
6	56.1	72.5	21.0
7	47.0	59.5	19.2
8	40.1	49.4	17.7
9	35.1	41.7	16.4
10	31.5	36.0	15.2
11	29.1	31.9	14.1
12	27.6	29.0	13.2
13	26.6	27.0	12.3
14	25.9	25.7	11.5
15	25.5	24.8	10.8
16	25.1	24.0	10.1
17	24.5	23.2	9.5
18	23.9	22.4	8.9
19	23.0	21.4	8.3
20	22.0	20.2	7.7
21	20.8	18.7	7.2
22	19.5	17.1	6.8
23	18.3	15.4	6.3
24	17.4	13.6	5.8
25	16.8	12.1	0.0
26	16.8	10.9	0.0
27	16.8	10.4	0.0
28	16.8	10.7	0.0
29	16.8	10.0	0.0
30 and more	0.0	0.0	0.0

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

4. Retirement rates - Separate male and female rates, based on age. Sample rates are shown below:

Contributory Members

Expected Retirements per 100 Lives

	General Employees				Teachers				Police & Fire
	Unreduced Retirement		Reduced Retirement		Unreduced Retirement		Reduced Retirement		Unreduced Retirement
Age	Male	Female	Male	Female	Male	Female	Male	Female	Male & Female
45	0	0	0	0	0	0	0	0	12.5
46	0	0	0	0	0	0	0	0	12.5
47	0	0	0	0	0	0	0	0	12.5
48	0	0	0	0	0	0	0	0	12.5
49	0	0	0	0	0	0	0	0	12.5
50	0	0	0	0	0	0	1	0	15.0
51	0	0	2	1	0	0	1	1	15.0
52	0	0	2	1	0	0	1	1	15.0
53	0	0	2	1	0	0	2	2	15.0
54	0	0	3	2	0	0	3	3	15.0
55	25	20	3	2	20	18			20.0
56	25	20			15	16			20.0
57	16	13			15	16			20.0
58	16	13			15	16			22.0
59	13	13			15	16			25.0
60	13	15			14	18			30.0
61	13	15			14	18			30.0
62	28	25			14	25			30.0
63	20	20			14	20			30.0
64	20	20			14	15			30.0
65	20	20			20	25			100.0
66	18	20			15	25			
67	18	20			15	20			
68	18	20			15	20			
69	18	20			15	20			
70	20	20			15	20			
71	20	20			15	20			
72	20	20			15	20			
73	20	20			15	20			
74	20	20			15	20			
75	100	100			100	100			

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

Noncontributory Members

	Expected Retirements per 100 Lives							
	General Employees				Teachers			
	Unreduced Retirement		Reduced Retirement		Unreduced Retirement		Reduced Retirement	
Age	Male	Female	Male	Female	Male	Female	Male	Female
55	20	11	1	1	10	13	1	2
56	18	11	1	1	10	7	1	2
57	13	11	1	1	10	8	1	2
58	10	11	1	1	10	10	2	2
59	10	11	2	2	10	20	3	3
60	10	14	3	3	10	11	5	5
61	11	18	4	4	10	16	7	5
62	20	20			16	25		
63	20	20			12	20		
64	12	20			10	15		
65	14	20			20	25		
66	20	20			15	25		
67	20	20			15	25		
68	20	20			15	25		
69	20	20			15	25		
70	20	20			15	25		
71	20	20			15	25		
72	20	20			15	25		
73	20	20			15	25		
74	20	20			15	25		
75	100	100			100	100		

Note: Retirement rates for the 25 & out group ages 50-54 are 10% for male and 11% for female.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

Hybrid Members

Expected Retirements per 100 Lives

	General Employees				Teachers			
	Unreduced Retirement		Reduced Retirement		Unreduced Retirement		Reduced Retirement	
Age	Male	Female	Male	Female	Male	Female	Male	Female
55	16	18	1	1	20	16	2	2
56	10	13	1	1	13	10	2	2
57	10	13	1	1	13	10	2	2
58	14	13	1	2	13	12	2	2
59	14	13	2	2	13	12	3	3
60	14	13	2	4	14	14	3	5
61	14	15	3	4	14	18	3	10
62	21	20			22	30		
63	18	20			14	20		
64	18	20			14	20		
65	21	20			20	25		
66	18	18			15	25		
67	18	18			15	25		
68	18	18			15	25		
69	18	18			15	25		
70	20	20			15	25		
71	20	20			15	25		
72	20	20			15	25		
73	20	20			15	25		
74	20	20			15	25		
75	100	100			100	100		

Note: Retirement rates for the 25 & out group ages 50-54 are 6% for both male and female.

For members hired after June 30, 2012 the retirement rates for members once they reach unreduced retirement eligibility are increased 10% (multiplicative) for each year the member is beyond the age the member would have been eligible under the Hybrid provisions for members hired prior to June 30, 2012.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

C. *Other Assumptions*

1. Projected payroll for contributions: The aggregate projected payroll for the fiscal year following the valuation date is calculated by increasing the actual payroll paid during the previous fiscal year by the payroll growth rate and multiplying by the ratio of current active members to the average number of active members during the previous fiscal year.

2. Age difference: Male members are assumed to be four years older than their spouses, and female members are assumed to be four years younger than their spouses.

3. Marriage Assumption: While not implicitly used in the valuation, 100% of active members are assumed to be married when setting other benefit election and eligibility assumptions.

4. Percent electing annuity on death for contributory participants (when eligible): All of the spouses of married participants who die after becoming eligible for a retirement benefit are assumed to elect an annuity or a refund, whichever is more valuable at time of participant's death.

5. Payment Option: Future healthy retirees are assumed to choose the life only payment option. 50% of future disabled retirees are assumed to choose the 100% Joint and Survivor option.

6. Percent electing deferred termination benefit: vested terminating members are assumed to elect a refund or a deferred benefit, whichever is more valuable at the time of termination.

7. Assumed age for commencement of deferred benefits: Members electing to receive a deferred benefit are assumed to commence receipt when eligible for early retirement.

8. Administrative expenses: Administrative expenses are assumed to be 0.35% of active member payroll.

9. Reemployment, purchase of service, transfers: No recognition is made of (i) future member reimbursements upon reemployment, (ii) future purchase of additional service, or (iii) special transfer provisions.

10. Sick Leave: It is assumed that all members will have their benefit service increased by sick leave and the following loads will be applied by group:

General Employees	3.75%
Teachers	4.25%
Police and Fire	5.00%

11. COLA delay: It is assumed that the first COLA will be received 9 months after retirement. Teachers are assumed to receive COLA 12 months after retirement.

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

12. There will be no recoveries once disabled.

13. No surviving spouse will remarry and there will be no children's benefit.

14. Pay increase timing: Beginning of (fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.

15. Decrement timing: Retirements and terminations of Teachers are assumed to occur at the beginning of the year. All other decrements are assumed to occur mid-year.

16. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

17. Decrement relativity: Decrement rates are used directly from the Experience Study, without adjustment for multiple decrement table effects.

18. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.

19. Benefit Service: All members are assumed to accrue 1 year of service each year. Exact fractional service is used to determine the amount of benefit payable.

20. Police officers, firefighters, investigators of the Department of the Prosecuting Attorney and the Attorney General, narcotic enforcement investigators, and public safety investigators hired prior to June 30, 2012 are not assumed to retire at age 55 unless they have 10 years of service.

VII. Participant Data

Participant data was supplied in electronic files for (i) active members, (ii) inactive vested members, who are entitled to a future deferred benefit, (iii) members and beneficiaries receiving benefits.

Salary supplied for the current year was based on the actual pensionable earnings for the 12-month period ending the March preceding the valuation date. This pay was increased by 1% to reflect the three month difference from March to June. For members with less than one year of service, the base pay rate provided in the data was used.

VIII. Dates of Adoption of Assumptions and Methods

The actuarial assumptions and methods were adopted by the Board of Trustees on December 12, 2016 as recommended by Gabriel, Roeder, Smith & Company (GRS).

Summary of Actuarial Methods and Assumptions (continued)
(Adopted on December 12, 2016)

IX. Changes in Assumptions and Methods since Prior Valuation

The actuarial assumptions have been materially revised since the prior valuation. The major changes were (i) a decrease in the investment return assumption from 7.65% to 7.00%, and (ii) the mortality assumption was modified to assume longer life expectancies as well as to reflect continuous mortality improvement (generational mortality improvement). Please see our Experience Study report dated July 5, 2016 for a more extensive discussion of the changes in the actuarial assumptions and the rationale for the current assumptions.

Summary of Plan Changes

Act 65, effective July 1, 1999

Requires judges who enter or re-enter service after June 30, 1999 to be at least 55 years old and five years of service or have 25 years of service to retire.

Act 100, effective June 30, 1999

Uses actuarial investment earnings in excess of a ten percent (10%) actuarial investment yield rate to reduce the employer's contribution requirements by $147.0 million and $50.6 million for fiscal years ending June 30, 2000 and 2001, respectively.

Act 284, effective June 30, 2001

Provide an increase in pension benefits for current retirees with military service who retired prior to July 2, 1989. A retirant who rendered honorable active military service could be granted up to 4 years of military service credits based upon his/her years of credited service under the ERS, not to exceed his/her actual years of military service. The years of military service credits granted are based on the following schedule:

- 0 years for retirants with less than 8 years of credited service
- Up to 2 years of retirants with 8 years or more of credited service
- Up to 3 years of retirants with 20 years or more of credited service
- Up to 4 years of retirants with 25 years or more of credited service

For each year of military service credits granted on the schedule above, the retirant will be provided a $36.00 increase is his/her monthly pension or retirement allowance.

Act 199, effective June 30, 2003

Emergency Medical Technicians (EMTs) are allowed to retire with an unreduced benefit after 25 years of service regardless of age, of which the last five or more years prior to retirement must be in that capacity. This feature is phased in one year at a time, July 1, 2003 through June 30, 2008.

Act 177, effective July 1, 2004

This Act allows police officers with a permanent service-connected disability to retain the 2-1/2% benefit multiplier for each year of service as a police officer.

Act 179, effective July 1, 2004

This Act increased the Noncontributory service-connected disability formula to 35% of average final compensation. The Act also changed the methodology for crediting interest on contributions for terminated members so that interest continues to accrue until the date of refund. The Act adds a "pop-up" feature to the joint & survivor benefit options if the beneficiary pre-deceases the retiree.

This Act also created the new Hybrid Plan which became effective July 1, 2006.

Summary of Plan Changes (continued)

Act 181, effective July 1, 2004

This Act establishes fixed employer contribution rates as a percentage of compensation effective July 1, 2005. Employers will contribute 15.75% for their police officers and firefighters and 13.75% for other employees.

Act 183, effective July 1, 2004

This Act amends the ERS statutes to comply with the federal tax limits on compensation retroactive to July 1, 1996.

Act 56, effective December 1, 2004

This Act amends the ERS statutes to allow the automatic cost-of-living-adjustment to be reflected when determining actuarial equivalent optional forms of payment.

Act 256, effective July 5, 2007

Legislation was enacted to remove the statutory salary increase assumption from the statutes and to grant the System's Board of Trustees the authority to set the salary increase assumption. As a result of that legislation, the Board has adopted effective with this valuation the salary increase assumption recommended by GRS as a result of the Experience Study performed in 2006.

Legislation was also enacted to increase the employer contribution rates to the System. Effective July 1, 2008, the employer contribution rate for Police and Fire employees will increase from 15.75% to 19.70% and the rate for All Other employees will increase from 13.75% to 15.00%

Act 163, effective June 23, 2011

Legislation was enacted that increased the future employer contribution rates to ERS. Employers of Police and Fire employees will contribute 22.0% of pay in FY 2013, 23.0% in FY 2014, 24.0% in FY 2015, and 25.0% in FY 2016 and beyond. Employers of All Other Employees will contribute 15.5% of pay in FY 2013, 16.0% in FY 2014, 16.5% in FY 2015, and 17.0% in FY 2016 and beyond.

Act 163 continued on next page

.

Summary of Plan Changes (continued)

<u>Act 163, effective June 23, 2011 (continued)</u>

Legislation was enacted that made numerous changes to the benefits and member contribution rates for employees hired after June 30, 2012. Key changes are shown below:

Benefit Provision	Police & Fire Employees	All Other Employees
Benefit Multiplier	2.25%	1.75%
Normal Retirement	Age 55 with 25 years of service, or age 60 with 10 years of service	Age 60 with 30 years of service, or age 65 with 10years of service
Post-Retirement Increase	1.5%	1.5%
Hybrid Match	N/A	120%
Average Final Compensation	Highest 5 annual base salaries	Highest 5 annual base salaries
Eligibility for Deferred Benefit	10 years of service	10 years of service
Member Contribution Rate	14.20%	8.00%

Similar changes were also made to the benefits of Judges, Legislative Officers, etc.

Similar changes were also made to those employees in the All Other Employees group who are eligible to retire at 25 years of service including the addition of a minimum age requirement (55).

Finally, legislation was enacted that set the investment return assumption for the June 30, 2011 valuation at 7.75% (the rate recommended in the Experience Study presented to the Board in December of 2010). In addition, the legislation granted ERS's Board the authority to set this assumption for valuations after 2011.

<u>Act 152, effective June 26, 2012</u>

Legislation was enacted to require employers to pay additional contributions if a retiring employee, who was first employed prior to July 1, 2012 and who was last employed by the employer, has significant non-base pay increases included in their average final compensation. The additional contribution is equal to the actuarial present value of the additional benefits earned due to the "excessive" non-base pay increases.

<u>Act 153, effective June 26, 2012</u>

Legislation was enacted to eliminate most types of non-base pay from the definition of compensation for employees hired after June 30, 2012. For the impacted employees, non-base pay compensation will be excluded in determining both the contributions made by and on behalf of these employees and the benefits they will earn in the System.

Summary of Actuarial Methods and Assumptions (continued)

Act 017, effective July 1, 2017

Legislation was enacted that increased the future employer contribution rates to ERS. Employers of Police and Fire employees will contribute 28% of pay in FY 2018, 31% in FY 2019, 36% in FY 2020, and 41% in FY 2021 and beyond. Employers of All Other Employees will contribute 18% of pay in FY 2018, 19% in FY 2019, 22% in FY 2020, and 24% in FY 2021 and beyond.

Ten Year Actuarial Schedules
2009 to 2018

- Retirement System Membership **
  - 2018 Membership Data *
- Historical Summary of Active Member Data *
- Pensioners, Average Annual Pension and Active Member/Pensioner Comparison **
- Number of Retirants and Beneficiaries **
- Solvency Test **
- Employer Contribution Rates as a Percentage of Payroll **
- Employer Appropriations to Pension Accumulation Fund, Appropriation Years 2008-2009 to 2017-2018 **

Note: * Prepared by Gabriel, Roeder, Smith & Company
** Compiled by ERS Staff from actuary reports, or other data.

Retirement System Membership **
2009 to 2018

March 31,	Active Members	Terminated Vested Members	Inactive Nonvested Members (a)	Pensioners & Beneficiaries	Total Membership
2009	67,912	6,016	n/a	36,999	110,927
2010	65,890	6,895	n/a	38,441	111,226
2011	65,310	6,649	n/a	39,689	111,648
2012	65,599	6,909	n/a	40,774	113,282
2013	66,226	7,312	n/a	41,812	115,350
2014	67,206	8,105	11,247	43,087	129,645
2015	67,310	7,413	13,840	44,283	132,846
2016	67,377	7,741	14,554	45,506	135,178
2017	65,911	9,241	16,482	46,927	138,561
2018	66,271	9,249	17,819	48,569	141,908

** Schedule compiled by ERS Staff from actuary reports.
(a) Number not reported in prior years, included in counts for GASB Statement No. 68 reporting.
n/a = not available

Ten-Year Actuarial Schedules (continued)

2018 Membership Data

	Police and Firefighters		All Other Employees		All Employees	
	June 30, 2018	June 30, 2017	June 30, 2018	June 30, 2017	June 30, 2018	June 30, 2017
1. Active members						
a. Number	4,890	5,009	61,381	60,902	66,271	65,911
b. Total payroll	$ 480,304,486	$ 478,393,096	$3,776,937,484	$3,655,763,685	$4,257,241,970	$4,134,156,781
c. Average salary	$ 98,222	$ 95,507	$ 61,533	$ 60,027	$ 64,240	$ 62,723
d. Average age	42.7	42.8	48.3	48.4	47.90	48.0
e. Average service	14.4	14.6	13.1	13.2	13.2	13.3
2. Terminated vested members (a)						
a. Number	382	378	8,867	8,863	9,249	9,241
b. Total annual deferred benefits	$ 6,427,960	$ 6,372,538	$ 92,406,838	$ 75,657,983	$ 98,834,798	$ 82,030,521
c. Average annual deferred benefit	$ 16,827	$ 16,859	$ 10,421	$ 8,536	$ 10,686	$ 8,877
3. Service retirees						
a. Number	3,633	3,439	39,029	37,809	42,662	41,248
b. Total annual benefits	$ 206,589,158	$ 186,219,761	$1,043,197,275	$ 989,160,649	$1,249,786,433	$1,175,380,410
c. Average annual benefit	$ 56,865	$ 54,149	$ 26,729	$ 26,162	$ 29,295	$ 28,495
4. Disabled retirees						
a. Number	125	124	1,518	1,485	1,643	1,609
b. Total annual benefits	$ 2,825,661	$ 2,722,839	$ 20,913,676	$ 19,580,231	$ 23,739,337	$ 22,303,070
c. Average annual benefit	$ 22,605	$ 21,958	$ 13,777	$ 13,185	$ 14,449	$ 13,861
5. Beneficiaries						
a. Number	312	304	3,952	3,766	4,264	4,070
b. Total annual benefits	$ 11,934,021	$ 11,184,933	$ 65,573,518	$ 60,704,184	$ 77,507,539	$ 71,889,117
c. Average annual benefit	$ 38,250	$ 36,793	$ 16,592	$ 16,119	$ 18,177	$ 17,663

(a) As of June 30, 2014 - Terminated vested members does not include 11, 247 Inactive members that may return to service and earn additional service credits to become vested (612 Police and firefighters plus 10,635 All other employees). As of June 30, 2015, there were 13,840 (568 Police and firefighters plus 13,272 All other employees). As of June 30, 2016, there were 14,554 (599 Police and firefighters plus 13,955 All other employees). As of June 30, 2017, there were 16,482 (641 Police and firefighters plus 15,841 All other employees). As of June 30, 2018, there were 17,819 (666 Police and firefighters plus 17,153 All other employees).

Historical Summary of Active Member Data

Year Ending June 30,	Active Members		Covered Payroll		Average Salary			
	Number	Percent Increase	Amount in $ Millions	Percent Increase	$ Amount	Percent Increase	Average Age	Average Service
2009	67,912	2.0%	3,838.0	6.6%	56,514	4.5%	46.8	12.9
2010	65,890	-3.0%	3,713.6	-3.2%	56,360	-0.3%	47.1	13.2
2011	65,310	-0.9%	3,731.4	0.5%	57,133	1.4%	47.4	13.4
2012	65,599	0.4%	3,706.1	-0.7%	56,497	-1.1%	47.6	13.5
2013	66,226	1.0%	3,720.8	0.4%	56,184	-0.6%	47.7	13.5
2014	67,206	1.5%	3,871.0	4.0%	57,600	2.5%	47.8	13.5
2015	67,310	0.2%	3,952.6	2.1%	58,723	1.9%	47.8	13.2
2016	67,377	0.1%	4,118.4	4.2%	61,124	4.1%	47.9	13.3
2017	65,911	-2.2%	4,134.2	0.4%	62,723	2.6%	48.0	13.3
2018	66,271	0.5%	4,257.2	3.0%	64,240	2.4%	47.9	13.2

Ten-Year Actuarial Schedules (continued)

Pensioners, Average Annual Pension and Active Member/Pensioner Comparison**

2009 to 2018

March 31,	Number of Pensioners	Average Annual Pension (1)	Ratio of Active Members per Pensioner
2009	34,429	$22,337	1.9
2010	35,763	$23,173	1.8
2011	36,871	$24,160	1.8
2012	37,830	$24,853	1.7
2013	38,741	$25,485	1.7
2014	39,680	$26,032	1.7
2015	40,657	$26,671	1.7
2016	41,654	$27,260	1.6
2017	42,857	$27,946	1.5
2018	44,305	$28,745	1.5

** Schedule compiled by ERS Staff from actuary reports.

(1) Pension amount includes base pension plus 2.5% post-retirement increases (excludes other bonuses and cost-of-living adjustments).

Number of Retirants and Beneficiaries**

2009 to 2018

As of Mar 31,	Added	Average Added to Rolls	Removed	Average Removed from Rolls	Total	Average Pension	% Chg
Retirants							
2009	1,531	$20,861	995	$16,053	34,429	$22,337	2.77%
2010	2,316	$25,153	982	$16,362	35,763	$23,173	3.74%
2011	2,056	$27,808	948	$18,154	36,871	$24,160	4.26%
2012	1,987	$24,680	1,028	$17,958	37,830	$24,853	2.87%
2013	1,994	$23,503	1,083	$18,144	38,741	$25,485	2.54%
2014	2,027	$22,585	1,088	$19,456	39,680	$26,032	2.15%
2015	2,229	$22,997	1,252	$19,820	40,657	$26,671	2.45%
2016	2,237	$23,785	1,240	$20,694	41,654	$27,260	2.21%
2017	2,402	$28,043	1,199	$21,286	42,857	$27,946	2.52%
2018	2,709	$28,712	1,261	$21,995	44,305	$28,745	2.86%
Beneficiaries							
2009	298	$14,518	95	$9,772	2,570	$13,308	4.38%
2010	214	$14,803	106	$9,713	2,678	$13,814	3.80%
2011	212	$15,843	72	$12,107	2,818	$14,256	3.20%
2012	225	$14,798	99	$11,882	2,944	$14,628	2.61%
2013	238	$14,515	111	$11,790	3,071	$14,962	2.28%
2014	442	$17,964	106	$12,439	3,407	$15,651	4.60%
2015	310	$19,597	91	$12,530	3,626	$16,337	4.38%
2016	325	$20,598	99	$14,371	3,852	$17,022	4.19%
2017	333	$19,992	115	$13,012	4,070	$17,663	3.77%
2018	336	$19,355	142	$15,036	4,264	$18,177	2.91%

** Schedule compiled by ERS staff from actuary reports.

Ten-Year Actuarial Schedules (continued)

Solvency Test**

2009 to 2018

	Actuarial Accrued Liabilities (AAL)				Cumulative Portion of Actuarial Accrued Liabilities Covered by Assets		
June 30,	Active Member Contributions	Retirees, Beneficiaries, and Inactive Vested Members	Active and Inactive Members Employer Financed Portion	Actuarial Value of Assets	Column (1)	Column (2)	Column (3)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
2009	1,168.9	8,584.0	7,883.4	11,400.1	100%	100%	20.9%
2010	1,265.0	9,259.4	7,959.2	11,345.6	100%	100%	10.3%
2011	1,364.2	10,183.7	8,549.0	11,942.8	100%	100%	4.6%
2012	1,485.1	10,707.2	8,491.1	12,242.5	100%	100%	0.6%
2013	1,658.2	11,182.5	8,403.0	12,748.8	100%	99%	0.0%
2014	1,812.9	11,673.0	8,734.2	13,641.8	100%	100%	1.8%
2015	1,981.8	12,321.8	8,934.8	14,463.7	100%	100%	1.8%
2016	2,150.4	14,228.2	11,060.6	14,998.7	100%	90%	0.0%
2017	2,183.2	15,020.6	11,444.8	15,720.6	100%	90%	0.0%
2018	2,181.3	16,008.8	11,727.3	16,512.7	100%	90%	0.0%

(Amounts in $millions)

** Schedule compiled by ERS Staff from actuary reports

Unfunded Actuarial Accrued Liability FY 2009-2018

Ten-Year Actuarial Schedules (continued)

Employer Contribution Rates as a Percentage of Payroll **

2009 to 2018

Actuarial Valuation as of June 30,	Police and Firefighters			All Other Employees			All Active Employees		
	Normal Cost Rate	Amortization Percent	Total Employer Rate	Normal Cost Rate	Amortization Percent	Total Employer Rate	Normal Cost Rate	Amortization Percent	Total Employer Rate
2009	6.58%	13.12%	19.70%	5.79%	9.21%	15.00%	5.89%	9.57%	15.46%
2010	6.59%	13.11%	19.70%	5.78%	9.22%	15.00%	5.88%	9.59%	15.47%
2011	6.60%	13.10%	19.70%	5.79%	9.21%	15.00%	5.90%	9.59%	15.49%
2012	8.09%	11.01%	19.70%	5.78%	9.22%	15.00%	6.06%	9.46%	15.52%
2013	7.98%	14.02%	22.00%	5.69%	9.81%	15.50%	5.97%	10.14%	16.11%
2014 *	7.17%	14.83%	23.00%	5.34%	10.66%	16.00%	5.54%	11.22%	16.76%
2015 *	8.04%	15.96%	24.00%	5.76%	10.74%	16.50%	6.02%	11.26%	17.28%
2016 *	13.32%	11.68%	25.00%	7.57%	9.43%	17.00%	8.23%	9.66%	17.89%
2017 *	13.13%	14.87%	28.00%	7.33%	10.67%	18.00%	8.02%	9.89%	17.91%
2018 *	12.97%	15.03%	28.00%	7.14%	10.86%	18.00%	7.82%	11.34%	19.16%

Note: Effective with the June 30, 2004 valuation, the employer contribution rate is statutorily changed to a percentage of pay of 15.75% of actual pay for Police and Fire and 13.75% of actual pay for All Other Employees, per Act 181/2004 SLH. Effective July 1, 2008, the employer contribution rate increased to 19.70% of actual pay for Police and Fire and 15.00% of actual pay for All Other Employees, per Act 256/2006 SLH.

Per Act 163/2011 SLH, the statutory employer contribution rate for Police and Fire employees will be 22.00% in FY 2013, 23.00% in FY 2014, 24.00% in FY 2015 and 25.00% in FY 2016 and thereafter, and the rate for All Other Employees will be 15.50% in FY 2013, 16.00% in FY 2014, 16.50% in FY 2015 and 17.00% in FY 2016 and thereafter.

Per Act 017/2017 SLH, the statutory employer contribution rates for Police and Fire employees will be 28% of pay in FY 2018, 31% in FY 2019, 36% in FY 2020, and 41% in FY 2021 and thereafter, and the rate for All Other Employees will be 18% of pay in FY 2018, 19% in FY 2019, 22% in FY 2020, and 24% in FY 2021 and thereafter.

* This chart does not include the effects of GASB Statement No 67 (implemented by the ERS only for FY 2014) that requires member contributions "picked up" as employer contributions pursuant to IRC section 414(h)(2) to be reported as Employer Contributions. ERS implemented GASB Statement No. 82 in FY 2015 that excludes these amounts from Employer Contributions.

** Schedule compiled by ERS Staff from actuary reports.

Ten-Year Actuarial Schedules (continued)

Employer Appropriations to Pension Accumulation Fund**

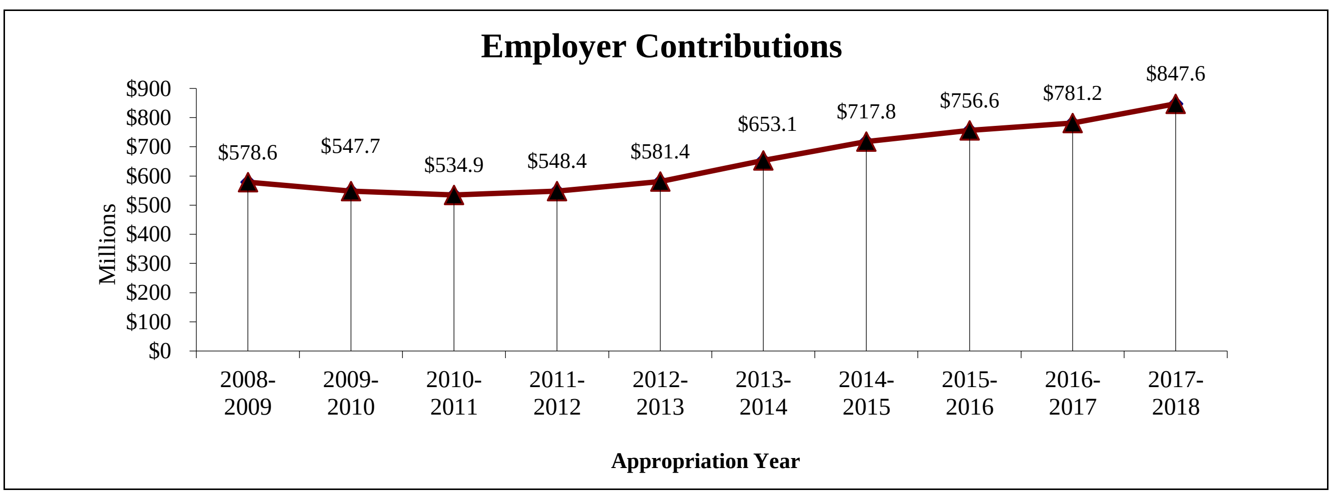
	Investment Yield Rate	
Fiscal Year	Assumed for Actuarial Valuation	Actuarial Investment Return
2008-2009	8.0%	0.87%
2009-2010	8.0%	(0.42)%
2010-2011	7.75%	7.10%
2011-2012	7.75%	5.05%
2012-2013	7.75%	6.67%
2013-2014	7.75%	9.23%
2014-2015	7.65%	7.85%
2015-2016	7.00%	5.59%
2016-2017	7.00%	6.92%
2017-2018	7.00%	7.18%

Notes: (1) Beginning with the valuation for fiscal year 1996-97 (appropriation fiscal year 1999-2000), the actuarial investment income is the sum of the expected net investment income based on the actuarial assumption of 8% and a four-year smoothing of the difference between the market value of assets at year-end and the expected actuarial value of assets. In prior years, the actuarial investment income was the sum of interest, dividends, and net realized gains less net realized losses and investment expenses.

(2) Effective July 1, 2008, the employer contribution rate increased to 19.70% of actual pay for Police and Fire and 15.00% of actual pay for All Other Employees, per Act 256/2006 SLH. Pursuant to Act 163/2012 SLH, the employer rates increased over a four-year phase in period. The employer contribution rates for Police and Fire employees increased according to the following schedule: 22.00% in FY2013, 23.00% in FY 2014, and 24.00% in FY 2015, and 25.00% in FY 2016 and beyond. The employer contribution rates for All Other Employees increased according to the following schedule: 15.50% in FY2013, 16.00% in FY 2014, and 16.50% in FY 2015, and 17.00% in FY 2016 and beyond.

Pursuant to Act 017/2017 SLH, the employer rates increased over a four-year phase in period. The employer contribution rates for Police and Fire employees increased according to the following schedule: 25.00% in FY2018, 31.00% in FY 2019, 36.00% in FY 2020, and 41.00% in FY 2021 and beyond. The employer contribution rates for All Other Employees increased according to the following schedule: 18.00% in FY2018, 19.00% in FY 2019, 22.00% in FY 2020, and 24.00% in FY 2021 and beyond.

** Schedule compiled by ERS Staff from actuary reports.



*** This chart of Employer Contributions does not include Member contributions picked up as employer contributions per IRC section 414(h)(2) and Chapter 88, HRS (as required by GASB Statement No. 68 in FY 2014).

AGGREGATED FUNDED RATIOS FOR STATES

Funded Ratio		Aggregated Statewide Retirement Systems (all statewide systems for state employees, teachers, school employees, or municipal employees)			
100% or more	2	South Dakota	100.0%	Wisconsin	100.0%
90% to 99%	4	New York	95.5%	Washington	92.5%
		Tennessee	93.9%	Idaho	91.2%
80% to 89%	10	Nebraska	88.8%	Iowa	82.3%
		Utah	87.4%	Oklahoma	82.1%
		Delaware	86.9%	Minnesota	80.7%
		North Carolina	86.0%	Missouri	80.5%
		Florida	83.9%	Oregon	80.1%
		Maine	82.9%		
70% to 79%	12	Arkansas	79.6%	Wyoming	76.3%
		Virginia	78.6%	Nevada	75.1%
		Texas	78.4%	Georgia	74.3%
		Ohio	77.0%	Maryland	72.8%
		West Virginia	76.5%	Montana	71.4%
60% to 69%	12	Alaska	69.9%	Arizona	64.8%
		California	69.1%	Michigan	63.2%
		Alabama	68.5%	Vermont	62.0%
		Louisiana	68.5%	New Hampshire	61.8%
		Kansas	68.4%	Mississippi	61.8%
		New Mexico	67.6%	Indiana	60.8%
		North Dakota	65.4%	Colorado	60.2%
Less than 60%	9	Massachusetts	57.9%	New Jersey	55.2%
		Rhode Island	57.7%	Connecticut	49.1%
		Pennsylvania	57.3%	Illinois	48.8%
		South Carolina	56.1%	Kentucky	45.8%
		Hawaii	**55.2%**		

Source: Compiled from most recent Public Funds Survey by Gabriel, Roeder, Smith & Company

Note: Funded Ratios are shown for all 50 states. Multiple statewide retirement systems are aggregated together to produce the overall funded ratio for the state.

Employees' Retirement System

of the State of Hawaii

STATISTICAL SECTION

Summary

This section contains various statistical and historical data considered useful in evaluating the condition of the ERS. All non-accounting data is taken from ERS' internal sources except for that information which is derived from the actuarial valuations.

Changes in Fiduciary Net Position

Last Ten Fiscal Years

Fiscal Year Ended June 30,:	2009	2010	2011	2012	2013
Additions					
Employer Contributions	$ 578,672,058	$ 547,669,675	$ 538,692,849	$ 548,353,394	$ 581,447,213
Member contributions	177,781,610	360,047,068	232,880,063	182,401,324	185,837,186
Investment income (net of expense)	(1,937,317,469)	1,026,461,210	2,040,061,555	(57,798,410)	1,331,208,154
Total additions to plan net assets	(1,180,863,801)	1,934,177,953	2,811,634,467	672,956,308	2,098,492,553
Deductions					
Benefits	833,691,245	905,315,348	960,219,432	1,015,447,668	1,060,561,148
Refunds	3,937,464	7,573,619	7,901,509	7,187,606	7,204,411
Administrative expenses	13,011,283	12,406,339	13,325,781	11,634,197	11,941,446
Total deductions from plan net assets	850,639,992	925,295,306	981,446,722	1,034,269,471	1,079,707,005
Net increase (decrease) in net position	(2,031,503,793)	1,008,882,647	1,830,187,745	(361,313,163)	1,018,785,548
Net position restricted for pension benefits					
Beginning of year	10,846,788,965	8,815,285,172	9,824,167,819	11,654,355,564	11,293,042,401
End of year	$ 8,815,285,172	$ 9,824,167,819	$ 11,654,355,564	$11,293,042,401	$12,311,827,949

Fiscal Year Ended June 30,:	2014 **	2015	2016	2017	2018
Additions					
Employer Contributions	$ 653,127,697	$ 717,792,981	$ 756,558,222	$ 781,244,218	$ 847,595,466
Member contributions	206,127,337	223,505,419	236,801,861	250,704,067	259,427,934
Investment income (net of expense)	2,175,479,961	556,436,475	(169,368,110)	1,934,512,507	1,225,572,599
Total additions to plan net assets	3,034,734,995	1,497,734,875	823,991,973	2,966,460,792	2,332,595,999
Deductions					
Benefits	1,122,445,642	1,170,744,770	1,232,589,353	1,306,788,954	1,395,881,342
Refunds	8,475,969	10,507,888	12,927,672	16,340,290	20,846,500
Administrative expenses	12,626,030	14,032,964	13,960,587	14,986,159	15,784,490
Total deductions from plan net assets	1,143,547,641	1,195,285,622	1,259,477,612	1,338,115,403	1,432,512,332
Net increase (decrease) in net position	1,891,187,354	302,449,253	(435,485,639)	1,628,345,389	900,083,667
Net position restricted for pension benefits					
Beginning of year	12,311,827,949	14,203,015,303	14,505,464,556	14,069,978,917	15,698,324,306
End of year	$ 14,203,015,303	$ 14,505,464,556	$ 14,069,978,917	$ 15,698,324,306	$ 16,598,407,973

** For FYE June 30, 2014, ERS implemented GASB Statement No. 67 that requires Member Contributions "picked up" per Internal Revenue Code section 414(h)(2) as employer contributions to be classified for financial statement purposes as "Employer Contributions". This was subsequently changed effective with FYE June 30, 2015 with the implementation of GASB Statement No. 82.

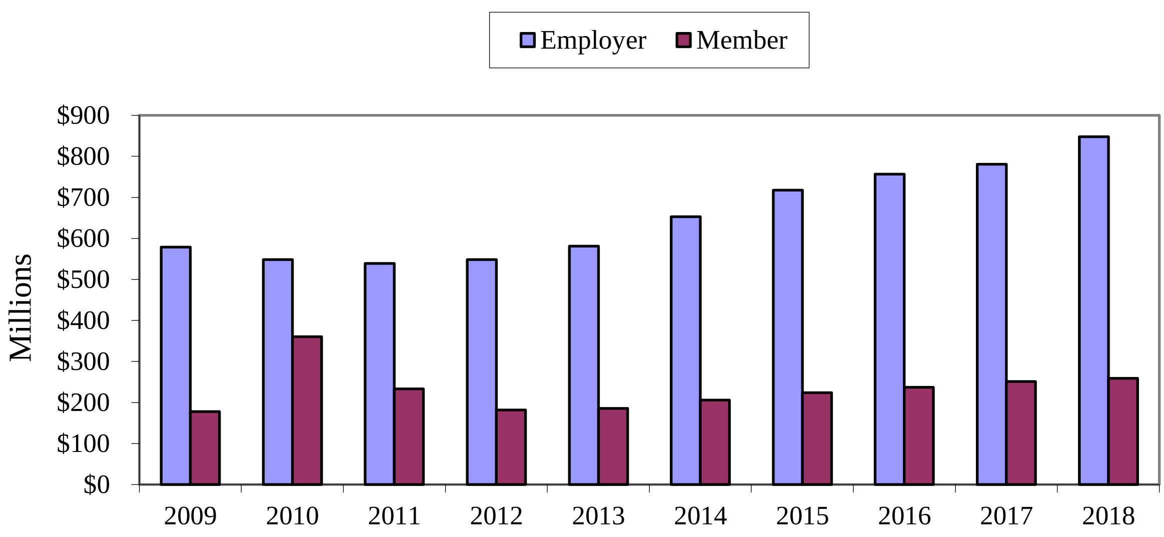
Contributions

Employer Contribution Rates as a Percentage of Payroll **

Fiscal Year		Police & Firefighters	All Other Employees	Composite Rate
2009		19.70%	15.00%	15.46%
2010		19.70%	15.00%	15.47%
2011		19.70%	15.00%	15.49%
2012		19.70%	15.00%	15.52%
2013		22.00%	15.50%	16.11%
2014	**	23.00%	16.00%	16.76%
2015		24.00%	16.50%	17.28%
2016		25.00%	17.00%	17.89%
2017		25.00%	17.00%	17.91%
2018		28.00%	18.00%	19.16%

** Excludes member contributions picked up as employer contributions per IRC section 414(h)(2) and Chapter 88, HRS for FY 2014.

Contributions **



*** Member contributions picked up as employer contributions per IRC section 414(h)(2) and Chapter 88, HRS are included in the Member Contributions for this chart, they are not included in Employer Contributions for FY 2014.

Deductions from Fiduciary Net Position for Benefit Payments by Type

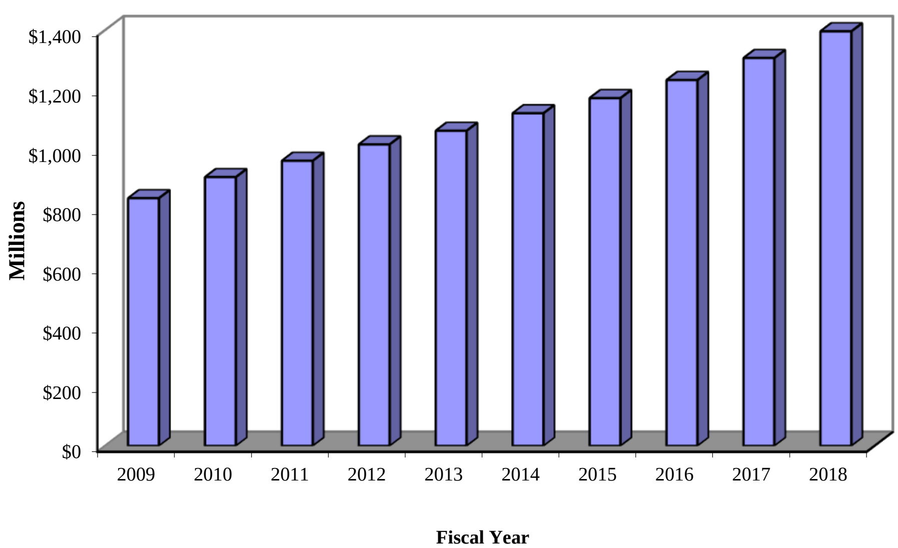
Last Ten Fiscal Years

Fiscal Year Ended June 30,:	2009 **	2010	2011	2012	2013
Recurring benefit payments					
Service	$ 754,432,615	$ 807,662,216	$ 859,915,959	$ 917,840,937	$ 963,894,245
Disability	15,619,011	16,470,042	17,355,973	17,877,572	18,987,509
Death	34,201,206	36,993,685	40,173,678	43,053,039	45,948,656
subtotal	804,252,832	861,125,943	917,445,610	978,771,548	1,028,830,410
Refund Option payments (one-time)	29,438,413	44,189,405	42,773,822	36,676,120	31,730,738
Total benefit payments	$ 833,691,245	$ 905,315,348	$ 960,219,432	$ 1,015,447,668	$1,060,561,148

Fiscal Year Ended June 30,:	2014	2015	2016	2017	2018
Recurring benefit payments					
Service	$ 1,016,912,124	$ 1,058,688,356	$ 1,111,416,262	$ 1,175,380,410	$ 1,241,819,373
Disability	19,835,520	20,732,259	21,437,486	22,303,070	23,739,337
Death	53,324,252	59,238,051	65,568,232	71,889,117	77,507,539
subtotal	1,090,071,896	1,138,658,666	1,198,421,980	1,269,572,597	1,343,066,249
Refund Option payments (one-time)	32,373,746	32,086,104	34,167,373	37,216,357	52,815,093
Total benefit payments	$ 1,122,445,642	$ 1,170,744,770	$ 1,232,589,353	$ 1,306,788,954	$ 1,395,881,342

** From FYE 6/30/2009, death benefits include payments to continuing beneficiaries.

Benefit Payments



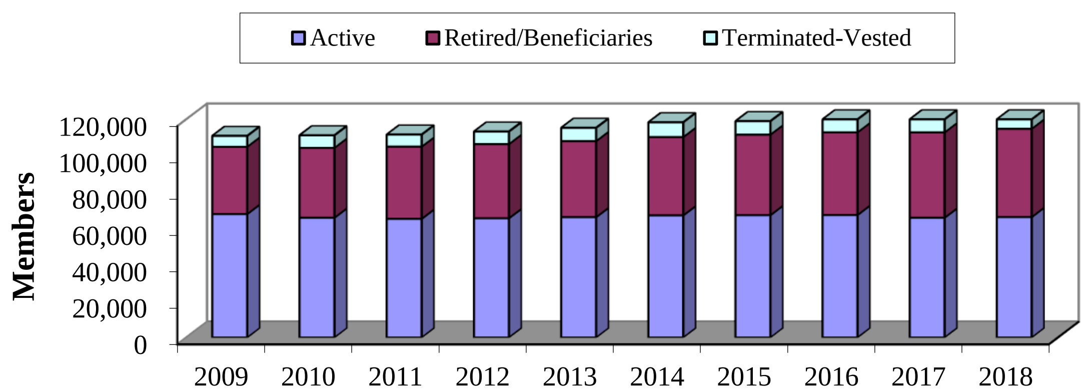
Participating Employers and Membership in ERS

Last Ten Fiscal Years

ERS Membership

As of March 31,:	Active	Retired/ Beneficiaries	Terminated- Vested	Inactive- Non-Vested	Totals
2009	67,912	36,999	6,016	na	110,927
2010	65,890	38,441	6,895	na	111,226
2011	65,310	39,689	6,649	na	111,648
2012	65,599	40,774	6,909	na	113,282
2013	66,226	41,812	7,312	na	115,350
2014	67,206	43,087	8,105	11,247	129,645
2015	67,310	44,283	7,413	13,840	132,846
2016	67,377	45,506	7,741	14,554	135,178
2017	65,911	46,927	9,241	16,482	138,561
2018	66,271	48,569	9,249	17,819	141,908

ERS Membership



Participating Employers and Active Members

As of March 31,:	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
State of Hawaii	52,704	50,789	50,268	50,604	51,176	51,875	51,791	51,723	50,288	50,719
City & County of Honlulu	8,640	8,519	8,485	8,451	8,457	8,625	8,727	8,807	8,740	8,709
- Board of Water Supply	554	526	516	505	532	551	558	558	572	570
Hawaii County	2,527	2,501	2,459	2,427	2,446	2,489	2,550	2,596	2,561	2,553
Kauai County	1,160	1,129	1,158	1,201	1,227	1,244	1,234	1,244	1,246	1,247
Maui County	2,327	2,426	2,424	2,411	2,388	2,422	2,450	2,449	2,504	2,473
Total	67,912	65,890	65,310	65,599	66,226	67,206	67,310	67,377	65,911	66,271

Benefit Payments by Retirement Type and Option

As of March 31, 2018

Retired Contributory Members

Monthly Benefit	Number of Recipients	Type of Retirement * 1	2	3	4	5	Retirement Option Max	Opt. 1	Opt. 2	Opt. 3	Opt. 4	Opt. 5	Other
$ 1 - 500	1,276	960	21	14	1	280	235	233	187	70	245	305	1
500 - 1,000	2,006	1,536	72	30	15	353	222	136	140	63	780	661	4
1,000 - 1,500	2,146	1,712	35	69	12	318	232	115	150	62	921	662	4
1,500 - 2,000	2,256	1,917	19	55	10	255	200	91	149	60	1,045	704	7
2,000 - 2,500	2,141	1,917	9	34	7	174	163	66	128	41	940	798	5
2,500 - 3,000	2,385	2,207	4	21	8	145	199	54	111	52	1,046	916	7
3,000 - 3,500	2,344	2,205	3	12	6	118	206	71	129	57	1,159	718	4
3,500 - 4,000	1,828	1,725	-	9	3	91	200	51	84	65	1,062	364	2
4,000 - 4,500	1,388	1,325	-	7	2	54	193	41	92	56	791	214	1
4,500 - 5,000	1,025	977	-	2	3	43	152	29	75	58	572	139	-
5,000	2,780	2,684	-	-	5	91	360	67	275	172	1,678	228	-
	21,575	19,165	163	253	72	1,922	2,362	954	1,520	756	10,239	5,709	35

Retired Hybrid Members

Monthly Benefit	Number of Recipients	Type of Retirement * 1	2	3	4	5	Retirement Option Max	Opt. 1	Opt. 2	Opt. 3	Opt. 4	Opt. 5	Other
$ 1 - 500	669	610	3	-	29	27	292	79	148	83	29	38	-
500 - 1,000	1,769	1,573	77	6	40	73	673	118	434	215	175	154	-
1,000 - 1,500	1,601	1,395	95	29	22	60	560	99	394	178	198	172	-
1,500 - 2,000	1,157	1,029	62	14	13	39	386	61	311	155	149	93	2
2,000 - 2,500	1,081	1,012	24	2	13	30	357	69	269	168	146	70	2
2,500 - 3,000	941	902	20	1	7	11	370	46	215	155	104	51	-
3,000 - 3,500	736	706	4	4	8	14	288	36	163	118	93	38	-
3,500 - 4,000	562	555	1	-	3	3	217	31	107	120	55	32	-
4,000 - 4,500	361	359	-	-	1	1	152	21	74	71	25	18	-
4,500 - 5,000	256	249	1	-	2	4	95	11	61	61	22	6	-
5,000	587	573	-	-	2	12	200	30	134	129	68	26	-
	9,720	8,963	287	56	140	274	3,590	601	2,310	1,453	1,064	698	4

Retired Noncontributory Members

Monthly Benefit	Number of Recipients	Type of Retirement * 1	2	3	4	5	Retirement Option Max	Opt. A	Opt. B	Opt. C	Other
$ 1 - 500	2,511	1,699	133	53	148	478	993	555	708	115	140
500 - 1,000	4,312	3,392	314	50	88	468	2,079	820	1,144	199	70
1,000 - 1,500	2,887	2,428	149	51	33	226	1,414	582	733	135	23
1,500 - 2,000	1,909	1,669	75	10	11	144	866	390	553	97	3
2,000 - 2,500	1,688	1,554	25	5	8	96	842	341	392	112	1
2,500 - 3,000	1,630	1,555	10	2	4	59	967	301	239	123	-
3,000 - 3,500	1,054	1,011	5	1	5	32	649	186	167	52	-
3,500 - 4,000	573	551	-	1	4	17	342	120	92	19	-
4,000 - 4,500	293	276	-	-	1	16	174	62	48	9	-
4,500 - 5,000	183	176	-	-	2	5	111	38	29	5	-
5,000	234	223	-	-	4	7	123	52	52	7	-
	17,274	14,534	711	173	308	1,548	8,560	3,447	4,157	873	237

* Type of Retirement
1 – Normal retirement for age & service
2 – Ordinary disability retirement
3 – Occupational disability retirement
4 – Survivor payment – death in service
5 – Survivor payment – normal or disability retirement

Note: Refer to Plan Summary in the Introductory Section for descriptions of the types of retirements and benefit options selected by the members.

Average Monthly Service Pensions
by Years of Credited Service

		Years of Credited Service							
As of March 31,		0-9	10-14	15-19	20-24	25-29	30-34	35+	All
2009	Average Monthly Benefit	$368	$548	$925	$1,319	$2,218	$2,672	$2,997	$1,906
	Number of Active Retirants	1,184	3,987	3,555	4,173	7,570	8,615	3,859	32,943
2010	Average Monthly Benefit	$336	$563	$948	$1,356	$2,289	$2,750	$3,097	$1,975
	Number of Active Retirants	1,143	4,062	3,719	4,373	7,775	8,926	4,268	34,266
2011	Average Monthly Benefit	$364	$583	$984	$1,397	$2,374	$2,849	$3,261	$2,059
	Number of Active Retirants	1,221	4,106	3,843	4,526	7,920	9,176	4,567	35,359
2012	Average Monthly Benefit	$388	$603	$1,012	$1,424	$2,446	$2,934	$3,361	$2,117
	Number of Active Retirants	1,292	4,222	3,929	4,705	8,030	9,361	4,769	36,308
2013	Average Monthly Benefit	$429	$622	$1,038	$1,449	$2,521	$3,009	$3,454	$2,171
	Number of Active Retirants	1,371	4,303	4,018	4,906	8,134	9,544	4,902	37,178
2014	Average Monthly Benefit	$451	$642	$1,061	$1,473	$2,574	$3,082	$3,531	$2,216
	Number of Active Retirants	1,478	4,430	4,080	5,092	8,216	9,675	5,133	38,104
2015	Average Monthly Benefit	$485	$650	$1,081	$1,487	$2,623	$3,141	$3,619	$2,269
	Number of Active Retirants	1,305	4,547	4,221	5,319	8,344	10,009	5,318	39,063
2016	Average Monthly Benefit	$522	$667	$1,111	$1,519	$2,680	$3,210	$3,725	$2,318
	Number of Active Retirants	1,383	4,676	4,379	5,483	8,467	10,195	5,474	40,057
2017	Average Monthly Benefit	$553	$687	$1,150	$1,563	$2,753	$3,278	$3,824	$2,375
	Number of Active Retirants	1,450	4,854	4,515	5,629	8,688	10,457	5,655	41,248
2018	Average Monthly Benefit	$589	$713	$1,182	$1,608	$2,848	$3,366	$3,929	$2,441
	Number of Active Retirants	1,534	5,076	4,699	5,772	8,938	10,765	5,878	42,662

Retirees and Beneficiaries

(Recurring Benefit Payments)

Tabulated by Fiscal Year that Payments Started as of March 31, 2018

Valuation Year	Number	Total Annual Benefits	Monthly Average Benefit	Valuation Year	Number	Total Annual Benefits	Monthly Average Benefit
1944	1	$ 382	$32	1989	561	$ 12,381,699	$1,839
1959	1	4,498	$375	1990	606	14,979,338	$2,060
1960	1	699	$58	1991	731	18,247,117	$2,080
1961	1	280	$23	1992	710	19,162,912	$2,249
1962	1	5,984	$499	1993	755	22,312,717	$2,463
1963	1	14,491	$1,208	1994	796	22,749,413	$2,382
1964	4	35,226	$734	1995	1,577	54,212,585	$2,865
1966	2	13,897	$579	1996	1,582	51,897,563	$2,734
1967	2	24,317	$1,013	1997	598	14,884,752	$2,074
1968	2	20,577	$857	1998	624	15,660,535	$2,091
1969	4	35,868	$747	1999	903	24,814,351	$2,290
1970	2	15,043	$627	2000	1,140	32,730,906	$2,393
1971	4	30,130	$628	2001	1,340	38,229,552	$2,377
1972	11	162,167	$1,229	2002	1,139	32,615,891	$2,386
1973	13	132,272	$848	2003	1,503	47,077,203	$2,610
1974	15	178,032	$989	2004	1,470	43,256,765	$2,452
1975	19	220,987	$969	2005	1,564	46,851,201	$2,496
1976	34	495,230	$1,214	2006	1,558	44,463,130	$2,378
1977	50	676,412	$1,127	2007	1,695	47,359,987	$2,328
1978	57	957,931	$1,400	2008	1,683	45,326,033	$2,244
1979	84	1,328,111	$1,318	2009	1,595	42,967,818	$2,245
1980	115	1,920,484	$1,392	2010	2,309	73,850,336	$2,665
1981	174	2,848,007	$1,364	2011	2,111	68,432,678	$2,701
1982	200	3,454,424	$1,439	2012	2,048	58,666,775	$2,387
1983	223	4,362,175	$1,630	2013	2,086	55,631,828	$2,222
1984	287	5,604,601	$1,627	2014	2,159	56,811,754	$2,193
1985	339	7,147,674	$1,757	2015	2,418	61,766,208	$2,129
1986	434	9,766,823	$1,875	2016	2,490	63,593,712	$2,128
1987	696	16,559,290	$1,983	2017	2,653	72,704,386	$2,284
1988	420	8,463,976	$1,679	2018	2,968	82,914,176	$2,328
				Total	48,569	$ 1,351,033,309	$2,318

Total Benefits Payable
(Recurring Benefit Payments)
Tabulated by Attained Ages of Benefit Recipients as of March 31, 2018

	Service Retirement		Disability Retirement		Survivors and Beneficiaries		Total	
Attained Ages	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 20	-	-	-	-	53	$ 251,302	53	$ 251,302
20-24	-	-	-	-	10	111,455	10	111,455
25-29	-	-	-	-	34	324,790	34	324,790
30-34	-	-	-	$ -	52	732,784	52	732,784
35-39	-	-	6	71,540	77	757,196	83	828,736
40-44	1	$ 18,004	4	84,822	98	1,149,015	103	1,251,841
45-49	66	4,099,435	38	612,776	140	1,895,536	244	6,607,747
50-54	272	18,439,801	104	1,585,744	168	2,368,464	544	22,394,009
55-59	1,488	65,209,987	251	3,793,469	280	4,930,909	2,019	73,934,365
60-64	4,608	153,332,123	369	5,438,455	431	8,014,591	5,408	166,785,169
65-69	9,560	274,485,385	356	5,353,423	546	11,283,924	10,462	291,122,732
70-74	9,949	295,928,040	261	3,391,141	642	12,641,406	10,852	311,960,587
75-79	6,481	187,712,222	125	1,748,560	526	10,902,504	7,132	200,363,286
80-84	4,638	126,070,460	50	614,594	462	8,908,663	5,150	135,593,717
85-89	3,408	81,525,267	51	681,815	434	8,309,683	3,893	90,516,765
90-94	1,690	34,802,959	21	283,315	241	3,921,863	1,952	39,008,137
95-99	440	7,199,892	7	79,683	58	808,264	505	8,087,839
100 & over	61	962,858	-	-	12	195,190	73	1,158,048
Total	42,662	$ 1,249,786,433	1,643	$ 23,739,337	4,264	$ 77,507,539	48,569	$ 1,351,033,309