ORANGE COUNTY
OCERS
EMPLOYEES RETIREMENT SYSTEM

Comprehensive Annual Financial Report

For the Year Ended December 31, 2019

Orange County, California

OCERS Members Serving the Public

Pieces of Public Transportation

Orange County Transportation Authority | Transportation Corridor Agencies | County of Orange | City of San Juan Capistrano

ORANGE COUNTY

OCERS

EMPLOYEES RETIREMENT SYSTEM

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Orange County Employees Retirement System

COMPREHENSIVE ANNUAL FINANCIAL REPORT

For the Year Ended December 31, 2019

Prepared by: The Finance Department of the
Orange County Employees Retirement System

Issued by: Steve Delaney, Chief Executive Officer
Brenda Shott, Assistant CEO of Finance and Internal Operations

Orange County Employees Retirement System
2223 East Wellington Avenue, Suite 100
Santa Ana, CA 92701-3161

714.558.6200
www.ocers.org

Mission

We provide secure retirement and disability benefits with the highest standards of excellence.

Vision

To be a trusted partner providing premier pension administration, distinguished by consistent, quality member experiences and prudent financial stewardship.

Values

***O**pen and Transparent*

***C**ommitment to Superior Service*

***E**ngaged and Dedicated Workforce*

***R**eliable and Accurate*

***S**ecure and Sustainable*

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June 4, 2020

Board of Retirement
Orange County Employees Retirement System
2223 East Wellington Avenue, Suite 100
Santa Ana, CA 92701

Dear Board Members,

We are pleased to present the Comprehensive Annual Financial Report (CAFR) of the Orange County Employees Retirement System (OCERS or System) as of and for the year ended December 31, 2019.The information contained in this report is intended to provide a detailed overview of the System's financial and investment results for the year ended December 31, 2019. It also includes information from the current actuarial valuation as of December 31, 2018.

OCERS and its Services

Established in 1945, OCERS is a public retirement system that has provided service retirement, disability, death and survivor benefits to its members for over 70 years, administered in accordance with the County Employees Retirement Law of 1937 (CERL) and the California Public Employees Pension Reform Act of 2013 (PEPRA).

Pursuant to certain provisions of CERL, OCERS is an independent governmental unit within the County of Orange, with a separate operating budget and professional staff. The California Constitution gives the Board of Retirement full authority over the administration of the System, which includes administering plan benefits for over 47,000 members, managing $17.1 billion in net assets, and serving 13 active agencies. A complete listing of both active and inactive agencies as of December 31, 2019, can be found on page 30, Section II of the CAFR, under Note 1: Plan Descriptions.

This year's CAFR theme is the third consecutive year of "OCERS Members Serving the Public" series and serves as a reminder that prior to retiring from a career in public service, our members are dedicated to providing a wide variety of services that benefit residents throughout Orange County. This year we have chosen to focus the theme on "Pieces of Public Transportation" which highlights employers whose members provide various public transportation services within our community.

Major Initiatives and Significant Events

Coronavirus COVID-19

This year's CAFR was prepared during one of the most significant disruptions to our economy since the Great Depression. In March 2020, the World Health Organization declared Coronavirus COVID-19 a global pandemic, followed by a Stay at Home Order issued by California Governor Gavin Newsom. As a result of this order, OCERS closed its offices to the public and staff has been working remotely from home. Despite working remotely, there has been no significant disruption to the services we provide to our members and retiree payroll continues to be processed and issued on time. In addition, OCERS' investment portfolio is well positioned to face the challenges of the current market volatility. During these challenging times, OCERS is committed to providing superior service and safeguarding the contributions made by our members and employers so that they are available now and into the future to provide safe and secure benefits.

OCERS Website

In May 2019, OCERS launched a completely new website. The redesigned website was a multi-year project, developed and created by OCERS' team members and a consulting website developer, as well as a series of focus groups that included input from active members, retirees and employers. The new, easy-to-navigate website offers members, employers and the public improved access to news and information about OCERS and the services we provide. The new and improved website also provides enhanced capabilities and improved functionality for those accessing the site using mobile devices such as tablets and smart phones.

Master Final Average Salary Project

The Member Services Department and Legal Division partnered on a Master Final Average Salary Project. The goal of the project was to have a comprehensive list of all pay items so that every element of pay that is transmitted to OCERS has been analyzed for pension attributes. The deliverables of the project included the creation of a new Pay Item Request form, updated pay code values in OCERS' pension administration system, and the documentation of new policies for Compensation Earnable, Pensionable Compensation and OCERS' Administrative Procedures (OAP).

Whiteboard Animation Videos

OCERS had an initiative for 2019 to begin updating informational videos with state-of-the-art graphic videos, a fun and powerful new platform that captures the attention of members and allows for a greater understanding of in-depth topics. OCERS completed its first Whiteboard Animation video "Introduction to OCERS" in December 2019 and has plans to continue producing more videos in 2020.

Key Staff Additions

After completing a competitive recruitment and selection process, OCERS named Reginald Tucker as its new Managing Director, Investments. This is a newly created position that provides assistance and support to the CIO in all duties related to the investment of the portfolio, including but not limited to portfolio strategy, manager due diligence, and internal/external communications and reporting. Mr. Tucker is responsible for the operational infrastructure of the plan in accordance with the County Employees Retirement Law of 1937 and the Board of Retirement's directives and leads the operational implementation of OCERS' investment program strategic vision.

Board Member Updates

On January 1, 2019, incumbent General Board Member, Mr. Chris Prevatt, began serving another 3-year term after he was certified by the Orange County Board of Supervisors at their December 4, 2018 Board meeting as the winner of the General Member election.

On October 22, 2019 the Orange County Board of Supervisors approved the appointment of incumbent Retired Board Member, Mr. Frank Eley, and first time General Board Member, Ms. Adele Tagaloa, who were the only qualified candidates in each of their respective elections. Both Board members will serve 3-year terms that will run January 1, 2020 to December 31, 2022.

At its regular meeting held on December 17, 2019, the Orange County Board of Supervisors approved the appointment of Mr. Arthur Hidalgo to replace the seat previously held by appointed Board Member David Ball (whose regular term ended December 31, 2019). In addition, the reappointment of current Board Members Mr. Shawn Dewane and Mr. Charles Packard were also approved. All three Board Members will serve 3-year terms that will run from January 1, 2020 to December 31, 2022.

Financial Information

OCERS' management is responsible for the complete and fair presentation of the financial information in accordance with accounting standards generally accepted in the United States of America (GAAP). To the best of our knowledge, the enclosed data is accurate in all material respects and is reported in a manner designed to fairly present the financial position and operating results of OCERS. Macias Gini & O'Connell LLP (MGO) audited the accompanying basic financial statements and related disclosures and has issued an unqualified opinion in the independent auditor's report found on page 15, Section II of the CAFR. The financial audit provides reasonable assurance that OCERS' financial statements are presented in conformity with GAAP and are free from material misstatement.

The CAFR was prepared in accordance with GAAP and reporting guidelines set forth by the Governmental Accounting Standards Board (GASB) and CERL. GAAP requires that management provide a narrative introduction, overview, and analysis to accompany the basic financial statements in the form of management's discussion and analysis (MD&A). This letter of transmittal is designed to complement the MD&A and should be read in conjunction with it. OCERS' MD&A can be found immediately following the independent auditor's report.

OCERS' management is responsible for establishing a system of internal controls to safeguard assets, maintain accurate and reliable accounting records, protect member privacy, detect and prevent fraud, and provide a reasonable basis for asserting that financial statements are fairly presented. OCERS' internal controls are designed to provide reasonable, but not absolute, assurance these objectives are met. The concept of reasonable assurance recognizes that the cost of a control should not exceed the benefits likely to be derived and that the valuation of costs and benefits requires estimates and judgment by management. In addition, oversight of internal controls and operational efficiency is provided by OCERS' Audit Committee and supported by internal auditing staff.

Investment Activities

The Board of Retirement (with the participation of the Investment Committee, staff and advisors) has exclusive control of all investments of the System and is responsible for the establishment of investment objectives, strategies and policies. OCERS' Investment Policy Statement helps guide decisions that impact OCERS' investment structure with the overall objective to invest the assets of the System solely for the benefit of its members while attempting to minimize employer contributions and investment and administration costs. In January 2017, the Board adopted a more simplified asset allocation policy, taking into consideration a risk framework with an objective to lower investment management fees. During 2018, a subsequent study of the asset allocation was performed, which resulted in increasing risk mitigating strategies and private equity and decreasing real assets and credit, as well as reconsidering a unique strategies asset class. These changes to the asset allocation are expected to generate the same projected long-term return with less volatility and were adopted by the Board in October 2018.

During 2019, OCERS' Investment Division implemented the asset allocation changes from October 2018 including: increasing risk mitigation by 5% and private equity by 2%, and decreasing real assets by 5% and credit by 2%. The Investment Division also implemented asset class reviews at the Investment Committee meetings throughout 2019. Within global public equity, OCERS' Investment Division replaced its passive small cap value exposure with an active manager. Within real estate, the growth in e-commerce has been leading the way for industrial to outperform. OCERS had the objectives to increase its exposure to industrial and to the West Coast, and the team hired a new industrial manager to help with these objectives. The Investment Division continued to develop its new internal manager database Backstop, creating a new manager due diligence checklist within Backstop that is shared with the Finance Department after each new manager hire. During 2019, the Investment Division team members conducted 647 total meetings and calls with managers, including 310 meetings and calls with funded managers and 337 with prospective managers. The Investment Division always strives to continue to develop its bench of prospective managers for each asset class.

For the year ended December 31, 2019, OCERS' investment portfolio returned 14.41%, net of fees. Our annualized net return over the last 25 years was approximately 8.02%, which is a similar period to the historical average years of service for a new OCERS' retiree of approximately 22 years for a general member and 24 years for a safety member. Both the one-year and 25 year net returns exceed our 7.00% long-term assumed earnings rate.

Pension Actuarial Funding Status

OCERS maintains a funding goal to establish contributions that fully fund the System's liabilities, and that, as a percentage of payroll, remain as level as possible for each generation of active members. It also ensures that contributions are sufficient for each generation of active members to avoid an inter-generational burden on future employees' contributions. Actuarial valuations are performed annually with actuarial experience investigations conducted triennially in accordance with state statute. The use of realistic assumptions is important in maintaining the necessary funding while paying promised benefits. Each year the actual experience of the System is compared to our assumptions and the differences are studied to determine whether changes in the contribution requirements are necessary. In addition, triennially, the actuarial experience investigation is undertaken to review the actuarial assumptions and compare the actual experience during the preceding three year period with that expected under those assumptions. The latest experience investigation was completed during 2017 for plan years ending in 2014 through 2016. The Board adopted changes in several assumptions that were incorporated into the 2017 actuarial valuation, including a change in the assumed rate of return from 7.25% to 7.00%. The next triennial experience study is scheduled to be completed in 2020 for the plan years ending 2017 through 2019, with the goal of taking into consideration other factors, in addition to reviewing the actual experience from the previous three years, that could impact funding goals and future contributions.

As of the most current actuarial valuation for the year ended December 31, 2018, OCERS' funding status was 72.40% on a valuation basis, versus 69.31% on a market value basis, with an Unfunded Actuarial Accrued Liability (UAAL) of $5.7 billion. Average employer and employee contribution rates for the year ended December 31, 2018, were 40.02% and 12.47%, respectively.

Budget

The Board of Retirement approves OCERS' annual budget. The 1937 Act limits OCERS' annual administrative expenses, excluding the costs of administration for computer software and hardware and computer technology consulting services (IT costs), to twenty-one hundredths of one percent (0.21%) of OCERS' actuarial accrued liability. OCERS' 2019 administrative expense of $18.1 million was .08% of OCERS' actuarial accrued liability.

Certificate of Achievement

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to OCERS for its CAFR for the year ended December 31, 2018. In order to be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized comprehensive annual financial report. This report must satisfy both generally accepted accounting principles and applicable legal requirements.

A Certificate of Achievement is valid for a period of one year only. We believe that our current CAFR continues to meet the Certificate of Achievement Program's requirements and we are submitting it to the GFOA to determine its eligibility for another certificate.

OCERS was also the recipient of the Public Pension Coordinating Council (PPCC) Award in recognition of compliance with professional standards for plan funding and administration for the year ended December 31, 2018. This is awarded to a retirement system that meets the professional standards for plan design and administration as set forth in the Public Pension Standards, including a Comprehensive Benefit Program, Funding Adequacy, Actuarial Valuation, Independent Audit, Investments, and Communications. A Public Pension Standards Award is valid for a period of one year.

Acknowledgements

We would like to take this opportunity to thank the members of the System for their continued confidence in OCERS during the past year. Also, we would like to express our thanks to the Board of Retirement for its dedicated effort in supporting the System throughout this past year. Finally, we would like to thank the staff and consultants for their commitment to OCERS and their diligent work to assure the System's continued success. We hope everyone stays safe and healthy in these uncertain times.

Respectfully submitted,

Steve Delaney
Chief Executive Officer

Brenda Shott
Assistant Chief Executive Officer, Finance & Internal Operations

Members of the Board of Retirement

As of December 31, 2019

Charles E. Packard
Chair Person
Appointed by
the Board of Supervisors

Roger Hilton
Vice Chair Person
Elected by
Safety Members

Russell Baldwin
Elected by
General Members

David Ball
Appointed by
the Board of Supervisors

Shawn Dewane
Appointed by
the Board of Supervisors

Frank E. Eley
Elected by
Retired Members

Shari L. Freidenrich
Treasurer-Tax Collector
County of Orange

Wayne Lindholm
Appointed by
the Board of Supervisors

Chris Prevatt
Elected by
General Members

Jeremy Vallone
Alternate Elected by
Safety Members

Organization of OCERS

Board of Retirement

The Board of Retirement is responsible for establishing policies governing the administration of the retirement plan, disability determinations, assuring benefit payments, establishing investment policy for the System and monitoring execution of its policies. The Board of Retirement consists of nine members and one alternate. Four members of the Board of Retirement are appointed by the Board of Supervisors of the County; four members are elected by active members of the System, including two by the general members, two by the safety members, of which one is the alternate member; one member is elected by the retirees; and the Treasurer of the County, elected by registered voters in the County, serves as an Ex-Officio member.

Executive Division

This division consists of the Chief Executive Officer (CEO) who implements and executes policies promulgated by the Board of Retirement. Two Assistant CEOs, a Director of Internal Audit, a Chief Investment Officer and a General Counsel assist the CEO in the daily operations of the System.

Investment Division

This division is responsible for the administration and management of the investment program, in accordance with policies, regulations, and guidelines set forth by the Board of Retirement. It is responsible for the interface with investment managers, including monitoring investment performance objectives, adherence to investment guidelines, conducting due diligence visits to investment managers' sites, and interviewing prospective investment managers. This division is also responsible for the interface with outside investment consultants in reviewing and evaluating all investment managers' performance and investment manager fees. Refer to the Investment Section on pages 87 and 88 for the Schedules of Commissions and Investment Expenses.

External Operations Division

This division is comprised of the following departments: Member Services, Disabilities and Communications.

The Member Services Department is responsible for providing all benefit services to the members of the System. This includes benefit calculations, preparation of data to support applications for retirement, preparation of the retiree payroll, processing transmittals, membership counseling, and retirement seminars.

The Disabilities Department is responsible for reviewing claims and medical records of the members of the System; interviewing applicants and witnesses; preparing written reports of findings and recommendations; and making presentations to the Disability Committee and the Board of Retirement regarding the disposition of cases.

The Communications Department is responsible for developing and coordinating information for members and employers through publications, newsletters, seminars and publishing content to the website.

Internal Operations Division

This division is comprised of the following departments: Finance, Information Technology, Information Security, and Administrative Services.

The Finance Department is responsible for all of the financial records and reports of OCERS. This includes the preparation of the Comprehensive Annual Financial Report, monthly and quarterly financial statements and the annual operating budget. The Finance Department also maintains OCERS' system of internal controls; processes and accounts for retirement payroll and refunds of contributions and interest to members; collects and accounts for employers' and members' contributions; reconciles investment portfolios; and pays costs incurred for goods received and services rendered.

The Information Technology Department is responsible for OCERS' network systems, personal computers, website and databases, as well as providing programming and technical support to our Pension Administration System. In addition, this department is responsible for overseeing business continuity/disaster recovery and administering all audio/visual services.

The Information Security Department is responsible for overseeing the security of OCERS' data and systems with a focus on protecting members' information and the systems which are relied on for daily operations.

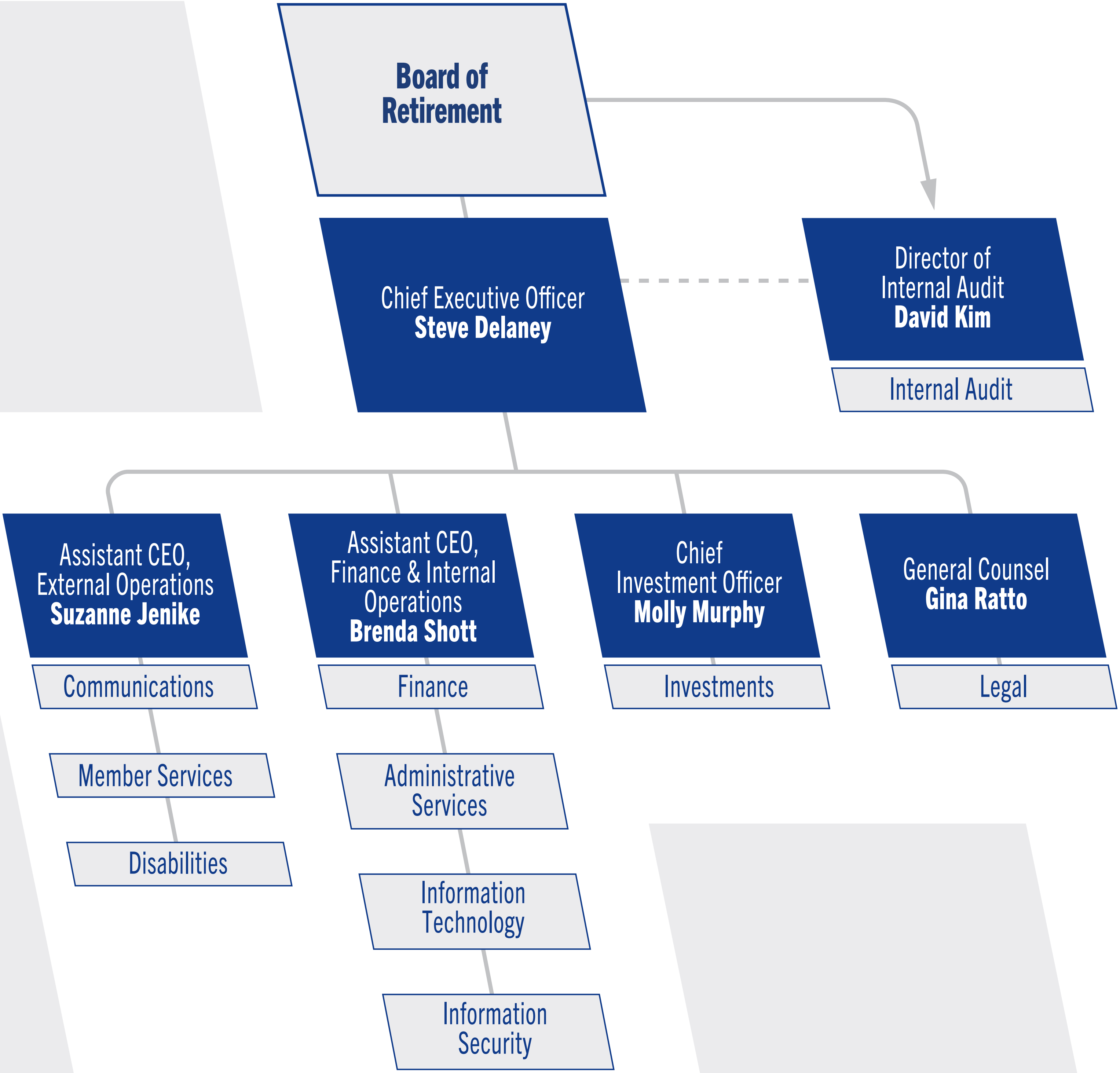
The Administrative Services Department is responsible for providing contract administration, risk management, purchasing, headquarters building administration, human resources and labor relations functions of OCERS.

Legal Division

This division provides legal advice and representation to the Board of Retirement and OCERS on a wide variety of issues. Among other things, this includes issues involving pension benefits, disability retirements, investments, legislation and vendor contracts.

Administrative Organization Chart

As of December 31, 2019



List of Professional Consultants

As of December 31, 2019

Actuary
The Segal Company

Investment Consultant
Meketa Investment Group

Private Equity and Private Real Assets Consultant
TorreyCove Capital Partners LLC

Real Estate Consultant
The Townsend Group, an Aon Company

Independent Auditor
Macias Gini & O'Connell LLP

Investment Counsel
Foley and Lardner, LLP
Foster Garvey PC
Nossaman LLP

Fiduciary Counsel
Reed Smith, LLP

Tax Counsel
Reed Smith, LLP

Custodian
State Street Bank and Trust Company

Note: Schedule of Commissions, Schedule of Investment Expenses and List of Investment Managers, can be found in the Investment Section on pages 87, 88 and 90, respectively.

Certificate of Achievement for Excellence in Financial Reporting

Public Pension Standards Award for Funding and Administration

Public Pension Coordinating Council

Public Pension Standards Award
For Funding and Administration
_2019_

Presented to

Orange County Employees Retirement System

In recognition of meeting professional standards for
plan funding and administration as
set forth in the Public Pension Standards.

Presented by the Public Pension Coordinating Council, a confederation of

National Association of State Retirement Administrators (NASRA)
National Conference on Public Employee Retirement Systems (NCPERS)
National Council on Teacher Retirement (NCTR)

Alan H. Winkle

Alan H. Winkle
Program Administrator

Section II

Financial

TOLL ROADS

Transportation Corridor Agencies (TCA) – Toll Roads

The Transportation Corridor Agencies enhances the mobility of Orange County residents by developing and operating publicly-owned toll roads as part of the state highway system. Comprised of State Routes 73, 133, 241 and 261, The Toll Roads consist of 31 miles of state highway and make up over 20 percent of Orange County's major thoroughfare highway system. More than 300,000 tolls are collected on The Toll Roads every weekday. The Toll Roads are one of the fastest, easiest and most predictable ways to get to and through Orange County.

ORANGE COUNTY

OCERS

EMPLOYEES RETIREMENT SYSTEM

MGO Certified Public Accountants

Independent Auditor's Report

To the Board of Retirement of the
Orange County Employees Retirement System
Santa Ana, California

Report on the Financial Statements

We have audited the accompanying financial statements of the Orange County Employees Retirement System (the System), California, as of and for the year ended December 31, 2019, and the related notes to the financial statements, which collectively comprise the System's 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 accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

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 from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the 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 policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

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

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the Orange County Employees Retirement System as of December 31, 2019, and the changes in its fiduciary net position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Emphasis of Matter

As discussed in Note 2 and Note 6 to the basic financial statements, the System implemented the provisions of Governmental Accounting Standards Board Statement No. 84, *Fiduciary Activities*, for the year ended December 31, 2019, and the financial statements and the related disclosures reflect the changes as required by GASB 84.

As discussed in Note 9 to the basic financial statements, based on the actuarial valuation of the pension plan's total pension liability as of December 31, 2018, rolled forward to December 31, 2019, the total pension liability of participating employers exceeded the pension plan's fiduciary net position by $5.1 billion. The actuarial valuation is sensitive to the underlying assumptions, including the discount rate of 7.0 percent, which represents the long-term expected rate of return on investments.

Our opinion is not modified with respect to this matter.

Other Matters

Prior-Year Comparative Information

The financial statements include partial prior-year comparative information. Such information does not include all of the information required to constitute a presentation in conformity with accounting principles generally accepted in the United States of America. Accordingly, such information should be read in conjunction with the System's financial statements for the year ended December 31, 2018, from which such partial information was derived.

We have previously audited the System's 2018 financial statements, and we expressed an unmodified opinion on the financial statements in our report dated June 6, 2019. In our opinion, the partial comparative information presented herein as of and for the year ended December 31, 2018, is consistent, in all material respects, with the audited financial statements from which it has been derived.

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the Management's Discussion and Analysis, the Schedule of Changes in Net Pension Liability of Participating Employers, Schedule of Investment Returns, Schedule of Employer Contributions, Notes to the Required Supplementary Information, and Significant Factors Affecting Trends in Actuarial Information – Pension Plan, as listed in the table of contents, 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.

Independent Auditor's Report

(continued)

Other Information

Our audit was conducted for the purpose of forming an opinion on the System's basic financial statements. The other supplementary information, introductory, investments, actuarial, statistical, and glossary sections as listed in the table of contents are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The other supplementary information is 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 other supplemental information is fairly stated, in all material respects, in relation to the basic financial statements as a whole.

The introductory, investments, actuarial, statistical, and glossary 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 June 4, 2020, on our consideration of the System's 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 solely 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 effectiveness of the System's 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 System's internal control over financial reporting and compliance.

Macias Gini & O'Connell LLP

Newport Beach, California
June 4, 2020

Management's Discussion and Analysis

The Management's Discussion and Analysis (MD&A) of the Orange County Employees Retirement System (OCERS or System) presents the financial performance and provides a summary of OCERS' financial position and activities as of and for the year ended December 31, 2019. The narrative overview and analysis is presented in conjunction with the Letter of Transmittal, included in Section I – Introductory to this Comprehensive Annual Financial Report. The MD&A should be read in conjunction with OCERS' Basic Financial Statements as presented in this report. Amounts in this section have been grouped together to facilitate readability.

OCERS administers the OCERS pension plan—a cost-sharing multiple-employer defined benefit pension plan (the Plan) as well as acts as a trustee and custodian for retirement health benefit plan funds that are sponsored by participating employers. OCERS' financial information is comprised of four fiduciary funds: a defined benefit pension trust fund, two other postemployment benefit (OPEB) trust funds for retiree medical plans and a custodial fund.

Financial Highlights

- The net position restricted for pension, other postemployment benefits and OPEB 115 as of December 31, 2019, totaled $17.1 billion, an increase of $2.3 billion or 15.4% from the prior year. The increase is primarily due to positive returns on investments during the year.
- Total additions to fiduciary net position increased 459.4% from $576.8 million in 2018 to $3.2 billion in 2019.
    - Net investment income increased significantly from a net investment loss of -$331.2 million in 2018 to a net investment income of $2.2 billion in 2019.The net year-to-date rate of return on investments on a fair value basis was approximately 14.41% in 2019 versus a negative net return of -1.67% in 2018.
    - Contributions received from employers and employees totaled $990.7 million in 2019, an increase of 9.1% compared to 2018 contributions received of $908.0 million.
- Total deductions from fiduciary net position increased $76.5 million from $885.0 million in 2018 to $961.5 million in 2019.
    - Member pension benefit payments increased by $73.2 million or 9.0% in 2019 from $813.8 million to $887.0 million.
    - The number of retired members and beneficiaries receiving a benefit payment increased 4.2% from 17,674 payees at the end of 2018 to 18,420 payees as of December 31, 2019.
    - The average annual benefit paid to retired members and beneficiaries during 2019 was $48,154, an increase of 4.6% over the average annual benefit payment of $46,044 in 2018.
- The net pension liability of participating employers as calculated in the December 31, 2019, Governmental Accounting Standards Board (GASB) Statement No.67 Actuarial Valuation used for financial reporting purposes is $5.1 billion, which as a percentage of covered payroll is 284.66%. The plan fiduciary net position of the pension trust fund of $16.7 billion as a percentage of the total pension liability of $21.8 billion is 76.67%.
- Based upon the most recent actuarial funding valuation dated as of December 31, 2018, the funding status for the pension plan, as measured by the ratio of the actuarial value of assets (which smooths market gains and losses over five years) to the actuarial value of accrued liabilities was 72.43% versus 69.31% if market gains and losses were recognized immediately.

Overview of the Financial Statements

The following discussion and analysis serve as an introduction and overview of the OCERS' Basic Financial Statements. The Basic Financial Statements and required disclosures are prepared in accordance with accounting principles and reporting guidelines as set forth by the Governmental Accounting Standards Board (GASB). These pronouncements require OCERS to make certain disclosures and to report using the full accrual method of accounting.

OCERS implemented GASB Statement No. 84, *Fiduciary Activities* (GASB 84) during the year ended December 31, 2019. Agency funds are now classified as custodial funds and in addition to the presentation of a Statement of Fiduciary Net Position, a Statement of Changes in Fiduciary Net Position is required. This implementation resulted in the Orange County Transportation Authority (OCTA) 115 Agency Fund being reclassified as a custodial fund and has been renamed the OCTA 115 Custodial Fund.

OCERS' Basic Financial Statements are comprised of the following:

Statement of Fiduciary Net Position

The Statement of Fiduciary Net Position presents the major categories of assets and liabilities and their related value as of year-end. The difference between assets and liabilities is reported as "Net Position Restricted for Pension, Other Postemployment Benefits and OPEB 115," representing funds available to pay future benefits to plan participants. The Statement of Fiduciary Net Position includes prior year-end total balances for comparative purposes. Increases and decreases in Net Position Restricted for Pension, Other Postemployment Benefits and OPEB 115, when analyzed over time, may serve as an indicator of whether OCERS' financial position is improving or deteriorating. Other factors, such as market conditions, should also be considered when measuring the overall financial health of the System.

The County of Orange (the County) and Orange County Fire Authority (OCFA) participate in irrevocable postemployment health care plan trusts (retiree medical plans) that are reported as other postemployment benefit trust funds in the Statement of Fiduciary Net Position as separate health care funds. OCERS serves as trustee for these trusts. Assets are commingled with pension trust assets for investment purposes and are used exclusively to pay health allowances. The County and OCFA have financial reporting responsibility of the retiree medical plans, including financial statement disclosures and required supplementary information regarding the retiree medical plans funded status and contributions, in accordance with GASB Statement No.74, *Financial Reporting for Postemployment Benefits Plans Other than Pension Plans*.

The OCTA has revocable trust assets held by OCERS in an investment capacity that are reported as a custodial fund. Assets are not commingled with those of the pension plan and health care plan trusts. Prior to the implementation of GASB 84, the assets and offsetting liabilities were reported in the Statement of Fiduciary Net Position as an agency fund.

Statement of Changes in Fiduciary Net Position

The Statement of Changes in Fiduciary Net Position provides information about the financial activities during the reporting period that increased and decreased Net Position Restricted for Pension, Other Postemployment Benefits and OPEB 115. The trend of additions versus deductions to the Plan indicates the strength of OCERS' financial position over time. For comparative purposes, prior year-end total balances are also provided.

To distinguish the activities of the health care plan trusts from the pension plan, the health care plan trusts are also reported separately in the Statement of Changes in Fiduciary Net Position as health care funds.

Under the new financial reporting provisions of GASB 84, the custodial fund reported activity for additions, deductions and net position as a new statement in the Statement of Changes in Fiduciary Net Position for the year ended December 31, 2019 and will report a net position balance going forward.

Notes to the Basic Financial Statements

The Notes to the Basic Financial Statements are an integral part of the basic financial statements and provide additional information that is essential to acquire a full understanding of the information provided in the two statements discussed above. The notes include further discussion and details regarding OCERS' key policies, programs, investments and activities that occurred during the year.

Required Supplementary Information

The Required Supplementary Information (RSI) presents historical trend information related to the pension plan reported in the Basic Financial Statements. The pension plan includes a schedule of changes in net pension liability of participating employers, a schedule of investment returns, a schedule of employer contributions and other required supplementary information as required by GASB Statement No.67, *Financial Reporting for Pension Plans – an Amendment of GASB Statement No. 25* (GASB 67). The information contained in the schedules is based on the actuarial valuation prepared for the pension plan and includes additional actuarial information that contributes to the understanding of the changes in the net pension liability of participating employers in the pension plan. The actuarial information is based upon assumptions made regarding future events at the time the valuation was performed. Therefore, the amounts presented in the schedules are management's estimates. A summary of factors that affected the trends of the actuarial information is included in this section as well.

Other Supplementary Information

The Other Supplementary Information includes schedules pertaining to contributions by employers and members, OCERS' administrative expenses, investment expenses, and professional services. In accordance with the provisions of GASB 84, the statement of changes for the agency fund has been removed from the Other Supplementary Information. Instead, the reporting of additions, deductions and net position of the fiduciary activity are reported as a new statement in the Statement of Changes in Fiduciary Net Position.

Financial Analysis

Tables 1 and 2 compare and summarize OCERS' financial activity for the current and prior years.

Table 1 : Fiduciary Net Position

As of December 31, 2019 and 2018
(Dollars in Thousands)

	12/31/2019	12/31/2018	Increase / (Decrease)	Percentage Change
Assets				
Cash and Cash Equivalents	$ 425,804	$ 475,196	$ (49,392)	-10.4%
Securities Lending Collateral	197,095	321,770	(124,675)	-38.7%
Receivables	392,106	162,056	230,050	142.0%
Investments at Fair Value	16,942,195	14,770,937	2,171,258	14.7%
Capital Assets, Net	16,060	18,542	(2,482)	-13.4%
Total Assets	**17,973,260**	**15,748,501**	**2,224,759**	**14.1%**
Liabilities				
Obligations Under Securities Lending Program	197,095	321,770	(124,675)	-38.7%
Securities Purchased	309,015	234,056	74,959	32.0%
Other	358,766	364,880	(6,114)	-1.7%
Total Liabilities	**864,876**	**920,706**	**(55,830)**	**-6.1%**
Net Position Restricted for Pension, Other Postemployment Benefits and OPEB 115	**$ 17,108,384**	**$ 14,827,795**	**$ 2,280,589**	**15.4%**

As of December 31, 2019, OCERS has a net position of $17.1 billion restricted for pension and other postemployment benefits. Net position increased $2.3 billion, an increase of 15.4% over 2018. The increase in net position includes an increase in total assets of $2.2 billion and a decrease in total liabilities of $55.8 million.

The increase in total assets is primarily attributed to a $2.2 billion increase in total investments at fair value and a $230.0 million increase in receivables. The increase in total assets is offset by a decrease in securities lending collateral of $124.7 million and a $49.4 million decrease in cash and cash equivalents. The increase in investments at fair value can be attributed to increases in net appreciation of investments at fair value, earnings from interest and dividends and the investment of proceeds received from prepaid employer contributions. The increase in receivables is primarily related to investment receivables and the timing of investments for unsettled trades. Securities lending collateral decreased $124.7 million due to lower demand which has led to lower balances across most of the asset classes in the securities lending program.

Cash and cash equivalents decreased $49.4 million due to timing of investing redemptions, distributions, and contributions received near year-end.

The decrease in total liabilities of $55.8 million includes a decrease in the obligations under the securities lending program of $124.7 million, which is directly related to the decrease in securities lending collateral as previously discussed. Other liabilities, which includes unearned contributions from prepaid employer contributions, foreign currency forward contracts, retiree payroll payables and other miscellaneous liabilities, such as investment manager fees, had an overall net decrease of $6.1 million. These decreases were offset by an increase in the timing of unsettled security purchases of $75.0 million.

Table 2 : Changes in Fiduciary Net Position

For the Years Ended December 31, 2019 and 2018
(Dollars in Thousands)

	12/31/2019	12/31/2018	Increase / (Decrease)	Percentage Change
Additions				
Employer Pension Contributions	$ 653,793	$ 580,905	$ 72,888	12.5%
Employer Health Care Contributions	56,899	57,056	(157)	-0.3%
Employee Pension Contributions	279,373	270,070	9,303	3.4%
Other Postemployment Contributions	613	-	613	
Net Investment Income/(Loss)	2,235,897	(331,206)	2,567,103	-775.1%
Total Additions	**3,226,575**	**576,825**	**2,649,750**	**459.4%**
Deductions				
Participant Benefits - Pension	887,003	813,775	73,228	9.0%
Participant Benefits - Health Care	40,030	38,367	1,663	4.3%
Death Benefits	650	570	80	14.0%
Member Withdrawals and Refunds	13,249	13,933	(684)	-4.9%
Other Postemployment Benefits	1,318	-	1,318	
Administrative Expenses - Pension	19,171	18,284	887	4.9%
Administrative Expenses - Health Care and OPEB 115	61	50	11	22.0%
Total Deductions	**961,482**	**884,979**	**76,503**	**8.6%**
Increase/(Decrease) in Net Position Restricted for Pension, Other Postemployment Benefits and OPEB 115	2,265,093	(308,154)	2,573,247	-835.1%
Net Position Restricted for Pension, Other Postemployment Benefits and OPEB 115				
Beginning of the Year, as Previously Reported	14,827,795	15,135,949		
Restatement of Net Position	15,496	-		
Beginning of the Year, as Restated	14,843,291	15,135,949		
End of the Year	**$ 17,108,384**	**$ 14,827,795**		

Additions to Fiduciary Net Position

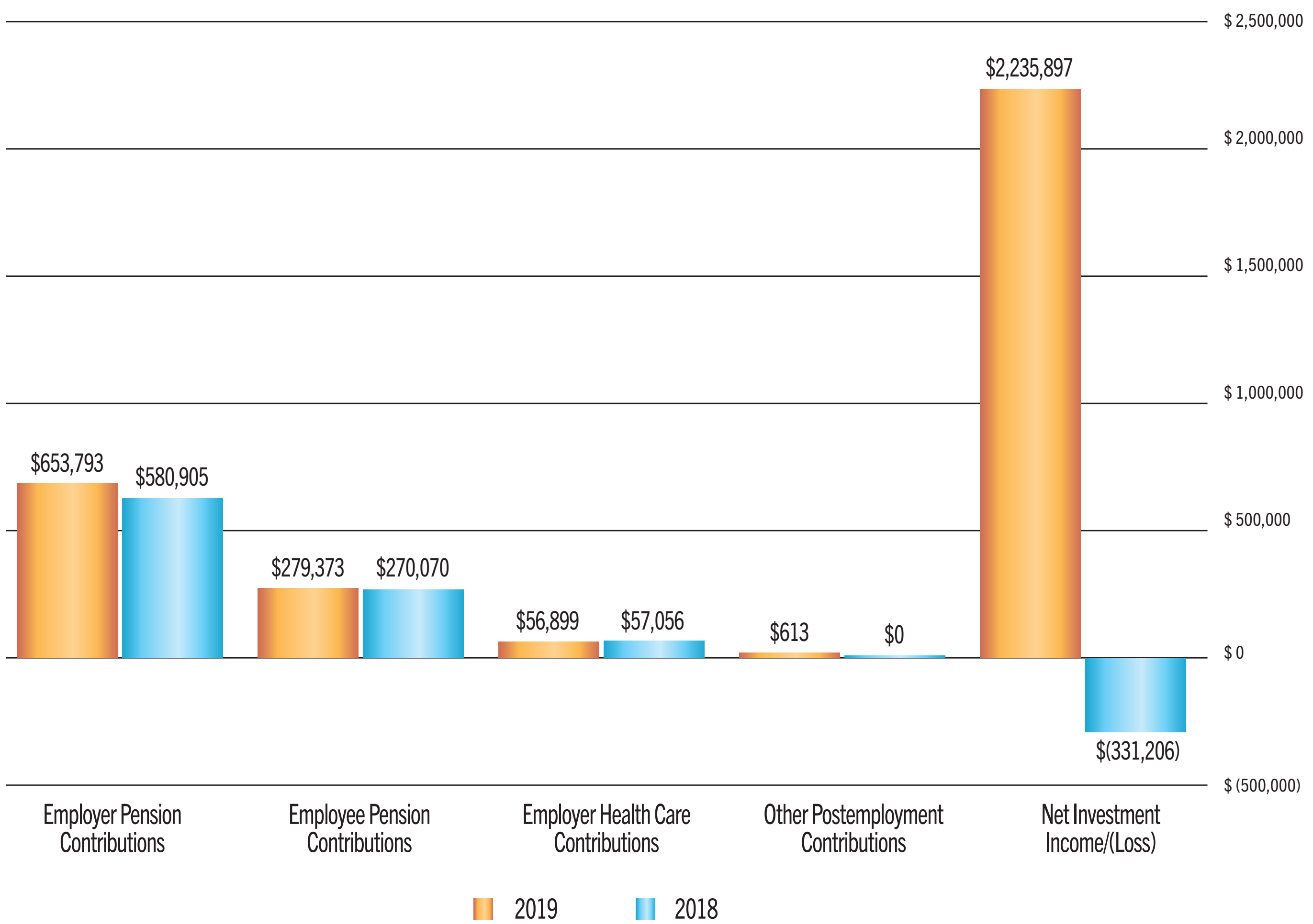
The primary funding sources of pension benefits are the collection of participating employer and member contributions and earnings on investments, net of investment expenses. Additions to fiduciary net position increased 459.4% in 2019. Total additions for the year ended December 31, 2019, were $3.2 billion compared to $576.8 million for the year ended December 31, 2018. The increase is comprised of increases in investment income of $2.6 billion and total contributions of $82.6 million.

The increase in investment income is attributed to appreciation in the fair value of investments. Overall market performance as of December 31, 2019, was up significantly from the prior year. OCERS' global public equity asset class rebounded significantly and experienced strong market performance in 2019 with a return of 26.85% versus a loss of -10.59% in 2018. Core fixed income had a return of 8.81% compared to a loss of -0.22% in 2018. Overall net investment returns for the year ended December 31, 2019, were 14.41% compared to a loss of -1.67% in the prior year.

Total employer and employee contributions continue to rise due to increases in the number of members in the plan, increases in the average employer and employee contribution rates and increases in employee salaries.

Additions to Fiduciary Net Position

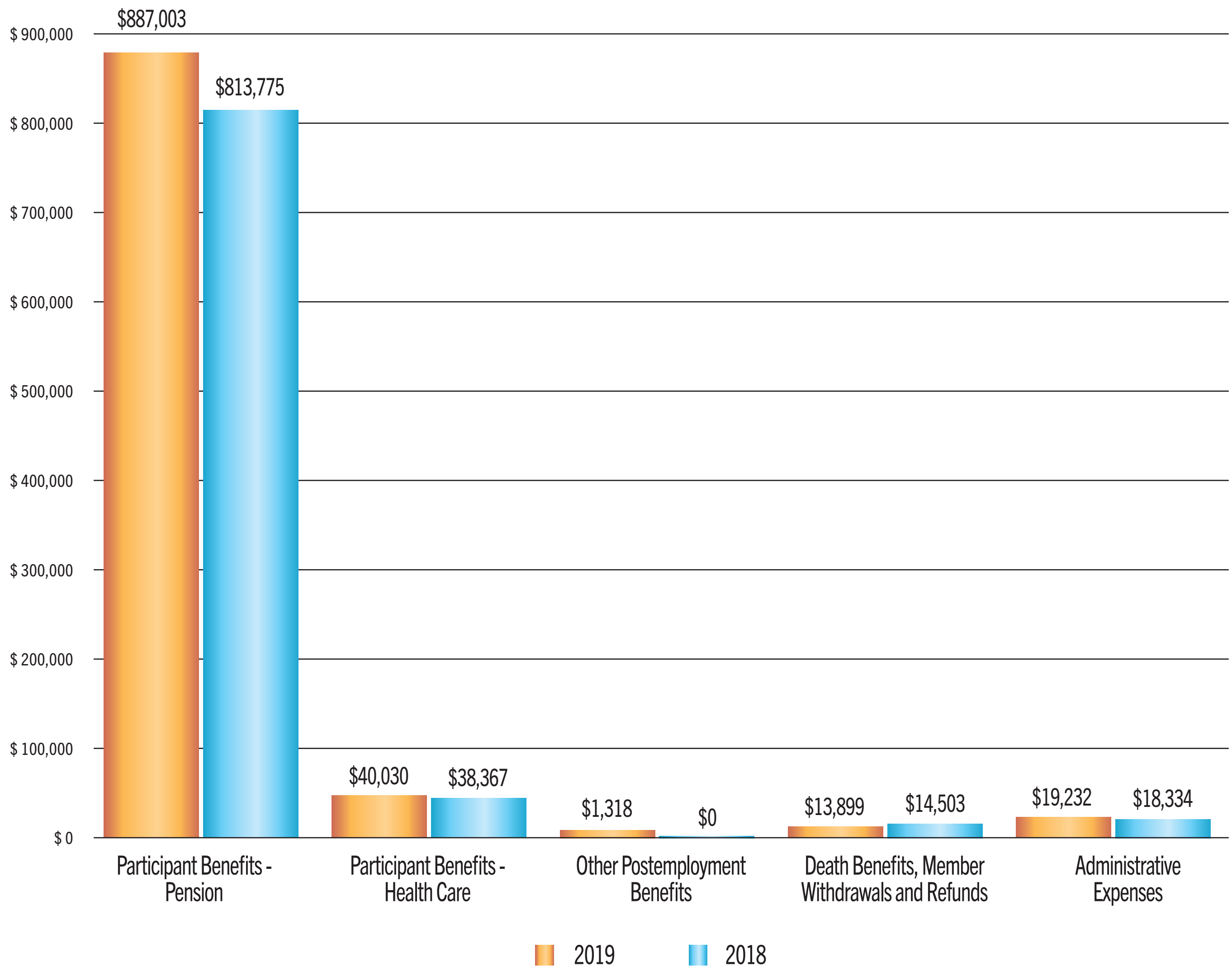
(Dollars in Thousands)



Deductions from Fiduciary Net Position

The costs associated with the System include payments of benefits to members and their beneficiaries, refunds of contributions to terminated members and the costs of administering the plan. Deductions from fiduciary net position increased $76.5 million or 8.6% compared to the prior year, primarily due to the continued and anticipated growth in member pension benefit payments, both in the total number of OCERS' retired members receiving a pension benefit and the average benefit received. Participant benefit payments for pension and health care have increased by $73.2 million and $1.7 million, respectively. Total benefit recipients increased by 746, from 17,674 to 18,420. The average annual pension benefit increased from $46,044 to $48,154.

Deductions from Fiduciary Net Position
(Dollars in Thousands)



OCERS Membership

The table below provides comparative OCERS' membership data for the last two years.

Table 3 : Membership Data

As of December 31, 2019 and 2018

	12/31/2019	12/31/2018	Increase/ (Decrease)	Percentage Change
Active Members	22,257	21,929	328	1.5%
Retired Members	18,420	17,674	746	4.2%
Deferred Members	6,520	6,026	494	8.2%
Total Membership	**47,197**	**45,629**	**1,568**	3.4%

Total OCERS' membership increased during 2019 by 1,568 members. The number of active members increased by 328 or 1.5% and the number of retirees increased by 746 or 4.2%, suggesting that during 2019 employers hired employees at a higher rate than members who left their employment for retirement or other opportunities.

Actuarial Valuations

In order to determine whether Net Position Restricted for Pension Benefits will be sufficient to meet future obligations, a calculation of the actuarial funded status is required. An actuarial valuation includes an appraisal of both the assets available to pay future benefits and the liabilities of the System, which represent the actuarial present value of all future benefits expected to be paid for each member. The purpose of the valuation is to determine the amount of future contributions by the employees and employers, which will be required to pay all expected future benefits. OCERS utilizes an independent actuarial firm, The Segal Company (Segal), to prepare an annual valuation. The most recent Annual Actuarial Valuation as of December 31, 2018 is included in the Actuarial Section of this report, and contains a detailed discussion of the funding requirements. This valuation is used for funding purposes and establishing employer and employee contribution rates. Segal also prepared a Governmental Accounting Standards Board (GASB) Statement No.67 Actuarial Valuation as of December 31, 2019, used for financial reporting purposes.

In order to prepare the valuations, the actuary must use several assumptions with regards to OCERS' members such as their life expectancy, projected salary increases over time, and the age at which members will retire. The actuary must also utilize assumptions with regards to how the assets will perform over time. All assumptions used by the actuary are reviewed and adjusted, as required, on a triennial basis and adopted by the Board of Retirement. The most recent triennial study was adopted by the Board on October 16, 2017, for the three-year experience period ended December 31, 2016. As a result, the following assumptions were changed as of the December 31, 2017 valuation: assumed rate of return lowered from 7.25% to 7.00%; inflation lowered from 3.00% to 2.75%; active member payroll increases lowered from 3.50% to 3.25%; and projected salary increases for general members lowered from a range of 4.25% to 13.50% to a range of 4.25% to 12.25% and for safety members, the range was changed from 5.00% to 17.50% to 4.75% to 17.25%. In addition, mortality rates were adjusted for after service retirement to reflect a generational approach for anticipating future mortality improvement, and the assumption remains that all general pre-retirement deaths and 90% of safety pre-retirement deaths are assumed to be non-service connected deaths.

The GASB 67 valuation provides the calculation of the employers' pension liability. In order to accommodate the annual reporting requirements of our employers in a timely manner, the valuation was prepared using the December 31, 2018 valuation as the basis for calculating the total pension liability (TPL) and rolled forward to December 31, 2019. Based on this actuarial valuation, the TPL was $21.8 billion compared to a fiduciary net position of $16.7 billion, resulting in the employers' net pension liability (NPL) of $5.1 billion and a fiduciary net position as a percentage of the TPL of 76.67%. The NPL as a percentage of covered payroll was 284.66%.

In the actuarial funding valuation for the pension plan as of December 31, 2018, the funding ratio of the valuation value of assets to actuarial accrued liabilities was 72.43%. The calculation of funding status takes into account OCERS' policy to smooth the impact of market volatility by spreading each year's gains or losses over five years. Using the market value of assets as of the valuation date, the funded status of OCERS' pension plan was 69.31% in 2018.

Investment Summary

OCERS' portfolio returned 14.41% net of fees in 2019 as most risk-oriented assets enjoyed a strong year. The OCERS portfolio finished 2019 with a market value of $17.3 billion, up from $14.8 billion at the end of 2018. The 14.41% net of fee return more than doubled OCERS' actuarial assumed rate of return of 7.0%. Over the trailing three years, five years, and ten years, OCERS has returned 8.8%, 6.9%, and 7.3% annualized net of fees, respectively.

Global public equities led the way in performance with OCERS' global equity portfolio gaining 26.9%. OCERS' domestic equity portfolio returned 30.0% in 2019 with large cap stocks outperforming small cap stocks. OCERS' international equity portfolio lagged the U.S. equity portfolio but still earned 23.8% for the year. Within emerging markets equity, OCERS earned 23.1%, significantly outperforming the MSCI Emerging Markets Index return of 18.4% thanks to strong performance of William Blair, an emerging markets growth manager that returned 29.2%.

Fixed income markets also enjoyed a solid 2019 as the yield on the 10-year Treasury declined from 2.69% to 1.92% throughout the year. OCERS' core fixed income portfolio returned 8.8% net of fees during the year. Long-term Treasuries performed even better. OCERS' U.S. Long Treasury portfolio, within the risk mitigation asset class, gained 15.2%. This portfolio has an effective duration of 18.0 years and performed strongly due to declining yields for long-term bonds. OCERS increased its target allocation to risk mitigation in late 2018 from 5% to 10%. OCERS' new systematic trend following managers (within risk mitigation) also enjoyed positive performance during the year by taking advantage of the long fixed income trend.

It is customary to report private market performance on a quarterly lag. Therefore, OCERS' year-end performance will reflect returns as of the end of the third quarter for many private equity, private credit, and private real asset managers. OCERS' private equity portfolio returned 10.9% in 2019. OCERS' real estate portfolio gained 6.8% for the year. OCERS' energy portfolio was a drag on performance, and the exit environment for private upstream energy assets remains challenged.

Calendar year 2019 was very strong for OCERS in absolute returns, but OCERS did lag its peers on a relative return basis. OCERS historically takes less risk and has a lower target to equities than its peers have. This may lead to outperformance during periods of distress, but can also cause OCERS to underperform its peers when equity markets are on a tear, which occurred in 2019. As of December 31, 2019, OCERS had 39.3% of the portfolio invested in global public equities. The median public defined benefit plan had 48.6% exposure to public equities causing OCERS to lag its peers during such a robust year for global equity returns.

Known Matters That May Impact Financial Operations

In March 2020, the World Health Organization declared Coronavirus COVID-19 a global pandemic. The Coronavirus outbreak has caused tremendous human and economic hardship both globally and throughout the United States. The measures taken to protect public health has had an adverse impact, disrupting economic activity and creating a surge in job losses. While the ongoing pandemic poses considerable economic risks, there has been no significant disruption to the operations of OCERS while employees have been working remotely since a Stay at Home Order was issued by Governor Gavin Newsom on March 19, 2020. Although the financial markets remain volatile, OCERS' has a well-diversified, global investment portfolio that is structured to withstand short-term disruptions and will be monitored closely for any adverse effects if disruptions continue for an extended period of time.

Request for Financial Information

This Comprehensive Annual Financial Report is designed to provide the Board of Retirement, plan members, participating employers, taxpayers, investment managers and other interested parties with a general overview of OCERS' financial condition and to demonstrate OCERS' accountability for the funds under its stewardship.

Please address any questions about this report or requests for additional information to:

Orange County Employees Retirement System
2223 East Wellington Avenue, Suite 100
Santa Ana, CA 92701

Section II

Financial

Basic Financial Statements

IN BLOOM

The Beautiful Landscape of the Toll Roads

Statement of Fiduciary Net Position

As of December 31, 2019
(with summarized comparative amounts as of December 31, 2018)
(Dollars in Thousands)

	Pension Trust Fund	Health Care Fund-County	Health Care Fund-OCFA	OPEB 115 Custodial Fund	Total Funds	Comparative Totals 2018
Assets						
Cash and Short-Term Investments						
Cash and Cash Equivalents	$ 415,160	$ 9,145	$ 1,032	$ 467	$ 425,804	$ 475,196
Securities Lending Collateral	192,379	4,238	478	-	197,095	321,770
Total Cash and Short-Term Investments	607,539	13,383	1,510	467	622,899	796,966
Receivables						
Investment Income	18,054	398	45	-	18,497	19,623
Securities Sales	335,681	7,394	835	-	343,910	118,301
Contributions	24,104	-	-	-	24,104	20,834
Foreign Currency Forward Contracts	514	11	1	-	526	64
Other Receivables	4,948	109	12	-	5,069	3,234
Total Receivables	383,301	7,912	893	-	392,106	162,056
Investments at Fair Value						
Global Public Equity	6,597,475	145,323	16,405	11,860	6,771,063	5,449,639
Private Equity	1,694,344	37,321	4,213	-	1,735,878	1,494,052
Core Fixed Income	2,787,092	61,391	6,930	5,694	2,861,107	2,644,944
Credit	1,574,316	34,678	3,915	-	1,612,909	1,726,250
Real Assets	2,198,809	48,433	5,467	-	2,252,709	2,671,001
Risk Mitigation	1,666,705	36,713	4,144	-	1,707,562	783,665
Absolute Return	944	21	2	-	967	1,386
Total Investments at Fair Value	16,519,685	363,880	41,076	17,554	16,942,195	14,770,937
Capital Assets, Net	16,060	-	-	-	16,060	18,542
Total Assets	**17,526,585**	**385,175**	**43,479**	**18,021**	**17,973,260**	**15,748,501**
Liabilities						
Obligations Under Securities Lending Program	192,379	4,238	478	-	197,095	321,770
Securities Purchased	301,621	6,644	750	-	309,015	234,056
Unearned Contributions	259,285	-	-	-	259,285	246,133
Foreign Currency Forward Contracts	196	4	-	-	200	2,366
Retiree Payroll Payable	73,559	3,446	798	-	77,803	72,555
Other	20,964	462	52	-	21,478	28,330
Due to Employer	-	-	-	-	-	15,496
Total Liabilities	**848,004**	**14,794**	**2,078**	**-**	**864,876**	**920,706**
Net Position Restricted for Pension, Other Postemployment Benefits and OPEB 115	**$ 16,678,581**	**$ 370,381**	**$ 41,401**	**$ 18,021**	**$ 17,108,384**	**$ 14,827,795**

The accompanying notes are an integral part of these financial statements.

Statement of Changes in Fiduciary Net Position

For the Year Ended December 31, 2019
(with summarized comparative amounts for the Year Ended December 31, 2018)
(Dollars in Thousands)

	Pension Trust Fund	Health Care Fund-County	Health Care Fund-OCFA	OPEB 115 Custodial Fund	Total Funds	Comparative Totals 2018
Additions						
Contributions						
Employer	$ 653,793	$ 54,788	$ 2,111	$ -	$ 710,692	$ 637,961
Employee	279,373	-	-	-	279,373	270,070
Other Postemployment Contributions	-	-	-	613	613	-
Total Contributions	933,166	54,788	2,111	613	990,678	908,031
Investment Income						
Net Appreciation / (Depreciation) in Fair Value of Investments	1,951,974	38,441	4,714	1,097	1,996,226	(476,680)
Dividends, Interest, & Other Investment Income	337,022	7,424	838	2,156	347,440	247,729
Securities Lending Income						
Gross Earnings	7,522	166	19	-	7,707	7,483
Less: Borrower Rebates and Bank Charges	(6,380)	(141)	(16)	-	(6,537)	(5,931)
Net Securities Lending Income	1,142	25	3	-	1,170	1,552
Total Investment Income / (Loss)	2,290,138	45,890	5,555	3,253	2,344,836	(227,399)
Investment Fees and Expenses	(106,330)	(2,342)	(264)	(3)	(108,939)	(103,807)
Net Investment Income / (Loss)	2,183,808	43,548	5,291	3,250	2,235,897	(331,206)
Total Additions	**3,116,974**	**98,336**	**7,402**	**3,863**	**3,226,575**	**576,825**
Deductions						
Participant Benefits	887,003	35,012	5,018	-	927,033	852,142
Death Benefits	650	-	-	-	650	570
Member Withdrawals and Refunds	13,249	-	-	-	13,249	13,933
Other Postemployment Benefits	-	-	-	1,318	1,318	-
Administrative Expenses	19,171	20	21	20	19,232	18,334
Total Deductions	**920,073**	**35,032**	**5,039**	**1,338**	**961,482**	**884,979**
Net Increase / (Decrease)	2,196,901	63,304	2,363	2,525	2,265,093	(308,154)
Net Position Restricted For Pension, Other Postemployment Benefits and OPEB 115, Beginning of Year	14,481,680	307,077	39,038	-	14,827,795	15,135,949
Restatement of Net Position	-	-	-	15,496	15,496	-
Net Position Restricted For Pension, Other Postemployment Benefits and OPEB 115, Beginning of Year as Restated	14,481,680	307,077	39,038	15,496	14,843,291	15,135,949
Ending Net Position Restricted For Pension, Other Postemployment Benefits and OPEB 115	**$ 16,678,581**	**$ 370,381**	**$ 41,401**	**$ 18,021**	**$ 17,108,384**	**$ 14,827,795**

The accompanying notes are an integral part of these financial statements.

Notes to the Basic Financial Statements

NOTE 1 : Plan Descriptions

The Orange County Employees Retirement System (OCERS or System) was established in 1945 under the provisions of the County Employees Retirement Law of 1937 (CERL). OCERS is governed by a ten-member Board of Retirement, nine voting members and one alternate member. Board membership consists of four members appointed by the County of Orange Board of Supervisors, five members elected by the members of the System, including an alternate, two by the general members, one by the safety members, and one by the retired members. Safety members elect the alternate member. The County of Orange Treasurer Tax-Collector, elected by the voters registered in the County, serves as an Ex-Officio member.

OCERS operates as a cost-sharing multiple-employer defined benefit pension plan for the County of Orange, Orange County Superior Court of California, City of San Juan Capistrano, and ten special districts: Orange County Cemetery District, Children and Families Commission of Orange County, Orange County Employees Retirement System, Orange County Fire Authority, Orange County In-Home Supportive Services Public Authority, Orange County Local Agency Formation Commission (LAFCO), Orange County Public Law Library, Orange County Sanitation District, Orange County Transportation Authority and Transportation Corridor Agencies. Capistrano Beach Sanitary District, Cypress Recreation & Parks District, Orange County Mosquito and Vector Control District, City of Rancho Santa Margarita, the Orange County Department of Education and the University of California, Irvine Medical Center and Campus are no longer active employers, but retired members and their beneficiaries, as well as deferred members, remain in the System. OCERS is legally and fiscally independent of the County of Orange.

Pension Plan Membership

OCERS provides retirement, disability and death benefits to general and safety members. Safety membership includes those members serving in active law enforcement, fire suppression and as probation officers. General membership applies to all other occupations. Plan retirement benefits are tiered based upon date of OCERS membership. Tier I members were hired prior to September 21, 1979 and use their highest one-year average salary to determine their retirement allowance while Tier II members were hired on or after September 21, 1979 and use their highest three-year average salary to determine their retirement allowance. All Public Employees Pension Reform Act (PEPRA) members hired on or after January 1, 2013 are Tier II and use their highest three-year average salary to determine their retirement allowance. Member rate groups are determined by employer, bargaining unit, and benefit plan (a description of the benefit plans can be found under Member Retirement Benefits). The benefit plan represents the benefit formula and tier that will be used in calculating a retirement benefit. All regular employees scheduled to work 20 hours or more per week become members of the plan upon commencing employment with one of OCERS' employers, with the exception of a provision adopted in 2014 that allows new members over the age of 60 to opt out of the plan if their employer has implemented the provision. Active members are categorized as vested in the table below upon accumulating five years of accredited service or attaining the age of 70. Additional information regarding the pension plan's benefit structure is included in the Summary Plan Description that is available on the web at **https://www.ocers.org/summary-plan-description**.

The following table is a summary of OCERS' general and safety membership as of December 31, 2019, consisting of active members, retired members or their beneficiaries, and deferred members who have terminated, but are not yet receiving benefits (further information regarding benefit eligibility for deferred members is described under the Deferred Members Benefits section):

NOTE 1 : Plan Descriptions (continued)

OCERS Membership - General Members

As of December 31, 2019

Rate Group	Benefit Plan	Tier	Active Vested	Active Non-Vested	Retired Members & Beneficiaries	Deferred Members	Total
1	A	I	2	-	344	1	347
1	B	II	690	8	439	288	1,425
1	U	II-PEPRA	269	681	3	292	1,245
Rate Group 1 Total			**961**	**689**	**786**	**581**	**3,017**
2	A	I	-	-	2,906	11	2,917
2	B	II	-	-	1,917	681	2,598
2	I	I	21	-	1,141	-	1,162
2	J	II	8,791	140	5,976	2,315	17,222
2	P	II	166	16	8	85	275
2	S	II	9	7	1	5	22
2	T	II-PEPRA	876	4,064	3	1,226	6,169
2	U	II-PEPRA	47	201	-	48	296
2	W	II-PEPRA	-	1	-	-	1
Rate Group 2 Total			**9,910**	**4,429**	**11,952**	**4,371**	**30,662**
3	A	I	-	-	79	1	80
3	B	II	39	12	64	45	160
3	G	I	1	-	29	-	30
3	H	II	321	-	336	54	711
3	U	II-PEPRA	46	189	-	35	270
Rate Group 3 Total			**407**	**201**	**508**	**135**	**1,251**
4	H	II	-	-	1	-	1
Rate Group 4 Total			**-**	**-**	**1**	**-**	**1**
5	A	I	2	-	378	3	383
5	B	II	937	31	1,067	527	2,562
5	U	II-PEPRA	2	378	2	106	488
Rate Group 5 Total			**941**	**409**	**1,447**	**636**	**3,433**
9	A	I	-	-	4	-	4
9	B	II	-	-	10	11	21
9	N	II	29	1	40	42	112
9	U	II-PEPRA	3	28	1	14	46
Rate Group 9 Total			**32**	**29**	**55**	**67**	**183**
10	A	I	-	-	7	-	7
10	B	II	-	-	40	8	48
10	I	I	-	-	16	-	16
10	J	II	123	-	129	88	340
10	N	II	19	17	1	19	56
10	U	II-PEPRA	14	137	3	94	248
Rate Group 10 Total			**156**	**154**	**196**	**209**	**715**
11	A	I	-	-	4	-	4
11	B	II	-	-	3	-	3
11	N	II	15	-	6	2	23
11	U	II-PEPRA	1	8	-	-	9
Rate Group 11 Total			**16**	**8**	**13**	**2**	**39**
12	A	I	-	-	2	-	2
12	B	II	-	-	4	1	5
12	H	II	12	-	7	2	21
12	U	II-PEPRA	-	2	-	-	2
Rate Group 12 Total			**12**	**2**	**13**	**3**	**30**
Total General Members			12,435	5,921	14,971	6,004	39,331

Notes to the Basic Financial Statements

NOTE 1 : Plan Descriptions (continued)

OCERS Membership - Safety Members

As of December 31, 2019

Rate Group	Benefit Plan	Tier	Active Vested	Active Non-Vested	Retired Members & Beneficiaries	Deferred Members	Total
6	C	I	-	-	88	-	88
6	D	II	-	-	45	35	80
6	E	I	-	-	44	-	44
6	F	II	657	4	259	177	1,097
6	V	II-PEPRA	7	68	-	10	85
Rate Group 6 Total			**664**	**72**	**436**	**222**	**1,394**
7	C	I	-	-	462	-	462
7	D	II	-	-	263	43	306
7	E	I	-	-	281	-	281
7	F	II	1,018	-	1,232	91	2,341
7	R	II	375	15	2	33	425
7	V	II-PEPRA	138	513	4	27	682
Rate Group 7 Total			**1,531**	**528**	**2,244**	**194**	**4,497**
8	C	I	-	-	26	-	26
8	D	II	-	-	68	5	73
8	E	I	-	-	16	-	16
8	F	II	659	1	656	46	1,362
8	R	II	35	121	1	7	164
8	V	II-PEPRA	57	233	2	42	334
Rate Group 8 Total			**751**	**355**	**769**	**100**	**1,975**
Total Safety Members			**2,946**	**955**	**3,449**	**516**	**7,866**
Grand Total			**15,381**	**6,876**	**18,420**	**6,520**	**47,197**

Member Retirement Benefits

Members are entitled to receive a retirement allowance with ten or more years of service credit beginning at age 50 (5 years of service and age 52 for General PEPRA plans and 5 years of service and age 50 for Safety PEPRA, for all plans except those identified as PEPRA compliant), at any age with thirty years of service credit (twenty years of service credit for safety members), or if a part-time employee at age 55 or older with five or more years of service credit and at least ten years of active employment with a sponsoring agency covered by OCERS. Members attaining age 70 are eligible to retire regardless of credited service. Benefits received are determined by plan formula, age, years of service and final average salary (see Section II, Notes to the Required Supplementary Information, for any changes in benefit terms). Member rate groups and benefit plans as of December 31, 2019, are as follows:

Notes to the Basic Financial Statements

NOTE 1 : Plan Descriptions (continued)

Rate Groups and Benefit Plans

As of December 31, 2019

Rate Group	Plan Type	Benefit Plan	Benefit Formula per Year of Service	Sponsoring Agencies
#1	General	A	2.0% @ 57	County of Orange; OC In-Home Supportive Services Public Authority (OC Department of Education, UCI Medical Center and Campus, Capistrano Beach Sanitary District, Cypress Recreation & Parks District, and OC Mosquito and Vector Control District are no longer active employers)
		B	1.67% @ 57.5	
		U	2.5% @ 67 PEPRA	
#2	General	A	2.0% @ 57	County of Orange; City of San Juan Capistrano; Orange County LAFCO; OCERS; Orange County Superior Court of California; and Children and Families Commission of Orange County
		B	1.67% @ 57.5	
		I	2.7% @ 55	
		J	2.7% @ 55	
		P	1.62% @ 65	
		S	2.0% @ 57	
		T	1.62% @ 65 PEPRA	
		U	2.5% @ 67 PEPRA	
		W	1.62% @ 65 PEPRA	
#3	General	A	2.0% @ 57	OC Sanitation District
		B	1.67% @ 57.5	
		G	2.5% @ 55	
		H	2.5% @ 55	
		U	2.5% @ 67 PEPRA	
#4	General	H	2.5% @ 55	City of Rancho Santa Margarita (no longer an active employer)
#5	General	A	2.0% @ 57	OC Transportation Authority
		B	1.67% @ 57.5	
		U	2.5% @ 67 PEPRA	
#6	Safety	C	2.0% @ 50	County of Orange (Probation)
		D	2.0% @ 50	
		E	3.0% @ 50	
		F	3.0% @ 50	
		V	2.7% @ 57 PEPRA	
#7	Safety	C	2.0% @ 50	County of Orange (Law Enforcement)
		D	2.0% @ 50	
		E	3.0% @ 50	
		F	3.0% @ 50	
		R	3.0% @ 50	
		V	2.7% @ 57 PEPRA	
#8	Safety	C	2.0% @ 50	OC Fire Authority
		D	2.0% @ 50	
		E	3.0% @ 50	
		F	3.0% @ 50	
		R	3.0% @ 50	
		V	2.7% @ 57 PEPRA	

Rate Groups and Benefit Plans (continued)

As of December 31, 2019

Rate Group	Plan Type	Benefit Plan	Benefit Formula per Year of Service	Sponsoring Agencies
#9	General	A	2.0% @ 57	Transportation Corridor Agencies
		B	1.67% @ 57.5	
		N	2.0% @ 55	
		U	2.5% @ 67 PEPRA	
#10	General	A	2.0% @ 57	OC Fire Authority
		B	1.67% @ 57.5	
		I	2.7% @ 55	
		J	2.7% @ 55	
		N	2.0% @ 55	
		U	2.5% @ 67 PEPRA	
#11	General	A	2.0% @ 57	OC Cemetery District
		B	1.67% @ 57.5	
		N	2.0% @ 55	
		U	2.5% @ 67 PEPRA	
#12	General	A	2.0% @ 57	OC Law Library
		B	1.67% @ 57.5	
		H	2.5% @ 55	
		U	2.5% @ 67 PEPRA	

Public Employees Pension Reform Act (PEPRA)

During 2012, the Public Employees Pension Reform Act (PEPRA) was signed into law, resulting in the creation of three new benefit formulas for employees entering OCERS on or after January 1, 2013: 1.62% @ 65 PEPRA - General; 2.5% @ 67 PEPRA - General; and 2.7% @ 57 PEPRA - Safety. New plan provisions include a cap on pensionable compensation at 120% of the social security taxable wage base limit, three year final average salary, and new cost-sharing requirements by members to pay at least 50% of the total normal cost of the plan.

Deferred Member Benefits

If a member terminates employment with a participating employer, the member is entitled to withdraw the employee contributions made, together with accumulated interest, unless the member enters a reciprocal retirement system within 180 days and leaves their accumulated contributions on deposit with OCERS and receives a deferred retirement allowance when eligible. There are different deferred retirement eligibility requirements for members with less than five years of service when terminating and leaving funds on deposit. It is possible for these members to earn a deferred retirement allowance upon attaining the age of 70, or upon accumulating reciprocal service. Members who terminate employment with a participating employer, and defer with five or more years of service may become eligible for a service retirement allowance when they would have accrued ten years of service and attain the age of 50 or greater (5 years of service and age 52 for PEPRA).

Disability Benefits

Members found by the Board of Retirement to be permanently incapacitated from the performance of their job are eligible for disability retirement benefits. A disability retirement benefit may either be service-connected or non-service-connected. Members applying for non-service-connected disability must have five or more years of eligible service credit. There are no service credit requirements for members applying for service-connected disability benefits, but the disabling condition must be a result of injury or disease arising out of or in the course of the member's employment.

Death Benefits

Death benefits are payable to eligible beneficiaries of OCERS members. Eligible beneficiaries of retired members may receive a percentage of a deceased member's retirement allowance based upon the retirement option selected by the member at the time of retirement. The beneficiary of a retired member will also receive a $1,000 burial benefit.

Survivor benefits for members who die prior to retirement are dependent upon a number of factors including whether or not the member was eligible for a service retirement or disability retirement at the time of death, and whether the death was job related. The eligible beneficiary of a member who is not eligible for service retirement or disability retirement is eligible to receive the member's accumulated contributions plus one month's salary for each year of creditable service, subject to a maximum of six month's salary. The eligible beneficiary of a member who is entitled to receive a service retirement or disability retirement, in lieu of the benefit described above, may elect to receive a monthly retirement allowance equal to 60% of the monthly allowance the member would have received for a non-service connected disability as of the day after the date of death, or a monthly allowance equal to the higher of 50% of the member's monthly compensation and service retirement allowance if the death was found to be service-connected.

Survivor benefits for deferred members (with no reciprocity) consist of a refund to eligible beneficiaries of all contributions and interest accumulated by the member as of the date of death.

Cost-of-Living Adjustments

Retired member monthly allowances will be adjusted annually in accordance with changes in the cost-of-living, as determined by the average annual change in the Consumer Price Index (CPI) for the prior calendar year. The cost-of-living adjustment is limited to a maximum increase or decrease of three percent per year as established by the Board of Retirement. The 2019 cost-of-living adjustment was 3%.

STAR COLA

Retired members and eligible beneficiaries who have lost more than 20% of their original retirement benefit's purchasing power due to inflation are eligible to receive the STAR COLA (Supplemental Targeted Adjustment for Retirees Cost-of-Living Adjustment). STAR COLA benefits are reviewed annually by the Board of Retirement and as of December 31, 2019, only those members that retired on or before April 1, 1980 are eligible to receive the STAR COLA benefit.

Postemployment Health Care Plans

OCERS serves as trustee for the County of Orange (County) and Orange County Fire Authority (OCFA) postemployment health care plan trusts established under Internal Revenue Code section 401(h), which are reported as other postemployment benefit trust funds in OCERS basic financial statements. Health care assets for the 401(h) trusts are commingled with pension trust assets for investment purposes and are used exclusively to pay health allowances to eligible retired members of the County of Orange and participating special districts including OCERS and the OCFA.

Notes to the Basic Financial Statements

NOTE 1 : Plan Descriptions (continued)

In July 2007, the County of Orange established under Internal Revenue Code both a 115 trust and a 401(h) trust as funding sources of retiree health care benefits, including grants, for the County of Orange Retiree Medical Plan (the "Plan"). The County maintains control and custody of all the 115 trust assets, which acts as a conduit for collecting contributions and passing them through to the 401(h) trust at their discretion, as well as distributing lump sum health care grant payments as part of a termination program that is being phased-out. OCERS maintains custody of the assets in the 401(h) trust and pays all primary benefits of the Plan as directed by the County. The County has evaluated the structure of its plan and related roles and responsibilities and has determined that the County is the plan administrator. Therefore, the County has taken financial reporting responsibility of the plan including financial statement disclosures and required supplementary information regarding the plan's funded status and contributions, in accordance with Governmental Accounting Standards Board (GASB) Statement No.74, *Financial Reporting for Postemployment Benefit Plans Other than Pension Plans*. A publicly available financial report can be obtained from the County of Orange at 12 Civic Center Plaza, Santa Ana, California 92702 or their website at **http://ac.ocgov.com**.

As trustee of OCFA's 401(h) Other Postemployment Benefit (OPEB) trust fund, the sole source of funding for OCFA's postemployment health care plan, OCFA has evaluated the structure of its plan and related roles and responsibilities and has determined that OCFA is the plan administrator. Therefore, OCFA has taken financial reporting responsibility of the Plan including financial statement disclosures and required supplementary information regarding the plan's funded status and contributions, in accordance with GASB Statement No.74, *Financial Reporting for Postemployment Benefit Plans Other than Pension Plan*s. A publicly available financial report can be obtained from the Orange County Fire Authority at 1 Fire Authority, Irvine, California 92602 or their website at **http://ocfa.org**.

Assets are allocated on the Statement of Fiduciary Net Position between the pension plan and the two 401(h) health care trusts based upon pro-rata shares of the net assets after balances and transactions specific to the respective trusts are assigned. Contributions and benefit payment information for the pension plan and individual health care trusts are readily identified; however, investment income must be allocated and is based upon the individual health care trusts' pro-rata share of total fund assets.

In addition to serving as Trustee for the two 401(h) health care trusts, OCERS also provides investment advisory services to the Orange County Transportation Authority (OCTA) health care plan pursuant to an agreement established in accordance with Internal Revenue Code section 115 (115 Plan). Investments in the 115 Plan are not commingled with those of the pension plan and 401(h) plan trusts, but rather are invested in separately managed index funds. OCTA's 115 Plan assets held by OCERS in an investment capacity are reported as a Custodial Fund. Additional information regarding the OCTA 115 Plan is available by contacting OCTA at 550 S. Main Street, Orange, California 92868 or their website at **http://www.octa.net.**

NOTE 2 : Summary of Significant Accounting Policies

Basis of Accounting

The accompanying financial statements have been prepared on the accrual basis of accounting and in accordance with accounting principles generally accepted in the United States of America (GAAP). Employee and employer contributions are recognized in the period in which contributions are due pursuant to legal requirements, and benefits and refunds are recognized when currently due and payable in accordance with plan terms. Unearned contributions represent prepaid employer contributions that will be recognized as an addition to plan net position in future periods. Investment income is recognized as revenue when earned. The net appreciation/(depreciation) in the fair value of investments is recorded as an increase/(decrease) to investment income based upon investment valuations, which includes both realized and unrealized gains and losses on investments.

Investment Policy and Valuation

State Street Bank and Trust (State Street) maintains custody of the majority of OCERS' investments held as of December 31, 2019. The acquisition of investments is authorized by state statute and OCERS' Investment Policy Statement (refer to Note 3: Investments for further information). Investments are reported at fair value on a trade-date basis. The allocation of investment assets is approved by OCERS' Board of Retirement, as outlined in the Investment Policy Statement, and System assets are invested solely for the benefit of plan participants and beneficiaries while attempting to minimize employer contributions and investment and administration costs. The Investment Policy Statement calls for an asset allocation plan that seeks to optimize long-term returns for the level of risk that the Board of Retirement considers appropriate. The current asset allocation adopted by the Board of Retirement as of December 31, 2019, is detailed in Section III - Investments. The Board of Retirement conducts a periodic review of the asset allocation plan to maintain an optimal allocation, and may also revise the asset allocation in response to significantly changing market conditions that may affect valuations and forward-looking expected returns of asset classes.

Plan investments consist of global public equity securities, core fixed income, real assets, credit, risk mitigation, absolute return strategies and private equity. Investments are reported at fair value and the overall valuation process and information sources by major asset classification are as follows:

Cash and Short-Term Investments

Cash and short-term investments represent funds held in operating accounts with State Street, Wells Fargo Bank and deposits held in a pooled account with the County of Orange Treasurer. Short-term investments are expected to be utilized within 30-90 days and are reported at fair value. OCERS is a participant in the County Treasurer's Orange County Investment Pool (OCIP). The OCIP is an external investment pool, is not rated, and is not registered with the Securities and Exchange Commission. The County Treasury Oversight Committee conducts OCIP oversight. Cash on deposit in the OCIP is stated at fair value. The OCIP values participant shares on an amortized cost basis during the year and adjusts to fair value at year-end. Deposits held in the OCIP are invested in the Orange County Money Market Fund and the Extended Fund. At December 31, 2019, the OCIP had a weighted average maturity of 219 days. The Orange County Money Market Fund is rated AAAm by Standard & Poor's. The Extended Fund is not rated. For further information regarding the OCIP, refer to the County of Orange Comprehensive Annual Financial Report.

Global Public Equity

The majority of OCERS' domestic, international and global securities, including those traded in emerging markets, consist of institutional funds that are valued based on the fair value of underlying investments using pricing models or other valuation methodologies that use pricing inputs that are either directly or indirectly observable on the valuation date for the securities or assets held in the fund. Other domestic, international and global securities are actively traded on major security exchanges, or over-the-counter. Fair value for exchange traded securities is determined as of the close of the trading date in the primary market or agreed upon exchange. The last known price is used for listed securities that did not trade on a particular date. Fair value is obtained from third-party pricing sources for securities traded over-the-counter.

Core Fixed Income

Actively traded debt instruments such as those securities issued by the U.S. Treasury, Federal Agencies and corporate issuers are reported at fair value as of the close of the trading date. Fair values of irregularly traded debt securities are obtained from pricing vendors who employ modeling techniques in determining security values. Inputs typically employed by pricing vendors include cash flows, maturity and credit rating.

Real Assets

OCERS invests in real assets, which include agriculture, energy, infrastructure, real estate and timber holdings. The fair value for real estate, timber, energy, infrastructure and agriculture are determined based on independent appraisals and/or estimates made in good faith by the general partner or management.

Real estate assets are in commingled real estate funds structured as either limited partnerships or trust funds. Properties held in commingled funds are based on the investment's net asset value (NAV) per share provided by the investment management firms/general partners, who perform regular internal appraisals and obtained at regular intervals independent third-party appraisals and are further supported by annual financial statements, which are audited by an independent third-party accountant. Primary determinants of fair value include market and property type specific information, which typically involve a degree of expert judgment.

Other real asset funds, agriculture, energy, and infrastructure, are held in limited partnerships. The investment's NAV per share are provided by the investment management firms/general partners, and are further supported by annual financial statements, which are audited by an independent third-party accountant. Primary determinants of fair value include market specific information, which involves a degree of expert judgment.

Other Investments

OCERS invests in a variety of different credit strategies, alternative strategies which include private equity and absolute return, and risk mitigation investments.

Credit is a global allocation that includes a number of diverse fixed-income related strategies. It represents an allocation that is diversified by region, by credit quality, and by sources of risk. The general shared characteristics of these strategies are a degree of illiquidity, and a focus on current yield as a principal source of expected return. Hedging of market and individual security risks and diversified risk-controlled tactical trading may be permitted.

Credit is a combination of liquid and illiquid credit strategies and the fair value depends on the nature of the investment. For credit funds structured as partnerships, the fair values are based on NAV. Credit included in Level 2 of the fair value hierarchy may be estimated by the underlying managers in the absence of observable market data or the general partner may estimate the fair value in good faith using the best information available, which may incorporate the general partner's own assumptions. The liquid strategies comprised of multi-strategies are actively traded and are generally reported at fair value as of the close of the trading date. The illiquid strategies comprised of mortgages, direct lending and energy-based credit funds are valued initially at cost as an approximation of fair value with subsequent adjustments to fair value as determined by the general partner. The factors considered include readily available market quotes, earnings-multiple analysis using comparable companies or discounted cash flow analysis.

Private equity and absolute return are alternative strategies. The fair value of these alternative investments depends upon the nature of the investment and the underlying business. Typically, alternative investments are less liquid and subject to redemption restrictions. Fair value is determined either quarterly or semi-annually with valuations conducted by general partners, management and valuation specialists. Valuation techniques vary by investment type and involve expert judgment or estimates made in good faith using the best information available, including the general partner's or management's own assumptions. Investments reported at NAV are based on audited financial statements.

Risk mitigation investments include generally liquid investments with shorter redemption periods. Risk mitigation funds included in Level 2 are short-term investment funds and NAV is determined daily; for risk mitigation funds structured as partnerships, the fair values are based on NAV. Risk mitigation investments are uncorrelated or negatively correlated to economic growth assets.

Capital Assets

Capital assets consist of furniture, equipment, intangible assets, including computer software, and building and improvements for the portion of the OCERS' headquarters building used for plan administration. Capital assets are defined by OCERS as assets with an initial, individual cost of more than $25,000 and an estimated useful life in excess of one year. Such assets are recorded at cost. Capital assets are depreciated using the straight-line depreciation method over their estimated useful lives, ranging from five to fifteen years for furniture, equipment and building improvements; three years for purchased computer software; sixty years for buildings; and five years for the data center. Intangible assets are amortized over an estimated useful life of ten years.

Notes to the Basic Financial Statements

NOTE 2 : Summary of Significant Accounting Policies (continued)

Capital Assets
As of December 31, 2019
(Dollars in Thousands)

Building and Improvements	$	5,196
Computer Software - Pension Administration System		21,853
Data Center		1,234
Construction in Progress		99
Total Capital Assets (at cost)		28,382
Less: Accumulated Depreciation and Amortization		(12,322)
Total Capital Assets (Net of Depreciation and Amortization)	**$**	**16,060**

Use of Estimates
The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect reported amounts of net position. Actual results could differ from those estimates.

Comparative Totals
The basic financial statements include certain prior-year summarized comparative information in total but not at the level of detail required for a presentation in conformity with GAAP. Accordingly, such information should be read in conjunction with OCERS' financial statements for the year ended December 31, 2018, from which the summarized information was derived.

Effect of New Governmental Accounting Standards (GASB) Pronouncement
In January 2017, GASB issued Statement No. 84, *Fiduciary Activities* (GASB 84), which establishes criteria for identifying fiduciary activities for state and local governments. The objective of the statement was to improve guidance regarding the identification of fiduciary activities for accounting and financial reporting purposes and how those activities should be reported. The statement describes four fiduciary funds that should be reported, if applicable: (1) pension (and other employee benefit) trust funds, (2) investment trust funds, (3) private-purpose trust funds, and (4) custodial funds. Agency funds are now classified as custodial funds and require the presentation of a Statement of Fiduciary Net Position and a Statement of Changes in Fiduciary Net Position. The OCTA 115 Agency Fund was impacted by the requirements of GASB 84 which is now classified as a custodial fund and has been renamed the OCTA 115 Custodial Fund. The requirements of this statement that are applicable to OCERS are effective for reporting periods beginning after December 15, 2018. OCERS implemented GASB 84 for the year ended December 31, 2019, and the financial statements and the related disclosures reflect the changes as required by GASB 84.

NOTE 3 : Investments

OCERS may invest, in accordance with state statutes, in any form or type of investment deemed prudent by the Board of Retirement. Pension and 401(h) Health Care plan assets are restricted for the exclusive purposes of providing benefits to plan participants and defraying reasonable expenses of administering the plans. The Board of Retirement may invest, or delegate the authority to invest, the assets of the funds through the purchase, holding, or sale of any form or type of investment, financial instrument, or financial transaction. Custodial fund assets, restricted pursuant to section 115 of the Internal Revenue Code, are separately invested in domestic equity, international equity and domestic bond index funds in accordance with the respective OCTA Third-Party Administrative and Investment Management Agreement.

Custodial Credit Risk

Custodial credit risk for deposits is the risk that in the event of a financial institution's failure, OCERS would not be able to recover its deposits. Deposits are exposed to custodial risk if they are not insured or not collateralized. As of December 31, 2019, OCERS' deposits with a financial institution are fully insured by Federal Deposit Insurance Corporation (FDIC) insurance up to $250,000 with the remaining balance exposed to custodial credit risk as it is not insured; however, the financial institution does collateralize the deposit of monies in excess of the FDIC insurance amount with eligible securities held by the pledging financial institution, but not in OCERS' name. Deposits held by OCERS' custodial bank are not exposed to custodial credit risk as they are held in a qualified pool trust, separate from the custodial bank assets.

For an investment, custodial credit risk is the risk that, in the event of a counterparty failure, OCERS will not be able to recover the value of its investments or collateral securities that are in the possession of counterparties. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in OCERS' name or by other qualified third-party administrator trust accounts.

OCERS' investments and collateral received through securities lending are not exposed to custodial credit risk because all securities are held by OCERS' custodial bank in OCERS' name or by other qualified third-party administrator trust accounts. OCERS does not maintain any general policies regarding custodial credit risk.

Credit Risk

By definition, credit risk measures the risk that an issuer or counterparty will not fulfill its obligations. Standard & Poor's defines investment grade as those fixed income securities with ratings between AAA and BBB. OCERS' investment policy permits, on an opportunistic basis, the investment in fixed income securities rated below investment grade. A rating of NR represents pooled funds and other securities that have not been rated by Standard and Poor's and NA represents securities explicitly guaranteed by the U.S. Government that are not subject to the GASB Statement No. 40 disclosure requirements. The credit ratings for individual OCERS' fixed income portfolios are monitored regularly.

As of December 31, 2019, the Standard & Poor's credit ratings of the OCERS' fixed income portfolio were as follows:

Credit Ratings
As of December 31, 2019
(Dollars in Thousands)

Rating	Pooled	U.S. Treasuries	Corporates	Mortgages	Asset-Backed	Municipals	Agencies	International	Swaps	Total
AAA	$ -	$ -	$ 3,864	$ 6,407	$ 11,341	$ -	$ -	$ 666	$ -	$ 22,278
AA	-	-	12,232	322,763	19,243	21,547	1,531	8,319	-	385,635
A	-	-	79,274	530	2,318	8,892	-	25,361	-	116,375
BBB	-	-	188,796	1,778	5,702	1,773	-	64,643	-	262,692
BB	-	-	80,671	281	1,520	1,078	-	38,257	-	121,807
B	-	-	47,075	1,154	1,516	2,000	-	7,886	-	59,631
CCC	-	-	24,737	1,947	9,294	-	-	1,406	-	37,384
CC	-	-	641	455	5,393	-	-	8	-	6,497
D	-	-	118	639	1,573	-	-	-	-	2,330
NR	1,658,893	-	14,061	56,563	45,494	3,577	3,767	21,789	1,951	1,806,095
NA	-	475,031	-	28,381	-	-	-	-	-	503,412
Total	$1,658,893	$475,031	$ 451,469	$ 420,898	$103,394	$ 38,867	$ 5,298	$ 168,335	$1,951	$ 3,324,136

This schedule reflects credit ratings for OCERS' fixed income portfolio, which includes $471.8 million of fixed income securities which are included in the Credit investment category and excludes $8.8 million of non-fixed income securities that are included in the Core Fixed Income investment category on the Statement of Fiduciary Net Position.

Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. Duration is a measure of the price sensitivity of a fixed-income portfolio to changes in interest rates. It is calculated as the weighted average time to receive a bond's coupon and principal payments. The longer the duration of a portfolio, the greater its price sensitivity to changes in interest rates.

Interest rate risk is managed through OCERS' investment policies requiring that investment managers investing on behalf of OCERS have applicable investment guidelines and that the effective durations of fixed income portfolios remain within a defined range of the benchmark's effective duration. The primary benchmark for domestic fixed income is a blend of three different indices, the Bloomberg Barclays Aggregate Total Return (60%), the Bloomberg Barclays US Universal Total Return (20%), and the Bloomberg US TIPS Total Return (20%). As of December 31, 2019, the durations of these three indices are 5.69 years, 5.94 years and 7.36 years, respectively for a blended duration of 6.07 years. All investment managers were in compliance within their defined range.

OCERS invests in a variety of fixed income instruments including asset-backed securities, corporate obligations and commercial mortgage backed securities. The value, liquidity and income of these securities are sensitive to changes in overall economic conditions and the fair value of these securities may be affected by changes in interest rates, default rates and the value of the underlying securities.

The interest rate risk schedule presents the duration of fixed income securities by investment category as of December 31, 2019:

Interest Rate Risk Schedule

As of December 31, 2019
(Dollars in Thousands)

Category	Amount	Duration (in Years)	Percent
Pooled	$ 1,658,893	6.22	50%
U.S. Treasuries	475,031	6.70	14%
Corporates	447,662	5.80	13%
Mortgages	401,481	2.24	13%
Asset-Backed	90,848	2.16	3%
Municipals	35,642	7.84	1%
Agencies	5,298	2.69	0%
International	166,204	5.08	5%
No Effective Duration:			
Corporates	3,807	N/A	0%
Mortgages	19,417	N/A	1%
Asset-Backed	12,546	N/A	0%
Municipals	3,225	N/A	0%
International	2,131	N/A	0%
Swaps	1,951	N/A	0%
Total	$ 3,324,136	5.51	100%

Foreign Currency Risk

The value of deposits or investments denominated in foreign currency may be adversely affected by changes in currency exchange rates. OCERS' investment policy permits investment in international securities that includes investments in international equity securities, global equity securities, emerging markets equity securities and debt, public real estate securities, and real return. Investment managers monitor currency exposures daily.

The following schedule represents OCERS' net exposure to foreign currency risk in U.S. dollars as of December 31, 2019:

Foreign Currency Risk Schedule

As of December 31, 2019
(Dollars in Thousands)

Currency in U.S. Dollar	Cash	Equity	Fixed Income	Forward Contracts	Swaps	Total
Argentine Peso	$ 42	$ -	$ 494	$ -	$ -	$ 536
Australian Dollar	145	26,684	-	720	7	27,556
Brazilian Real	110	5,728	472	101	-	6,411
Canadian Dollar	1	15,239	806	332	-	16,378
Colombian Peso	-	-	-	57	-	57
Danish Krone	5	26,350	-	(25)	-	26,330
Euro Currency	221	256,918	6,661	(252)	4	263,552
Hong Kong Dollar	180	34,244	-	(5)	8	34,427
Iceland Krona	77	-	1,652	-	-	1,729
Indonesian Rupiah	-	2,447	-	-	-	2,447
Japanese Yen	895	164,746	-	2	(505)	165,138
Mexican Peso	14	-	185	(13)	49	235
New Israeli Sheqel	-	593	-	4	-	597
New Taiwan Dollar	-	-	-	(28)	-	(28)
New Zealand Dollar	-	1,104	-	66	-	1,170
Norwegian Krone	-	5,088	666	-	-	5,754
Peruvian Sol	6	-	2,017	-	-	2,023
Pound Sterling	325	129,129	5,945	164	307	135,870
Polish Zloty	114	-	-	-	-	114
Singapore Dollar	175	5,843	-	(23)	-	5,995
South African Rand	-	1,235	-	-	-	1,235
South Korean Won	-	6,810	-	-	-	6,810
Swedish Krona	24	16,631	-	(167)	(126)	16,362
Swiss Franc	8	53,331	-	(607)	(223)	52,509
Thailand Bhat	-	760	-	-	-	760
Yuan Renminbi	-	1,776	-	-	-	1,776
Amount Exposed to Foreign Currency Risk	$ 2,342	$ 754,656	$ 18,898	$ 326	$ (479)	$775,743

Concentration of Credit Risk

Concentration of credit risk is the risk of loss attributed to the magnitude of OCERS' investment in a single issuer. By policy, OCERS did not hold investments in any one issuer that represented five percent (5%) or more of plan net position and net investments. Investments issued or explicitly guaranteed by the U.S. Government and pooled investments are excluded from this policy requirement.

Concentration of Investments

As of December 31, 2019, OCERS did not hold investments in any one organization that represented five percent (5%) or more of the plan's fiduciary net position. Investments issued or explicitly guaranteed by the U.S. Government and pooled investments are excluded from this requirement.

Derivative Instruments

As of December 31, 2019, all derivative instruments held by OCERS are considered investments and not hedges for accounting purposes. Any reference to the term hedging in these financial statements references an economic activity and not an accounting method. All gains and losses associated with these activities are recognized as incurred in the Statement of Changes in Fiduciary Net Position.

The table that follows presents the related net appreciation/(depreciation) in fair value, the fair value amounts and the notional amounts of derivative instruments outstanding at December 31, 2019.

Notes to the Basic Financial Statements

NOTE 3 : Investments (continued)

Derivative Instruments

As of December 31, 2019
(Amounts in Thousands)

Derivative Instruments	Changes in Fair Value Net Appreciation/ (Depreciation) [4] Amount [1]	Fair Value at December 31, 2019 Classification	Amount [2]	Notional [3]
Commodity Futures Long	$ 1,333	Cash	$ -	$ 3,681
Commodity Futures Short	323	Cash	-	(1)
Credit Default Swaps Bought	(169)	Cash	(210)	4,053
Credit Default Swaps Written	1,247	Core Fixed Income/ Credit	918	45,857
Fixed Income Futures Long	14,389	Cash / Core Fixed Income/ Credit	-	81,099
Fixed Income Futures Short	(3,028)	Core Fixed Income/ Credit	-	(45,905)
Fixed Income Options Bought	(34)	Core Fixed Income/ Credit	-	-
Fixed Income Options Written	71	Core Fixed Income/ Credit	-	(5,200)
Foreign Currency Options Written	46	Core Fixed Income	-	-
Futures Options Written	56	Core Fixed Income/ Credit	-	-
FX Forwards	3,268	Core Fixed Income/ Credit/ Global Public Equity	326	172,611
Index Futures Long	66,722	Cash/ Global Public Equity	-	414
Index Futures Short	(4,023)	Global Public Equity	-	(35)
Pay Fixed Interest Rate Swaps	(8,251)	Core Fixed Income/ Credit	333	116,795
Receive Fixed Interest Rate Swaps	1,357	Credit	910	28,307
Rights	9	Global Public Equity	3	1
Total Return Swaps Bond	(3,622)	Global Public Equity	(361)	71,801
Total Return Swaps Equity	2,544	Global Public Equity	92	(10,013)
Grand Totals	$ 72,238		$ 2,011	

[1] Negative values (in brackets) refer to losses
[2] Amount represents net of negative position (liabilities) and positive position (asset) for each type of the derivative instruments
[3] Notional may be a dollar amount or size of underlying for futures and options, negative values refer to short positions
[4] Excludes futures margin payments

Valuation of Derivative Instruments

Non-exchange traded instruments, such as swaps, are valued using similar methods as those described for debt securities.

Futures contracts are traded on exchanges and typically derive their value from underlying indices and are marked to market daily. All gains and losses associated with changes in the value of futures contracts also settle on a daily basis and result in the contracts themselves having no fair value at the end of any trading day, including December 31, 2019. Future variation margin accounts also settle daily and are recognized in the financial statements under net appreciation/(depreciation) in the fair value of the investments as incurred.

In general, option values are dependent upon a number of different factors, including the current market price of the underlying security, the strike price of the option, costs associated with holding a position in the underlying security including interest and dividends, the length of time until the option expires and an estimate of the future price volatility of the underlying security relative to the time period of the option.

Foreign currency forward contracts are agreements to buy or sell a currency at a specified exchange rate on a specified date. The fair value of a foreign currency forward is determined by the difference between the specified exchange rate and the closing exchange rate at December 31, 2019.

Custodial Credit Risk – Derivative Instruments

As of December 31, 2019, all investments in derivative instruments are held in OCERS' name and are not exposed to custodial credit risk as described in the previous discussion of custodial credit risk.

Counterparty Credit Risk – Derivative Instruments

A summary of counterparty credit ratings relating to non-exchange traded derivatives in asset positions as of December 31, 2019 is as follows:

Counterparty Credit Risk Schedule for Derivative Instruments

As of December 31, 2019
(Dollars in Thousands)

Counterparty Name	S&P Rating	Foreign Currency Forward Contracts	Swaps	Total Fair Value
Bank of America CME	A-	$ -	$ 242	$ 242
Bank of America ICE	A-	-	330	330
Bank of America LCH	A-	-	104	104
Bank of America, N.A.	A+	52	-	52
BNP Paribas SA	A+	8	-	8
Citibank N.A.	A+	1,052	6	1,058
Credit Suisse FOB CME	A+	-	1,085	1,085
Credit Suisse FOB ICE	A+	-	107	107
Credit Suisse FOB LCH	A+	-	117	117
Goldman Sachs Bank USA	BBB+	4	-	4
Goldman Sachs International	A+	-	23	23
HSBC Bank USA	AA-	91	2	93
JPMorgan Chase Bank, N.A.	A+	911	-	911
Merrill Lynch International	A-	-	319	319
Morgan Stanley and Co. International PLC	BBB+	3	-	3
Morgan Stanley Capital Services Inc	BBB+	-	1	1
Morgan Stanley Co Incorporated	BBB+	-	99	99
State Street Bank and Trust Company	AA-	45	-	45
Other	NR	-	533	533
Total Non-Exchange Traded Derivatives in Asset Position		**$ 2,166**	**$ 2,968**	**$ 5,134**

Interest Rate Risk – Derivatives

At December 31, 2019, OCERS is exposed to interest rate risk on its investments in various swap arrangements based on daily interest rates for LIBOR (London Interbank Offered Rate), UKRPI (UK Retail Price Index), the Interbank Equilibrium Interest Rate (TIIE), European reference rates and Mexican swap rate. The following table illustrates the maturity periods of these investments:

Interest Rate Risk - Schedules for Derivative Instruments

As of December 31, 2019
(Dollars in Thousands)

Investment Type	Fair Value	Investment Maturities (in years)			
		Less Than 1	1-5	6-10	More than 10
Credit Default Swaps Bought	$ (210)	$ -	$ (210)	$ -	$ -
Credit Default Swaps Written	918	-	978	-	(60)
Pay Fixed Interest Rate Swaps	333	(165)	(7)	(242)	747
Receive Fixed Interest Rate Swaps	910	-	818	(1)	93
Total Return Swaps Bond	(361)	(361)	-	-	-
Total Return Swaps Equity	92	92	-	-	-
Total	**$ 1,682**	**$ (434)**	**$ 1,579**	**$ (243)**	**$ 780**

Derivative Instruments Highly Sensitive to Interest Rate Changes

As of December 31, 2019
(Dollars in Thousands)

Investment Type	Receive Rate	Payable Rate	Fair Value	Notional
Pay Fixed Interest Rate Swaps	Variable 3-month LIBOR	Fixed 1.50%-3.00%	$ 588	$ 64,540
Pay Fixed Interest Rate Swaps	Variable 6-month EURIB	Fixed 0.08%-2.00%	(255)	52,255
Total Pay Fixed Interest Rate Swaps			**$ 333**	
Receive Fixed Interest Rate Swaps	Fixed 3.58%	Variable 1-month UKRPI	$ 93	1,590
Receive Fixed Interest Rate Swaps	Fixed 7.35%	Variable 1-month TIIE	49	1,239
Receive Fixed Interest Rate Swaps	Fixed 2.60%-2.70%	Variable 3-month LIBOR	818	22,800
Receive Fixed Interest Rate Swaps	Fixed 1.00%	Variable 6-month EURIB	(50)	2,678
Total Receive Fixed Interest Rate Swaps			**$ 910**	
Total Interest Rate Swaps			**$ 1,243**	

Notes to the Basic Financial Statements

NOTE 3 : Investments (continued)

Foreign Currency Risk – Derivatives

At December 31, 2019, OCERS is exposed to foreign currency risk on investments in swaps and forward currency contracts denominated in foreign currencies that may be adversely affected by changes in the currency exchange rates.

Foreign Currency Risk Schedule for Derivative Instruments

As of December 31, 2019
(Dollars in Thousands)

		Currency Forward Contracts			
Currency Name	**Rights**	**Net Receivables**	**Net Payables**	**Swaps**	**Total Exposure**
Australian Dollar	$ -	$ 958	$ (237)	$ 7	$ 728
Brazilian Real	3	132	(31)	-	104
Canadian Dollar	-	364	(32)	-	332
Colombian Peso	-	57	-	-	57
Danish Krone	-	3	(28)	-	(25)
Euro Currency	-	43	(294)	4	(247)
Hong Kong Dollar	-	-	(5)	8	3
Japanese Yen	-	3	(2)	(505)	(504)
Mexican Peso	-	59	(72)	49	36
New Israeli Sheqel	-	5	(1)	-	4
New Taiwan Dollar	-	-	(28)	-	(28)
New Zealand Dollar	-	66	-	-	66
Pound Sterling	-	450	(286)	307	471
Singapore Dollar	-	21	(45)	-	(24)
Swedish Krona	-	-	(167)	(126)	(293)
Swiss Franc	-	5	(612)	(223)	(830)
Total Foreign Currency	**$ 3**	**$ 2,166**	**$ (1,840)**	**$ (479)**	**$ (150)**
U.S. Dollar	-	-	-	2,161	2,161
Total	**$ 3**	**$ 2,166**	**$ (1,840)**	**$ 1,682**	**$ 2,011**

Rate of Return

For the year ended December 31, 2019, the annual money-weighted rate of return on the assets of the plan, net of investment expense, was 14.81%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the timing of cash flows and the changing amounts actually invested.

Securities Lending

OCERS is authorized by investment policy and state law to lend its investment securities including global public equities, core fixed income, credit and real assets to broker/dealers in exchange for collateral in the form of either cash or securities. Lent domestic and international securities are collateralized with an initial market value of not less than 102% or 105% depending on the nature of the loaned securities and the collateral received, of fair value of the loaned securities. The lending agent receives cash and non-cash collateral for the securities on loan. There are no restrictions on the amount of securities that can be lent at one time. State Street Bank serves, in accordance with a Securities Lending Authorization Agreement, as OCERS' agent to loan domestic and international securities. State Street Bank does not have the ability to pledge or sell collateral securities delivered absent a borrower default.

Cash collateral received on loaned securities is invested together with the cash collateral of other qualified tax-exempt investors in a collective investment fund managed by State Street. The collective investment fund is not rated. In December 2010 the collective investment fund was divided into separate investment pools: 1) a liquidity pool and 2) a duration pool. As of December 31, 2019, the liquidity pool had an average life-final maturity of 96 days and a weighted average maturity (WAM) of 31 days. The duration pool had an average life-final maturity of 1,650 days and a WAM of 18 days. Because loans are terminable at will, the duration of the loans did not generally match the duration of the investments made with the cash collateral. The Securities Lending Authorization Agreement requires State Street to indemnify OCERS if the broker/dealer fails to return any borrowed securities. During 2019, there were no failures to return loaned securities or to pay distributions by the borrowers. Furthermore, there were no losses due to borrower defaults. The fair value of securities on loan and the total cash and non-cash collateral held as of December 31, 2019 was $192.8 million and $197.1 million, respectively. The following table shows fair values of securities on loan and cash collateral received by asset class:

Securities on Loan and Collateral Received

As of December 31, 2019

(Dollars in Thousands)

Security Lent for Cash Collateral	Fair Value of OCERS' Securities Lent	Cash Collateral Received	Non-Cash Collateral Received	Total Collateral Received
Global Public Equity	$ 48,603	$ 49,813	$ -	$ 49,813
Core Fixed Income	93,480	95,529	-	95,529
Credit	50,750	51,753	-	51,753
Total	**$ 192,833**	**$ 197,095**	**$ -**	**$ 197,095**

Investments – Fair Value Measurements

OCERS categorizes its fair value measurements of its investments based on the three level fair value hierarchy established by GAAP. The fair value hierarchy is based on the valuation inputs used to measure fair value of the asset or liability and gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 inputs) and the lowest priority to unobservable inputs (Level 3 inputs). Unobservable inputs are developed using the best information available about the assumptions that market participants would use when pricing an investment. The three levels of the fair value hierarchy are:

- 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 are derived from valuation techniques in which significant inputs are unobservable. Investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not classified in the fair value hierarchy.

NOTE 3 : Investments (continued)

The following table represents the fair value measurements as of December 31, 2019:

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

As of December 31, 2019
(Dollars in Thousands)

	12/31/2019	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investments by Fair Value Level				
Fixed Income:				
U.S. Fixed Income:				
Pooled	$ 1,658,893	$ -	$ 1,658,893	$ -
U.S. Treasuries	475,031	-	475,031	-
Corporates	451,469	-	451,469	-
Mortgages	420,898	-	420,898	-
Asset-backed	103,394	-	103,394	-
Municipals	38,867	-	38,867	-
Agencies	5,298	-	5,298	-
International	168,335	-	167,471	864
Total Fixed Income	**3,322,185**	**-**	**3,321,321**	**864**
Global Public Equity Investments:				
Domestic Equity	3,785,614	394,836	3,390,778	-
International Equity	1,809,093	781,480	1,027,613	-
Emerging Markets Equity	1,191,442	-	1,191,442	-
Total Global Public Equity	**6,786,149**	**1,176,316**	**5,609,833**	**-**
Real Assets:				
Agriculture	72,877	-	-	72,877
Energy	117,114	-	-	117,114
Real Estate	3,454	-	-	3,454
Timber	78,715	-	-	78,715
Total Real Assets	**272,160**	**-**	**-**	**272,160**
Other Investments:				
Credit	52,292	-	52,292	-
Risk Mitigation	756,345	-	756,345	-
Total Other Investments	**808,637**	**-**	**808,637**	**-**
Total Investments by Fair Value Level	**$ 11,189,131**	**$ 1,176,316**	**$ 9,739,791**	**$ 273,024**

Core Fixed Income in the above schedule includes $470.7 million of fixed income securities, which are included in the Credit investment category; and excludes $9.6 million of non-fixed income securities and derivatives that are included in the Core Fixed Income investment category on the Statement of Fiduciary Net Position.

Notes to the Basic Financial Statements

NOTE 3 : Investments (continued)

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

As of December 31, 2019
(Dollars in Thousands)
(Continued)

	12/31/2019	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investments Measured at the Net Asset Value (NAV)				
Global Public Equity Investments:				
Domestic Equity	$ 2,182			
Total Global Public Equity	**2,182**			
Real Assets:				
Agriculture	62,961			
Energy	513,697			
Infrastructure	139,872			
Real Estate	1,264,019			
Total Real Assets	**1,980,549**			
Other Investments:				
Absolute Return	967			
Credit	1,080,589			
Private Equity	1,735,878			
Risk Mitigation	951,217			
Total Other Investments	**3,768,651**			
Total Investments Measured at the NAV	**$ 5,751,382**			
Investments Derivative Instruments				
Swaps:				
Interest Rate Swaps	$ 1,243	$ -	$ 1,243	$ -
Credit Default Swaps	708	-	708	-
Total Return Swaps	(269)	-	(269)	-
Total Investment Derivative Instruments	**$ 1,682**	**$ -**	**$ 1,682**	**$ -**
Total Investments Measured at Fair Value	**$ 16,942,195**			
Investments Securities Lending Collateral				
Debt Securities:				
Core Fixed Income	$ 95,529	$ -	$ 95,529	$ -
Credit	51,753	-	51,753	-
Equity Investments:				
U.S. Equities	39,910	39,910	-	-
International Equities	9,903	9,903	-	-
Total Invested Securities Lending Collateral	**$ 197,095**	**$ 49,813**	**$ 147,282**	**$ -**

Core fixed income include actively traded debt instruments such as those securities issued by the United States government, federal agencies, municipal obligations, foreign governments, and both U.S. and foreign corporate issuers. Core fixed income securities are reported at fair value as of the close of the trading date. Fair values for securities not traded on a regular basis are obtained from pricing vendors who employ modeling techniques, such as matrix pricing or discounted cash flow method, in determining security values. These inputs are observable, which supports the Level 2 fair value hierarchy. Argentina fixed income securities are categorized in the Level 3 fair value hierarchy due to ongoing debt renegotiations with holders of governmental bonds.

Global public equity include U.S. and international equity securities, and emerging markets equity securities. Global public equity securities classified in Level 1 of the fair value hierarchy are primarily common and preferred stock or real estate investment trusts. Fair value for these exchange traded securities is determined as of the close of the trading date in the primary market or agreed upon exchange. The last known price is used for listed securities that did not trade on a particular date. Fair value is obtained from third-party pricing sources for securities traded over-the-counter. Global public equity securities classified in Level 2 of the fair value hierarchy consist of institutional funds that are valued based on the fair value of underlying investments using pricing models or other valuation methodologies that use pricing inputs that are either directly or indirectly observable on the valuation date for the securities or assets held in the fund.

Real assets investments at fair value include a variety of real return investments in agriculture, energy, real estate and timber resources which are held directly. Real asset investments classified as Level 3 include energy investments that are not actively traded, are less liquid and subject to redemption restrictions. Determining the fair value requires valuation techniques, such as expert judgment, which are unobservable. The general partner of energy funds estimates the fair value of these investments in good faith using the best information available, which may incorporate the general partner's own assumptions. Real estate assets held directly are appraised by independent third-party appraisers in accordance with the Uniform Standards of Professional Appraisal Practice. Independent appraisals use professional judgment, which is unobservable input, to determine the fair value of the asset; therefore these real estate investments are classified as Level 3. Agriculture and timber resources included in Level 3 are based on independent appraisals and/or the good faith estimates of management.

Other investments include one credit investment fund and two risk mitigation funds. These investments are classified in Level 2 of the fair value hierarchy and include primarily institutional mutual funds that are valued based on the fair value of underlying investments using pricing models or other valuation methodologies that use pricing inputs that are either directly or indirectly observable on the valuation date for the securities or assets held in the fund.

Derivative instruments classified as Level 2 are valued using a market approach with observable inputs from major indices as well as benchmark interest rates and foreign exchange rates.

Securities Lending represents cash collateral received for securities lent. The equity securities lent include U.S. equities and international and global equities in Level 1 of the fair value hierarchy, valued using a market approach for prices quoted in active markets for securities. Level 2 securities lent are core fixed income securities, which include U.S. government, federal agencies, and credit securities including municipal obligations along with corporate issuers.

Investments Measured at NAV, Unfunded Commitments and Redemption Terms

As of December 31, 2019
(Dollars in Thousands)

The System uses the Net Asset Value (NAV) to determine the fair value of the underlying investments, when an investment does not have a readily determinable fair value, provided that the NAV is calculated and used as a practical expedient to estimate fair value in accordance with GAAP requirements.

	Fair Value Measured at NAV	Unfunded Commitments	Redemption Frequency (If Currently Eligible)[1]	Redemption Notice Period
Investments Measured at the Net Asset Value (NAV)				
Global Public Equity:				
Domestic Equity	$ 2,182	$ -	S	60 days
Total Global Public Equity Measured at the NAV	**2,182**	**-**		
Real Assets:				
Agriculture	62,961	22,451	Q	60 days
Energy	513,697	579,373	N/A	N/A
Infrastructure	139,872	235,158	N/A	N/A
Real Estate	1,264,019	230,799	Q	5-90 days
Total Real Assets Measured at the NAV	**1,980,549**	**1,067,781**		
Other Investments:				
Absolute Return	967	-	N/A	N/A
Credit	1,080,589	443,308	M, Q, N/A	5-90 days, N/A
Private Equity	1,735,878	922,217	N/A	N/A
Risk Mitigation	951,217	-	D, W, M, Q	1-75 days
Total Other Investments at the NAV	**3,768,651**	**1,365,525**		
Total Investments Measured at the NAV	**$ 5,751,382**	**$ 2,433,306**		

[1] D=Daily, W=Weekly, M=Monthly, S=Semi-Annually, Q=Quarterly

NOTE 3 : Investments (continued)

The investment types listed in the above table were measured at the Net Asset Value (NAV) as explained below:

Global public equity includes one institutional fund. The fund's focus is primarily U.S. equity securities. The fair value if each fund has been determined using NAV per share or unit of the investments.

Real assets: Agriculture includes one fund that invests in a diversified portfolio of row, vegetable and permanent crop farmland in select major agricultural states. The fund is an open-end, infinite life, private REIT (real estate investment trust) subject to the redemption terms in the above schedule.

Real assets: Energy consists of fifteen limited partnerships that invest primarily in oil and gas related investments. There are no redemption terms for any of these partnerships. These investments are considered illiquid. During the life of the partnerships, distributions are received as underlying partnership investments are realized. The fair values of this investment type have been determined using estimates provided by the underlying partnerships and are at NAV. One of the partnerships is considered a going concern, and is included at a zero value.

Real assets: Infrastructure consists of four limited partnerships that invest primarily in energy related renewable infrastructure. There are no redemption terms for any of these partnerships. These investments are considered illiquid. During the life of the partnerships, distributions are received as underlying partnership investments are realized. The fair values of this investment type have been determined using estimates provided by the underlying partnerships and are at NAV.

Real assets: Real estate investments include 15 funds consisting of primarily trust funds and limited partnerships. The purpose of these funds is to acquire, own, invest in real estate and real estate related assets with the intention of achieving current income, capital appreciation or both. These investments are valued through independent appraisals and other unobservable methods. Approximately 26% of the investments are closed-end funds with structured investment periods, and are considered illiquid investments. All other funds have no redemption restrictions other than the restrictions noted above.

Absolute return: Direct hedge includes one limited partnership fund, which is winding down. No redemptions are available at this time. Proceeds will be distributed when liquidated.

Credit includes investments in seventeen limited partnership funds. Twelve of these funds are considered private credit investments which are closed-end funds and are considered illiquid investments. These investments represent approximately 56% of the value. The remaining five funds allow for redemption based on the terms noted above. The fair value of these investments has been determined using NAV per share of the investments.

Private equity includes primarily investments in limited partnership funds, managed by various different investment managers. Generally, the partnership strategies are to maximize the return by participating in private equity and equity-related investments through a diversified portfolio of venture capital, growth equity, buyouts, special situation partnerships and other limited liability vehicles. Investments in these partnerships are typically for 10-12 years and are considered illiquid. Redemptions are restricted over the life of the partnership. During the life of the partnerships, distributions are received as underlying partnership investments are realized. The fair values of this investment type have been determined using NAV per share of the System's ownership interest in partners' capital.

Risk mitigation includes eight limited partnership funds, which allow redemption with proper notification. The funds assist in diversifying the portfolio and protecting in an economic downturn of growth assets. The strategies are uncorrelated or negatively correlated to economic growth assets. The fair value of these investments has been determined using NAV per share.

NOTE 4 : Funding Policy - Pension Plan

Employer and employee/member pension plan contribution requirements are determined as a percentage of employer payrolls. In determining contributions, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. The projected total pensionable compensation for all OCERS' employers for the year ended December 31, 2019 was $1.8 billion. Employer contribution rates are determined using the entry age normal actuarial cost method based upon a level percentage of payroll. The employer contributions provide for both normal cost and an amount to amortize any unfunded or overfunded actuarial accrued liabilities. By definition, the normal cost is the annual contribution rate that, if paid annually from a member's first year of membership through the year of retirement, would accumulate to the amount necessary to fully fund the member's retirement benefit if all underlying assumptions are met. The actuarial valuation report as of December 31, 2016 established the contribution rates for the first six months of calendar year 2019 (second half of fiscal year 2018-2019), and the actuarial valuation report as of December 31, 2017 established the contribution rates for the last six months of calendar year 2019 (first half of fiscal year 2019-2020). For the year ended December 31, 2019, employer contribution rates ranged from 12.46% of payroll to 62.38% depending upon the benefit plan type. Employer pension contributions were $653.8 million for the year ended December 31, 2019 of which approximately $439.9 million and $88.0 million, net of prepayment discounts, were made by the County of Orange and the Orange County Fire Authority, respectively. Participating employers are required by Government Code sections 31453.5 and 31454 to contribute a percentage of covered salary to the Plan. The contribution requirements of participating active members and employers are established and may be amended by the OCERS' Board of Retirement. Participating employers may pay a portion of the participating active employees' contributions through negotiations and bargaining agreements. Employer contributions paid for by the employee through negotiated reverse pick-up arrangements are treated and reported as employee contributions. Employee contributions elected to be paid for by the employer under Section 31581.1 are treated and reported as employer contributions as these payments do not become part of the accumulated contributions of the employee and are immaterial. Employee contributions elected to be paid for by the employer under Section 31581.2 are treated and reported as employee contributions as these payments are credited to the employee account and become a part of their accumulated contributions.

Employee contributions are established by the OCERS' Board of Retirement and guided by state statute (Government Code sections 31621, 31621.5, 31621.8, 31639.25 and 31639.5) and vary based upon employee age at the time of entering OCERS membership. OCERS received $279.4 million in employee pension contributions for the year ended December 31, 2019. Average employee contribution rates for the year ended December 31, 2019 ranged between 9.61% and 17.15%.

NOTE 5 : Plan Reserves

Employer and employee contributions are deposited into various legally-required reserve accounts established on a book value basis. Set forth below are the descriptions of OCERS' various reserve accounts:

Pension Reserve

Pension reserve represents funding set aside for retirement payments derived from employer contributions. Additions include transfers from the employer contribution reserve and interest credited. Deductions include benefit payments made to retired members.

Employee Contribution Reserve

Employee contribution reserve represents the balance of member contributions. Additions include member contributions and interest credited. Deductions include member refunds and transfers to the annuity reserve fund retirement benefits.

Employer Contribution Reserve

Employer contribution reserve represents the balance of employer contributions for active member future retirement benefits. Additions include employer contributions. Deductions include transfers to the pension reserves in order to fund retirement benefits, disability benefits and death benefits.

Annuity Reserve

Annuity reserve represents funding set aside for retirement payments derived from contributions made by members. Additions include transfers from the employee contribution reserve and interest credited. Deductions include benefit payments made to retired members.

NOTE 5 : Plan Reserves (continued)

Contra Account

A positive balance in this account represents excess earnings. A credit balance in this account represents the amount of interest credited to the reserve accounts that has not been paid for out of current or excess earnings. Additions include net increases to the fiduciary net position, which are decreased by interest credited to the reserves account.

County Investment Account (POB Proceeds) Reserve

County investment account (POB Proceeds) reserve represents the remaining proceeds from the County of Orange's 1994 Pension Obligation Bond issuance. The remaining proceeds are utilized, in accordance with a long standing agreement between OCERS and the County of Orange, to offset a portion of the annual actuarially-determined contribution rates for the County of Orange. In 2019, none of the remaining proceeds were utilized to offset the actuarially determined contributions for the County of Orange.

OCSD UAAL Deferred Reserve

The Orange County Sanitation District (OCSD) UAAL Reserve represents the payment made by OCSD for its deferred UAAL. OCERS shall make annual transfers from the OCSD reserve account into the OCERS' employer contribution reserve account in the amount necessary to satisfy the actual UAAL attributed to OCSD. The intent of this transfer is to provide that the OCSD's future annual employer contribution obligation to OCERS shall consist of either the normal cost portion only, or the normal cost and amortizing installments of only such amount of future actual UAAL that exceeds to the amount of funds remaining in the OCSD reserve account.

Actuarial Deferred Return

The actuarial deferred return represents the balance of deferred earnings created by a five-year smoothing of actual gains and losses compared to the assumed investment rate of return.

Health Care Plan Reserves

Health care plan reserves represent assets held to pay medical benefits for eligible retirees of the 401(h) health care plans. Additions include employer contributions and investment earnings. Deductions include medical payments and administrative expenses.

OPEB 115 Plan Reserve

OPEB 115 plan reserve represents custodial assets held by OCERS in an investment capacity for the Orange County Transportation Authority (OCTA) health care plan. Additions include other postemployment benefit contributions and investment earnings. Deductions include other postemployment benefits and administrative expenses.

Total Plan Reserves

As of December 31, 2019
(Dollars in Thousands)

Valuation Reserves	
Pension Reserve	$ 9,885,751
Employee Contribution Reserve	3,421,183
Employer Contribution Reserve	2,803,809
Annuity Reserve	1,842,827
Contra Account	(1,916,648)
Non-Valuation Reserves	
County Investment Reserve	150,416
OCSD UAAL Deferred Reserve	12,088
Total Pension Fund Reserves (smoothed market actuarial value)	**16,199,426**
Actuarial Deferred Return	479,155
Net Position Restricted for Pensions including Non-Valuation Reserves	**16,678,581**
Health Care Reserves	411,782
OPEB 115 Plan Reserve	18,021
Net Position-Total Funds	**$ 17,108,384**

Notes to the Basic Financial Statements

NOTE 6 : Net Position Restatement

In accordance with the implementation of GASB Statement No. 84, *Fiduciary Activities*, the OPEB 115 Custodial Fund beginning net position restricted for pension, other postemployment benefits and OPEB 115 has been restated by $15.5 million to reclassify the due to employer balance to restricted net position. The effect of net position restricted for pension, other postemployment benefits and OPEB 115 is detailed below:

OPEB 115 Custodial Fund	(Dollars in Thousands)
Net Position Restricted for Pension, Other Postemployment Benefits and OPEB 115, Beginning of Year, as Previously Reported	$ -
To reclassify the amount previously reported as due to employer as restricted net position	15,496
Net Position Restricted for Pension, Other Postemployment Benefits and OPEB 115, Beginning of Year as Restated	**$ 15,496**

NOTE 7 : Administrative Expenses - Pension

As permitted by Government Code (Code) Section 31580.2, the Board of Retirement adopts an annual budget, financed from the System's assets, covering the entire expenses for the administration of OCERS. The Code provides that administrative expenses incurred in any year are to be charged against the earnings of the pension trust fund and are not to exceed twenty-one hundredths of one percent (0.21%) of OCERS' actuarial accrued liabilities, excluding investment related costs and expenditures for computer software, hardware and related technology consulting services. Administrative expenses incurred in calendar year 2019 were within the limits established by the Code. The following schedule represents the excess of the maximum allowed over actual administrative expenses for the year ended December 31, 2019.

Administrative Expense Compared to Projected Actuarial Accrued Liability

For the Year Ended December 31, 2019
(Dollars in Thousands)

Projected Actuarial Accrued Liability (AAL) as of 12/31/19	$	21,747,090
Maximum Allowed for Administrative Expense (AAL * 0.21%)		45,669
Actual Administrative Expense[1]		18,119
Excess of Allowed Over Actual Expense	**$**	**27,550**
Actual Administrative Expense as a Percentage of Projected Actuarial Accrued Liability as of 12/31/19		0.08%
[1] Administrative Expense Reconciliation		
Administrative Expense per Statement of Changes in Fiduciary Net Position	$	19,171
Less: Administrative Expense Not Considered per CERL Section 31596.1		(1,052)
Administrative Expense Allowable Under CERL Section 31580.2	**$**	**18,119**

NOTE 8 : Contingencies

At December 31, 2019, OCERS was involved in various litigation matters. In management's opinion, and after consultation with legal counsel, the outcome of these matters is not expected to have a material adverse effect on OCERS' financial position.

The net pension liability was measured as of December 31, 2019. The plan fiduciary net position was valued as of the measurement date while the total pension liability was determined based upon rolling forward the total pension liability from the actuarial valuation as of December 31, 2018. The components of the net pension liability as of December 31, 2019 are as follows:

Net Pension Liability

For the Year Ended December 31, 2019
(Dollars in Thousands)

Total Pension Liability	$	21,754,263
Less: Plan Fiduciary Net Position		(16,678,581)
Net Pension Liability	**$**	**5,075,682**
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability		**76.67%**

Actuarial Assumptions

Actuarial valuations involve estimates of the value of reported amounts and assumptions about the probability of events far into the future. Examples include future salary increases and investment earnings, expected retirement age, life expectancy and other relevant factors. Actuarially determined amounts are subject to continual revision as results are compared to past expectations and new estimates are made about the future. OCERS' independent actuary and Board of Retirement review the economic and demographic assumptions every three years and the actuarially determined contributions annually.

In preparing the actuarial valuation, the actuary has complied with the parameters set forth in GASB 67, and employed generally accepted actuarial methods and assumptions to measure the total pension liability of employers. The actuary's calculations are based upon member data and financial information provided by the System. Projection of benefits for financial reporting purposes is based on all benefits estimated to be payable through the System to current active, retired and inactive employees as a result of their past service and their expected future service.

The total pension liability as of December 31, 2019 was determined by the actuarial valuation as of December 31, 2018. The actuarial assumptions used were based on the results of an experience study for the period from January 1, 2014 through December 31, 2016 and they are the same assumptions used in the December 31, 2019 funding valuations for OCERS. In particular, the following actuarial assumptions were applied in the measurement:

Inflation	2.75%
Projected Salary Increases	General: 4.25% to 12.25% and Safety: 4.75% to 17.25%, vary by service, including inflation
Investment Rate of Return	7.00%, net of pension plan investment expense, including inflation
Mortality Rates	Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table as a starting point, projected generationally using the two-dimensional Scale MP-2016, with age adjustments, and adjusted separately for healthy and disabled for both general and safety members.
Other Assumptions	Actuarial experience study during the period of January 1, 2014 through December 31, 2016

Long-Term Expected Real Rate of Return

The long-term expected rate of return on pension plan investments was determined using a building-block method in which expected future real rates of return (expected returns, net of inflation) are developed for each major asset class. These returns are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage, adding expected inflation and subtracting expected investment expenses and a risk margin. The target allocation and projected arithmetic real rates of return for each major asset class, after deducting inflation but before deducting investment expenses are shown in the following table. This information was used in the derivation of the long-term expected investment rate of return assumption for the December 31, 2019 actuarial valuation. This information will change every three years based on the actuarial experience study.

Long-Term Expected Real Rate of Return
For the Year Ended December 31, 2019

Asset Class	Target Allocation	Long-Term Expected Arithmetic Real Rate of Return
Global Equity	35 %	6.38 %
Core Bonds	13 %	1.03 %
High Yield Bonds	4 %	3.52 %
Bank Loan	2 %	2.86 %
TIPS	4 %	0.96 %
Emerging Markets Debt	4 %	3.78 %
Real Estate	10 %	4.33 %
Core Infrastructure	2 %	5.48 %
Natural Resources	10 %	7.86 %
Risk Mitigation	5 %	4.66 %
Mezzanine / Distressed Debts	3 %	6.53 %
Private Equity	8 %	9.48 %
Total	100 %	

Discount Rate

The discount rate used to measure the total pension liability was 7.00% for the year ended December 31, 2019. The projection of cash flows used to determine the discount rate assumed plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the actuarially determined contribution rates. For this purpose, only employer contributions that are intended to fund benefits for current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs for future plan members and their beneficiaries, as well as projected contributions from future plan members, are not included. Based on those assumptions, the plan fiduciary net position was projected to be available to make all projected future benefit payments for 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 as of December 31, 2019.

Sensitivity of the Net Pension Liability to Changes in the Discount Rate

The following table represents the net pension liability as of December 31, 2019, of participating employers calculated using the discount rate of 7.00%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1.00% lower (6.00%) or 1.00% higher (8.00%) than the current rate:

Sensitivity of Net Pension Liability to Changes in the Discount Rate
As of December 31, 2019
(Dollars in Thousands)

1% Decrease (6.00%)	Current Discount Rate (7.00%)	1% Increase (8.00%)
$ 8,216,743	$5,075,682	$2,520,727

Notes to the Basic Financial Statements

NOTE 10 : Subsequent Event

In March 2020, the World Health Organization declared coronavirus COVID-19 a global pandemic. This contagious disease outbreak, which has continued to spread, and any related adverse public health developments, has adversely affected workforces, customers, economies, and financial markets globally, potentially leading to an economic downturn. On March 19, 2020, Governor Gavin Newsom issued a Stay at Home Order and OCERS has been diligently working to maintain normal operation remotely. There has been no significant disruption to the operation since the Stay at Home Order and OCERS' investment performance has been closely monitored. OCERS' investment strategy is to maintain a well-diversified portfolio in order to mitigate the risk of market uncertainty. The System is exposed to general and private market risk. In a pension plan context, this is the risk that the long-term rate of return earned on the pension plan assets could be below the actuarially assumed rate of return, which is 7.00%. Market risk could impact the financial condition of the System and the plan participant actuarial determined contributions. The System's actuarial valuations use a five year smoothing method for investment returns; any contribution rate impact from the capital markets depends in large measure on how deep the future market downturn is, how long it lasts, and how it fits within the fiscal year reporting periods. There has not been any significant decline in OCERS' investment portfolio. The fair value of the System's investments as of December 31, 2019 and March 31, 2020 (based on available information) were $16.9 billion and $15.5 billion, respectively. The fair value of the portfolio declined approximately -8.87% during the quarter ended March 31, 2020, (based on available information). Constructed to protect assets in down markets, the OCERS' investment portfolio ranked in the top 7% of peer U.S. pension plans and in the top 11% for the quarter and trailing one-year period ended March 31, 2020, respectively. OCERS' defensive positioning has propelled the System to a top quartile ranking amongst other U.S. pensions for the trailing three- and five-year periods ended March 31, 2020. Subsequent to March 31, 2020 and through the date of issuance, the global markets have recouped approximately 50% of early 2020 losses and the OCERS' portfolio has responded accordingly.

ORANGE COUNTY

OCERS

EMPLOYEES RETIREMENT SYSTEM

Section II

Financial

Pictured Left to Right:

Osman Aziz - *Program Manager, Violation Processing & Toll Compliance*
Tom Nguyen - *Facilities Maintenance Technician*
Stephanie Eddie - *Administrative Coordinator/Planner*
David Simpson - *Director, Government Relations*
Melissa Massey - *Communications Coordinator*

Required Supplementary Information

FACES OF THE TCA

**The Toll Roads Are More Than Just Roads...
Here Are Just a Few of the People That Make it Happen**

Schedule of Changes in Net Pension Liability of Participating Employers

For the Years Ended December 31, 2013 through 2019[1]
(Dollars in Thousands)

	2019	2018	2017	2016	2015	2014	2013
Total Pension Liability							
Service Cost	$ 499,256	$ 491,373	$ 452,412	$ 427,473	$ 439,454	$ 438,600	$ 444,838
Interest	1,452,644	1,379,917	1,305,268	1,241,080	1,197,308	1,153,352	1,109,002
Change of Benefit Terms	-	-	-	-	-	-	-
Differences Between Expected and Actual Experience	24,383	(118,124)	(66,964)	(323,566)	(205,463)	(327,402)	(295,483)
Changes of Assumptions	-	-	827,197	-	-	(127,729)	-
Benefit Payments, Including Refunds of Employee Contributions	(900,902)	(828,278)	(764,344)	(717,976)	(675,963)	(630,678)	(586,284)
Other	-	-	-	(509)[2]	-	-	-
Net Change in Total Pension Liability	1,075,381	924,888	1,753,569	626,502	755,336	506,143	672,073
Total Pension Liability - Beginning	20,678,882	19,753,994	18,000,425	17,373,923	16,618,587	16,112,444	15,440,371
Total Pension Liability - Ending (a)	**$ 21,754,263**	**$ 20,678,882**	**$ 19,753,994**	**$ 18,000,425**	**$ 17,373,923**	**$ 16,618,587**	**$ 16,112,444**
Plan Fiduciary Net Position							
Contributions - Employer[3]	$ 653,793	$ 580,905[5]	$ 572,104[4]	$ 567,196	$ 571,298	$ 625,520	$ 427,095
Contributions - Employee	279,373	270,070	262,294	258,297	249,271	232,656	209,301
Net Investment Income/(Loss)	2,183,808	(324,628)	1,939,635	1,061,243	(10,873)	499,195	1,152,647
Benefit Payments, Including Refunds of Employee Contributions	(900,902)	(828,278)	(764,344)	(717,976)	(675,963)	(630,678)	(586,284)
Administrative Expense	(19,171)	(18,284)	(17,002)	(16,870)	(12,521)	(11,905)	(11,705)
Net Change in Plan Fiduciary Net Position	2,196,901	(320,215)	1,992,687	1,151,890	121,212	714,788	1,191,054
Plan Fiduciary Net Position - Beginning	14,481,680	14,801,895	12,809,208	11,657,318	11,536,106	10,821,318	9,630,264
Plan Fiduciary Net Position - Ending (b)	16,678,581	14,481,680	14,801,895	12,809,208	11,657,318	11,536,106	10,821,318
Net Pension Liability (a) - (b) = (c)	**$ 5,075,682**	**$ 6,197,202**	**$ 4,952,099**	**$ 5,191,217**	**$ 5,716,605**	**$ 5,082,481**	**$ 5,291,126**
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability (b)/(a)	76.67%	70.03%	74.93%	71.16%	67.10%	69.42%	67.16%
Covered Payroll (d)[6]	$ 1,783,054	$ 1,718,798	$ 1,678,322	$ 1,602,675	$ 1,521,036	$ 1,513,206	$ 1,494,745
Plan Net Pension Liability as a Percentage of Covered Payroll (c)/(d)	284.66%	360.55%	295.06%	323.91%	375.84%	335.88%	353.98%

[1] Data for years prior to 2013 is not available. Information will be presented over ten years as it becomes available prospectively.

[2] Orange County Public Law Library was separated out from the Orange County Sanitation District in Rate Group #3 and put into their own Rate Group (Rate Group #12) after the valuation as of December 31, 2015. There was an adjustment to the UAAL for Rate Group #3 that was originally included in the December 31, 2015 valuation. There was a credit of $509 given to the Orange County Public Law Library to reflect that their future service enhancement did not increase the UAAL.

[3] Reduced by discount for prepaid contributions and transfers from County Investment Account.

[4] A $24,042 transfer from the Orange County Sanitation District Deferred UAAL Account which was required to offset a UAAL increase for the assumption changes has been excluded from this amount.

[5] A $14,589 transfer from the Orange County Sanitation District Deferred UAAL Account which was required to offset a UAAL increase for the actuarial losses as of December 31, 2018 has been excluded from this amount.

[6] Covered payroll represents payroll on which contributions to the pension plan are based.

Schedule of Investment Returns

For the Years Ended December 31, 2014 Through 2019[1]

Years Ended December 31	Annual Money Weighted Rate of Return, Net of Investment Expense
2014	4.64%
2015	-0.51%
2016	8.71%
2017	14.74%
2018	-1.31%
2019	14.81%

[1] Data for years prior to 2014 is not available. Information will be presented over ten years as it becomes available prospectively.

Schedule of Employer Contributions

For the Years Ended December 31, 2010 through 2019
(Dollars in Thousands)

Years Ended December 31	Actuarially Determined Contributions[1,2]	Actual Contributions[1,2]	Contribution Deficiency / (Excess)[3]	Covered Payroll	Contributions as a % of Covered Payroll
2010	$ 372,437	$ 372,437	$ -	$ 1,511,569	24.64%
2011	387,585	387,585	-	1,498,914	25.86%
2012	406,521	406,521	-	1,497,475	27.15%
2013	426,020	427,095[3]	(1,075)	1,494,745	28.57%
2014	476,320	625,520[3]	(149,200)	1,513,206	41.34%
2015	502,886	571,298[3]	(68,412)	1,521,036	37.56%
2016	521,447	567,196[3]	(45,749)	1,602,675	35.40%
2017	536,726[4]	572,104[3,4]	(35,378)	1,678,322	34.09%
2018	556,728[5]	580,905[3,5]	(24,177)	1,718,798	33.80%
2019	583,057	653,793[3]	(70,733)	1,783,054	36.67%

[1] Excludes employer pickup of member contributions and transfers from County Investment Account (funded by pension obligation proceeds held by OCERS). Those transfers are as follows:

2010	$11,000
2011	11,000
2012	5,500
2013	5,000
2014	5,000

[2] Reduced by discount for prepaid contributions

[3] Includes additional contributions made by employers towards the reduction of their UAAL.

[4] A $24,042 transfer from the Orange County Sanitation District Deferred UAAL Account, which was required to offset a UAAL increase for the assumption changes has been excluded from both these amounts.

[5] A $14,589 transfer from the Orange County Sanitation District Deferred UAAL Account which was required to offset a UAAL increase for the actuarial losses as of December 31, 2018 has been excluded from both of these amounts.

Actuarial Valuation Methods and Assumptions

The actuarial determined contribution rates in the schedule of employer contributions are calculated as of December 31. Rates are effective eighteen months after the valuation date for the fiscal year that begins July 1. The following actuarial methods and assumptions were used to calculate the actuarially determined contributions for the year ended December 31, 2019:

Valuation Date	Actuarially determined contribution rates for the first six months of calendar year 2019 or the second half of fiscal year 2018-2019 are calculated based on the December 31, 2016 valuation. Actuarially determined contribution rates for the last six months of calendar year 2019 or the first half of fiscal year 2019-2020 are calculated based on the December 31, 2017 valuation.
Actuarial Cost Method	Entry Age Actuarial Cost Method
Amortization Method	Level percent of payroll for total unfunded actuarial accrued liability
Remaining Amortization Period	Effective December 31, 2013, the outstanding balance of the UAAL from the December 31, 2012 valuation was combined and re-amortized over a declining 20-year period. Any changes in UAAL due to actuarial gains or losses or due to changes in assumptions or methods will be amortized over separate 20-year periods. Any changes in UAAL due to plan amendments will be amortized over separate 15-year periods and any change in UAAL due to early retirement incentive programs will be amortized over a separate period of up to 5 years.
Asset Valuation Method	The Actuarial Value of Assets is determined by recognizing any difference between the actual and the expected market return over a five-year period. The Valuation Value of Assets is the Actuarial Value of Assets reduced by the value of the non-valuation reserves.

Actuarial Assumptions:	
December 31, 2016 Valuation	
Investment Rate of Return	7.25% net of pension plan investment expense, including inflation
Inflation Rate	3.00%
Real Across-the-Board Salary Increase	0.50%
Projected Salary Increases	General: 4.25% to 13.50% and Safety: 5.00% to 17.50%, vary by service, including inflation
Cost of Living Adjustments	3.00% of retirement income
Other Assumptions	Same as those used in the December 31, 2016 funding actuarial valuation
December 31, 2017 Valuation	
Investment Rate of Return	7.00% net of pension plan investment expense, including inflation
Inflation Rate	2.75%
Real Across-the-Board Salary Increase	0.50%
Projected Salary Increases	General: 4.25% to 12.25% and Safety: 4.75% to 17.25%, vary by service, including inflation
Cost of Living Adjustments	2.75% of retirement income
Other Assumptions	Same as those used in the December 31, 2017 funding actuarial valuation

Significant Factors Affecting Trends in Actuarial Information – Pension Plan

Changes in Benefit Terms

2016 • New employees hired by the City of San Juan Capistrano on and after July 1, 2016 will be offered a choice in retirement plan formulas; the PEPRA Plan U (2.5% at 67 PEPRA – General) or the alternate plan formula, Plan W (1.62% at 65 PEPRA – General).

• Orange County Public Law Library was moved from Rate Group #3 into its own rate group, Rate Group #12.

2012 • With the exception of OCTA, members with membership date on or after January 1, 2013 will be placed in PEPRA tiers: Plan T (1.62% at 65 PEPRA – General); Plan U (2.5% at 67 PEPRA – General); or Plan V (2.7% at 57 PEPRA – Safety).

2011 • Effective April 20, 2012, certain employees previously employed at the City of Santa Ana became employees of OCFA General and OCFA Safety and are eligible for benefits under Plan N (2 % at 55) and Plan F (3% at 50), respectively.

• Effective July 1, 2012, new General employees hired by the City of San Juan Capistrano will be covered under General Plan S (2% at 57).

2010 • LAFCO adopted an optional 1.62% of final average salary at age 65 for members hired on or after July 1, 2010.

• County Managers unit adopted an optional 1.62% of final average salary at age 65 for members hired on or after August 17, 2010.

• Sanitation District adopted a 1.64% of final average salary at age 57 for members within Supervisors and Professional unit hired on or after October 1, 2010.

• OCFA adopted a 3.00% of final average salary at age 55 for Safety members within the Executive Management unit hired on or after July 1, 2011 and for all Safety members hired on or after July 1, 2012.

• OCFA adopted a 2.00% of final average salary at age 55 for General members hired on or after July 1, 2011.

Significant Factors Affecting Trends in Actuarial Information – Pension Plan

(continued)

Changes in Assumptions

2017 • The assumed rate of return was decreased from 7.25% to 7.00%.

• The inflation rate was decreased from 3.00% to 2.75%.

• Projected salary increases for general members of 4.25% to 13.50% changed to 4.25% to 12.25% and safety members changed from 5.00% to 17.50% to 4.75% to 17.25%.

• Mortality rate tables changed to a Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally using two-dimensional MP-2016 scale, adjusted separately for healthy and disabled for both general and safety members.

• Impact due to assumption changes to be phased-in over three years.

2014 • The inflation rate was reduced from 3.25% to 3.00%

• Total wage inflation and payroll growth was reduced from 3.75% to 3.50%.

• Inclusion of additional cash-out assumptions in developing basic member contribution rates in the legacy plans.

• Mortality rates for after service retirement were changed to reflect longer life expectancies for Safety members and shorter life expectancies for General members and longer life expectancies for both General and Safety members for after disability retirement. The cost impact to employer to be phased in over three years.

2013 • The outstanding balance of the December 31, 2012 UAAL was combined and re-amortized over a 20-year period.

2012 • The investment rate of return was decreased from 7.75% to 7.25%.

• The inflation rate was decreased from 3.50% to 3.25%.

• Projected salary increases for general members of 4.50% to 11.50% changed to 4.75% to 13.75% and safety members changed from 4.50% to 13.50% to 4.75% to 17.75%.

2011 • Changes in mortality, disability, termination, retirement, salary scale, and annual pay-off assumptions in the December 31, 2010 triennial experience study increased the pension plan UAAL by $364 million.

ORANGE COUNTY

OCERS

EMPLOYEES RETIREMENT SYSTEM

Section II

Financial

Other Supplementary Information

FasTrak

FasTrak Makes Paying Your Toll Easy and Stress-free...
Routes 73, 133, 241, 261

Schedule of Contributions

For the Year Ended December 31, 2019
(Dollars in Thousands)

	Employee	Employer
Pension Trust Fund Contributions		
County of Orange	$ 215,481	$ 458,721
Orange County Fire Authority	25,522	89,510[1]
Orange County Sanitation District	7,999	46,056[2]
Orange County Superior Court of California	17,187	31,424
Orange County Transportation Authority	9,822	26,415
Transportation Corridor Agencies	748	14,063[3]
UCI Medical Center & Campus	-	2,789[4]
Orange County Employees Retirement System	1,090	2,503
City of San Juan Capistrano	842	2,444
Orange County Mosquito & Vector Control District	-	878[5]
Orange County Department of Education	-	267[4]
Orange County In-Home Supportive Services Public Authority	122	188
Orange County Cemetery District	153	187
Orange County Local Agency Formation Commission	45	150
Orange County Children & Families Commission	203	129
Orange County Public Law Library	159	118
Contributions Before Prepaid Discount	279,373	675,842
Prepaid Employer Contribution Discount	-	(22,049)
Total Pension Trust Fund Contributions	**279,373**	**653,793**
Health Care Fund - County Contributions	**-**	**54,788**
Health Care Fund - OCFA Contributions	**-**	**2,111**
OPEB 115 Custodial Fund Postemployment Contributions	**-**	**613**
Total Contributions	**$ 279,373**	**$ 711,305**

[1] Unfunded actuarial accrued liability payments were made for $19.0 million by the Orange County Fire Authority.
[2] Unfunded actuarial accrued liability payments were made for $38.0 million by the Orange County Sanitation District which includes $29.9 million for the deferred UAAL account.
[3] Unfunded actuarial accrued liability payments were made for $12.8 million by the Transportation Corridor Agencies.
[4] Unfunded actuarial accrued liability payments have been made in accordance with a separate 20-year level dollar payment schedule to include liabilities for employee benefits related to past service credit.
[5] Unfunded actuarial accrued liability payments were made for $0.9 million by the Orange County Mosquito & Vector Control District.

Schedule of Administrative Expenses

For the Year Ended December 31, 2019
(Dollars in Thousands)

Pension Trust Fund Administrative Expenses		
Expenses Subject to the Statutory Limit		
Personnel Services		
Employee Salaries and Benefits	$	11,660
Board Members' Allowance		16
Total Personnel Services		11,676
Office Operating Expenses		
Depreciation/Amortization		2,534
Professional Services		1,811
General Office and Administrative Expenses		1,488
Rent/Leased Real Property		610
Total Office Operating Expenses		6,443
Total Expenses Subject to the Statutory Limit		18,119
Expenses Not Subject to the Statutory Limit		
Information Technology Professional Services		533
Actuarial Fees		236
Equipment / Software		176
Information Security Professional Services		107
Total Expenses Not Subject to the Statutory Limit		1,052
Total Pension Trust Fund Administrative Expenses		**19,171**
Health Care Fund - County Administrative Expenses		**20**
Health Care Fund - OCFA Administrative Expenses		**21**
OPEB 115 Custodial Fund - Administrative Expenses		**20**
Total Administrative Expenses	**$**	**19,232**

Schedule of Investment Expenses

For the Year Ended December 31, 2019
(Dollars in Thousands)

Investment Management Fees*	
Global Public Equity	
U.S. Equity	$ 2,360
International Equity	5,066
Emerging Markets Equity	7,007
Total Global Public Equity	14,433
Core Fixed Income	
U.S. Fixed Income	2,535
Total Core Fixed Income	2,535
Credit	
High Yield	1,770
Emerging Markets Debt	2,316
Direct Lending	2,782
Multi-Strategy	5,067
Non-U.S. Direct Lending	2,276
Total Credit	14,211
Real Assets	
Real Estate	11,181
Real Return	
Timber	780
Agriculture	1,242
Infrastructure	2,982
Energy	12,626
Total Real Return	17,630
Total Real Assets	28,811
Absolute Return	
Direct Hedge Fund	129
Total Absolute Return	129
Private Equity	17,825
Risk Mitigation	8,226
Short-Term Investments	366
Total Investment Management Fees	**86,536**
Other Fund Expenses[1]	**17,249**
Other Investment Expenses	
Consulting/Research Fees	1,877
Investment Department Expenses	2,158
Legal Services	520
Custodian Services	580
Investment Service Providers	19
Total Other Investment Expenses	**5,154**
Security Lending Activity	
Security Lending Fees	281
Rebate Fees	6,256
Total Security Lending Activity	**6,537**
Total Investment Expenses	**$ 115,476**

* Does not include undisclosed fees deducted at source.

[1] These costs include, but are not limited to, foreign income tax and other indirect flow-through investment expenses such as organizational expenses in limited partnership structures.

Schedule of Payments for Professional Services

For the Year Ended December 31, 2019
(Dollars in Thousands)

Type of Services*		
Professional Expenses Subject to the Statutory Limit		
Legal Counsel	$	380
Information Technology Services		354
Medical/Disability Services		305
Other Consulting/Services		278
Other Legal Services		198
Administrative Services		123
Audit Services		122
Finance Services		51
Total Professional Expenses Subject to the Statutory Limit		**1,811**
Professional Expenses Not Subject to the Statutory Limit		
Consulting/Research Fees		1,877
Custodian Services		580
Information Technology Consultants		533
Investment Legal Services		520
Actuarial Services		236
Information Security Consultants		107
Investment Service Providers		19
Total Professional Expenses Not Subject to the Statutory Limit		**3,872**
Total Payments for Professional Expenses	**$**	**5,683**

* Detail for fees paid to investment professionals is presented in the Investment Section.

Section III

Investments

SENIOR MOBILITY

County of Orange and Orange County Transportation Authority (OCTA) – Senior Mobility Programs

Orange County's Office on Aging provides transportation to older adults who are in need of low cost transportation to and from medical appointments, dentists, therapies, exercise programs, testing and other health related trips through the Senior Non-Emergency Medical Transportation (SNEMT) Program.

Orange County Transportation Authority also offers ACCESS, a shared-ride service for people unable to use the regular, fixed-route bus service due to functional limitations caused by a disability. OCTA has a formal certification process that follows ADA guidelines. And finally, the Senior Mobility Program provides services to fill gaps between local fixed route buses and ADA paratransit or ACCESS service. Participating cities in South County include Laguna Niguel, Laguna Woods, Lake Forest, Rancho Santa Margarita, and San Juan Capistrano.

MEKETA
INVESTMENT GROUP

5796 Armada Drive
Suite 110
Carlsbad, CA 92008

760.795.3450
Meketa.com

MEMORANDUM

TO: Board Members, Orange County Employees Retirement System

FROM: Stephen McCourt, Allan Emkin, Laura Wirick, Stephanie Sorg, Meketa Investment Group

DATE: May 5, 2020

RE: Investment Consultant's Statement for 2019 CAFR

This letter reviews the investment performance of the Orange County Employees Retirement System (OCERS) portfolio for the fiscal year ending December 31, 2019.

OCERS' stated mission is to provide secure retirement and disability benefits with the highest standards of excellence. To this end, OCERS strives to align the portfolio's asset allocation, investments, and other related decisions with the goals of the overall System. This alignment is a fundamental part of the Investment Committee's regular meetings, where performance is examined (both on an overall portfolio basis and at the manager level), asset allocation is reviewed and modified to fit changes in expected return, strategic and tactical decisions are discussed, and the System's liabilities are reviewed. Meketa Investment Group, OCERS' general consultant, works to provide guidance to the Board (the System's fiduciary), and assist the Board with performance evaluation, asset allocation, manager selection, and other industry best practices.

State Street Bank and Trust Company, OCERS' custodian, independently prepared the performance data used in this report. Rates of return are represented using a time-weighted rate of return methodology based upon market values.

2019 Calendar Year in Review

Following a volatile fourth quarter of 2018 that saw most major markets deliver negative returns, 2019 saw sharply positive returns across most major asset classes, with riskier assets generating particularly strong results. The Federal Reserve began 2019 with an abrupt "dovish pivot" toward a more accommodative monetary policy stance, after a gradual tightening of monetary policy in 2018 and tighter liquidity conditions helped catalyze the aforementioned Q4 2018 selloff. Outside of the US, major central banks affirmed similar accommodative policy stances in 2019. This pivot set the stage for strong performance in global equities and other risk assets. Monetary accommodation persisted throughout 2019.

Prompted by ongoing concerns regarding slower global growth and the trade standoff between the US and China, the Federal Reserve cut rates by 0.25% three times over the course of the year (August, September, and October) to settle at a range of 1.50-1.75% by year-end. Meanwhile, the European Central Bank (ECB) held rates steady with the main deposit rate at -0.50% and the marginal lending

BOSTON CHICAGO LONDON MIAMI NEW YORK PORTLAND SAN DIEGO

May 5, 2020

facility rate at 0.25%, noting a potential for further reductions. The Bank of Japan showed no signs of pulling back from its unprecedented monetary stimulus, keeping bank deposit rates negative (-0.10%) and continuing to target a 0.0% target yield on the 10-year government bond. Of these three major developed markets central banks, only the US had room to lower rates from positive territory toward zero, while Japan and Europe were already in negative territory.

Despite this broadly accommodative stance, growth revisions for global GDP growth in 2019 and 2020 tended to be negative (the IMF forecasts growth of 2.9% and 3.3% for the two years, respectively). Going forward, uncertainty regarding the path of fiscal and monetary policies, elevated valuations, declining growth in China and a general slowdown in growth across major global economies, the potential for additional trade issues, political uncertainty in Europe (Italy, Greece, Brexit) should be carefully monitored.

Global equities rebounded significantly from last year's December lows to close out the 2019 calendar year with strong positive results. Most global equity markets embraced a "risk on" appetite. The VIX Index, which had seen a jump in Q4 2018 above 30.0, remained low for much of the year, despite a spike in August after the yield curve briefly inverted. The VIX closed out the year at a relatively benign level of 14.0.

US equities, as represented by the Russell 3000 Index, finished the year with a 31.0% return. Emerging markets (MSCI Emerging Markets Index) delivered 18.4% for the year; the index was up 11.8% in the fourth quarter following an apparent trade resolution agreement between China and the US. The MSCI EAFE Index, representing foreign developed markets, returned 22.0%. While major EAFE countries faced declining GDP growth outlooks, uncertainties related to Brexit, and elevated trade tensions during the year, markets in these regions proved to be resilient.

In the US, the recent trend of growth stocks outperforming value stocks persisted during 2019. In 2019, growth stocks outperformed value stocks by 9.6%. The Russell 3000 Growth Index closed out the year with a 35.9% return, versus 26.3% for the Russell 3000 Value Index.

As central banks abruptly shifted to a more accommodative policy stance by early January 2019, fixed income markets also rallied alongside equities. The expectation of continued accommodative policy, benign inflation, and incrementally lower global growth expectations were significant tailwinds. In addition, trade concerns provided support for bond prices. Over the calendar year, the broad US bond market, as measured by the Bloomberg Barclays Aggregate Index, returned 8.7% for the year, high yield bonds returned 14.3% and TIPS returned 8.4%. Local currency emerging market bonds (as represented by the JPM GBI-EM Global Diversified Index) posted a 13.5% return for the calendar year.

Despite strong returns, the deterioration of trade talks between the US and China in May prompted a temporary drop in global equity prices and U.S. Treasury yields. The 3 month – 10 year segment of the yield curve inverted for the second time in 2019, leading investors to question the economic outlook. Historically, the shape of the yield curve has been viewed as a barometer of economic strength and as

M

May 5, 2020

a potential recession indicator. Inversions in the yield curve (long term bond interest rates falling below short term bond interest rates) have preceded recessions in most previous instances in the US, with few exceptions.

Within other asset classes, natural resource stocks (S&P Global Natural Resources Index) returned 17.2%, commodities (Bloomberg Commodity Index) returned 7.7%, and REITs (MSCI U.S. REIT Index) gained 25.8%. WTI crude oil settled at $61.10/barrel, well above the December 2018 value of $45.15. OPEC-led production cuts, along with sanctions on Iran and Venezuela, supported prices. However, these production cuts had only a moderate positive impact on oil prices as market participants' economic growth and oil demand expectations were both revised downward.

2020 Outlook

As we moved toward 2020, there were a number of issues that we believed merited close monitoring: a slowdown in global growth, elevated valuations, the potential for ongoing trade conflicts, the duration of the current growth cycle, weaker growth in China, and political risk in Europe. However, in early 2020, the COVID-19 ("coronavirus") global pandemic and oil price collapse caused significant market volatility, and dominated other market concerns.

On March 11, the World Health Organization officially designated the coronavirus a pandemic. Much of the world subsequently took aggressive action to contain the spread, including closing schools and businesses, canceling community events, and mandating remote work for non-essential employees.

In terms of the monetary response, central banks have taken a variety of measures, including policy rate cuts and increases in short and longer-dated liquidity programs and provisions, as well as forward guidance that policy will remain accommodative over the near-term. On the fiscal side, efforts have broadly taken the form of allocating government funds to deploy as the needs become evident, including increased unemployment aid and forgivable loans to impacted businesses.

In March 2020, we saw two of the largest single day losses across equity markets, and the largest losses since 1987. Citing the Coronavirus and the potential adverse effects on economic activity, the Federal Open Market Committee lowered policy rates to the zero bound of 0% to 0.25% on March 15.

Regarding oil prices, in April 2020, there was an unprecedented drop in the West Texas Intermediate ("WTI") oil price amid fears of available storage in the United States. Prices for WTI oil opened at $18 per barrel and crossed into negative territory for the first time in history reaching as low as -$36 per barrel. This was a decline of over 300% and basically meant that producers have to pay in order to offload their oil supply for front-month May 2020 delivery. The initial decline in oil prices starting in February 2020 was the result of demand destruction from the COVID-19 crisis and surplus supply from Organization of the Petroleum Exporting Countries ("OPEC") and Russia (collectively "OPEC+") production increases. In response to cratering demand and over supply, OPEC+ agreed to a historic cut of almost 10 million barrels of oil equivalent per day. Those cuts did little to curtail the decreasing available storage as supply continued to out produce demand.

May 5, 2020

The third factor in determining oil prices is market sentiment toward oil futures contracts that are settled with the physical delivery of oil. The decline happened as May 2020 futures contacts were set to expire, and buyers did not want to take delivery of the oil due to lack of demand and storage. This resulted in oil traders selling futures to avoid taking physical delivery and sending the May contacts into negative territory. As a result, producers had to pay counterparties to take delivery of May oil production. Oil needs to be delivered to Cushing, Oklahoma where approximately 91 million barrels of storage capacity is housed and where official transfer of title accompanying the actual physical movement of oil occurs. With growing concern of Cushing reaching capacity, there was an unwillingness of buyers to take delivery. Referencing Brent prices, the international pricing benchmark in the North Sea, prices were $27 per barrel where storage capacity is still available.

Going forward, we are likely to see additional declines in US production with oil-producing wells being shut-in, which means the well spigot is close, production is ceased, and hydrocarbons are left in the ground. This is active intervention, in addition to the natural declines from well production, which is exponential for shale production. If shut-ins occur, there will be further volume and supply decreases.

Meketa Investment Group continues to monitor the impact the COVID-19 virus is having on the capital markets and global economy, as well as the oil price situation. We will continue to monitor these issues and others, as they arise.

OCERS 2019 Performance

OCERS' portfolio returned 14.4% in 2019, performing in line with the Policy Index, and outperforming the System's 7.0% required actuarial rate of return by double. US Equity had the strongest absolute performance of all asset classes, returning 30.0%, while the Real Return asset class had the weakest 2019 performance of -3.4% (the asset class outperformed its Real Return Custom Index[1], which returned -4.6% over the same period).

Over the trailing three- and five-year periods, the OCERS portfolio returned 8.8% and 6.9% on average annually, compared to the Policy Index returns of 9.1% and 7.4%, respectively. For the trailing three years, OCERS was in the 56th percentile compared to peers[2], and over the trailing five years, OCERS was in the 44th percentile compared to peers.

If you have any questions, please contact us at (760) 795-3450.

SPM/LBW/SBS/jls

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[1] 62.5% Cambridge Associates PE Energy (1Qtr Lag) / 37.5% NCREIF Timberland.

[2] Based on InvestorForce peer rankings: Defined Benefit Public Funds over $1 billion in assets.

Investment Returns

The table below details the annualized rates of return for the different asset categories over various time periods ended December 31, 2019. The returns for each asset class represent the composite returns of all the manager portfolios within the asset class. All returns are net of fees, which is a change from the reporting in prior years when only indirect or at source fees were deducted from the returns being presented. The method of computation of investment returns is time-weighted approximation.

	1 Year	3 Year	5 Year
Global Public Equity (%)	26.85	12.64	8.67
MSCI ACWI IMI (1) (%)	26.35	12.37	8.37
Private Equity (%)	10.93	14.00	12.44
Cambridge Private Equity Lagged	7.76	14.55	11.68
Core Fixed Income (%)	8.81	4.48	3.36
Fixed Income Custom Index (2) (%)	8.77	3.94	3.00
Credit (%)	6.76	5.43	5.76
Credit Custom Index (3) (%)	11.78	5.27	5.26
Real Assets (%)	1.94	N/A	N/A
Real Assets Custom Index (4) (%)	-0.24	N/A	N/A
Real Return (%)	-3.41	0.38	0.84
Real Return Custom Index (5) (%)	-4.60	4.91	5.77
Real Estate (%)	6.76	7.61	10.30
Real Estate Custom Index (6) (%)	5.34	7.09	8.47
Risk Mitigation (%)	8.78	N/A	N/A
Risk Mitigation Custom Index (7) (%)	9.33	N/A	N/A
Short Term Investments (%)	2.48	1.94	1.33
Cash Overlay (%)	14.92	6.78	5.18
91-day Treasury Bill (%)	2.28	1.67	1.07
Total Fund (%)	**14.41**	**8.81**	**6.91**
Composite Policy Benchmark (8) (%)	**14.51**	**9.06**	**7.44**

(1) 100% MSCI AC World Net USD Index through 12/31/2018, and 100% MSCI ACWI IMI Net Index thereafter

(2) Fixed Income Custom Index = 100% Bloomberg Barclays Capital Universal Index through 12/31/2017, and 60% Bloomberg Barclays U.S. Aggregate Index + 20% Bloomberg Barclays U.S. Universal Index + 20% Bloomberg Barclays U.S. TIPS Index thereafter

(3) Credit Custom Index = 50% Merrill Lynch High Yiled Constrained Index + 50% Credit Suisse Levered Loan Index through 12/31/2017, 40% Bloomberg Barclays U.S. High Yield Index + 40% Credit Suisse Levered Loan Index + 13% JPMorgan GBI-EM Global Diversified Un-hedged Index + 7% JPMorgan EM Bond Index through 6/30/2019, and 40% Bloomberg Barclays U.S. High Yield Index + 40% Credit Suisse Levered Loan Index + 10% JPMorgan GBI-EM Global Diversified Un-hedged Index + 10% JPMorgan EM Bond Index thereafter

(4) Real Assets Custom Index = 45% NCREIF ODCE Index/ 36% Cambridge Private Equity Energy Lagged/ 13% Cambridge Infrastructure Index L/ 6% NCREIF Farmland Index

(5) Real Return Custom Index = CPI + 5% through 6/30/14, CPI + 3% through 6/30/16, and 10% NCREIF Farmland Index + 25% S&P GSCI Index + 15% NCREIF Timberland Index + 50% Cambridge Private Equity Energy Lagged thereafter

(6) Real Estate Custom Index = 90% NCREIF ODCE Index + 10% FTSE EPRA/NAREIT Developed Real Estate Ex-U.S. Index through 12/31/2016, and 100% NCREIF ODCE Index thereafter

(7) Risk Mitigation Custom Index = 50% HFRI MACRO: Systematic Diversified CTA + 50% Bloomberg Barclays Long Term U.S. Treasury Index through 9/30/2019, and 33.33% Bloomberg Barclays Long Term U.S. Treasury Index + 33.33% HFRI MACRO: Systematic Diversified CTA + 33.33% SG Trend Index thereafter

(8) Policy Benchmark = 39.95% MSCI ACWI IMI Index + 10.17% Cambridge Private Equity 1-Quarter Lag Index + 16.41% Fixed Income Custom Index[2] + 10.26% Credit Custom Index[3] + 13.19% Real Assets Custom Index[4] + 10.03% Risk Mitigation Custom Index[7]
As of January 1, 2018, OCERS' Policy Benchmark changed from being policy target weighted to being weighted based on the monthly actual asset class weights.

N/A - Represents new investment category and custom index in 2017; data not available.

Statement of Investment Objectives and Policies

General

The primary goal of the Orange County Employees Retirement System's investment program is to provide Plan participants with retirement benefits as required by the County Employees Retirement Law of 1937. This goal is accomplished through Employers' and Plan participants' contributions and the implementation of a carefully planned and monitored long-term investment program. The Board of Retirement (with the participation of the Investment Committee, staff and advisors) has exclusive control of all investments of the Plan and is responsible for the establishment of investment objectives, strategies and policies.

The Board of Retirement is authorized to invest in any form or type of investment deemed prudent in the informed opinion of the Board. The Investment Committee has adopted an Investment Policy Statement that provides a frame work for the management of OCERS' investments. This purpose of the Investment Policy Statement is to assist the Investment Committee in effectively supervising, monitoring, and evaluating the investment of the system's assets.

Investment Objectives

OCERS' goal is to meet the promised retirement benefits due its members. OCERS invests the assets of the system solely for the benefit of plan participants and beneficiaries while minimizing employer contributions and investment and administration costs. The long-term performance objective for the portfolio is to exceed the actuarially assumed rate of return net of fees and expenses, with a secondary objective of exceeding the return on an appropriate designated benchmark over a complete economic cycle and relevant longer periods, also net of fees and expenses.

Strategic Asset Allocation Policy and Maintenance

A pension fund's strategic asset allocation policy, implemented in a consistent and timely manner, is generally recognized to have the most impact on a fund's investment performance. The asset allocation policy determines a fund's optimal long-term asset class mix (target allocation). This policy is expected to achieve a specific set of investment goals, such as risk and return objectives. The policy also establishes ranges around the targeted levels which assets levels are permitted to fluctuate. Fluctuations outside the permitted range act as triggers for reallocating assets to ensure adherence to targeted weights.

Program Administration and Manager Structure

For each major asset class, the System shall diversify assets by employing managers with demonstrated skill in their particular areas of expertise. The System will retain managers who utilize varied investment approaches and allocate assets in a manner that is consistent with the overall investment plan. For example, the sum of all domestic equity managers should exhibit characteristics that are similar, but not necessarily identical, to the overall equity market. When asset fluctuation causes the asset class to exhibit characteristics that are dissimilar from the plan, staff shall direct cash flows to or from the various managers so that actual characteristics are consistent with the plan.

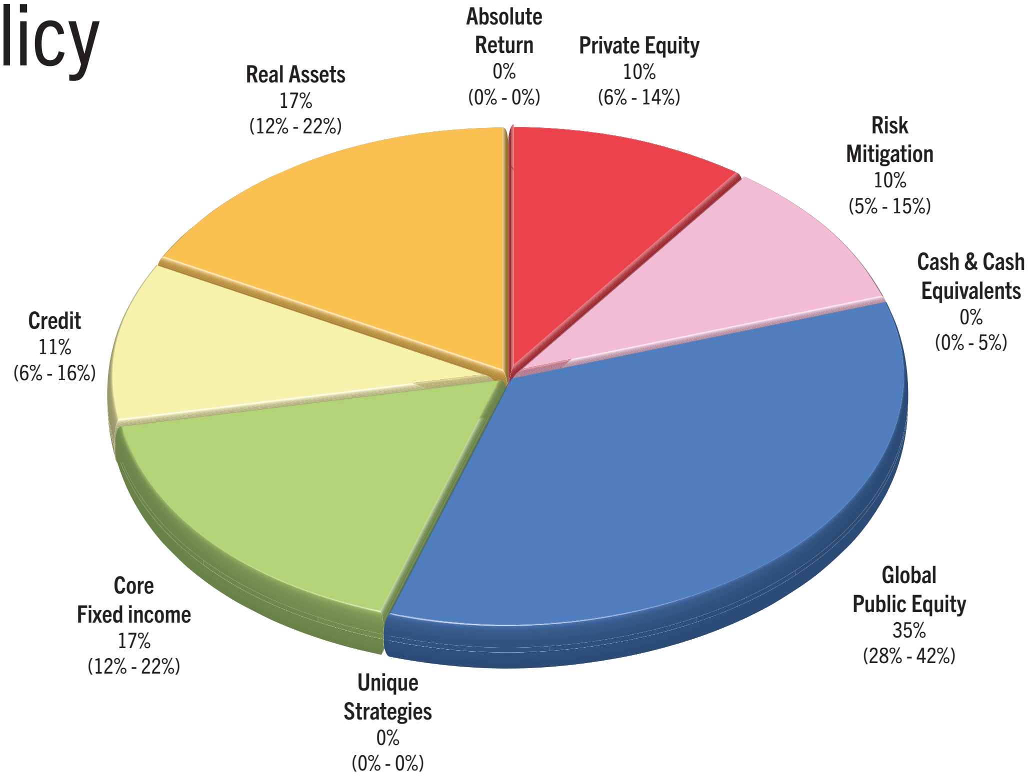
Use of Proxies

OCERS utilizes the services of Institutional Shareholder Services (ISS) to vote public equity proxies on OCERS' behalf. ISS is solely responsible for voting all proxies for securities, consistent with the ISS Benchmark Policy, as approved by the Investment Committee. If the ISS Benchmark Policy does not contain recommended voting guidelines for the subject of the proxy vote, ISS will contact OCERS for guidance prior to casting the vote to ensure proxy votes are in accordance with OCERS' guidelines to protect and enhance returns on behalf of plan participants.

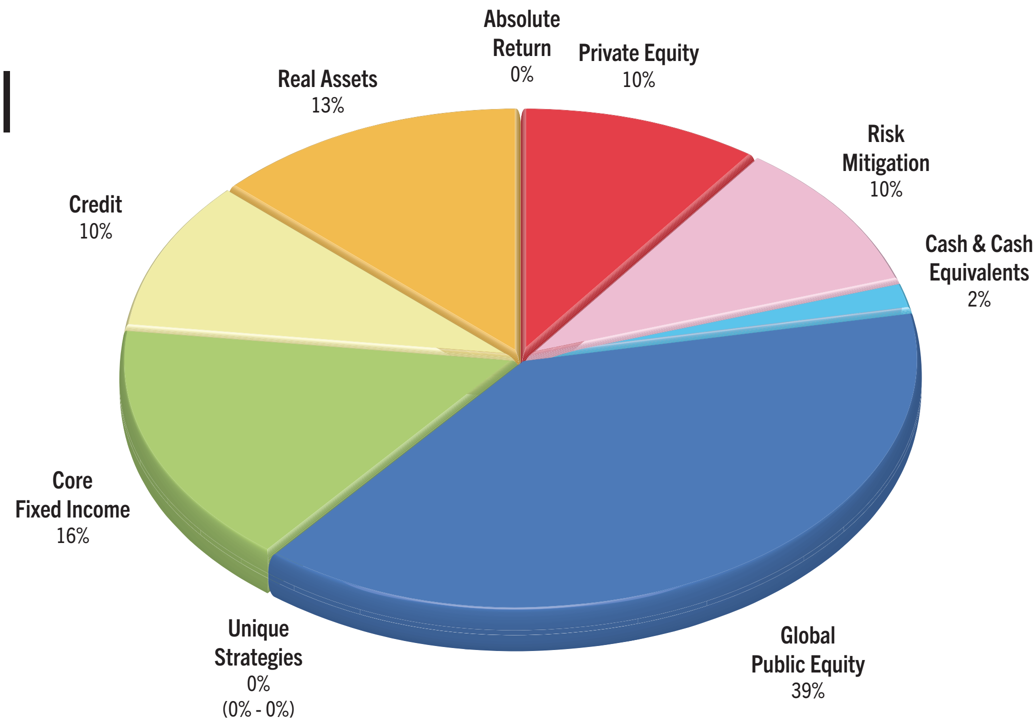
Asset Diversification

December 31, 2019

Policy

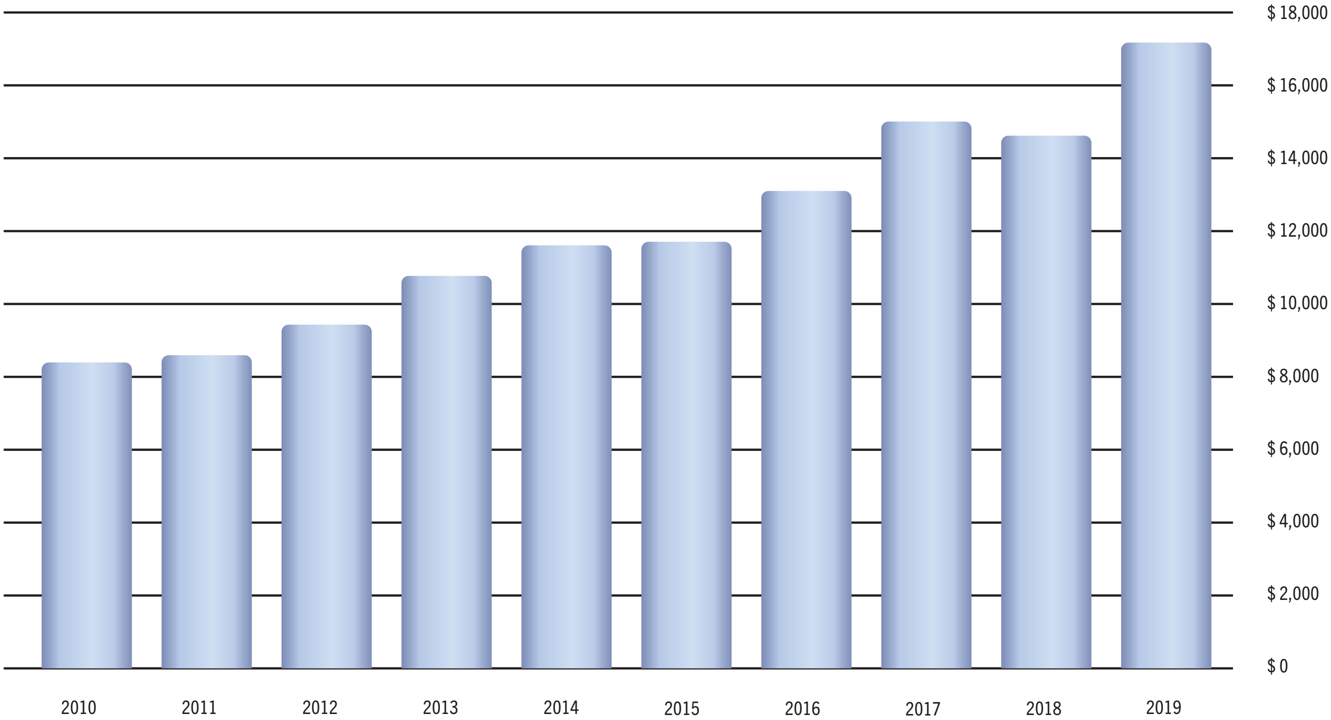


Actual



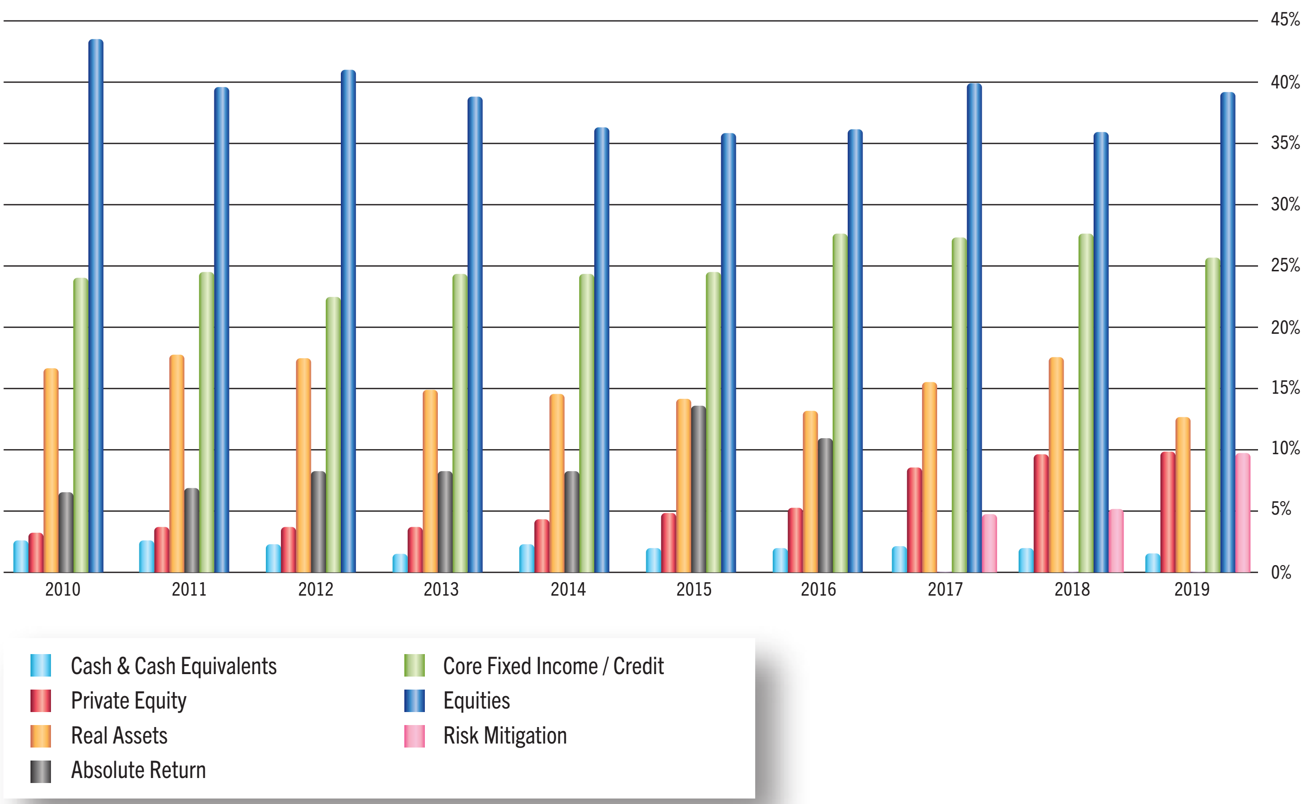
Growth of System Net Investments at Fair Value

For the Ten Years Ended December 31, 2019
(in Millions of Dollars)



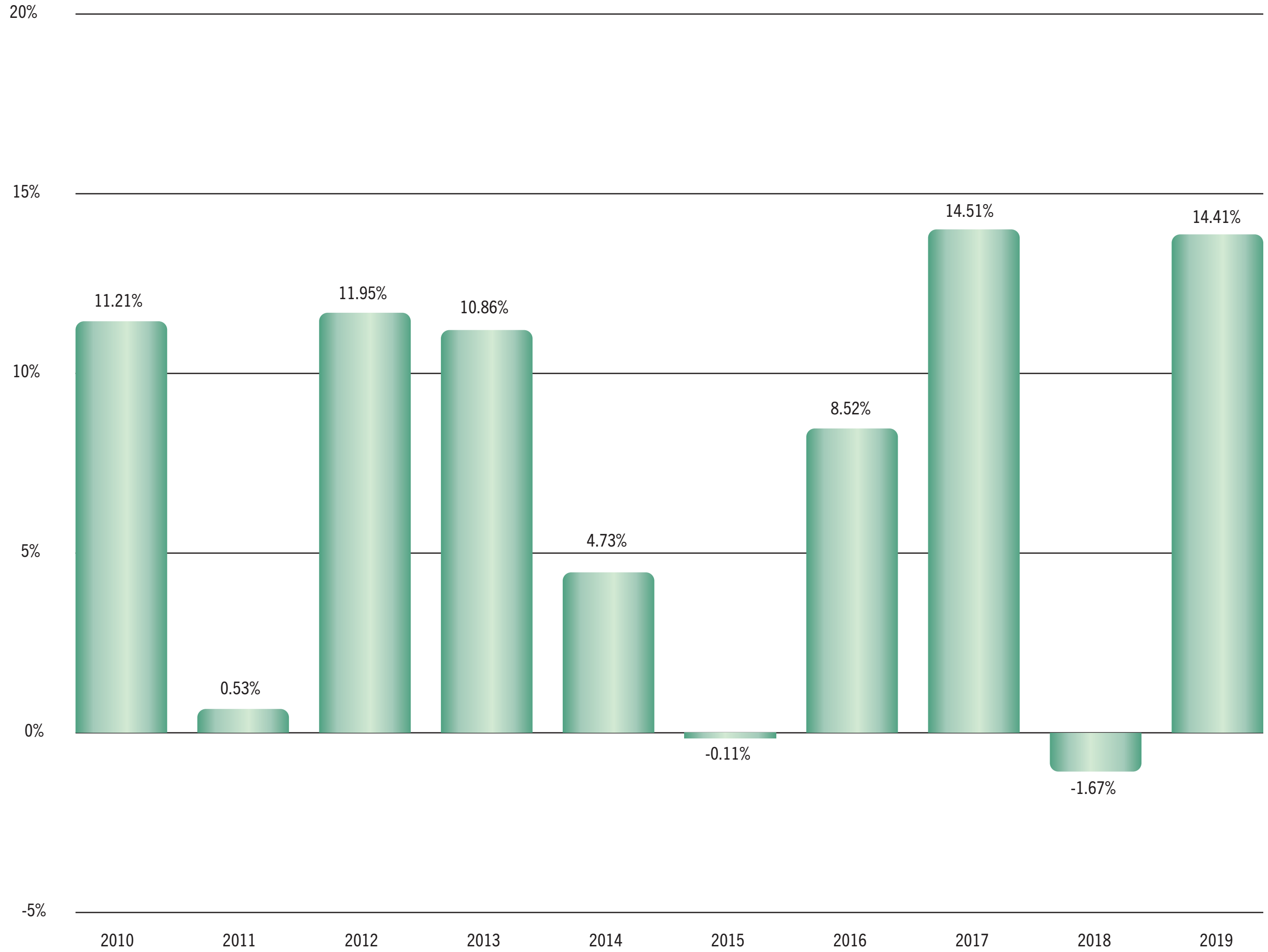
Historical Asset Allocation

December 2010 - December 2019
(Actual)



History of Performance - Net

December 2010 - December 2019
(Actual)



As of 2016, all History of Performance rates of returns have been recalculated from the prior years reporting to report net of all fees. In prior years, the rates of returns in the above schedule included indirect or at source fees, but excluded other direct fees.

Schedule of Commissions

For the Year Ended December 31, 2019
(Amounts in Thousands)

Broker Name	Number of Shares Traded	Commission per Share (in cents)	Total Commission
Bank of America Securities, Inc.	1,112	3.60	$ 40
Barclays Capital	648	0.93	6
Citigroup Global Markets, Inc.	1,570	0.89	14
Credit Lyonnais Securities	2,397	0.21	5
Credit Suisse Securities	11,144	0.21	23
Deutshe Bank	5,694	0.16	9
Goldman Sachs	15,563	0.40	62
HSBC	513	0.58	3
Instinet	3,505	1.00	35
Investment Technology Group, Ltd.	1,795	0.78	14
J.P. Morgan Securities	7,039	0.34	24
Jefferies	968	1.65	16
Liquidnet	5,105	1.41	72
MacQuarie	706	0.85	6
Merrill Lynch & Company, Inc.	11,555	0.15	17
Morgan Stanley & Company, Inc.	13,971	0.22	31
RBC	662	1.36	9
UBS	7,769	0.58	45
Wells Fargo Securities, LLC	582	3.44	20
Other*	7,072	1.19	84
Total	**99,370**	**0.54**	**$ 535**

* Other includes 70 additional firms that comprise approximately 16% of total commissions and approximately 7% of the total number of shares traded. The average commission per share is 1.19 cents.

Commission Recapture Program

OCERS implemented a direct brokerage program where investment managers can trade with specific brokerage firms for the purpose of reducing trading commissions. The brokerage firms utilized for these services are Abel Noser, Capital Institutional Services, Cowen Execution Services Limited, and State Street Bank.

Schedule of Investment Expenses and Investment Summary

For the Year Ended December 31, 2019
(Dollars in Thousands)

Type of Investment Expenses	Assets Under Management at Fair Value	Percentage	Fees
Investment Management Fees*			
Investments at Fair Value:			
Global Public Equity	$ 6,771,063	40%	$ 14,433
Core Fixed Income	2,861,107	17%	2,535
Credit	1,612,909	9%	14,211
Real Assets	2,252,709	13%	28,811
Absolute Return	967	0%	129
Private Equity	1,735,878	10%	17,825
Risk Mitigation	1,707,562	10%	8,226
Total Investments at Fair Value	**16,942,195**		**86,170**
Short-Term Investments[1]	42,168	1%	366
Total Investment Management Fees	**$ 16,984,363**	**100%**	**86,536**
Other Fund Expenses[2]			**17,249**
Other Investment Expenses			
Consulting/Research Fees			1,877
Investment Department Expenses			2,158
Legal Services			520
Custodian Services			580
Investment Service Providers			19
Total Other Investment Expenses			**5,154**
Securities Lending Activity			
Securities Lending Fees			281
Rebate Fees			6,256
Total Securities Lending Activity			**6,537**
Total Investment Expenses			**$ 115,476**

[1] Short-Term Investments are categorized as Cash and Cash Equivalents in the Statement of Fiduciary Net Position.

[2] These costs include, but are not limited to, foreign income tax and other indirect flow-through investment expenses such as organizational expenses in limited partnership structures.

Schedule of Largest Equity Holdings

(by Fair Value) [1, 2]

As of December 31, 2019
(Amounts in Thousands)

Common Stock	Shares	Fair Value
NESTLE SA REG	124	$ 13,392
ASML HOLDING NV	39	11,572
ENEL SPA	1,309	10,391
OCADO GROUP PLC	608	10,305
NOVO NORDISK A/S B	167	9,702
ASTRAZENECA PLC	92	9,283
LVMH MOET HENNESSY LOUIS VUI	19	8,970
SAFRAN SA	53	8,244
AIRBUS SE	56	8,186
SAP SE	58	7,800

Schedule of Largest Fixed Income Holdings

(by Fair Value) [1]

As of December 31, 2019
(Amounts in Thousands)

Asset	CPN/ Maturity	Fair Value
FNMA TBA 30 YR 3	3.0% / 02-15-2050	$ 82,176
BWU00W8W9 IRS GBP R V 06MLIBOR	0.0% / 03-18-2025	31,529
US TREASURY N/B	1.6% / 11-15-2022	26,183
US TREASURY N/B	1.9% / 07-31-2022	25,277
US TREASURY N/B	1.9% / 08-31-2022	24,783
US TREASURY N/B	1.6% / 08-15-2029	20,090
BWU00RYH4 IRS USD R V 03MLIBOR	1.9% / 09-14-2020	18,900
US TREASURY N/B	2.4% / 05-15-2029	17,679
US TREASURY N/B	3.1% / 08-15-2044	16,901
FNMA TBA 30 YR 4	4.0% / 02-15-2050	16,856

[1] A complete list of portfolio holdings is available for review at the OCERS' office.
[2] The holding schedules pertain to holdings of individual securities; they do not reflect OCERS' investments in commingled funds.

List of Investment Managers

As of December 31, 2019

Absolute Return

Fore Research & Management
Perry Capital

Cash Overlay

Parametric

Credit

Alcentra Clareant European Direct Lending
Ashmore
Beach Point Capital Management
BlackRock Institutional Trust Company
BlueBay Asset Management
Brigade Capital Management
Caspian Capital Advisors
Crescent Capital Group
Cross Ocean Partners
Hayfin Capital Management
Loomis, Sayles, & Company
Monroe Capital
NXT Capital
Owl Rock Technology Finance Corp
Pacific Investment Management Company
Pharo Management
Wellington Trust Company, NA

Core Fixed Income

BlackRock Institutional Trust Company
Dodge & Cox
Longfellow Investment Management Co.
Mondrian Investment Partners, Ltd.
Pacific Investment Management Company
Schroder Investment Management Ltd.

Global Public Equity

Acadian Asset Management
AQR Capital Management, LLC
BlackRock Institutional Trust Company
Capital Guardian Trust Company
City of London
Eagle Asset Management
Fidelity Institutional Asset Management
Franklin Templeton Investments
Highfields Capital
J.P. Morgan Asset Management
Mondrian Investment Partners, Ltd.
Systematic Financial Management
William Blair & Co.

Private Equity

Abbott Capital
Accel-KKR
Adams Street Partners
Advent International Global Private Equity
Alcentra Clareant European Direct Lending
DBL Partners
Genstar Capital
GGV Capital
H.I.G. Capital
HarbourVest Partners, LLC
Harvest Partners
Healthquest Capital
Mesirow Financial Private Equity
Monroe Capital
OCP Asia
Oak HC/FT Partners
Pantheon Ventures
Park Square Capital
Thoma Bravo, LLC
Vista Equity Partners

Real Assets

AEW Capital Management
Almanac Realty Investors
Angelo Gordon & Co.
Argo Capital Platform
BlackRock Institutional Trust Company
Blackstone Infrastructure Partners, L.P.
Brigade Capital Management
BTG Pactual
CB Richard Ellis Investors
Clarion Partners
EIG Global Energy Partners
EnCap
EnerVest, Ltd
Global Infrastructure Partners
Hancock Agricultural Investment Group
Hancock Timber Resource Group
J.P. Morgan Asset Management
Jamestown
Kayne Anderson Capital Advisors
Morgan Stanley
Oaktree Capital Management
Pacific Investment Management Company
True North Management Group
UBS Farmland Investors LLC
Warwick Group
Waterton Associates
Westbrook Real Estate Fund X, L.P.

Risk Mitigation

Alpha Simplex Group, LLC
AQR Capital Management, LLC
Brevan Howard -- DG Partners
BlackRock Institutional Trust Company
Bridgewater Associates, Inc.
D.E. Shaw Group
Pacific Investment Management Company
Graham Capital Management, L.P.
Systematica Investments
Two Sigma Investments

ORANGE COUNTY
OCERS
EMPLOYEES RETIREMENT SYSTEM

Section IV

Actuarial

BIKEWAY PROJECTS

County of Orange, Orange County Transportation Authority (OCTA) and City of San Juan Capistrano – Bikeway Projects

The County of Orange works with the Orange County Transportation Authority (OCTA) and its city partners, including the City of San Juan Capistrano, to plan, design and encourage the development of bicycle facilities in the County's Bikeways Plan and OCTA's Commuter Bikeways Strategic Plan. Orange County has over 1,000 miles of bikeways and has prioritized the advancement of active transportation through bikeways planning, safety programs and community events. Orange County is a bicycle friendly community providing residents a fun, healthy and efficient way to travel to work or school or for exercise or recreation.

Segal

Paul Angelo, FSA, MAAA, FCA, EA
Senior Vice President & Actuary
T 415.263.8273
pangelo@segalco.com
Andy Yeung, ASA, MAAA, FCA, EA
Vice President & Actuary
T 415.263.8283
ayeung@segalco.com

180 Howard Street,
Suite 1100
San Francisco, CA 94105-6147
segalco.com

May 21, 2020

Board of Retirement
Orange County Employees Retirement System
2223 Wellington Avenue
Santa Ana, CA 92701-3101

Re: Certification for Pension Plan

Dear Members of the Board:

Segal prepared the December 31, 2018 annual actuarial valuation of the Orange County Employees Retirement System (OCERS). We certify that the valuation was performed in accordance with generally accepted actuarial principles and practices and OCERS' funding policy that was last reviewed and adopted by the Board in 2014 and reaffirmed in 2017. In particular, it is our understanding that the assumptions and methods used for funding purposes meet the parameters set by Actuarial Standards of Practice (ASOPs). A discussion of the assumptions and methods used in the separate December 31, 2019 actuarial valuation for financial reporting purposes under Governmental Accounting Standards Board (GASB) Statement No. 67 is presented at the end of this letter.

December 31, 2018 Actuarial Valuation for Funding Purposes

Actuarial valuations are performed on an annual basis with the last valuation completed as of December 31, 2018. The actuarial calculations presented in the valuation report have been made on a basis consistent with our understanding of the historical funding methods used in determination of the liability for statutory retirement benefits.

The December 31, 2018 actuarial valuation is based on the plan of benefits verified by OCERS and on participant and financial data provided by OCERS. Segal conducted an examination of all participant data for reasonableness and we concluded that it was reasonable and consistent with the prior year's data. Summaries of the employee data used in performing the actuarial valuations over the past several years are provided in our valuation report.

We did not audit the System's financial statements. For actuarial valuation purposes, Plan assets are valued at actuarial value. Under this method, the assets used to determine employer contribution rates take into account market value by recognizing the differences between the actual and expected return on market value over a five-year period. The development of the

Board of Retirement
Orange County Employees Retirement System
May 21, 2020
Page 2

actuarial value as of December 31, 2018 is provided in the Development of Actuarial and Valuation Value of Assets.

One funding objective of the Plan is to establish rates, which, over time, will remain level as a percentage of payroll unless Plan benefit provisions are changed. Actuarial funding is based on the Entry Age Cost Method. Under this method, the employer contribution rate provides for current cost (normal cost) plus a level percentage of payroll to amortize any unfunded actuarial accrued liability (UAAL). One of the funding objectives of the System is to reduce that UAAL to zero over a declining period. Effective December 31, 2013, the outstanding balance of the UAAL from the December 31, 2012 valuation was combined and reamortized over a declining 20-year period. Any changes in UAAL due to actuarial gains or losses or due to changes in assumptions or methods will be amortized over separate 20-year periods. Any changes in UAAL due to plan amendments will be amortized over separate 15-year periods and any change in UAAL due to early retirement incentive programs will be amortized over a separate period of up to 5 years. The progress being made toward the realization of the funding objectives through December 31, 2018 is illustrated in the Schedule of Funding Progress.

Segal prepared all of the supporting schedules in the actuarial section of the System's Comprehensive Annual Financial Report (CAFR) based on the results of the December 31, 2018 actuarial valuation for funding purposes. A listing of the supporting schedules related to the statutory retirement plan benefits that Segal prepared for inclusion in the actuarial section of the System's CAFR is provided below. OCERS' staff prepared the remaining trend data schedules in the statistical section.

Actuarial Section (Based on December 31, 2018 Funding Valuation)

1. Schedule of Funding Progress
2. History of Employer Contribution Rates
3. Summary of Active Membership
4. Summary of Retired Membership
5. Development of Actuarial and Valuation Value of Assets
6. Schedule of Funded Liabilities by Type
7. Actuarial Methods and Assumptions
8. Summary of Major Plan Provisions
9. Experience Analysis

The valuation assumptions used in this valuation were included in the Actuarial Section. The results of this valuation were prepared using the actuarial assumptions and methods developed in the triennial actuarial experience study as of December 31, 2016. All of the assumptions recommended in the study, including the alternative 7.00% interest return and 2.75% inflation assumptions, were adopted by the Board. Actuarial valuations are performed on an annual basis and the experience analysis is performed every three years. The next experience analysis

Segal

Board of Retirement
Orange County Employees Retirement System
May 21, 2020
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is due to be performed as of December 31, 2019 and any changes in assumptions will be reflected in the December 31, 2020 valuation.

In the December 31, 2018 valuation, the ratio of the valuation value of assets to actuarial accrued liabilities increased from 72.3% to 72.4%. The aggregate employer rate (average of the County and all special districts rates combined) has changed from 37.66% of payroll to 40.02% of payroll. The 40.02% aggregate rate was calculated with two-thirds of the three-year phase-in of the UAAL cost impact due to changes in the actuarial assumptions. Without the phase-in, the aggregate rate is 41.26% of payroll. The aggregate employee's rate has changed from 12.46% of payroll to 12.47% of payroll.

In the December 31, 2018 valuation, the actuarial value of assets excluded $644.7 million in unrecognized investment losses, which represented 4.5% of the market value of assets. If these deferred investment losses were recognized immediately in the actuarial value of assets, the funded percentage would decrease from 72.4% to 69.3% and the aggregate employer contribution rate, expressed as a percent of payroll would increase from 40.02% to about 42.5%. (Again, both of the 40.02% and 42.5% rates have been calculated with only two-thirds of the UAAL cost impact due to changes in the actuarial assumptions.)

To the best of our knowledge, the December 31, 2018 funding valuation report is complete and accurate and in our opinion presents the Plan's current funding information.

December 31, 2019 GASB Statement 67 Actuarial Valuation for Financial Reporting Purposes

Segal prepared the December 31, 2019 GASB Statement 67 actuarial valuation for financial reporting purposes. The valuation was performed in order to comply with GASB Statement 67 and we certify that the assumptions and methods used for financial reporting purposes meet the parameters set by ASOPs and our understanding of generally accepted accounting principles (GAAP) applicable in the United States of America as promulgated by the GASB. The GASB rules only redefine pension liability and expense for financial reporting purposes, and do not apply to contribution amounts for pension funding purposes.

When measuring pension liability, GASB uses the same actuarial cost method (Entry Age method) and the same type of discount rate (expected return on assets) as OCERS uses for funding. The Net Pension Liabilities (NPLs) measured as of December 31, 2019 and December 31, 2018 have been determined by rolling forward the Total Pension Liabilities (TPLs) for the statutory Retirement Plan benefits as of December 31, 2018 and December 31, 2017, respectively. In addition, any changes in actuarial assumptions or plan provisions that occurred between the valuation date and the measurement date have been reflected.

Segal

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Note number 9 to the Basic Financial Statements and the Required Supplementary Information included in the Financial Section of the CAFR were prepared by the System based on the results of the GASB Statement No. 67 actuarial valuation as of December 31, 2019 prepared by Segal.

The undersigned are Members of the American Academy of Actuaries and meet the qualification requirements to render the actuarial opinion contained herein.

Sincerely,

Paul Angelo, FSA, MAAA, FCA, EA
Senior Vice President & Actuary

Andy Yeung, ASA, MAAA, FCA, EA
Vice President & Actuary

JY/bbf
Enclosures

Segal

Schedule of Funding Progress

(Dollars in Thousands)

Valuation Date	Actuarial Accrued Liability	Valuation Value of Assets	Unfunded Actuarial Accrued Liability	Ratio of Assets to Actuarial Accrued Liability	Projected Covered Payroll	Ratio of Unfunded Actuarial Accrued Liability to Projected Covered Payroll
12/31/09	$ 11,858,578	$ 8,154,687	$ 3,703,891	68.77%	$ 1,618,491	228.85%
12/31/10	12,425,873	8,672,592	3,753,281	69.79%	1,579,239	237.66%
12/31/11	13,522,978	9,064,355	4,458,623	67.03%	1,619,474	275.31%
12/31/12	15,144,888	9,469,208	5,675,680	62.52%	1,609,600	352.55%
12/31/13	15,785,042	10,417,125	5,367,917	65.99%	1,604,496	334.55%
12/31/14	16,413,124	11,449,911	4,963,213	69.76%	1,648,160	301.14%
12/31/15	17,050,357	12,228,009	4,822,348	71.72%	1,633,112	295.29%
12/31/16	17,933,461	13,102,978	4,830,483	73.06%	1,759,831	274.49%
12/31/17	19,635,427	14,197,125	5,438,302	72.30%	1,811,877	300.15%
12/31/18	20,703,349	14,994,420	5,708,929	72.43%	1,875,370	304.42%

Notes:

- **There were no significant assumptions or plan changes in the 12/31/18 valuation.**
- **The 12/31/17 valuation included the following assumptions changes:**
  Changes in investment return, inflation, mortality, disability, termination, retirement, salary scale, and additional cash-out assumptions in the December 31, 2016 triennial experience study increased the UAAL by $854 million.
- **The 12/31/16 valuation included the following change:**
  O.C. Law Library was separated from O.C. Sanitation District in Rate Group #3 and put into their own Rate Group (Rate Group #12) after the valuation as of December 31, 2015.
- **The 12/31/15 valuation included the following benefit changes:**
  City of San Juan Capistrano adopted an optional 1.62% of final average salary at age 65 for members hired on or after July 1, 2016.

  Effective January 1, 2015, new OCTA members were placed in CalPEPRA Plan U (2.50% of final average salary at age 67).
- **The 12/31/14 valuation included the following changes:**
  Assumption Changes:
  Changes in inflation, mortality, disability, termination, retirement, salary scale, and additional cashout assumptions in the December 31, 2013 triennial experience study decreased the UAAL by $122 million.

  Method Change:
  The cashout assumptions are now used in developing basic member contribution rates for employees in the legacy plans (impact is only on Normal Cost).

Schedule of Funding Progress

(continued)

- **The 12/31/13 valuation included the following method change:**
  The outstanding balance of the December 31, 2012 UAAL was combined and re-amortized over a 20-year period.

- **The 12/31/12 valuation included the following changes:**
  Assumption Changes:
  Changes in investment return, inflation, and across the board salary increase assumptions in the December 31, 2012 review of economic assumptions report increased the UAAL by $935 million.

- Benefit Changes:
  Members with membership date on or after January 1, 2013 were placed in CalPEPRA tiers (1.62% of final average salary at age 65, 2.50% of final average salary at age 67 and 2.70% of final average salary at age 57).

- **The 12/31/11 valuation included the following changes:**
  Assumption Changes:
  Changes in mortality, disability, termination, retirement, salary scale, and additional cashout assumptions in the December 31, 2010 triennial experience study increased the UAAL by $364 million.

  Benefit Changes:
  City of San Juan Capistrano adopted a 2.0% of final average salary at age 57 for members hired on or after July 1, 2012.

  Certain employees previously employed at the City of Santa Ana became employees of OCFA General and OCFA Safety eligible for benefits under 2.0% of final average salary at age 55 and 3.0% of final average salary at age 50, respectively.

- **The 12/31/10 valuation included the following benefit changes:**
  LAFCO adopted an optional 1.62% of final average salary at age 65 for members hired on or after July 1, 2010.

  County Managers unit adopted an optional 1.62% of final average salary at age 65 for members hired on or after August 17, 2010.

  Sanitation District adopted a 1.64% of final average salary at age 57 for members within Supervisors and Professional unit hired on or after October 1, 2010.

  OCFA adopted a 3.00% of final average salary at age 55 for Safety members within the Executive Management unit hired on or after July 1, 2011 and for all Safety members hired on or after July 1, 2012.

  OCFA adopted a 2.00% of final average salary at age 55 for General members hired on or after July 1, 2011.

- **The 12/31/09 valuation included the following benefit changes:**
  General County OCEA and Superior Court adopted an optional 1.62% of final average salary at age 65 for members hired on or after May 7, 2010.

  Law Enforcement adopted a 3.0% of final average salary at age 55 for members hired on or after April 9, 2010.

Schedule of Funding Progress

(continued)

The assets exclude amounts in the County Investment Account and prepaid employer contributions. For years ending December 31, 2016 and December 31, 2017, the assets also exclude amounts in the O.C. Sanitation District UAAL Deferred Account.

Valuation Date	Amount Excluded from Assets		
	County Investment Account	Prepaid Employer Contributions	O.C. Sanitation District UAAL Deferred Account
12/31/09	$ 108,324,000	$ 20,027,000	$ -
12/31/10	108,531,000	29,545,000	-
12/31/11	97,767,000	162,873,000	-
12/31/12	103,261,000	177,632,000	-
12/31/13	109,254,000	172,348,000	-
12/31/14	109,103,000	207,829,000	-
12/31/15	108,789,000	227,166,000	-
12/31/16	117,723,000	222,524,000	34,067,000
12/31/17	134,417,000	244,552,000	14,871,000
12/31/18	131,890,000	246,133,000	-

For informational purposes only, we have also developed the funded ratio determined using the historical market value of assets after adjustment for amounts in the County Investment Account, prepaid employer contributions, amounts in the O.C. Sanitation District UAAL Deferred Account, unclaimed member reserve and Medicare Medical Insurance Reserve.

Valuation Date	Funded Ratio based on Net Market Value of Assets
12/31/09	62.94%
12/31/10	67.25%
12/31/11	62.60%
12/31/12	63.17%
12/31/13	67.65%
12/31/14	69.63%
12/31/15	67.73%
12/31/16	70.58%
12/31/17	74.62%
12/31/18	69.31%

History of Employer Contribution Rates

Employer Contribution Rate (% of pay)

Valuation Date	General (Non-OCTA, Non-OCSD)	General (1.62% @ 65, Non-OCTA)	General (2.7% @ 55)	General (2.0% @ 57)	General (OCTA)	General (2.5% @ 55, OCSD)
12/31/09[1]	NC 8.69% UAAL 10.43 **Total 19.12%**	NC 3.69% UAAL 15.50 **Total 19.19%**	NC 11.61% UAAL 15.50 **Total 27.11%**	N/A	NC 11.11% UAAL 9.28 **Total 20.39%**	NC 10.93% UAAL 14.75 **Total 25.68%**
12/31/10[2]	NC 8.59% UAAL 8.26 **Total 16.85%**	NC 5.10% UAAL 16.84 **Total 21.94%**	NC 11.55% UAAL 16.84 **Total 28.39%**	N/A	NC 10.96% UAAL 10.00 **Total 20.96%**	NC 10.92% UAAL 16.55 **Total 27.47%**
12/31/11	NC 8.55% UAAL 10.39 **Total 18.94%**	NC 4.91% UAAL 20.98 **Total 25.89%**	NC 12.03% UAAL 20.98 **Total 33.01%**	NC 10.99% UAAL 20.98 **Total 31.97%**	NC 10.57% UAAL 13.08 **Total 23.65%**	NC 11.29% UAAL 20.66 **Total 31.95%**
12/31/12	NC 9.68% UAAL 12.91 **Total 22.59%**	NC 5.56% UAAL 25.85 **Total 31.41%**	NC 13.69% UAAL 25.85 **Total 39.54%**	NC 12.10% UAAL 25.85 **Total 37.95%**	NC 11.83% UAAL 16.48 **Total 28.31%**	NC 12.88% UAAL 25.60 **Total 38.48%**
With 2-Year Phase-In	**21.04%**	**29.84%**	**37.45%**	**35.96%**	**26.62%**	**36.57%**
12/31/13[3]	NC 9.82% UAAL 11.34 **Total 21.16%**	NC 5.61% UAAL 23.72 **Total 29.33%**	NC 13.66% UAAL 23.72 **Total 37.38%**	NC 12.46% UAAL 23.72 **Total 36.18%**	NC 11.81% UAAL 15.22 **Total 27.03%**	NC 12.89% UAAL[4] 21.87 **Total 34.76%**
12/31/14	NC 9.67% UAAL[6] 8.62 **Total 18.29%**	NC 5.49% UAAL 21.72 **Total 27.21%**	NC 13.22% UAAL 21.72 **Total 34.94%**	NC 10.54% UAAL 21.72 **Total 32.26%**	NC 10.78% UAAL 14.40 **Total 25.18%**	NC 12.40% UAAL[7] 6.26 **Total 18.66%**
With 3-Year Phase-In	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
12/31/15	NC 9.58% UAAL[8] 9.22 **Total 18.80%**	NC 5.46% UAAL 22.45 **Total 27.91%**	NC 13.19% UAAL 22.45 **Total 35.64%**	NC 11.40% UAAL 22.45 **Total 33.85%**	NC 10.70% UAAL 15.52 **Total 26.22%**	NC 12.33% UAAL[9] 1.42 **Total 13.75%**
With 3-Year Phase-In	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
12/31/16	NC 9.51% UAAL[10] 7.25 **Total 16.76%**	NC 5.53% UAAL 21.72 **Total 27.25%**	NC 13.19% UAAL[11] 21.72 **Total 34.91%**	NC 10.35% UAAL 21.72 **Total 32.07%**	NC 10.76% UAAL 14.76 **Total 25.52%**	NC 12.28% UAAL 0.00 **Total 12.28%**
12/31/17	NC 10.73% UAAL[14] 9.58 **Total 20.31%**	NC 6.21% UAAL 25.05 **Total 31.26%**	NC 14.39% UAAL[15] 25.05 **Total 39.44%**	NC 11.51% UAAL 25.05 **Total 36.56%**	NC 12.10% UAAL 18.26 **Total 30.36%**	NC 13.30% UAAL 0.00 **Total 13.30%**
With 3-Year Phase-In	**18.62%**	**28.88%**	**37.06%**	**34.18%**	**28.04%**	**N/A**
12/31/18	NC 10.73% UAAL[16] 9.40 **Total 20.13%**	NC 6.23% UAAL 26.24 **Total 32.47%**	NC 14.36% UAAL[17] 26.24 **Total 40.60%**	NC 12.13% UAAL 26.24 **Total 38.37%**	NC 12.03% UAAL 19.76 **Total 31.79%**	NC 13.24% UAAL[18] 0.86 **Total 14.10%**
With 3-Year Phase-In	**19.28%**	**31.28%**	**39.41%**	**37.18%**	**30.63%**	**N/A**

History of Employer Contribution Rates

(continued)

Employer Contribution Rate (% of pay)

Valuation Date	General (1.64% @ 57, OCSD)	General (2.0% @ 55, TCA)	General (2.0% @ 55, Cemetery, future service)	General (2.7% @ 55, OCFA)	General (2.0% @ 55, OCFA)	General (2.5% @ 55, Law Library)
12/31/09[1]	NC 10.14%	NC 12.59%	NC 11.24%	NC 11.98%	NC 11.11%	NC 10.93%
	UAAL 14.75	UAAL 7.05	UAAL 6.92	UAAL 14.55	UAAL 14.55	UAAL 14.75
	Total 24.89%	**Total 19.64%**	**Total 18.16%**	**Total 26.53%**	**Total 25.66%**	**Total 25.68%**
12/31/10[2]	NC 10.14%	NC 12.56%	NC 10.90%	NC 11.85%	NC 11.11%	NC 10.92%
	UAAL 16.55	UAAL 8.41	UAAL 6.86	UAAL 16.14	UAAL 16.14	UAAL 16.55
	Total 26.69%	**Total 20.97%**	**Total 17.76%**	**Total 27.99%**	**Total 27.25%**	**Total 27.47%**
12/31/11	NC 10.11%	NC 13.11%	NC 10.80%	NC 12.18%	NC 14.35%	NC 11.29%
	UAAL 20.66	UAAL 9.11	UAAL 8.23	UAAL 20.43	UAAL 20.43	UAAL 20.66
	Total 30.77%	**Total 22.22%**	**Total 19.03%**	**Total 32.61%**	**Total 34.78%**	**Total 31.95%**
12/31/12	NC 11.02%	NC 14.20%	NC 12.34%	NC 13.92%	NC 14.01%	NC 12.88%
	UAAL 25.60	UAAL 12.97	UAAL 12.28	UAAL 24.76	UAAL 24.76	UAAL 25.60
	Total 36.62%	**Total 27.17%**	**Total 24.62%**	**Total 38.68%**	**Total 38.77%**	**Total 38.48%**
With 2-Year Phase-In	**34.87%**	**25.71%**	**22.99%**	**36.70%**	**36.99%**	**36.57%**
12/31/13[3]	NC 10.53%	NC 14.13%	NC 12.33%	NC 14.06%	NC 14.15%	NC 12.89%
	UAAL[4] 21.87	UAAL 12.28	UAAL[5] 9.87	UAAL 23.34	UAAL 23.34	UAAL 21.87
	Total 32.40%	**Total 26.41%**	**Total 22.20%**	**Total 37.40%**	**Total 37.49%**	**Total 34.76%**
12/31/14	NC 10.30%	NC 13.59%	NC 11.79%	NC 13.53%	NC 12.47%	NC 12.40%
	UAAL[7] 6.26	UAAL 12.78	UAAL 0.00	UAAL 20.28	UAAL 20.28	UAAL 20.21
	Total 16.56%	**Total 26.37%**	**Total 11.79%**	**Total 33.81%**	**Total 32.75%**	**Total 32.61%**
With 3-Year Phase-In	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
12/31/15	NC 10.30%	NC 13.44%	NC 11.33%	NC 13.44%	NC 12.72%	NC 12.33%
	UAAL[9] 1.42	UAAL 13.79	UAAL 0.00	UAAL 20.53	UAAL 20.53	UAAL[12] 22.08
	Total 11.72%	**Total 27.23%**	**Total 11.33%**	**Total 33.97%**	**Total 33.25%**	**Total 34.41%**
With 3-Year Phase-In	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
12/31/16	NC 10.21%	NC 13.30%	NC 11.09%	NC 13.61%	NC 12.64%	NC 13.32%
	UAAL 0.00	UAAL 11.46	UAAL 0.00	UAAL 18.35	UAAL 18.35	UAAL[13] 9.69
	Total 10.21%	**Total 24.76%**	**Total 11.09%**	**Total 31.96%**	**Total 30.99%**	**Total 23.01%**
12/31/17	NC 11.25%	NC 14.51%	NC 11.98%	NC 14.72%	NC 13.46%	NC 14.11%
	UAAL 0.00	UAAL 12.74	UAAL 1.44	UAAL 17.62	UAAL 17.62	UAAL 0.00
	Total 11.25%	**Total 27.25%**	**Total 13.42%**	**Total 32.34%**	**Total 31.08%**	**Total 14.11%**
With 3-Year Phase-In	**N/A**	**26.00%**	**12.46%**	**30.46%**	**29.20%**	**N/A**
12/31/18	NC 11.11%	NC 14.51%	NC 12.05%	NC 14.71%	NC 13.50%	NC 14.28%
	UAAL[18] 0.86	UAAL[19] 15.29	UAAL 0.22	UAAL 15.90	UAAL 15.90	UAAL 1.77
	Total 11.97%	**Total 29.80%**	**Total 12.27%**	**Total 30.61%**	**Total 29.40%**	**Total 16.05%**
With 3-Year Phase-In	**N/A**	**29.17%**	**12.05%**	**29.67%**	**28.46%**	**N/A**

History of Employer Contribution Rates

(continued)

Employer Contribution Rate (% of pay)

Valuation Date		Safety Law Enforcement (3% @ 50)	Safety Law Enforcement (3% @ 55)	Safety Fire Authority (3% @ 50)	Safety Fire Authority (3% @ 55)	Safety Probation
12/31/09[1]	NC	21.13%	20.38%	21.31%	18.30%	20.17%
	UAAL	25.26	25.26	27.22	27.22	13.90
	Total	**46.39%**	**45.64%**	**48.53%**	**45.52%**	**34.07%**
12/31/10[2]	NC	21.05%	20.38%	21.54%	18.30%	20.07%
	UAAL	26.40	26.40	23.92	23.92	16.22
	Total	**47.45%**	**46.78%**	**45.46%**	**42.22%**	**36.29%**
12/31/11	NC	21.48%	21.47%	23.49%	18.58%	19.31%
	UAAL	29.38	29.38	19.66	19.66	17.26
	Total	**50.86%**	**50.85%**	**43.15%**	**38.24%**	**36.57%**
12/31/12	NC	24.24%	24.20%	26.16%	21.12%	21.26%
	UAAL	36.71	36.71	26.84	26.84	21.91
	Total	**60.95%**	**60.91%**	**53.00%**	**47.96%**	**43.17%**
With 2-Year Phase-In		**57.27%**	**57.37%**	**49.83%**	**44.85%**	**40.52%**
12/31/13[3]	NC	24.23%	22.58%	25.86%	21.70%	21.00%
	UAAL	32.47	32.47	24.14	24.14	19.72
	Total	**56.70%**	**55.05%**	**50.00%**	**45.84%**	**40.72%**
12/31/14	NC	25.79%	23.55%	27.05%	22.38%	22.17%
	UAAL	37.46	37.46	24.42	24.42	25.01
	Total	**63.25%**	**61.01%**	**51.47%**	**46.80%**	**47.18%**
With 3-Year Phase-In		**58.92%**	**56.88%**	**48.60%**	**43.93%**	**42.84%**
12/31/15	NC	25.56%	23.24%	26.87%	22.10%	21.92%
	UAAL	39.16	39.16	23.81	23.81	25.32
	Total	**64.72%**	**62.40%**	**50.68%**	**45.91%**	**47.24%**
With 3-Year Phase-In		**62.55%**	**60.34%**	**49.24%**	**44.47%**	**45.07%**
12/31/16	NC	25.63%	23.00%	26.84%	21.86%	21.87%
	UAAL	38.19	38.19	22.27	22.27	26.06
	Total	**63.82%**	**61.19%**	**49.11%**	**44.13%**	**47.93%**
12/31/17	NC	26.69%	23.69%	27.24%	21.97%	23.71%
	UAAL	41.07	41.07	23.09	23.09	33.00
	Total	**67.76%**	**64.76%**	**50.33%**	**45.06%**	**56.71%**
With 3-Year Phase-In		**64.05%**	**61.05%**	**48.04%**	**42.77%**	**52.45%**
12/31/18	NC	26.64%	23.48%	26.97%	21.83%	23.45%
	UAAL	42.56	42.56	24.99	24.99	34.41
	Total	**69.20%**	**66.04%**	**51.96%**	**46.82%**	**57.86%**
With 3-Year Phase-In		**67.35%**	**64.19%**	**50.81%**	**45.67%**	**55.73%**

History of Employer Contribution Rates

(continued)

Employer Contribution Rate (% of pay)

Valuation Date	CalPEPRA Rate Group #1 2.5% @ 67	CalPEPRA Rate Group #2 1.62% @ 65 (Plan T)	CalPEPRA Rate Group #2 2.5% @ 67	CalPEPRA Rate Group #2 1.62% @ 67 (Plan W)	CalPEPRA Rate Group #3 2.5% @ 67	CalPEPRA Rate Group #5 2.5% @ 67
12/31/10	NC 7.24% UAAL 8.26 **Total 15.50%**	NC 5.78% UAAL 16.84 **Total 22.62%**	NC 7.64% UAAL 16.84 **Total 24.48%**	N/A	NC 8.34% UAAL 16.55 **Total 24.89%**	N/A
12/31/11	NC 8.06% UAAL 10.39 **Total 18.45%**	NC 6.20% UAAL 20.98 **Total 27.18%**	NC 8.26% UAAL 20.98 **Total 29.24%**	N/A	NC 8.70% UAAL 20.66 **Total 29.36%**	N/A
12/31/12 With 2-Year Phase-In	NC 8.68% UAAL 12.91 **Total 21.59%** **20.33%**	NC 6.78% UAAL 25.85 **Total 32.63%** **31.10%**	NC 7.44% UAAL 25.85 **Total 33.29%** **32.05%**	N/A	NC 9.38% UAAL 25.60 **Total 34.98%** **33.52%**	N/A
12/31/13[3]	NC 9.39% UAAL 11.34 **Total 20.73%**	NC 6.70% UAAL 23.72 **Total 30.42%**	NC 8.56% UAAL 23.72 **Total 32.28%**	N/A	NC 9.66% UAAL[4] 21.87 **Total 31.53%**	N/A
12/31/14 With 3-Year Phase-In	NC 8.87% UAAL[6] 8.62 **Total 17.49%** **N/A**	NC 6.61% UAAL 21.72 **Total 28.33%** **N/A**	NC 8.33% UAAL 21.72 **Total 30.05%** **N/A**	N/A	NC 9.00% UAAL[7] 6.26 **Total 15.26%** **N/A**	NC 10.04% UAAL 14.40 **Total 24.44%** **N/A**
12/31/15 With 3-Year Phase-In	NC 8.92% UAAL[8] 9.22 **Total 18.14%** **N/A**	NC 6.56% UAAL 22.45 **Total 29.01%** **N/A**	NC 8.35% UAAL 22.45 **Total 30.80%** **N/A**	NC 6.68% UAAL 22.45 **Total 29.13%** **N/A**	NC 9.25% UAAL[9] 1.42 **Total 10.67%** **N/A**	NC 10.12% UAAL 15.52 **Total 25.64%** **N/A**
12/31/16	NC 8.63% UAAL[10] 7.25 **Total 15.88%**	NC 6.58% UAAL 21.72 **Total 28.30%**	NC 8.28% UAAL[11] 21.72 **Total 30.00%**	NC 6.68% UAAL 21.72 **Total 28.40%**	NC 9.27% UAAL 0.00 **Total 9.27%**	NC 10.25% UAAL 14.76 **Total 25.01%**
12/31/17 With 3-Year Phase-In	NC 9.93% UAAL[14] 9.58 **Total 19.51%** **17.82%**	NC 7.11% UAAL 25.05 **Total 32.16%** **29.78%**	NC 8.78% UAAL[15] 25.05 **Total 33.83%** **31.45%**	NC 8.56% UAAL 25.05 **Total 33.61%** **31.23%**	NC 10.37% UAAL 0.00 **Total 10.37%** **N/A**	NC 11.32% UAAL 18.26 **Total 29.58%** **27.26%**
12/31/18 With 3-Year Phase-In	NC 9.93% UAAL[16] 9.40 **Total 19.33%** **18.48%**	NC 7.12% UAAL 26.24 **Total 33.36%** **32.17%**	NC 8.78% UAAL[17] 26.24 **Total 35.02%** **33.83%**	NC 8.73% UAAL 26.24 **Total 34.97%** **33.78%**	NC 10.02% UAAL[18] 0.86 **Total 10.88%** **N/A**	NC 11.32% UAAL 19.76 **Total 31.08%** **29.92%**

(1) The UAAL established as a result of including additional premium pay items is amortized over a 25-year period.
(2) The UAAL established as a result of reallocating contributions and benefit payments among Rate Groups is amortized over a 24-year period.
(3) The outstanding balance of the December 31, 2012 UAAL has been combined and re-amortized over a period of 20 years.
(4) This is the UAAL rate for O.C. Sanitation District for FY 15-16 before reflecting the additional UAAL contributions made during calendar year 2014.
(5) This is the UAAL rate for O.C. Cemetery District for FY 15-16 before reflecting the additional UAAL contributions made during calendar year 2014.
(6) The net UAAL contribution rates for County and O.C. IHSS Public Authority (i.e., excluding U.C.I. and Department of Education) is 5.67% as of December 31, 2014.
(7) This is the UAAL rate for O.C. Sanitation District for FY 16-17 before reflecting the additional UAAL contributions made during calendar year 2015.
(8) The net UAAL contribution rates for County and O.C. IHSS Public Authority (i.e., excluding U.C.I. and Department of Education) is 5.57% as of December 31, 2015.
(9) This is the UAAL rate for O.C. Sanitation District for FY 17-18 before reflecting the additional UAAL contributions made during calendar year 2016.
(10) The net UAAL contribution rates for County and O.C. IHSS Public Authority (i.e., excluding U.C.I. and Department of Education) is 4.18% as of December 31, 2016.

History of Employer Contribution Rates

(continued)

Employer Contribution Rate (% of pay)

Valuation Date	CalPEPRA Rate Group #9 2.5% @ 67	CalPEPRA Rate Group #10 2.5% @ 67	CalPEPRA Rate Group #11 2.5% @ 67	CalPEPRA Rate Group #12 2.5% @ 67	CalPEPRA Rate Group #6 2.7% @ 57	CalPEPRA Rate Group #7 2.7% @ 57	CalPEPRA Rate Group #8 2.7% @ 57
12/31/10	NC 9.78%	NC 7.36%	NC 7.31%	NC 8.34%	NC 11.37%	NC 15.03%	NC 14.53%
	UAAL 8.41	UAAL 16.14	UAAL 6.86	UAAL 16.55	UAAL 16.22	UAAL 26.40	UAAL 23.92
	Total 18.19%	**Total 23.50%**	**Total 14.17%**	**Total 24.89%**	**Total 27.59%**	**Total 41.43%**	**Total 38.45%**
12/31/11	NC 10.36%	NC 7.84%	NC 7.95%	NC 8.70%	NC 12.23%	NC 15.55%	NC 15.23%
	UAAL 9.11	UAAL 20.43	UAAL 8.23	UAAL 20.66	UAAL 17.26	UAAL 29.38	UAAL 19.66
	Total 19.47%	**Total 28.27%**	**Total 16.18%**	**Total 29.36%**	**Total 29.49%**	**Total 44.93%**	**Total 34.89%**
12/31/12	NC 10.97%	NC 8.50%	NC 8.66%	NC 9.38%	NC 13.91%	NC 17.05%	NC 16.41%
	UAAL 12.97	UAAL 24.76	UAAL 12.28	UAAL 25.60	UAAL 21.91	UAAL 36.71	UAAL 26.84
	Total 23.94%	**Total 33.26%**	**Total 20.94%**	**Total 34.98%**	**Total 35.82%**	**Total 53.76%**	**Total 43.25%**
With 2-Year Phase-In	**22.87%**	**31.81%**	**19.63%**	**33.52%**	**33.40%**	**50.61%**	**40.96%**
12/31/13[3]	NC 11.40%	NC 9.71%	NC 8.66%	NC 9.66%	NC 13.95%	NC 19.17%	NC 16.85%
	UAAL 12.28	UAAL 23.34	UAAL[5] 9.87	UAAL 21.87	UAAL 19.72	UAAL 32.47	UAAL 24.14
	Total 23.68%	**Total 33.05%**	**Total 18.53%**	**Total 31.53%**	**Total 33.67%**	**Total 51.64%**	**Total 40.99%**
12/31/14	NC 9.85%	NC 9.63%	NC 11.81%	NC 9.00%	NC 15.25%	NC 20.10%	NC 15.71%
	UAAL 12.78	UAAL 20.28	UAAL 0.00	UAAL 20.21	UAAL 25.01	UAAL 37.46	UAAL 24.42
	Total 22.63%	**Total 29.91%**	**Total 11.81%**	**Total 29.21%**	**Total 40.26%**	**Total 57.56%**	**Total 40.13%**
With 3-Year Phase-In	**N/A**	**N/A**	**N/A**	**N/A**	**36.02%**	**54.01%**	**38.08%**
12/31/15	NC 10.57%	NC 8.81%	NC 12.23%	NC 9.25%	NC 15.00%	NC 20.04%	NC 15.30%
	UAAL 13.79	UAAL 20.53	UAAL 0.00	UAAL[12] 22.08	UAAL 25.32	UAAL 39.16	UAAL 23.81
	Total 24.36%	**Total 29.34%**	**Total 12.23%**	**Total 31.33%**	**Total 40.32%**	**Total 59.20%**	**Total 39.11%**
With 3-Year Phase-In	**N/A**	**N/A**	**N/A**	**N/A**	**38.20%**	**57.42%**	**38.09%**
12/31/16	NC 10.40%	NC 8.99%	NC 9.98%	NC 7.59%	NC 15.24%	NC 19.39%	NC 14.84%
	UAAL 11.46	UAAL 18.35	UAAL 0.00	UAAL[13] 9.69	UAAL 26.06	UAAL 38.19	UAAL 22.27
	Total 21.86%	**Total 27.34%**	**Total 9.98%**	**Total 17.28%**	**Total 41.30%**	**Total 57.58%**	**Total 37.11%**
12/31/17	NC 11.02%	NC 10.41%	NC 12.03%	NC 9.36%	NC 16.63%	NC 19.29%	NC 15.44%
	UAAL 12.74	UAAL 17.62	UAAL 1.44	UAAL 0.00	UAAL 33.00	UAAL 41.07	UAAL 23.09
	Total 23.76%	**Total 28.03%**	**Total 13.47%**	**Total 9.36%**	**Total 49.63%**	**Total 60.36%**	**Total 38.53%**
With 3-Year Phase-In	**22.51%**	**26.15%**	**12.51%**	**N/A**	**45.37%**	**56.65%**	**36.24%**
12/31/18	NC 11.13%	NC 10.16%	NC 12.33%	NC 10.32%	NC 16.76%	NC 19.04%	NC 15.27%
	UAAL[19] 15.29	UAAL 15.90	UAAL 0.22	UAAL 1.77	UAAL 34.41	UAAL 42.56	UAAL 24.99
	Total 26.42%	**Total 26.06%**	**Total 12.55%**	**Total 12.09%**	**Total 51.17%**	**Total 61.60%**	**Total 40.26%**
With 3-Year Phase-In	**25.79%**	**25.12%**	**12.33%**	**N/A**	**49.04%**	**59.75%**	**39.11%**

(11) This is the UAAL rate for O.C. Children and Families Commission for FY 18-19 before reflecting the additional UAAL contributions made during calendar year 2017.

(12) This is the UAAL rate for Law Library for FY 17-18 before reflecting the additional UAAL contributions made during calendar year 2016.

(13) This is the UAAL rate for Law Library for FY 18-19 before reflecting the additional UAAL contributions made during calendar year 2017.

(14) The net UAAL contribution rates for County and O.C. IHSS Public Authority (i.e., excluding U.C.I. and Department of Education) is 6.09% (or 4.61% after the three-year phase-in) as of December 31, 2017.

(15) The net UAAL contribution rates for O.C. Children and Families Commission is 3.13% (or 1.04% after the three-year phase-in) as of December 31, 2017.

(16) The net UAAL contribution rates for County and O.C. IHSS Public Authority (i.e., excluding U.C.I., Department of Education and Cypress Recreation and Parks) is 5.80% (or 5.06% after the three-year phase-in) as of December 31, 2018.

(17) The net UAAL contribution rates for O.C. Children and Families Commission is 4.30% (or 3.26% after the three-year phase-in) as of December 31, 2018.

(18) This is the UAAL rate for O.C. Sanitation District for FY 20-21 before reflecting the additional UAAL contributions made during calendar year 2019.

(19) This is the UAAL rate for Transportation Corridor Agency for FY 20-21 before reflecting the additional UAAL contributions made during calendar year 2019.

Summary of Active Membership

Valuation Date	Number	Annual Salary	Annual Average Salary	Increase in Average Salary (%)
12/31/09				
General	18,873	$ 1,258,558,000	$ 66,686	6.62
Safety	3,760	359,933,000	95,727	13.28
Total	**22,633**	**$ 1,618,491,000**	**$ 71,510**	**8.06**
12/31/10				
General	18,155	$ 1,232,657,000	$ 67,896	1.81
Safety	3,587	346,582,000	96,622	0.93
Total	**21,742**	**$ 1,579,239,000**	**$ 72,635**	**1.57**
12/31/11				
General	17,717	$ 1,249,064,000	$ 70,501	3.84
Safety	3,704	370,410,000	100,003	3.50
Total	**21,421**	**$ 1,619,474,000**	**$ 75,602**	**4.08**
12/31/12				
General	17,529	$ 1,238,958,000	$ 70,680	0.25
Safety	3,727	370,643,000	99,448	-0.55
Total	**21,256**	**$ 1,609,601,000**	**$ 75,725**	**0.16**
12/31/13				
General	17,547	$ 1,227,153,000	$ 69,935	-1.05
Safety	3,821	377,343,000	98,755	-0.70
Total	**21,368**	**$ 1,604,496,000**	**$ 75,089**	**-0.84**
12/31/14				
General	17,705	$ 1,267,582,000	$ 71,595	2.37
Safety	3,754	380,578,000	101,379	2.66
Total	**21,459**	**$ 1,648,160,000**	**$ 76,805**	**2.29**
12/31/15				
General	17,839	$ 1,254,521,000	$ 70,325	-1.77
Safety	3,686	378,590,000	102,710	1.31
Total	**21,525**	**$ 1,633,111,000**	**$ 75,870**	**-1.22**
12/31/16				
General	18,072	$ 1,353,363,000	$ 74,887	6.49
Safety	3,674	406,470,000	110,634	7.71
Total	**21,746**	**$ 1,759,833,000**	**$ 80,927**	**6.67**
12/31/17				
General	17,941	$ 1,385,356,000	$ 77,217	3.11
Safety	3,780	426,523,000	112,837	1.99
Total	**21,721**	**$ 1,811,879,000**	**$ 83,416**	**3.08**
12/31/18				
General	18,150	$ 1,432,041,000	$ 78,900	2.18
Safety	3,779	$ 443,331,000	$ 117,314	3.97
Total	**21,929**	**$ 1,875,372,000**	**$ 85,520**	**2.52**

Excludes Deferred and Pending members.

Summary of Retired Membership

Plan Year Ending	At Beginning of Year	Added to Rolls		Removed from Rolls		At End of Year	Annual Allowance (in 000's)	% Increase in Annual Allowance	Average Monthly Allowance
		Number	Annual Allowance (in 000's)(1)	Number	Annual Allowance (in 000's)				
2009	11,778	744	$ 32,435	(279)	$ (6,829)	12,243	$ 419,253	6.50	$ 2,854
2010	12,243	851	46,736	(332)	(8,334)	12,762	457,655	9.16	2,988
2011	12,762	888	45,913	(361)	(9,371)	13,289	494,197	7.98	3,099
2012	13,289	1,026	58,344	(368)	(9,036)	13,947	543,505	9.98	3,247
2013	13,947	911	52,319	(353)	(9,958)	14,505	585,866	7.79	3,366
2014	14,505	995	52,838	(331)	(9,812)	15,169	628,892	7.34	3,455
2015	15,169	1,053	58,679	(412)	(12,077)	15,810	675,494	7.41	3,560
2016	15,810	989	51,759	(430)	(12,895)	16,369	714,358	5.75	3,637
2017	16,369	1,039	62,374	(461)	(15,155)	16,947	761,577	6.61	3,745
2018	16,947	1,155	82,438	(428)	(14,191)	17,674	829,824	8.96	3,913

Note: Annual allowances exclude RMBR and STAR COLA.

[1] Includes COLA granted during the plan year.

Development of Actuarial and Valuation Value of Assets

As of December 31, 2018

Plan Year Ending	Total Actual Market Return (net)	Expected Market Return (net)	Investment Gain/ (Loss)	Deferred Factor	Deferred Return
2014	$ 487,104,000	$ 780,627,000	$ (293,523,000)	0.0	$ -
2015	(51,601,000)	833,757,000	(885,358,000)	0.2	(177,072,000)
2016	1,010,548,000	840,469,000	170,079,000	0.4	68,032,000
2017	1,878,172,000	920,426,000	957,746,000	0.6	574,648,000
2018	(361,321,000)	1,026,583,000	(1,387,904,000)	0.8	(1,110,323,000)

(1)	Total Deferred Return	$ (644,715,000)
(2)	Net Market Value of Assets (Excludes $131,890,000 in County Investment Account and $246,133,000 in Prepaid Employer Contributions)	$ 14,349,790,000[1]
(3)	Actuarial Value of Assets (2) – (1)	$ 14,994,505,000[2]
(4)	Non-valuation Reserves	
	(a) Unclaimed member deposit	$ -
	(b) Medicare medical insurance reserve	85,000
	(c) Subtotal	$ 85,000
(5)	Valuation Value of Assets (3) – (4)(c)	$ 14,994,420,000
(6)	Deferred Return Recognized in Each of the Next 4 Years	
	(a) Amount recognized on 12/31/2019	$ (229,086,000)
	(b) Amount recognized on 12/31/2020	(52,016,000)
	(c) Amount recognized on 12/31/2021	(86,032,000)
	(d) Amount recognized on 12/31/2022	(277,581,000)
	(e) Subtotal (may not total exactly due to rounding)	$ (644,715,000)

[1] Based on the preliminary unaudited financial statement provided by OCERS for the December 31, 2018 valuation.
[2] Ratio of Actuarial Value of Assets to Net Market Value of Assets is 104.5% ((3) ÷ (2)).

Schedule of Funded Liabilities by Type

(Dollars in Thousands)

Valuation Date	(1) Active Member Contributions	(2) Liability for Inactive Participants	(3) Liability for Active Members (Employer Financed Portion)	Valuation Value of Assets	Portion of Accrued Liability Covered by Valuation Assets (%) (1)	(2)	(3)
12/31/09	$ 1,536,849	$ 5,680,031	$ 4,641,698	8,154,687	100	100	20.20
12/31/10	1,680,401	6,107,350	4,638,122	8,672,592	100	100	19.08
12/31/11	1,829,406	6,881,152	4,812,420	9,064,355	100	100	7.35
12/31/12	1,967,117	7,919,478	5,258,293	9,469,208	100	94.73	0.00
12/31/13	2,126,182	8,502,269	5,156,591	10,417,125	100	97.51	0.00
12/31/14	2,298,744	9,017,874	5,096,506	11,449,911	100	100	2.62
12/31/15	2,488,757	9,696,776	4,864,824	12,228,009	100	100	0.87
12/31/16	2,654,599	10,109,528	5,169,334	13,102,978	100	100	6.56
12/31/17	2,815,839	11,121,965	5,697,623	14,197,125	100	100	4.55
12/31/18	2,980,108	12,018,354	5,704,887	14,994,420	100	99.97	0.00

Actuarial Methods and Assumptions

Economic Assumptions

The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the January 1, 2014 through December 31, 2016 Actuarial Experience Study dated August 14, 2017 and PowerPoint presentation dated October 16, 2017. Unless otherwise noted, all actuarial assumptions and methods shown below apply to members for all tiers. These assumptions were adopted by the Board.

Net Investment Return: 7.00%; net of investment expenses and administrative expenses.

Member Contribution Crediting Rate: 5.00%, compounded semi-annually.

Consumer Price Index: Increase of 2.75% per year, retiree COLA increases due to CPI subject to a 3.0% maximum change per year.

Payroll Growth: Inflation of 2.75% per year plus "across the board" real salary increases of 0.50% per year.

Increase in Section 7522.10 Compensation Limit: Increase of 2.75% per year from the valuation date.

Individual Salary Increases:

Annual Rate of Compensation Increase (%)

Inflation: 2.75% per year, plus "across the board" real salary increases of 0.50% per year, plus the following merit and promotion increases:		
Years of Service	**General**	**Safety**
Less than 1	9.00	14.00
1	7.25	10.00
2	6.00	7.75
3	5.00	6.00
4	4.00	5.50
5	3.50	4.50
6	2.50	3.75
7	2.25	3.25
8	1.75	2.50
9	1.50	2.25
10	1.50	1.75
11	1.50	1.75
12	1.50	1.75
13	1.50	1.75
14	1.50	1.75
15	1.50	1.75
16	1.00	1.50
17	1.00	1.50
18	1.00	1.50
19	1.00	1.50
20 & over	1.00	1.50

In addition to the individual salary increase assumptions, we have applied an average of two hours of additional salary annually for leap-year salary adjustment.

Demographic Assumptions

Post - Retirement Mortality Rates:

Healthy: For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally with the two-dimensional MP-2016 projection scale.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set back four years, projected generationally with the two-dimensional MP-2016 projection scale.

Disabled: For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table set forward five years, projected generationally with the two-dimensional MP-2016 projection scale.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, projected generationally with the two-dimensional MP-2016 projection scale.

Beneficiaries: Beneficiaries are assumed to have the same mortality as a General Member of the opposite sex who is receiving a service (non-disability) retirement.

The RP-2014 mortality tables and adjustments as shown above reflect the mortality experience as of the measurement date. The generational projection is a provision for future mortality improvement.

Employee Contribution Rates: For General Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional mortality improvement scale MP-2016, weighted 40% male and 60% female.

For Safety Members: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional mortality improvement scale MP-2016 set back four years, weighted 80% male and 20% female.

Optional Forms of Benefits: For General Service Retirees: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional mortality improvement scale MP-2016, weighted 40% male and 60% female.

For Safety Service Retirees: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional mortality improvement scale MP-2016 set back four years, weighted 80% male and 20% female.

For General Disabled Retirees: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional mortality improvement scale MP-2016 set forward five years, weighted 40% male and 60% female.

For Safety Disabled Retirees: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional mortality improvement scale MP-2016, weighted 80% male and 20% female.

For General Beneficiaries: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional mortality improvement scale MP-2016, weighted 60% male and 40% female.

For Safety Beneficiaries: Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table (separate tables for males and females), projected 20 years with the two-dimensional mortality improvement scale MP-2016, weighted 20% male and 80% female.

Pre-Retirement Mortality Rates: For General and Safety Members: Headcount-Weighted RP-2014 Employee Mortality Table times 80%, projected generationally with the two-dimensional MP-2016 projection scale.

Actuarial Methods and Assumptions

(continued)

Termination Rates Before Retirement

Mortality Rates (General and Safety)

Age	Rate (%) Mortality (General and Safety)	
	Male	Female
25	0.05	0.02
30	0.05	0.02
35	0.05	0.03
40	0.06	0.04
45	0.10	0.07
50	0.17	0.11
55	0.27	0.17
60	0.45	0.24
65	0.78	0.36
70	1.27	0.59

Note that generational projections beyond the base year (2014) are not reflected in the above mortality rates. All General pre-retirement deaths are assumed to be non-service connected. For Safety, 90% of pre-retirement deaths are assumed to be non-service connected. The other 10% are assumed to be service connected.

Disability Incidence Rates

Age	Rate (%) Disability			
	General All Other [1]	General OCTA [2]	Safety - Law & Fire [3]	Safety - Probation [4]
20	0.00	0.00	0.00	0.00
25	0.00	0.00	0.01	0.03
30	0.01	0.03	0.04	0.08
35	0.03	0.20	0.14	0.10
40	0.08	0.36	0.23	0.13
45	0.13	0.43	0.40	0.21
50	0.18	0.48	1.10	0.28
55	0.23	0.65	2.40	0.42
60	0.31	1.26	4.80	0.20

[1] 60% of General All Other disabilities are assumed to be service connected disabilities. The other 40% are assumed to be non-service connected.
[2] 65% of General OCTA disabilities are assumed to be service connected disabilities. The other 35% are assumed to be non-service connected.
[3] 100% of Safety Law Enforcement and Fire disabilities are assumed to be service connected disabilities.
[4] 75% of Safety Probation disabilities are assumed to be service connected disabilities. The other 25% are assumed to be non-service connected.

Termination Rates Before Retirement
(continued)

Termination Rates

Years of Service	Rate (%) Termination			
	General All Other	General OCTA	Safety - Law & Fire	Safety - Probation
0	11.00	17.50	4.50	14.00
1	7.50	11.00	2.50	13.00
2	6.50	9.00	2.00	10.00
3	5.00	8.50	1.50	5.00
4	4.50	7.50	1.25	4.00
5	4.25	7.00	1.00	3.50
6	3.75	4.50	0.95	2.75
7	3.25	4.00	0.90	2.00
8	3.00	3.50	0.85	2.00
9	2.75	3.00	0.80	1.75
10	2.50	3.00	0.75	1.75
11	2.00	3.00	0.65	1.50
12	2.00	3.00	0.60	1.25
13	1.75	2.50	0.55	1.00
14	1.50	2.50	0.50	0.75
15	1.40	2.50	0.45	0.75
16	1.30	2.00	0.40	0.75
17	1.20	1.80	0.35	0.25
18	1.10	1.60	0.30	0.25
19	1.00	1.40	0.25	0.25
20 & over	0.90	1.20	0.20	0.25

Election for Withdrawal of Contributions Rates

Years of Service	Rate (%) Election for Withdrawal of Contributions			
	General All Other	General OCTA	Safety - Law & Fire	Safety - Probation
0-4	35.0	40.0	20.0	25.0
5-9	30.0	35.0	20.0	25.0
10-14	25.0	30.0	20.0	25.0
15 or more	20.0	20.0	20.0	25.0

Actuarial Methods and Assumptions

(continued)

Retirement Rates

Age	Rate (%)							
	General			Safety				
	Enhanced	Non-Enhanced [1]	SJC	Law (3% @ 50) [2]	Law (3% @ 55) [2]	Fire (3% @ 50)	Fire (3% @ 55)	Probation [2]
48	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
49	30.0	25.0	0.0	12.0	0.0	2.0	0.0	0.0
50	2.5	2.0	3.0	18.0	11.5	5.0	8.0	3.3
51	2.0	2.0	3.0	18.0	12.0	7.0	10.0	3.3
52	2.5	2.0	3.0	17.0	12.7	9.5	11.0	4.3
53	2.5	2.8	3.0	17.0	17.9	10.5	12.0	4.3
54	5.5	2.8	3.0	22.0	18.8	15.0	14.0	7.0
55	15.0	3.3	4.0	22.0	30.7	18.0	24.0	12.0
56	10.0	3.5	5.0	20.0	20.0	20.0	23.0	12.0
57	10.0	5.5	6.0	20.0	20.0	21.0	27.0	18.0
58	11.0	5.5	7.0	20.0	25.0	28.0	27.0	18.0
59	11.0	6.5	9.0	26.0	30.0	28.0	36.0	18.0
60	12.0	9.3	11.0	35.0	40.0	30.0	40.0	20.0
61	12.0	12.0	13.0	35.0	40.0	30.0	40.0	20.0
62	14.0	16.0	15.0	40.0	40.0	35.0	40.0	25.0
63	16.0	16.0	15.0	40.0	40.0	35.0	40.0	40.0
64	16.0	18.0	20.0	40.0	40.0	35.0	40.0	40.0
65	22.0	22.0	20.0	100.0	100.0	100.0	100.0	100.0
66	22.0	28.0	24.0	100.0	100.0	100.0	100.0	100.0
67	23.0	24.0	24.0	100.0	100.0	100.0	100.0	100.0
68	23.0	24.0	24.0	100.0	100.0	100.0	100.0	100.0
69	23.0	20.0	24.0	100.0	100.0	100.0	100.0	100.0
70	25.0	20.0	50.0	100.0	100.0	100.0	100.0	100.0
71	25.0	25.0	50.0	100.0	100.0	100.0	100.0	100.0
72	25.0	25.0	50.0	100.0	100.0	100.0	100.0	100.0
73	25.0	25.0	50.0	100.0	100.0	100.0	100.0	100.0
74	25.0	25.0	50.0	100.0	100.0	100.0	100.0	100.0
75	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

[1] These assumptions are also used for the CalPEPRA 1.62% @ 65 formula (Plan T and Plan W).
[2] Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

Actuarial Methods and Assumptions

(continued)

Retirement Rates

(continued)

Age	Rate (%)			
	CalPEPRA			
	General Formula	Safety Formula – Probation [1]	Safety Formula – Law [1]	Safety Formula – Fire
50	0.0	2.5	11.0	6.0
51	0.0	2.5	11.5	7.0
52	4.0	3.0	12.0	9.0
53	1.5	3.0	16.0	10.0
54	1.5	5.5	17.0	11.5
55	2.5	10.0	28.0	21.0
56	3.5	10.0	18.0	20.0
57	5.5	15.0	17.5	22.0
58	7.5	20.0	22.0	25.0
59	7.5	20.0	26.0	30.0
60	7.5	40.0	40.0	40.0
61	7.5	40.0	40.0	40.0
62	14.0	40.0	40.0	40.0
63	14.0	40.0	40.0	40.0
64	14.0	40.0	40.0	40.0
65	18.0	100.0	100.0	100.0
66	22.0	100.0	100.0	100.0
67	23.0	100.0	100.0	100.0
68	23.0	100.0	100.0	100.0
69	23.0	100.0	100.0	100.0
70	25.0	100.0	100.0	100.0
71	25.0	100.0	100.0	100.0
72	25.0	100.0	100.0	100.0
73	25.0	100.0	100.0	100.0
74	25.0	100.0	100.0	100.0
75	100.0	100.0	100.0	100.0

[1] Retirement rate is 100% after a member accrues a benefit of 100% of final average earnings.

Retirement Age and Benefit for Deferred Vested Members: For current deferred vested members, we make the following retirement age assumptions:

General Age:	59
Safety Age:	53

We assume that 15% of future General and 25% of future Safety deferred vested members will continue to work for a reciprocal employer. For reciprocals, we assume 4.25% compensation increases for General and 4.75% for Safety per annum.

Liability Calculation for Current Deferred Vested Members: Liability for a current deferred vested member is calculated based on salary (adjusted with the additional cashout assumptions for non-CalPEPRA members), service, and eligibility for reciprocal benefit as provided by the Retirement System. For those members without salary information that have 3 or more years of service, we used an average salary. For those members without salary information that have less than 3 years of service or for those members without service information, we assumed a refund of account balance.

Future Benefit Accruals: 1.0 year of service per year of employment. There is no assumption to anticipate conversion of unused sick leave at retirement.

Unknown Data for Members: Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.

Percent Married: 75% of male members and 55% of female members are assumed to be married at retirement or time of pre-retirement death.

Age of Spouse: Female (or male) three years younger (or older) than spouse.

Additional Cashout Assumptions:

Non-CalPEPRA Formulas

Additional compensation amounts are expected to be received during a member's final average earnings period. The percentages used in this valuation are:

	Final One Year Salary	Final Three Year Salary
General Members	3.00%	2.80%
Safety - Probation	3.80%	3.40%
Safety - Law	5.20%	4.60%
Safety - Fire	2.00%	1.70%

The additional cashout assumptions are the same for service and disability retirements.

CalPEPRA Formulas

None

Actuarial Methods and Assumptions

(continued)

Actuarial Value of Assets:	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual and the expected return on a market value basis, and is recognized over a five-year period.
Valuation Value of Assets:	The Valuation Value of Assets is the Actuarial Value of Assets reduced by the value of the non-valuation reserves.
Actuarial Cost Method:	Entry Age Actuarial Cost Method. Entry Age is the current age minus Vesting Credit. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salaries, with Normal Cost determined as a level percentage of individual salary, as if the current benefit accrual rate had always been in effect. Effective December 31, 2013, the outstanding balance of the UAAL from the December 31, 2012 valuation was combined and re-amortized over a declining 20-year period. Any changes in UAAL due to actuarial gains or losses or due to changes in assumptions or methods will be amortized over separate 20-year periods. Any changes in UAAL due to plan amendments will be amortized over separate 15-year periods and any change in UAAL due to early retirement incentive programs will be amortized over a separate period of up to 5 years. Please note that for Probation members who have prior benefit service in another OCERS plan, the normal cost rate for the current plan is calculated assuming their Entry Age is the date they entered service with their current plan.

Summary of Major Plan Provisions

This section summarizes the major provisions of OCERS included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Membership Eligibility:	Membership with OCERS begins with the day of employment in an eligible position by the County or a participating employer.
Non-CalPEPRA General Plans:	
2.5% @ 55 Plans	*(Orange County Sanitation District[1] and Law Library[2])*
Plan G	General members hired before September 21, 1979.
Plan H	General members hired on or after September 21, 1979.
	[1] Sanitation District members within Supervisors and Professional unit hired on or after October 1, 2010 are in Plan B
	[2] Improvement is prospective only for service after June 23, 2005.
2.7% @ 55 Plans	*(City of San Juan Capistrano, Orange County Employees except bargaining unit AFSCME members, Orange County Superior Court, Orange County Local Agency Formation Commission[3], Orange County Employees Retirement System[4], Children and Family Commission[5] and Orange County Fire Authority)*
Plan I	General members hired before September 21, 1979.
Plan J	General members hired on or after September 21, 1979.
	[3] Improvement is prospective only for service after June 23, 2005.
	[4] Improvement for management employees is prospective only for service after June 30, 2005.
	[5] Improvement is prospective only for service after December 22, 2005.
2.0% @ 55 Plans	*(Transportation Corridor Agency, Cemetery District[6] and General OCFA employees effective July 1, 2011)*
Plan M	General members hired before September 21, 1979.
Plan N	General members hired on or after September 21, 1979.
	[6] Improvement is prospective only for service after December 7, 2007.
1.62% @ 65 Plans	*(Orange County Employees, Orange County Superior Court, Orange County Local Agency Formation Commission and Orange County Managers Unit)*
Plan O	County OCEA members and Superior Court members rehired on or after May 7, 2010, LAFCO members rehired on or after July 1, 2010 and County Managers unit members rehired on or after August 17, 2010 and not electing to rejoin Plan I.
Plan P	County OCEA members and Superior Court members hired on or after May 7, 2010, LAFCO members hired on or after July 1, 2010 and County Managers unit members hired on or after August 17, 2010 and not electing Plan J.
2.0% @ 57 Plan	*(City of San Juan Capistrano)*
Plan S	*General members hired on or after July 1, 2012.*
All Other General Employers:	
Plan A	General members hired before September 21, 1979.
Plan B	General members hired on or after September 21, 1979 and Sanitation District members within Supervisors and Professional unit hired on or after October 1, 2010.

Membership Eligibility: (continued)

Non-CalPEPRA Safety Plans:

3% @ 50 Plans	*(Law Enforcement, Fire Authority and Probation)*
Plan E	Safety members hired before September 21, 1979.
Plan F	Safety members hired on or after September 21, 1979 and before April 9, 2010 for Law Enforcement, before July 1, 2011 for Safety employees of OCFA Executive Management, and before July 1, 2012 for other OCFA Safety employees.
3% @ 55 Plans	*(Law Enforcement and Fire Authority)*
Plan Q	Safety Law Enforcement members rehired on or after April 9, 2010, Safety employees of OCFA Executive Management rehired on or after July 1, 2011, and other OCFA Safety employees rehired on or after July 1, 2012 and previously in Plan E.
Plan R	Safety Law Enforcement members hired on or after April 9, 2010, Safety employees of OCFA Executive Management hired on or after July 1, 2011, and other OCFA Safety employees hired on or after July 1, 2012.

CalPEPRA General Plans:

1.62% @ 65 Plan	*(Orange County Employees except County Attorneys, Orange County Employees Retirement System except Management Employees, Children and Family Commission, Local Agency Formation Commission, and Orange County Superior Court)*
Plan T	General members with membership dates on or after January 1, 2013.
2.5% @ 67 Plan	*(All Other General Employers, Orange County Attorneys, Orange County Employees Retirement System Management Employees)*
Plan U	General Non-Orange County Transportation Authority members with membership dates on or after January 1, 2013 and Orange County Transportation Authority members with membership dates on or after January 1, 2015.
1.62% @ 65 Plan	*(City of San Juan Capistrano)*
Plan W	General members with membership dates on or after January 1, 2016 and not electing Plan U.

CalPEPRA Safety Plans:

2.7% @ 57 Plan	*(Law Enforcement, Fire Authority and Probation Members)*
Plan V	Safety members with membership dates on or after January 1, 2013.

Summary of Major Plan Provisions

(continued)

Final Compensation for Benefit Determination:	
Plans A, E, G, I, M, O and Q	Highest consecutive twelve months of compensation earnable. (§31462.1) (FAS1)
Plans B, F, H, J, N, P, R and S	Highest consecutive thirty-six months of compensation earnable. (§31462) (FAS3)
Plan T	Highest consecutive thirty-six months of pensionable compensation. (§7522.32 and §7522.34) (FAS3)
Plans U, V and W	Highest consecutive thirty-six months of pensionable compensation. (§7522.10(c), §7522.32 and §7522.34) (FAS3)
Service:	Years of service. (Yrs)
Service Retirement Eligibility:	
Plans A, B, G, H, I, J, M, N, O, P, S, T, and W	Age 50 with 10 years of service, or age 70 regardless of service, or after 30 years, regardless of age. (§31672) All part-time employees over age 55 with 10 years of employment may retire with 5 years of service.
Plan U	Age 52 with 5 years of service (§7522.20(a)) or age 70 regardless of service. (§31672.3)
Plans E, F, Q and R	Age 50 with 10 years of service, or after 20 years, regardless of age. (§31663.25) All part-time employees over age 55 with 10 years of employment may retire with 5 years of service.
Plan V	Age 50 with 5 years of service (§7522.20(d)) or age 70 regardless of service. (§31672.3)

Summary of Major Plan Provisions

(continued)

Benefit Formula: General Plans

2.5% @ 55	Retirement Age	Benefit Formula
Plan G (§31676.18)	50	(2.00% x FAS1 x Yrs)
Tier 1	55	(2.50% x FAS1 x Yrs)
	60	(2.50% x FAS1 x Yrs)
	62	(2.62% x FAS1 x Yrs)*
	65 or later	(2.62% x FAS1 x Yrs)*
Plan H (§31676.18)	50	(2.00% x FAS3 x Yrs)
Tier 2	55	(2.50% x FAS3 x Yrs)
	60	(2.50% x FAS3 x Yrs)
	62	(2.50% x FAS3 x Yrs)
	65 or later	(2.50% x FAS3 x Yrs)

* Reflects benefit factors from Plan A as they provide a better benefit than those under 2.5% @ 55.

2.7% @ 55	Retirement Age	Benefit Formula
Plan I (§31676.19)	50	(2.00% x FAS1 x Yrs)
Tier 1	55	(2.70% x FAS1 x Yrs)
	60	(2.70% x FAS1 x Yrs)
	62	(2.70% x FAS1 x Yrs)
	65 or later	(2.70% x FAS1 x Yrs)
Plan J (§31676.19)	50	(2.00% x FAS3 x Yrs)
Tier 2	55	(2.70% x FAS3 x Yrs)
	60	(2.70% x FAS3 x Yrs)
	62	(2.70% x FAS3 x Yrs)
	65 or later	(2.70% x FAS3 x Yrs)

2.0% @ 55	Retirement Age	Benefit Formula
Plan M (§31676.16)	50	(1.43% x FAS1 x Yrs)
Tier 1	55	(2.00% x FAS1 x Yrs)
	60	(2.34% x FAS1 x Yrs)**
	62	(2.62% x FAS1 x Yrs)**
	65 or later	(2.62% x FAS1 x Yrs)**
Plan N (§31676.16)	50	(1.43% x FAS3 x Yrs)
Tier 2	55	(2.00% x FAS3 x Yrs)
	60	(2.26% x FAS3 x Yrs)
	62	(2.37% x FAS3 x Yrs)
	65 or later	(2.43% x FAS3 x Yrs)***

** Reflects benefit factors from Plan A as they provide a better benefit than those under 2.0% @ 55.
*** Reflects benefit factors from Plan B as they provide a better benefit than those under 2.0% @ 55.

Summary of Major Plan Provisions

(continued)

Benefit Formula: General Plans (continued)

1.62% @ 65	Retirement Age	Benefit Formula
Plan O (§31676.01)	50	(0.79% x FAS1 x Yrs)
Tier 1	55	(0.99% x FAS1 x Yrs)
	60	(1.28% x FAS1 x Yrs)
	62	(1.39% x FAS1 x Yrs)
	65 or later	(1.62% x FAS1 x Yrs)
Plan P, Plan T and Plan W (§31676.01)	50	(0.79% x FAS3 x Yrs)
Tier 2	55	(0.99% x FAS3 x Yrs)
	60	(1.28% x FAS3 x Yrs)
	62	(1.39% x FAS3 x Yrs)
	65 or later	(1.62% x FAS3 x Yrs)

2.0% @ 57	Retirement Age	Benefit Formula
Plan S (§31676.12)	50	(1.34% x FAS3 x Yrs)
Tier 2	55	(1.77% x FAS3 x Yrs)
	60	(2.34% x FAS3 x Yrs)
	62	(2.62% x FAS3 x Yrs)
	65 or later	(2.62% x FAS3 x Yrs)

All Other General Members	Retirement Age	Benefit Formula
Plan A (§31676.12)	50	(1.34% x FAS1 x Yrs)
Tier 1	55	(1.77% x FAS1 x Yrs)
	60	(2.34% x FAS1 x Yrs)
	62	(2.62% x FAS1 x Yrs)
	65 or later	(2.62% x FAS1 x Yrs)
Plan B (§31676.1)	50	(1.18% x FAS3 x Yrs)
Tier 2	55	(1.49% x FAS3 x Yrs)
	60	(1.92% x FAS3 x Yrs)
	62	(2.09% x FAS3 x Yrs)
	65 or later	(2.43% x FAS3 x Yrs)
Plan U (§7522.20(a))	52	(1.00% x FAS3 x Yrs)
	55	(1.30% x FAS3 x Yrs)
	60	(1.80% x FAS3 x Yrs)
	62	(2.00% x FAS3 x Yrs)
	65	(2.30% x FAS3 x Yrs)
	67 or later	(2.50% x FAS3 x Yrs)

Summary of Major Plan Provisions

(continued)

Benefit Formula: Safety Plans

3.0% @ 50	Retirement Age	Benefit Formula
Plan E (§31664.1)	50	(3.00% x FAS1 x Yrs)
Tier 1	55	(3.00% x FAS1 x Yrs)
	60 or later	(3.00% x FAS1 x Yrs)
Plan F (§31664.1)	50	(3.00% x FAS3 x Yrs)
Tier 2	55	(3.00% x FAS3 x Yrs)
	60 or later	(3.00% x FAS3 x Yrs)

3.0% @ 55	Retirement Age	Benefit Formula
Plan Q (§31664.2)	50	(2.29% x FAS1 x Yrs)
Tier 1	55	(3.00% x FAS1 x Yrs)
	60 or later	(3.00% x FAS1 x Yrs)
Plan R (§31664.2)	50	(2.29% x FAS3 x Yrs)
Tier 2	55	(3.00% x FAS3 x Yrs)
	60 or later	(3.00% x FAS3 x Yrs)
Plan V (§7522.25(d))	50	(2.00% x FAS3 x Yrs)
	55	(2.50% x FAS3 x Yrs)
	57 or later	(2.70% x FAS3 x Yrs)

Summary of Major Plan Provisions

(continued)

Maximum Benefit:

Plans A, B, E, F, G, H, I, J, M, N, O, P, Q, R, S, T and W	100% of Highest Average Compensation. (§31676.01, §31676.1, §31676.12, §31676.16, §31676.18, §31676.19, §31664.1, §31664.2)
Plans U and V	None

Ordinary Disability:

General Plans:

Plans A, B, G, H, I, J, M, N, O, P, S, T, U and W

Eligibility	Five years of service. (§31720)
Benefit Formula	Plans A, G, I, M, and O: 1.8% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to 62, but the total benefit cannot be more than one-third of Final Compensation. (§31727.1) Plans B, H, J, N, P, S, T, U and W: 1.5% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to 65, but the total benefit cannot be more than one-third of Final Compensation. (§31727)

Safety Plans:

Plans E, F, Q, R and V

Eligibility	Five years of service. (§31720)
Benefit Formula	1.8% per year of service. If the benefit does not exceed one-third of Final Compensation, the service is projected to 55, but the total benefit cannot be more than one-third of Final Compensation (§31727.2) For all members, 100% of the service retirement benefit will be paid, if greater.

Line-of-Duty Disability:

All Members:

Eligibility	No age or service requirements. (§31720)
Benefit Formula	50% of the Final Compensation or 100% of Service Retirement benefit, if greater. (§31727.4)

Pre-Retirement Death

All Members:

Eligibility	None
Benefit	Refund of employee contributions with interest plus one month's compensation for each year of service to a maximum of six month's compensation. (§31781) A lump sum benefit in the amount of $1,000 is payable upon death of a member (with 10 years of service) to his/her eligible beneficiary. (§31790)
Death in line of duty	50% of Final Compensation or 100% of Service Retirement benefit, if greater, payable to spouse or minor-children. (§31787)
	Or

Vested Members:

Eligibility	Five years of service.
Benefit	60% of the greater of Service or Ordinary Disability Retirement benefit payable to eligible surviving spouse (§31765.1, §31781.1), in lieu of §31781.

Summary of Major Plan Provisions

(continued)

Death After Retirement:

All Members:

Service or Ordinary Disability Retirement	60% of member's unmodified allowance continued to eligible spouse. (§31760.1) A lump sum benefit in the amount of $1,000 is payable upon death of a member (with 10 years of service) to his/her eligible beneficiary. (§31790) An eligible spouse is a surviving spouse who was married to or registered with the member one year prior to the effective retirement date. Certain surviving spouses or domestic partners may also be eligible if marriage or domestic partnership was at least two years prior to the date of death and the surviving spouse or domestic partner has attained age 55. (§31760.1)
Line-of-Duty Disability	100% of member's allowance continued to eligible spouse. (§31786) A lump sum benefit in the amount of $1,000 is payable upon death of a member (with 10 years of service) to his/her eligible beneficiary. (§31790)

Withdrawal Benefits:

Less than Five Years of Service	Refund of accumulated employee contributions with interest or earned benefit at age 70 (§31628). Effective January 1, 2003, a member may also elect to leave their contributions on deposit in the retirement fund. (§31629.5)
Five or More Years of Service	If contributions left on deposit, a member is entitled to earned benefits commencing at any time after eligible to retire. (§31700)

Post-retirement Cost-of-Living Benefits:

Future changes based on Consumer Price Index to a maximum of 3% per year, excess "banked." (§31870.1)

Supplemental Benefit:

Non-vested supplemental COLA and medical benefits are also paid by the System to eligible retirees and survivors. These benefits have been excluded from this valuation.

Member Contributions:

Non-CalPEPRA General Plans:

Plan A	
Basic	Provide for an average annuity at age 60 equal to 1/200 of FAS1. (§31621.5)
Cost-of-Living	Provide for 50% of future Cost-of-Living costs.
Plan B	
Basic	Provide for an average annuity at age 60 equal to 1/120 of FAS3. (§31621)
Cost-of-Living	Provide for 50% of future Cost-of-Living costs.
Plans G, H, I and J	
Basic	Provide for an average annuity at age 55 equal to 1/100 of FAS3 (FAS1 for Plans G and I). (§31621.8)
Cost-of-Living	Provide for 50% of future Cost-of-Living costs.
Plans M, N, O and P	
Basic	Provide for an average annuity payable at age 60 equal to 1/120 of FAS3 (FAS1 for Plans M and O). (§31621)
Cost-of-Living	Provide for 50% of future Cost-of-Living costs.
Plan S	
Basic	Provide for an average annuity at age 60 equal to 1/100 of FAS3. (§31621.2)
Cost-of-Living	Provide for 50% of future Cost-of-Living costs.

Summary of Major Plan Provisions

(continued)

Member Contributions: (continued)

Non-CalPEPRA Safety Plans:	
Plans E and Q	
Basic	Provide for an average annuity at age 50 equal to 1/200 FAS1. (§31639.5)
Cost-of-Living	Provide for 50% of future Cost-of-Living costs.
Plans F and R	
Basic	Provide for an average annuity at age 50 equal to 1/100 of FAS3. (§31639.25)
Cost-of-Living	Provide for 50% of future Cost-of-Living costs.
CalPEPRA Plans:	
Plans T, U, V and W	50% of total Normal Cost rate.
Other Information:	Non-CalPEPRA Safety members with 30 or more years of service are exempt from paying members contributions. The same applies for General members hired on or before March 7, 1973.

Note: The summary of major plan provisions is designed to outline principal plan benefits as interpreted for purposes of the actuarial valuation. If the System should find the plan summary not in accordance with the actual provisions, the System should alert the actuary so that both can be sure the proper provisions are valued.

Experience Analysis

(2009 - 2018)
(Dollars in Thousands)

Gains & Losses in Actuarial Accrued Liabilities During Years Ended December 31, Resulting from Differences Between Assumed Experience & Actual Experience

Type of Activity	Gains (or Losses) Per Year				
	2009	2010	2011	2012	2013
Retirements	$ -	$ -	$ -	$ -	$ -
Pay Increases	77,858	215,936	154,946	244,750	294,326
COLA Increases	-	-	-	-	-
Investment Income	(322,523)	(224,044)	(388,935)	(387,808)	176,930
Other	(14,931)	63,174	(38,159)	(19,979)	30,354
Gain (or Loss) During Year From Experience	**$ (259,596)**	**$ 55,066**	**$ (272,148)**	**$ (163,037)**	**$ 501,610**
Nonrecurring Items:					
Method and Procedure Changes	-	-	-	-	-
Plan Amendments and Assumption Changes	-	-	(363,842)	(934,619)	-
Correction to Include All Premium Pay Items	(228,051)	-	-	-	-
Composite Gain (or Loss) During Year	**$ (487,647)**	**$ 55,066**	**$ (635,990)**	**$ (1,097,656)**	**$ 501,610**

Gains & Losses in Actuarial Accrued Liabilities During Years Ended December 31, Resulting from Differences Between Assumed Experience & Actual Experience

Type of Activity	Gains (or Losses) Per Year				
	2014	2015	2016	2017	2018
Retirements	$ -	$ (62,070)	$ -	$ -	$ -
Pay Increases	125,746	282,696	(204,603)	66,399	71,908
COLA Increases	153,484	119,367	186,039	95,796	(24,279)
Investment Income	9,570	(229,138)	(113,103)	24,401	(255,908)
Other	(4,476)	10,056	(4,119)	5,316	(143,172)
Gain (or Loss) During Year From Experience	**$ 284,324**	**$ 120,911**	**$ (135,786)**	**$ 191,912**	**$ (351,451)**
Nonrecurring Items:					
Method of Procedure Changes	-	-	92,587[1]	-	-
Plan Amendments and Assumption Changes	122,171	-	-	(853,538)	-
Correction to Include All Premium Pay Items	-	-	-	-	-
Composite Gain (or Loss) During Year	**$ 406,495**	**$ 120,911**	**$ (43,199)**	**$ (661,626)**	**$ (351,451)**

(1) Includes leap year salary adjustment, revised benefit and eligibility service credits from pension administration system and automatic continuance benefit for child beneficiary.

Section V

Statistical

BUSES

Orange County Transportation Authority (OCTA)

The Orange County Transportation Authority serves Orange County residents and commuters by providing countywide bus and paratransit service, Metrolink commuter rail service, freeway improvements, street and road improvements, 91 Express Lanes, motorist aid services, and taxi program regulation. In addition, OCTA is the managing agency for the Los Angeles – San Diego – San Luis Obispo (LOSSAN) Rail Corridor Agency.

OCTA's responsibilities, programs and services impact every aspect of transportation within the county. OCTA keeps people moving by reducing freeway congestion, improving safety and efficiency on the local roads, providing bus service and regional multimodal connections, helping people find ways to leave their cars home, and providing safe, convenient transportation to those with special needs.

The Statistical Section of the Comprehensive Annual Financial Report provides additional information in order to promote a more comprehensive understanding of the financial statements, note disclosures and supplemental information.

The Governmental Accounting Standards Board (GASB) established five categories of information to be provided in the Statistical Section: Financial Trends, Revenues, Expenses, Demographic and Economic, and Operating Information.

Information of financial trends, revenues and expenses for the last ten years is presented in the Schedules of Changes in Fiduciary Net Position, Schedule and Graph of Fiduciary Revenue by Source, and Schedule and Graph of Expenses by Type.

Schedule of Changes in Fiduciary Net Position - Pension Trust Fund

2010 – 2019
(Dollars in Thousands)

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Additions										
Employer Contributions	$ 372,437	$ 387,585	$ 406,805	$ 427,095	$ 625,520	$ 571,298	$ 567,196	$ 572,104	$ 580,905	$ 653,793
Employee Contributions	177,929	183,820	191,215	209,301	232,656	249,271	258,297	262,294	270,070	279,373
Investment Income/(Loss)	886,693	48,753	1,002,763	1,151,193	497,760	(11,903)	1,060,040	1,938,025	(326,145)	2,182,666
Net Securities Lending	1,849	1,703	2,007	1,454	1,435	1,030	1,203	1,610	1,517	1,142
Total Additions	**$ 1,438,908**	**$ 621,861**	**$ 1,602,790**	**$ 1,789,043**	**$ 1,357,371**	**$ 809,696**	**$ 1,886,736**	**$ 2,774,033**	**$ 526,347**	**$ 3,116,974**
Deductions										
Benefits	$ 459,383	$ 493,749	$ 541,154	$ 586,284	$ 630,678	$ 675,963	$ 717,976	$ 764,344	$ 828,278	$ 900,902
Administrative Expenses	12,368	12,828	14,209	11,705	11,905	12,521	16,870	17,002	18,284	19,171
Total Deductions	**$ 471,751**	**$ 506,577**	**$ 555,363**	**$ 597,989**	**$ 642,583**	**$ 688,484**	**$ 734,846**	**$ 781,346**	**$ 846,562**	**$ 920,073**
Changes in Fiduciary Net Position	**$ 967,157**	**$ 115,284**	**$ 1,047,427**	**$ 1,191,054**	**$ 714,788**	**$ 121,212**	**$ 1,151,890**	**$ 1,992,687**	**$ (320,215)**	**$ 2,196,901**

Schedule of Changes in Fiduciary Net Position - Health Care Fund - County

2010 – 2019
(Dollars in Thousands)

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Additions										
Employer Contributions	$ 14,582	$ 39,694	$ 27,395	$ 66,057	$ 64,852	$ 36,557	$ 42,411	$ 59,864	$ 52,520	$ 54,788
Investment Income/(Loss)	8,561	(641)	10,308	13,702	7,374	(698)	16,902	34,087	(5,888)	43,523
Net Securities Lending	18	18	21	20	25	18	21	32	31	25
Total Additions	$ 23,161	$ 39,071	$ 37,724	$ 79,779	$ 72,251	$ 35,877	$ 59,334	$ 93,983	$ 46,663	$ 98,336
Deductions										
Benefits	$ 25,514	$ 26,250	$ 27,089	$ 28,293	$ 29,299	$ 30,107	$ 30,818	$ 32,042	$ 33,290	$ 35,012
Administrative Expenses	18	18	19	20	20	22	22	22	20	20
Total Deductions	$ 25,532	$ 26,268	$ 27,108	$ 28,313	$ 29,319	$ 30,129	$ 30,840	$ 32,064	$ 33,310	$ 35,032
Changes in Fiduciary Net Position	$ (2,371)	$ 12,803	$ 10,616	$ 51,466	$ 42,932	$ 5,748	$ 28,494	$ 61,919	$ 13,353	$ 63,304

Schedule of Changes in Fiduciary Net Position - Health Care Fund - OCFA

2010 – 2019
(Dollars in Thousands)

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Additions										
Employer Contributions	$ 3,634	$ 3,660	$ 3,590	$ 18,349	$ 2,667	$ 2,624	$ 2,414	$ 2,380	$ 4,536	$ 2,111
Investment Income/(Loss)	1,358	(7)	1,736	1,963	1,583	(99)	2,845	5,113	(725)	5,288
Net Securities Lending	3	3	3	4	5	3	3	4	4	3
Total Additions	$ 4,995	$ 3,656	$ 5,329	$ 20,316	$ 4,255	$ 2,528	$ 5,262	$ 7,497	$ 3,815	$ 7,402
Deductions										
Benefits	$ 2,158	$ 2,649	$ 2,804	$ 2,550	$ 3,138	$ 3,448	$ 3,867	$ 3,978	$ 5,077	$ 5,018
Administrative Expenses	9	9	9	14	22	22	22	27	30	21
Total Deductions	$ 2,167	$ 2,658	$ 2,813	$ 2,564	$ 3,160	$ 3,470	$ 3,889	$ 4,005	$ 5,107	$ 5,039
Changes in Fiduciary Net Position	$ 2,828	$ 998	$ 2,516	$ 17,752	$ 1,095	$ (942)	$ 1,373	$ 3,492	$ (1,292)	$ 2,363

Schedule of Changes in Fiduciary Net Position - OPEB 115 Custodial Fund

2010 – 2019
(Dollars in Thousands)

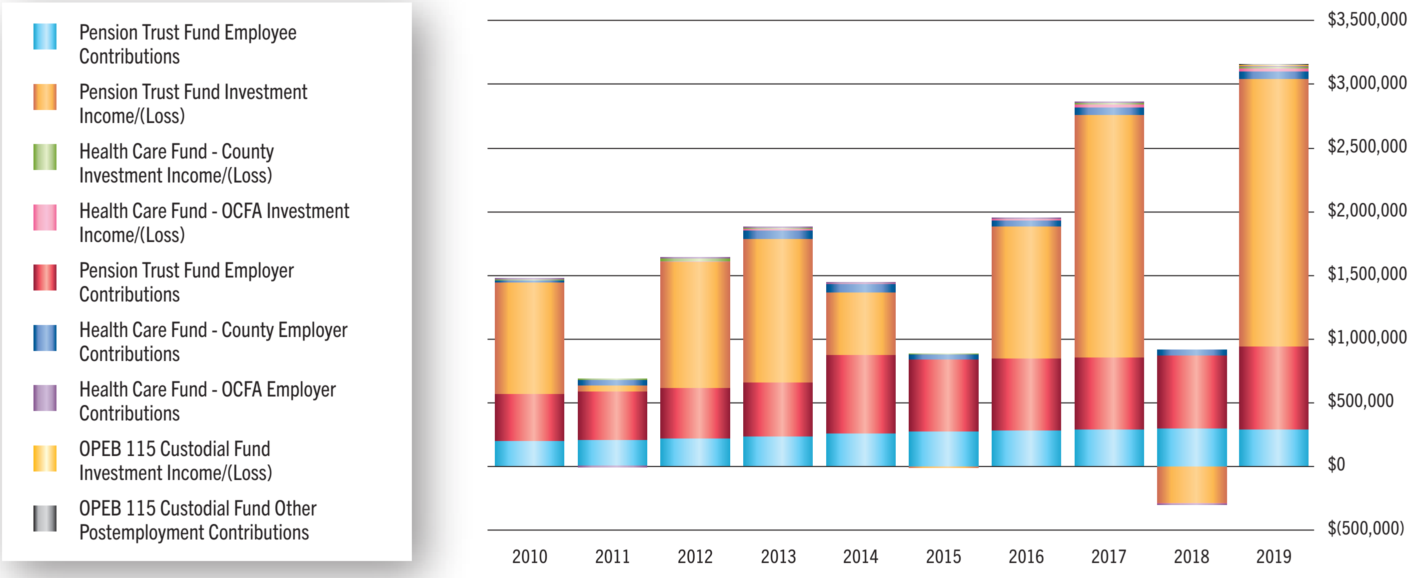
Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Additions										
Other Postemployment Contributions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	$ 613
Investment Income/(Loss)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3,250
Total Additions	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,863
Deductions										
Other Postemployment Benefits	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	$ 1,318
Administrative Expenses	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	20
Total Deductions	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,338
Changes in Fiduciary Net Position	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,525

N/A: Detailed information not available. This is a 10-year schedule. Information in this schedule is not available prior to 2019 due to the implementation of GASB 84. Additional years will be added to this schedule in future fiscal years until 10 years of data is presented.

Schedule and Graph of Fiduciary Revenues by Source

2010 – 2019
(Dollars in Thousands)

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Pension Trust Fund										
Employee Contributions	$ 177,929	$ 183,820	$ 191,215	$ 209,301	$ 232,656	$ 249,271	$ 258,297	$ 262,294	$ 270,070	$ 279,373
Employer Contributions	372,437	387,585	406,805	427,095	625,520	571,298	567,196	572,104	580,905	653,793
Investment Income/(Loss)[1, 2]	888,542	50,456	1,004,770	1,152,647	499,195	(10,873)	1,061,243	1,939,635	(324,628)	2,183,808
Health Care Fund - County										
Employer Contributions	14,582	39,694	27,395	66,057	64,852	36,557	42,411	59,864	52,520	54,788
Investment Income/(Loss)[1, 2]	8,579	(623)	10,329	13,722	7,399	(680)	16,923	34,119	(5,857)	43,548
Health Care Fund - OCFA										
Employer Contributions	3,634	3,660	3,590	18,349	2,667	2,624	2,414	2,380	4,536	2,111
Investment Income/(Loss)[1, 2]	1,361	(4)	1,739	1,967	1,588	(96)	2,848	5,117	(721)	5,291
OPEB 115 Custodial Fund										
Other Postemployment Contributions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	613
Investment Income/(Loss)[1, 2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3,250
Total	$ 1,467,064	$ 664,588	$ 1,645,843	$ 1,889,138	$ 1,433,877	$ 848,101	$ 1,951,332	$ 2,875,513	$ 576,825	$ 3,226,575



N/A: Detailed information not available.

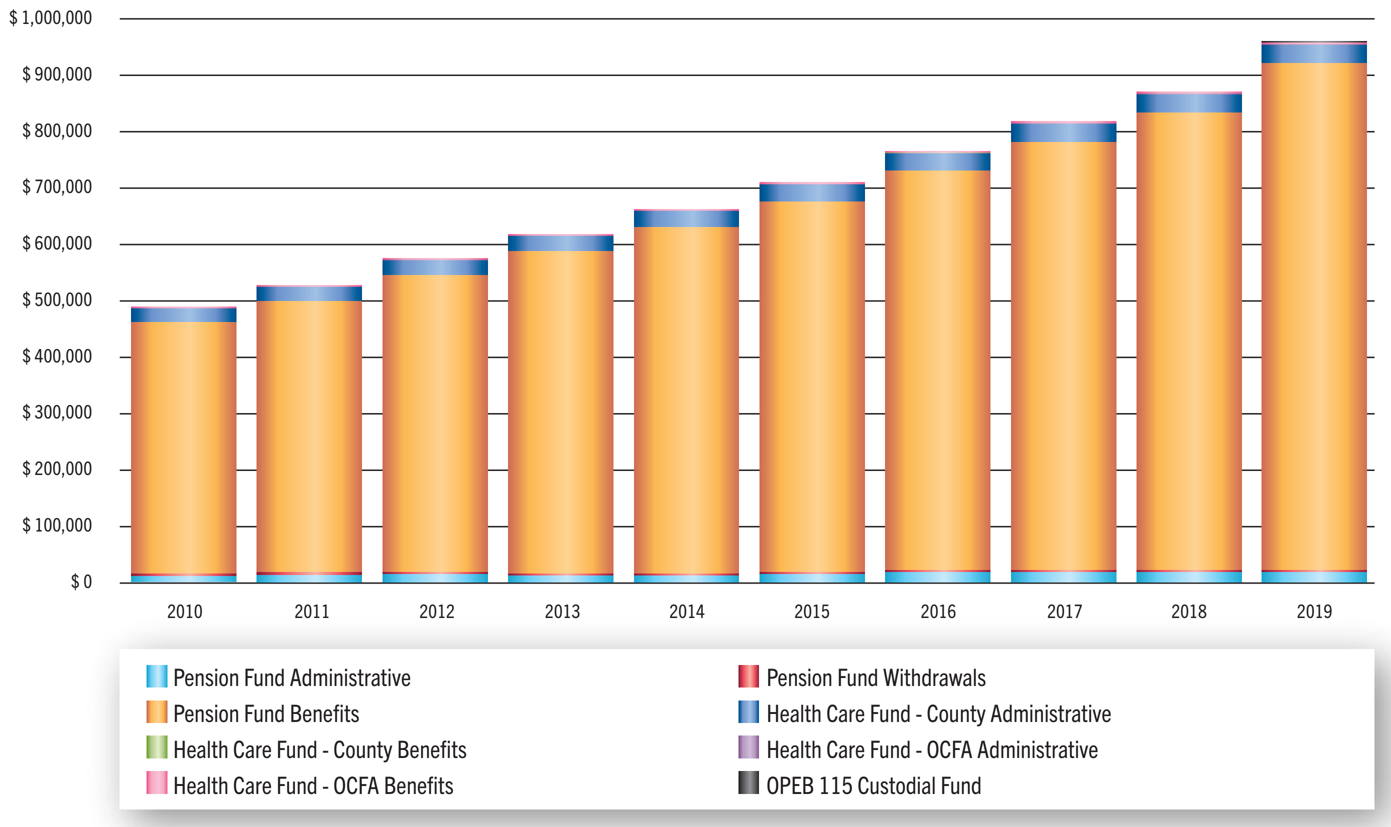
[1] Investment Income/(Loss) includes net appreciation/(depreciation) less investment manager fees, security lending fees and commission recapture.

[2] Beginning in 2013, Investment Income/(Loss) includes net appreciation/(depreciation) less investment manager fees, investment department expenses, security lending fees and commission recapture.

Schedule and Graph of Expenses by Type

2010 – 2019
(Dollars in Thousands)

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Pension Trust Fund										
Administrative	$ 12,368	$ 12,828	$ 14,209	$ 11,705	$ 11,905	$ 12,521	$ 16,870	$ 17,002	$ 18,284	$ 19,171
Withdrawals										
Separation	8,566	6,833	8,078	7,516	9,843	10,764	9,411	9,294	10,681	9,458
Death	1,880	2,041	2,019	2,348	1,887	1,093	4,232	4,572	3,252	3,791
Benefits	448,937	484,875	531,057	576,420	618,948	664,106	704,333	750,478	814,345	887,653
Health Care Fund - County										
Administrative	18	18	19	20	20	22	22	22	20	20
Benefits	25,514	26,250	27,089	28,293	29,299	30,107	30,818	32,042	33,290	35,012
Health Care Fund - OCFA										
Administrative	9	9	9	14	22	22	22	27	30	21
Benefits	2,158	2,649	2,804	2,550	3,138	3,448	3,867	3,978	5,077	5,018
OPEB 115 Custodial Fund										
Administrative	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,318
Benefits	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	20
Total	$ 499,450	$ 535,503	$ 585,284	$ 628,866	$ 675,062	$ 722,083	$ 769,575	$ 817,415	$ 884,979	$ 961,482

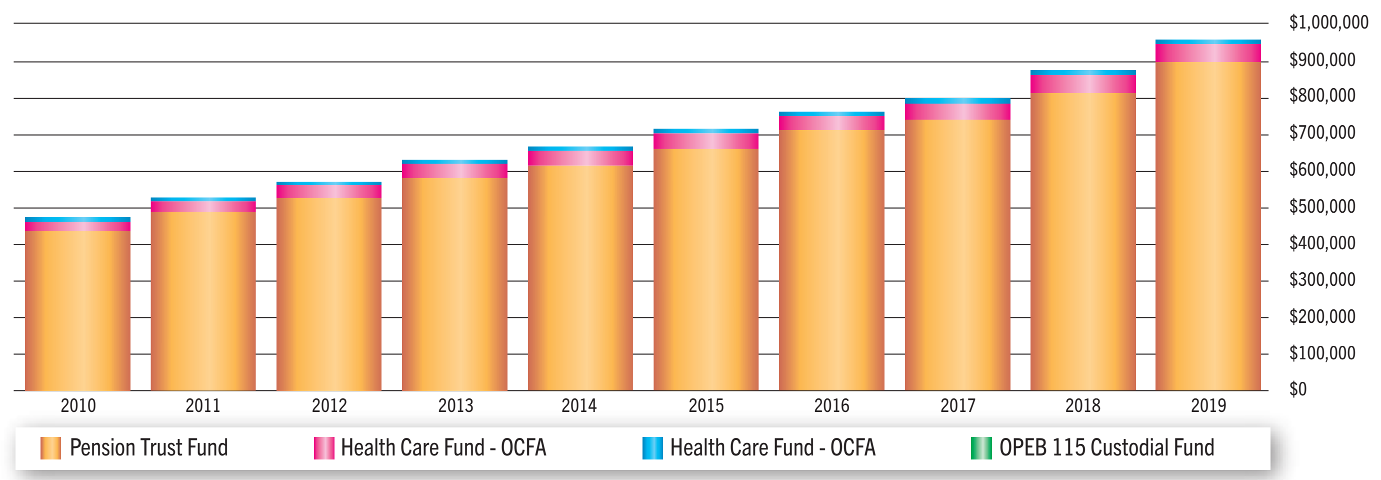


N/A: Detailed information not available.

Schedule and Graph of Benefit Expenses by Type

2010 – 2019
(Dollars in Thousands)

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Pension Trust Fund										
Participant Benefits										
Service Retiree Payroll										
General	N/A	N/A	N/A	N/A	N/A	$ 446,534	$ 475,838	$ 502,396	$ 545,028	$ 593,394
Safety	N/A	N/A	N/A	N/A	N/A	158,247	167,723	180,747	199,029	218,482
Service Retiree Payroll	N/A	N/A	N/A	N/A	N/A	604,781	643,561	683,143	744,057	811,876
Disability Retiree Payroll										
General	N/A	N/A	N/A	N/A	N/A	25,298	25,891	29,462	29,177	31,474
Safety	N/A	N/A	N/A	N/A	N/A	33,503	34,497	37,179	40,541	43,653
Disability Retiree Payroll	N/A	N/A	N/A	N/A	N/A	58,801	60,388	66,641	69,718	75,127
Total Participant Benefits										
General	N/A	N/A	N/A	N/A	N/A	471,832	501,729	531,858	574,205	624,868
Safety	N/A	N/A	N/A	N/A	N/A	191,750	202,220	217,926	239,570	262,135
Total Participant Benefits	$ 448,099	$ 484,012	$ 530,269	$ 575,633	$ 618,233	663,582	703,949	749,784	813,775	887,003
Membership Withdrawals and Refunds										
General Membership	N/A	N/A	N/A	N/A	N/A	N/A	12,778	13,063	12,288	12,536
Safety Membership	N/A	N/A	N/A	N/A	N/A	N/A	865	803	1,645	713
Total Withdrawals and Refunds	10,446	8,874	10,097	9,864	11,730	11,857	13,643	13,866	13,933	13,249
Death Benefits										
Total Death Benefits	838	863	788	787	715	524	384	694	570	650
Total Pension Trust Fund	459,383	493,749	541,154	586,284	630,678	675,963	717,976	764,344	828,278	900,902
Health Care Fund - County										
Health Care	25,514	26,250	27,089	28,293	29,299	30,107	30,818	32,042	33,290	35,012
Health Care Fund - OCFA										
Health Care	2,158	2,649	2,804	2,550	3,138	3,448	3,867	3,978	5,077	5,018
OPEB 115 Custodial Fund										
Postemployment Benefits	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,318
Total	$ 487,055	$ 522,648	$ 571,047	$ 617,127	$ 663,115	$ 709,518	$ 752,661	$ 800,364	$ 866,645	$ 942,250

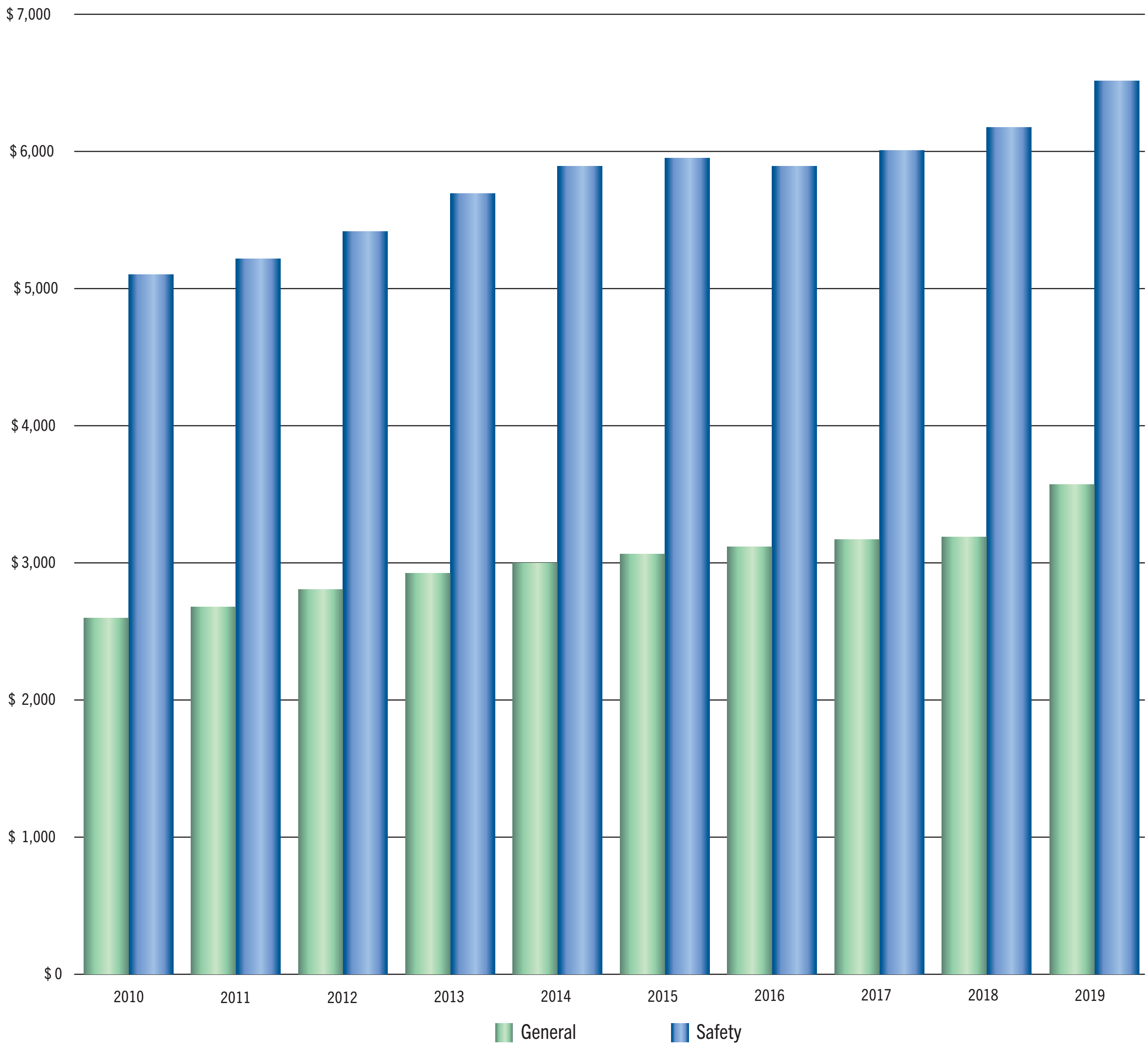


N/A: Detailed information not available.

Schedule and Graph of Average Monthly Pension Check

2010 – 2019

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
General	$ 2,621	$ 2,714	$ 2,836	$ 2,924	$ 2,991	$ 3,103	$ 3,142	$ 3,244	$ 3,372	$ 3,520
Safety	$ 5,141	$ 5,297	$ 5,516	$ 5,679	$ 5,914	$ 5,974	$ 5,917	$ 6,017	$ 6,245	$ 6,499



Source: OCERS' Pension Gold Information System and Pension Administration System.

Schedule of Average Pension Benefit Payments by Years of Service

Service Retirement Effective Dates	Years of Service 0-5	5-10	10-15	15-20	20-25	25-30	30 & Over
Period 1/1/10-12/31/10							
Average Monthly Pension Benefits	$ 587	$ 986	$ 1,855	$ 2,929	$ 4,046	$ 5,922	$ 6,856
Monthly Final Average Salary	$ 3,666	$ 4,800	$ 5,537	$ 6,291	$ 6,962	$ 7,764	$ 7,741
Number of Retired Members	23	45	108	106	130	127	129
Period 1/1/11-12/31/11							
Average Monthly Pension Benefits	$ 678	$ 1,057	$ 1,689	$ 3,054	$ 4,257	$ 5,910	$ 6,766
Monthly Final Average Salary	$ 4,843	$ 5,825	$ 5,475	$ 6,497	$ 7,314	$ 7,874	$ 7,650
Number of Retired Members	16	55	111	86	120	123	155
Period 1/1/12-12/31/12							
Average Monthly Pension Benefits	$ 647	$ 1,142	$ 1,701	$ 2,957	$ 4,058	$ 5,802	$ 7,015
Monthly Final Average Salary	$ 5,988	$ 5,398	$ 5,672	$ 6,347	$ 6,759	$ 7,702	$ 7,750
Number of Retired Members	20	71	128	88	187	145	172
Period 1/1/13-12/31/13							
Average Monthly Pension Benefits	$ 435	$ 1,166	$ 2,039	$ 2,946	$ 3,794	$ 6,409	$ 7,732
Monthly Final Average Salary	$ 8,199	$ 6,347	$ 6,458	$ 6,492	$ 6,431	$ 8,432	$ 8,482
Number of Retired Members	29	55	139	82	161	147	131
Period 1/1/14-12/31/14							
Average Monthly Pension Benefits	$ 421	$ 1,152	$ 1,925	$ 3,188	$ 4,117	$ 6,444	$ 6,719
Monthly Final Average Salary	$ 8,176	$ 6,955	$ 6,301	$ 6,961	$ 7,003	$ 8,463	$ 7,349
Number of Retired Members	23	45	146	96	143	192	138
Period 1/1/15-12/31/15							
Average Monthly Pension Benefits	$ 582	$ 1,263	$ 1,755	$ 2,850	$ 3,895	$ 5,679	$ 7,235
Monthly Final Average Salary	$ 8,802	$ 6,888	$ 5,970	$ 6,673	$ 6,800	$ 7,893	$ 8,352
Number of Retired Members	22	63	128	119	110	200	182
Period 1/1/16-12/31/16							
Average Monthly Pension Benefits	$ 427	$ 1,244	$ 2,135	$ 2,886	$ 4,272	$ 5,549	$ 6,782
Monthly Final Average Salary	$ 8,298	$ 6,907	$ 6,911	$ 6,580	$ 7,383	$ 7,651	$ 7,762
Number of Retired Members	24	56	121	120	113	195	163
Period 1/1/17-12/31/17							
Average Monthly Pension Benefits	$ 541	$ 1,215	$ 2,073	$ 3,062	$ 4,513	$ 5,851	$ 7,069
Monthly Final Average Salary	$ 7,952	$ 6,800	$ 6,844	$ 6,810	$ 7,743	$ 7,975	$ 7,931
Number of Retired Members	21	47	122	147	112	190	153
Period 1/1/18-12/31/18							
Average Monthly Pension Benefits	$ 554	$ 1,190	$ 1,943	$ 2,879	$ 4,681	$ 6,074	$ 7,439
Monthly Final Average Salary	$ 10,584	$ 7,287	$ 6,904	$ 6,859	$ 8,134	$ 8,246	$ 8,561
Number of Retired Members	23	62	125	144	127	205	208
Period 1/1/19-12/31/19							
Average Monthly Pension Benefits	$ 367	$ 1,424	$ 2,332	$ 3,073	$ 4,831	$ 6,475	$ 7,324
Monthly Final Average Salary	$ 7,568	$ 8,243	$ 7,509	$ 6,985	$ 8,088	$ 8,591	$ 8,249
Number of Retired Members	31	54	121	150	135	249	191

Source: OCERS' Pension Gold Information System and Pension Administration System.

Schedule of Pension Benefit Recipients by Type of Benefit

December 31, 2019

Monthly Benefit	Normal Retirement for Age and Service	Survivor Payment - Normal Retirement	Service-Connected Disability Retirement	Nonservice-Connected Disability Retirement	Survivor Payment - Disability Retirement	DRO (Domestic Relations Order Payees)	Active Deaths	Total
$1-500	552	123	4	2	14	75	12	782
$501-1,000	996	253	3	22	31	106	88	1,499
$1,001-1,500	1,292	222	9	57	30	102	75	1,787
$1,501-2,000	1,174	147	75	75	25	76	56	1,628
$2,001-2,500	1,131	123	185	33	19	54	27	1,572
$2,501-3,000	1,068	115	232	16	41	35	10	1,517
$3,001-3,500	977	92	147	19	20	33	6	1,294
$3,501-4,000	846	62	97	7	14	18	8	1,052
$4,001-4,500	735	50	100	5	20	7	6	923
$4,501-5,000	693	34	96	2	12	11	9	857
$5,001-5,500	664	52	44	2	9	9	2	782
$5,501-6,000	508	24	44	2	4	3	1	586
$6,001-6,500	524	18	29	2	4	1	2	580
$6,501-7,000	443	15	22	-	1	-	-	481
Over $7,000	2,845	38	174	-	19	-	4	3,080
Total	14,448	1,368	1,261	244	263	530	306	18,420

Definition of Terms

Eligible Spouse: A member's spouse is considered eligible if the member has been legally married for at least one year at the time of retirement and remains married throughout the member's retirement. Eligible Spouse also includes Qualified Domestic Partner registered in accordance with applicable Family Law provisions.

Eligible Child: An eligible child is an unmarried child under the age of 18, or under the age of 22 if a full-time student. This includes adopted children. Eligible Child can also include a stepchild living or domiciled with the member at the time of the member's death for purposes of an active member Nonservice-connected or Service-connected death benefit only.

Source: OCERS' Pension Gold Information System and Pension Administration System.

Schedule of Pension Benefit Recipients by Option Selected

December 31, 2019

Monthly Benefit	UM	OP1	OP2	OP3	OP4	DB	UMC	O2C	O3C	O4C	SCDC	NSCDC	LSRC	AN	Total
$1-500	518	1	25	3	2	75	120	9	8	-	1	10	1	9	782
$501-1,000	961	1	55	1	3	106	261	17	5	2	12	58	17	-	1,499
$1,001-1,500	1,313	1	41	2	1	102	242	10	-	2	3	63	7	-	1,787
$1,501-2,000	1,276	1	41	4	2	76	163	12	3	1	2	42	5	-	1,628
$2,001-2,500	1,313	-	28	1	7	54	130	15	1	-	-	20	3	-	1,572
$2,501-3,000	1,287	-	22	3	4	35	147	10	-	-	3	6	-	-	1,517
$3,001-3,500	1,116	1	22	3	1	33	106	6	1	-	1	4	-	-	1,294
$3,501-4,000	929	-	11	3	7	18	64	13	-	1	2	2	2	-	1,052
$4,001-4,500	808	1	20	2	9	7	70	6	-	-	-	-	-	-	923
$4,501-5,000	766	-	20	3	2	11	47	2	-	-	3	3	-	-	857
$5,001-5,500	690	-	14	-	6	9	52	10	-	-	-	1	-	-	782
$5,501-6,000	542	-	8	1	3	3	26	2	1	-	-	-	-	-	586
$6,001-6,500	538	1	8	-	8	1	20	3	-	-	1	-	-	-	580
$6,501-7,000	449	-	9	-	7	-	13	3	-	-	-		-	-	481
Over $7,000	2,967	2	27	2	21	-	48	11	-	-	-	1	1	-	3,080
Total	15,473	9	351	28	83	530	1,509	129	19	6	28	210	36	9	18,420

Definition of Options:

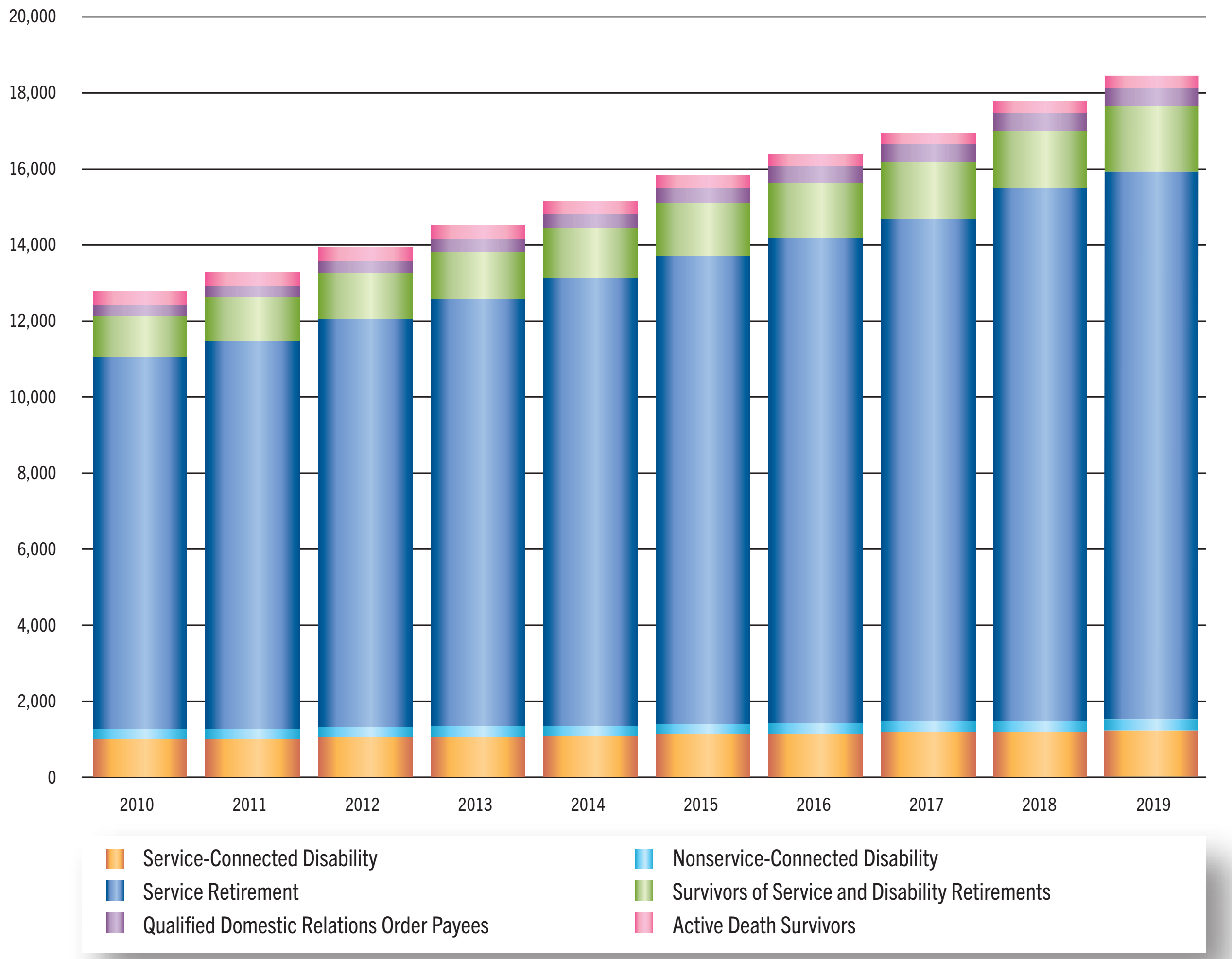
UM: Unmodified -- Maximum retirement allowance
OP1: Option 1 -- Reduced retirement allowance, at death of retiree beneficiary receives remaining balance on account
OP2: Option 2 -- Reduced retirement allowance
OP3: Option 3 -- Reduced retirement allowance
OP4: Option 4 -- Reduced retirement allowance
DB: DRO benefit -- Benefit as provided in Domestic Relations Order
UMC: Unmodified continuance -- Beneficiary receives 60% of maximum retirement allowance
O2C: Option 2 continuance -- Beneficiary receives same monthly allowance
O3C: Option 3 continuance -- Beneficiary receives 50% of monthly allowance
O4C: Option 4 continuance -- Multiple beneficiaries receive allowance as previously approved
SCDC: SCD continuance -- Service Connected Disability
NSCDC: NSCD continuance -- Non Service Connected Disability
LSRC: Lump sum and reduced continuance
AN: Annuity

Source: OCERS' Pension Gold Information System and Pension Administration System.

Schedule and Graph of Pension Benefit Recipients

2010 – 2019

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Service-Connected Disability	1,027	1,032	1,059	1,072	1,098	1,131	1,161	1,185	1,232	1,261
Nonservice-Connected Disability	254	259	260	263	265	271	257	261	250	244
Service Retirement	9,767	10,189	10,739	11,226	11,760	12,278	12,768	13,240	13,827	14,448
Survivors of Service and Disability Retirements	1,079	1,160	1,221	1,261	1,336	1,423	1,448	1,496	1,559	1,631
Qualified Domestic Relations Order Payees	272	289	314	340	366	399	426	455	495	530
Active Death Survivors	363	360	354	343	344	308	309	310	311	306
Total	12,762	13,289	13,947	14,505	15,169	15,810	16,369	16,947	17,674	18,420



Source: OCERS' Pension Gold Information System and Pension Administration System.

Schedule of Average Retirement Age

2010 – 2019

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
General	60.55	60.65	60.42	61.32	60.79	59.37	59.44	60.79	61.30	61.14
Safety	54.18	54.56	54.33	54.80	54.06	53.51	53.58	55.09	55.15	54.53

Schedule of Average Years of Service at Retirement

2010 – 2019

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
General	20.53	20.82	20.88	20.00	21.13	18.22	19.56	21.41	22.08	21.95
Safety	23.91	25.27	24.41	24.25	24.47	24.18	22.81	23.92	24.60	24.36

Schedule of Beneficiaries Receiving a Pension

2010 – 2019

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
General	1,286	1,352	1,398	1,503	1,457	1,498	1,514	1,540	1,593	1,652
Safety	156	168	177	187	223	233	243	266	277	285
Total	**1,442**	**1,520**	**1,575**	**1,690**	**1,680**	**1,731**	**1,757**	**1,806**	**1,870**	**1,937**

Schedule of Active and Deferred Members

2010 – 2019

Years Ended December 31	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
General										
Active	18,155	17,717	17,559	17,637	17,873	17,838	18,072	17,941	18,150	18,356
Deferred	3,905	3,998	3,980	4,205	4,380	4,668	4,940	5,341	5,547	6,004
Safety										
Active	3,587	3,704	3,730	3,731	3,587	3,687	3,674	3,780	3,779	3,901
Deferred	403	408	402	408	409	424	430	462	479	516
Total	**26,050**	**25,827**	**25,671**	**25,981**	**26,249**	**26,617**	**27,116**	**27,524**	**27,955**	**28,777**

Source: OCERS' Pension Gold Information System and Pension Administration System.

Schedule of Participating Employers - Pension Plan

2010 – 2019

	Years Ended December 31	Total	Orange County	OCTA	OC Superior Court	OC Fire Authority	OC Sanitation District	City of San Juan Capistrano	Trans-portation Corridor Agencies	All Other Employers
2010	Number of Covered Employees	21,742	16,486	1,639	1,635	1,064	594	87	79	158
	Percentage to Total System	100%	75.83%	7.54%	7.52%	4.89%	2.73%	0.40%	0.36%	0.73%
2011	Number of Covered Employees	21,421	16,084	1,549	1,638	1,244	596	80	80	150
	Percentage to Total System	100%	75.09%	7.23%	7.65%	5.81%	2.78%	0.37%	0.37%	0.70%
2012	Number of Covered Employees	21,289	16,118	1,509	1,569	1,195	596	80	74	148
	Percentage to Total System	100%	75.70%	7.09%	7.37%	5.61%	2.80%	0.38%	0.35%	0.70%
2013	Number of Covered Employees	21,368	16,281	1,519	1,492	1,185	587	81	77	146
	Percentage to Total System	100%	76.19%	7.11%	6.98%	5.55%	2.75%	0.38%	0.36%	0.68%
2014	Number of Covered Employees	21,460	16,453	1,454	1,460	1,213	594	80	65	141
	Percentage to Total System	100%	76.67%	6.78%	6.80%	5.65%	2.77%	0.37%	0.30%	0.66%
2015	Number of Covered Employees	21,525	16,574	1,409	1,462	1,224	572	75	63	146
	Percentage to Total System	100%	77.00%	6.55%	6.79%	5.69%	2.66%	0.35%	0.29%	0.68%
2016	Number of Covered Employees	21,746	16,756	1,372	1,486	1,263	578	80	68	143
	Percentage to Total System	100%	77.05%	6.31%	6.83%	5.81%	2.66%	0.37%	0.31%	0.66%
2017	Number of Covered Employees	21,721	16,778	1,313	1,455	1,288	592	81	64	150
	Percentage to Total System	100%	77.24%	6.04%	6.70%	5.93%	2.73%	0.37%	0.29%	0.69%
2018	Number of Covered Employees	21,929	17,048	1,279	1,419	1,262	616	78	62	165
	Percentage to Total System	100%	77.75%	5.83%	6.47%	5.75%	2.81%	0.36%	0.28%	0.75%
2019	Number of Covered Employees	22,257	17,160	1,350	1,419	1,416	608	76	61	167
	Percentage to Total System	100%	77.10%	6.07%	6.38%	6.36%	2.73%	0.34%	0.27%	0.75%

Source: OCERS' Pension Gold Information System and Pension Administration System.

History of Actuarial Assumption Rates

For the Period January 1945 - December 2019

The table shown below is a comprehensive history of the change in interest rate assumption and the salary assumption rates corresponding to the Orange County Employees Retirement System since the inception of the System. These rates are adopted by the Retirement Board and used by the consulting actuary in the creation of the actuarial valuation of the System.

Specifically, the interest rate assumption estimates the rate at which the funds of the System's investment portfolio will realize earnings over many years into the future. The salary assumption rate estimates the relative increases in the salary of a member from the date of the valuation to the estimated date of separation of the member from active service.

Effective Date	Interest Rate	Salary Assumption Rate
1/1/45	2.50%	0.00%
7/1/62	3.50%	0.00%
12/31/65	4.00%	0.00%
7/1/69	4.50%	0.00%
6/30/70	5.00%	0.00%
8/31/73	5.75%	0.00%
7/1/75	6.00%	0.00%
7/1/81	7.25%	5.00%
7/1/89	7.50%	5.50%
7/1/91	8.00%	6.00%
7/1/96	8.00%	3.50%
7/1/00	8.00%	5.50%
7/1/03	7.50%	4.50%
12/31/04	7.75%	3.50%[1]
12/31/07	7.75%	3.50%[2]
12/31/11	7.75%	3.50%[3]
12/31/12	7.25%	3.25%[4]
12/31/14	7.25%	3.25%[4]
12/31/17	7.00%	3.25%[4]

[1] Inflation per year plus merit and promotion increases ranging from 0.6% to 0.7%

[2] Inflation per year plus merit and promotion increases ranging from 1% to 10%

[3] Inflation per year plus 0.25% across-the-board real salary increases plus merit and promotion increases ranging from 1% to 14%

[4] Inflation per year plus 0.50% across-the-board real salary increase

Source: The Segal Company

Section VI

Glossary of Terms

Orange County, California

Pieces of Public Transportation


Garry D.
Herrera
U.S. AIR FORCE
COFFEE
octa
YOUR WHEELS

Glossary of Terms

Accrual Basis
The recording of the financial effects on a government of transactions and other events and circumstances that have financial consequences for the government in the periods in which those transactions, events and circumstances occur, rather than only in the periods in which cash is received or paid by the government.

Accumulated Plan Benefits
Benefits attributable under the provisions of a pension plan to employees for services rendered to the benefit information date.

Actuarial Accrued Liability
The actuarial accrued liability, as determined by a particular cost method, equals the total present value of benefits that is attributable to past service credit.

Actuarial Assumptions
Assumptions used in the actuarial valuation process as to the occurrence of future events affecting pension costs, such as mortality, withdrawal, disablement and retirement; changes in compensation and national pension benefits; rates of investments earnings and asset appreciation or depreciation: procedures used to determine the actuarial value of assets; characteristics of future entrants for open group actuarial cost methods and other relevant items.

Actuarial Determined Contribution
A target or recommended contribution to a defined benefit pension plan for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.

Actuarial Gain (Loss)
A measure of the difference between actuarial and expected experience based upon a set of actuarial assumptions. Examples include higher than expected salaries increases (loss) and a higher return on fund assets than anticipated (gain).

Actuarial Present Value
The discounted value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of actuarial assumptions.

Amortization
1. The portion of the cost of a limited-life or intangible asset charged as an expense during a particular period.

2. The reduction of debt by regular payments of principal and interest sufficient to retire the debt by maturity.

Comprehensive Annual Financial Report (CAFR)
The CAFR is the official annual report of a governmental entity. It includes the basic financial statements and their related notes prepared in conformity with GAAP. It also includes supporting schedules necessary to demonstrate compliance with finance-related legal and contractual provisions, required supplementary information, extensive introductory material and a detailed statistical section.

Cost-sharing Multiple-employer Defined Benefit Pension Plan (cost-sharing pension plan)
A multiple-employer defined benefit pension plan in which the pension obligations to the employees of more than one employer are pooled and pension plan assets can be used to pay the benefits of the employees of any employer that provides pensions through the pension plan.

Glossary of Terms

(Continued)

Discount Rate

The single rate of return that, when applied to all projected benefit payments, results in an actuarial present value of projected benefit payments equal to the total of the following:

1. The actuarial present value of benefit payments projected to be made in future periods in which (a) the amount of the pension plan's fiduciary net position is projected (under the requirements of GASB Statement No. 67) to be greater than the benefit payments that are projected to be made in that period and (b) pension plan assets up to that point are expected to be invested using a strategy to achieve the long-term expected rate of return, calculated using the long-term expected rate of return on pension plan investments.

2. The actuarial present value of projected benefit payments not included in (1), calculated using the municipal bond rate.

Entry Age Actuarial Cost Method

A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on the level basis over the earnings or services of the individual between entry age and assumed exit age(s).

Independent Auditor's Report

In the context of a financial audit, a statement by the auditor describing the scope of the audit and the auditing standards applied in the examination, and setting forth the auditor's opinion on the fairness of presentation of the basic financial statements in conformity with generally accepted accounting principles (GAAP).

Money-weighted Rate of Return

A method of calculating period-by-period returns on pension plan investments that adjusts for the changing amounts actually invested. For purposes of GASB Statement No. 67, money-weighted rate of return is calculated as the internal rate of return on pension plan investments, net of pension plan investment expense.

Net Pension Liability

The liability of employers and non-employer contributing entities to plan members for benefits provided through a defined benefit pension plan.

Normal Cost

The ongoing annual cost allocated to the system by a particular actuarial cost method for providing benefits (future cost). Normal cost payments are made during the working lifetime of the member.

Pension Contribution

The amount paid into a pension plan by an employer (and/or employee), pursuant to the terms of the plan, state law, actuarial calculations or some other basis for determinations.

Pension Trust Fund

A fund used to account for public employee retirement benefits. Pension trust funds use the accrual basis of accounting and have a capital maintenance focus.

Total Pension Liability

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of member service in conformity with the requirements of GASB Statement No. 67.

Unfunded Actuarial Accrued Liability (UAAL)

The excess of the actuarial accrued liability over the actuarial value of assets represents the unfunded actuarial accrued liability.

UAAL Amortization Payment

The UAAL amortization payment is the portion of pension contributions, which is designed to pay off (amortize) the UAAL in a systematic fashion. Equivalently, it is a series of periodic payments required to pay off a debt.

ORANGE COUNTY OCERS EMPLOYEES RETIREMENT SYSTEM

Pieces of Public Transportation

– Orange County Transportation Authority

– Transportation Corridor Agencies

– County of Orange

– City of San Juan Capistrano

Orange County Employees Retirement System
2223 East Wellington Avenue, Suite 100
Santa Ana, CA 92701-3161

714.558.6200
www.ocers.org