CITY OF PHOENIX, ARIZONA

EMPLOYEES' RETIREMENT PLAN

COPERS

COMPREHENSIVE ANNUAL FINANCIAL REPORT
FISCAL YEARS ENDING JUNE 30, 2018 AND 2017

CITY OF PHOENIX
EMPLOYEES' RETIREMENT PLAN
(A Component Unit of the City of Phoenix, Arizona)

SEVENTY-SECOND ANNUAL
COMPREHENSIVE ANNUAL FINANCIAL REPORT
FOR THE FISCAL YEARS ENDED
JUNE 30, 2018 and 2017

200 West Washington Ave, 10th Floor
Phoenix, Arizona 85003
(602) 534-4400
FAX (602) 495-2008

Prepared by:
City of Phoenix
Employees' Retirement System
and
City of Phoenix
Finance Department

Table of Contents

INTRODUCTORY SECTION

FINANCIAL SECTION

INVESTMENT SECTION

Table of Contents (continued)

ACTUARIAL SECTION

STATISTICAL SECTION

Introductory Section

The **Introductory Section** contains the Certificate of Achievement for Excellence in Financial Reporting, the letter of transmittal, the Retirement Board structure, the administrative organization and the Chairperson's Report.

Government Finance Officers Association

Certificate of Achievement for Excellence in Financial Reporting

Presented to

City of Phoenix Employees' Retirement Plan Arizona

For its Comprehensive Annual Financial Report for the Fiscal Year Ended

June 30, 2017

Christopher P. Morrill

Executive Director/CEO

Public Pension Coordinating Council

Public Pension Standards Award For Funding and Administration 2018

Presented to

City of Phoenix 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

City of Phoenix
RETIREMENT SYSTEM

November 16, 2018

Chairperson and Members of the Retirement Board
City of Phoenix Employees' Retirement Plan:

I am pleased to submit this Comprehensive Annual Financial Report (CAFR) of the City of Phoenix Employees' Retirement Plan (COPERS or the Plan) as of and for the years ended June 30, 2018 and 2017. This report consists of the Introductory, Financial, Investment, Actuarial and Statistical sections.

The Plan is governed by the City of Phoenix Employees' Retirement Law of 1953 (Chapter XXIV of the City of Phoenix Charter). This law has been revised over the years, with the latest amendment approved by the City voters on August 25, 2015.

COPERS HISTORY

COPERS was created to provide retirement, survivor and disability benefits to the City of Phoenix general employees. COPERS is a qualified retirement plan under the Internal Revenue Code. The City of Phoenix Employees' Retirement Board (the Board) is the trustee of the Plan.

The Mayor and City Council are covered by the Elected Officials Retirement Plan of Arizona (EORPA). Sworn police and fire employees are covered by the Arizona Public Safety Personnel Retirement System (APSPRS). The EORPA and the APSPRS were created by Arizona State Statute. EORPA and APSPRS benefit payments, investments and overall administration of the Plans are handled by centralized State Boards, and each of the retirement plans publish separate financial reports. However, the administration of the system and responsibility for making the APSPRS provisions effective for each employer are vested in Local Boards. For the City of Phoenix, this responsibility rests with the City of Phoenix Fire Pension Board and the City of Phoenix Police Pension Board. The COPERS Retirement Program Administrator serves as the Local Board Secretary for both Boards, and retirement office staff perform the administrative functions on behalf of those Boards.

FINANCIAL INFORMATION

Responsibility for accuracy of the data, completeness, and fairness of the presentation of the CAFR, including all disclosures, rests with the Retirement Board. The Plan's record-keeping, financial statement and investment control responsibilities have been performed by the City's Finance Department. To the best of our knowledge and belief, this report is accurate in all material respects and is reported in a manner designed to present fairly the Fiduciary Net Position and changes in Fiduciary net position. All disclosures necessary to enable the reader to gain an understanding of the Plan's financial activities have been included.

Readers of this CAFR are encouraged to review the Management's Discussion and Analysis starting on page 18, which a provides narrative analysis and highlights of our financial condition and activities for the fiscal years ended June 30, 2018 and 2017.

AWARDS AND ACKNOWLEDGEMENTS

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to COPERS for its comprehensive annual financial report for the fiscal year ended June 30, 2017. In order to be awarded a Certificate of Achievement, an organization must conform to the highest standards of fiduciary reporting and full disclosure. This is the 32nd year COPERS has received this award.

The Plan also received the Public Pension Standards Award for Funding and Administration. This award was presented by the Public Pension Coordinating Council, a confederation of the National Association of State Retirement Administrators, the National Conference on Public Employee Retirement Systems and the National Council on Teacher Retirement. This is the ninth year the Plan has applied for and received this award.

INTERNAL CONTROLS

Internal controls are procedures designed to accomplish the following: to protect assets from loss, theft or misuse; to check the accuracy and reliability of accounting data; to promote operational efficiency; and, to encourage compliance with managerial policies. The Board and the City of Phoenix (the City) management are responsible for establishing a system of internal controls designed to provide reasonable assurance that these objectives are met. Because the cost of internal controls should not outweigh their benefits, the City's comprehensive framework of internal controls has been designed to provide reasonable, rather than absolute, assurance that the financial statements are free of any material misstatements. Representatives from the City Auditor's Department meet periodically with the Board to review their audit plans and present the results of the audits. Moreover, representatives from the independent auditors meet annually with the Board to review their audit plans and receive input from the Board. The City also maintains budgetary controls designed to ensure compliance with legal provisions of the annual budget adopted by the City Council.

This report has been prepared in conformance with the principles of governmental accounting and reporting as set forth by the Governmental Accounting Standards Board. Transactions of COPERS are reported on the accrual basis of accounting. Revenues are recorded when earned, without regard to the date of collection, and expenses are recorded when incurred. The City's internal accounting and audit controls are designed to provide for the accuracy, reliability and integrity of all financial records.

MAJOR INITIATIVES INVOLVING PLAN ADMINISTRATION

In March of 2017, the Board adopted a revised asset allocation that more closely aligns the Board's risk tolerance with expected returns. The Retirement Board and COPERS staff have worked over the past year to move COPERS' investments within the approved target ranges for each of the asset classes. As of this report, this project is nearly 90 percent completed.

ADMINISTRATIVE BUDGET

The City provides an annual budgetary allocation to pay for the general administration of COPERS. The cost paid by the City for COPERS' administration was $1.863 million. Most investment-related expenses, such as investment custody costs, investment manager fees, and consultant fees, are paid directly from the Plan's assets. Certain administrative fees for legal, actuarial and computer services are also paid directly from Plan assets. The investment costs amounted to $17.07 million for the fiscal year ended June 30, 2018. These costs represented 0.67% of total Plan assets.

FUNDING STATUS AND PROGRESS

Fund balances are derived from net assets and are accumulated to meet current and future obligations to retirees and beneficiaries. COPERS' funding objective is to meet these obligations through contributions, which remain approximately level as a percent of member payroll. The actuarial valuation as of June 30, 2018, reflects a funded ratio of 60.6% (using the actuarial valuation of assets), the difference between the actuarial value of assets and the actuarially-calculated pension liability. The unfunded actuarial accrued liability will be amortized as a level percent of payroll over future years, except that the amortization of the impact of the assumption changes adopted in both 2013 and 2015 are being phased in to the full level percent of payroll amount over four years. The amortization period as of June 30, 2018 is 20 years. A smoothed market value of assets was used for the June 30, 2018 valuation. This method spreads the difference between the actual and expected investment return over four years. A detailed discussion of the funding of COPERS is provided in the Actuarial Section of this report.

INVESTMENT ACTIVITIES

As of June 30, 2018, the net asset value of the COPERS Plan is $2.554 billion. The fiscal year net return for the Plan is 7.1%, which is 0.15% below the assumed rate of return of 7.25%. The five-year annualized return, net of fees, is 8.5%. The Board considered and approved five contracts for investment managers during the year to implement the approved asset allocation.

For more information on COPERS' investment policies and performance, please refer to the Investment section in this report, beginning on page 51.

PROFESSIONAL SERVICES

The Retirement Board retains professional consultants to prudently discharge its fiduciary responsibility for the proper administration of the Plan. Gabriel Roeder Smith & Company (GRS) provides actuarial services and the corresponding certification. BNY Mellon serves as the master custodian. Brokerage trade execution monitoring is compiled by Elkins/McSherry, LLC. Meketa Investment Group provides investment performance analysis, asset allocation review and investment consulting to the Retirement Board. Alignium provides consultative services to COPERS regarding its real estate investments. COPERS' financial statements are audited by Baird, Kurtz & Dobson (BKD) and reviews of operations are performed by the City Auditor's Department. Managed Medical Review Organization, Inc., provides independent medical evaluation services related to disability retirement applications.

The City Attorney's office provides legal representation. COPERS also uses outside legal services in the event the City Attorney's office has a conflict or for specialized legal work. Those firms are Ice Miller and Ryan, Rapp & Underwood, P.L.C.

The guidance provided by the Retirement Board is greatly appreciated. The preparation of this report is a collaborative effort of many individuals. I would like to acknowledge the hard work of the COPERS staff, the Finance Department and the Retirement Board. This report is intended to provide important information crucial to the understanding of the pension plan.

Sincerely,

Scott Steventon

Scott Steventon
Acting Retirement Program Administrator

200 West Washington Street, 10th Floor • Phoenix, Arizona 85003 • 602-534-4400 • Fax: 602-495-2008 • 7-1-1 Relay Friendly

RETIREMENT BOARD



CHARLENE REYNOLDS
Chairperson, Retirement Board
Elected Board Member

SUSAN PERKINS
Vice Chairperson, Retirement Board
Retiree Board Member

ALAN MAGUIRE
Citizen Board Member



LORI BAYS
Human Resources Director
City of Phoenix
Ex-Officio Board Member

TONI MACCARONE
Special Assistant to the City Manager
City of Phoenix
Ex-Officio Board Member

KATHLEEN GITKIN
City Treasurer
City of Phoenix
Ex-Officio Board Member



JASON STOKES
Elected Board Member

DENISE OLSON
Chief Financial Officer
City of Phoenix
Ex-Officio Board Member

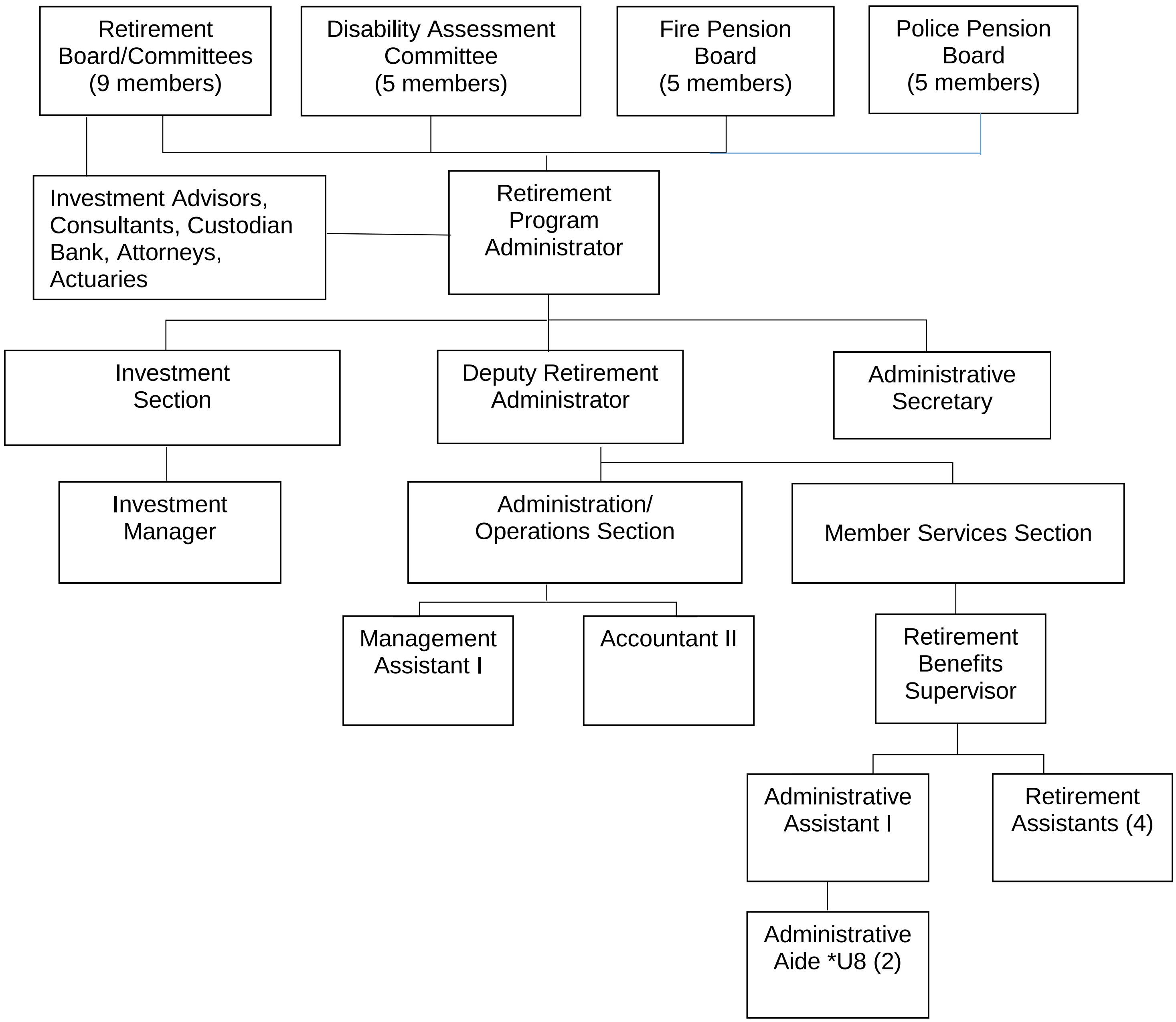
SPENCER SELF
Elected Board Member

Retirement Board Committees

Investment Committee	Charter Amendments/ Policies & Procedures Committee
Kathleen Gitkin	Lori Bays, Chairperson
Alan Maguire	Jason Stokes
Denise Olson	Denise Olson
Susan Perkins	
Charlene Reynolds	

Legal Review Committee	Disability Assessment Committee
Toni Maccarone, Chairperson	Scott Steventon, Chairperson
Alan Maguire	Jon Brodsky
Jason Stokes	Leslie Dewar
Susan Perkins	Ron Ramirez
	Robert Jones, M.D.

Retirement Department
Administrative Organization



Please refer to the Investment Section for a list of Investment Managers on page 63 and the Schedule of Investment Fees on pages 69-70 and 72.

Administrative Staff

Scott Steventon	Acting Retirement Program Administrator
Monica Lofton	Accountant II
Alejandra Montoya	Administrative Aide
Jana Evans	Administrative Aide
Kyle Corbin	Administrative Assistant I
Barbara Trollope	Deputy Retirement Administrator
Greg Fitchet	Investment Officer
Trista Eaden	Management Assistant I
Bobbie Gonzalez	Retirement Assistant
Marissa Hernandez	Retirement Assistant
Josie Romero	Retirement Assistant
Vacant	Retirement Assistant
Lollita Whitfield	Retirement Benefits Supervisor
Marcia Wilson	Secretary III

Accounting

Denise Olson	Chief Financial Officer, Finance Department

Treasurer

Kathleen Gitkin	City Treasurer, Finance Department

Legal

Michelle Wood	Assistant City Attorney IV, Law Department

Actuary

Gabriel, Roeder Smith & Company	Denver, CO

Auditor

Baird, Kurtz & Dobson, LLP (BKD)	Dallas, TX Certified Public Accountants under contract with the City Auditor

Brokerage

Elkins McSherry LLC	New York, NY

Investment Services

Refer to Investment Section for:
Investment Managers on page 63
Schedule of Fees and Commissions on pages 69 – 70 and 72

Legal Services

ICE Miller	Indianapolis, IN
Ryan, Rapp & Underwood	Phoenix, AZ

Master Custodian

BNY Mellon	Pittsburgh, Pennsylvania

Medical Advisors

Several physicians and clinics used for evaluation of disability applicants on a "per case" basis

City of Phoenix
RETIREMENT SYSTEM

November 16, 2018

To COPERS Members and Retirees:

On behalf of the Retirement Board, it is my pleasure to present the City of Phoenix Employees' Retirement System (COPERS) Comprehensive Annual Financial Report (CAFR) for the fiscal years ended June 30, 2018 and June 30, 2017. This annual report contains information regarding the COPERS administration, financial statements, investments, actuarial and statistical data.

During the fiscal year, the Board's investment consultant, Meketa, provided performance measurement and assisted the Board with analysis of investment issues. Meketa reports the COPERS' total fund assets increased from $2.349 billion to $2.549 billion and net performance for the year ended June 30, 2018 was 7.1%. The annualized net return for the past three and five years was 6.3% and 7.2%, respectively.

The Board has implemented a diversified portfolio, in which all segments of the U.S. and International equity markets are represented. The fixed income and real estate allocations are diversified among several managers. Real estate holdings are further diversified among geographic locations and property types. The Board recently modified the plan’s asset allocation with the objective of maximizing its returns with the lowest possible risk.

The Board's actuarial consultant, Gabriel Roeder Smith & Company (GRS), conducted the annual actuarial valuation as of June 30, 2018. GRS reports the funded ratio based on the actuarial value of assets (AVA) of the plan to be 60.6%, an increase from the June 30, 2017 funded ratio of 58.2%. The plan sponsor, the City of Phoenix, remains committed to funding the employer's actuarially-computed contribution amount.

Representatives from the City Auditor Department and external auditors under contract with the City Auditor meet annually with the Board to review their audit plans, receive input from the Board and present the results of their audits.

The CAFR and the Popular Annual Financial Report (PAFR) for the fiscal year ended June 30, 2017 were once again recognized by the Government Finance Officers Association. These reports are accessible through the COPERS' internet site.

The COPERS Board continues to focus on fulfilling its fiduciary obligation to the COPERS members, retirees and beneficiaries. Please contact the Retirement Office with any questions or comments.

Sincerely,

Charlene Reynolds

Charlene Reynolds
Chairperson, Retirement Board

200 West Washington Street, 10th Floor • Phoenix, Arizona 85003 • 602-534-4400 • Fax: 602-495-2008 • 7-1-1 Relay Friendly

Financial Section

The Financial Section contains the opinion of the independent auditors, management's discussion and analysis, the audited financial statements, notes to the financial statements, and relevant supplemental information.

BKD
CPAs & Advisors

14241 Dallas Parkway, Suite 1100 | Dallas, TX 75254-2961
972.702.8262 | Fax 972.702.0673 | bkd.com

Independent Auditor's Report

Honorable Mayor and Members of the City Council
City of Phoenix Employees' Retirement System Retirement Board
Phoenix, Arizona

We have audited the accompanying financial statements of the City of Phoenix Employees' Retirement System (Plan), a fiduciary fund of the City of Phoenix, Arizona, as of and for the years ended June 30, 2018 and 2017, and the related notes to financial statements, which collectively comprise the Plan's basic financial statement 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 audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the 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.

Honorable Mayor and Members of the City Council
City of Phoenix Employees' Retirement System Retirement Board
Page 2

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the net position restricted for pensions of the Plan as of June 30, 2018 and 2017, and the changes in its net position restricted for pensions for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis and pension information 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.

Other Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise the Plan's basic financial statements. The introductory section, supplementary information, investment section, actuarial section and statistical section 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 supplementary information including the schedule of investment expenses, schedule of administrative expenditures and encumbrances and schedule of administrative expenses 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 supplementary information noted above is fairly stated, in all material respects, in relation to the basic financial statements as a whole.

The introductory section, investment section, actuarial section and statistical section 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.

BKD, LLP

Dallas, Texas
November 16, 2018

Management's Discussion and Analysis (unaudited)

Dear Members and Retirees:

The City of Phoenix Employees' Retirement System ("COPERS" or the "Plan") is pleased to provide the following analysis of the financial activities for the fiscal years ended June 30, 2018 and 2017. The information provided is intended to be considered in conjunction with the Transmittal Letter in the Introductory Section, the Statements provided in the Financial, Investment, Actuarial and Statistical Sections of this Comprehensive Annual Financial Report ("CAFR"), and the Notes to the Financial Statements.

Financial Highlights:
(in thousands)

- As of June 30, 2018, COPERS has $2,554,514 in Net Position Restricted for Pensions, as reflected in the Statement of Fiduciary Net Position on page 24. This amount represents an increase of 8.5% in this fiscal year. The increase is primarily attributable to an excess employer contribution of $70,000. The Net Position Restricted for Pensions as of June 30, 2017, was $2,353,607 compared to $2,151,421 as of June 30, 2016. The increase of 9.4% during 2017 was attributable to gains experienced in the financial markets, which impacted COPERS' investment performance.

- COPERS' additions to the Net Position Restricted for Pensions, as reported in the Statement of Changes in Fiduciary Net Position on page 25, for the fiscal year ended June 30, 2018 was $429,344 compared to $426,276 for fiscal year ended June 30, 2017 and $158,538 for fiscal year ended June 30, 2016. The increase for the current year was attributable primarily attributable to an excess employer contribution of $70,000. The amount for the fiscal year ending June 30, 2018 includes employer and employee contributions of $262,830 and net investment income of $166,514. Fiscal year ended June 30, 2017 and June 30, 2016, employer and employee contributions were $183,066 and $149,367, respectively. The net investment income was $243,210 and $9,171 for fiscal years ended June 30, 2017 and June 30, 2016, respectively.

- The Statement of Changes in Fiduciary Net Position reflects an increase in deductions in Plan net position of 1.9% from the fiscal year ended June 30, 2017. This compares to a 3.4% increase in deductions between June 30, 2017 and June 30, 2016. Total deductions for fiscal year ended June 30, 2018 were $228,437 compared to $224,090 for fiscal year ended June 30, 2017 and $216,643 for fiscal year ended June 30, 2016. The increases in deductions as of June 30, 2018 and June 30, 2017 are attributable to an increase in the number of retirees and refunds of contributions.

Using This Annual Report:

This report is prepared to provide information as a means for making management decisions, complying with statutory provisions, and demonstrating the responsible stewardship of the assets of the Plan. The financial statements starting on page 24 in the Financial Section identify the Net Position Restricted for Pensions and provide a comparison of the current fiscal year to the prior year.

Overview of Financial Statements:

The Financial Section includes the following:

- Statement of Fiduciary Net Position (Page 24)
- Statement of Changes in Fiduciary Net Position (Page 25)
- Notes to the Financial Statements (Page 26)
- Required Supplementary Information (Page 49)
- Supplementary Information (Page 52)

Statement of Fiduciary Net Position:

This statement presents information on all of the assets and liabilities of the Plan with the difference reported as Net Position Restricted for Pensions available to retirees and survivors. The current year information is provided in comparison to the previous year to assist the reader in evaluating the progress of the Plan.

Statement of Changes in Fiduciary Net Position:

The Statement of Changes in Fiduciary Net Position presents information showing how the Plan's net position changed during the stated fiscal year.

Notes to the Financial Statements:

The Notes to the Financial Statements are an integral part of the financial statements. The information provides the reader additional information that is essential to a full understanding of the data presented in the financial statements to further evaluate the financial condition and operation of the Plan.

Required Supplementary Information:

The Schedule of Changes in Net Pension Liability and Related Ratios provides the Plan's funding progress for the last five years and the funding ratio that identify the Plan's ability to meet its current and future benefit obligations. The Schedule of Employer Contributions reflects the City's Actuarial Determined Contribution and Actual Contributions for the last ten years. The Notes to the Required Supplementary Information provide additional information regarding actuarial assumptions and factors affecting trends.

Supplementary Information:

The Supplementary Information includes Investment Expenses and Administrative Expenditures for the current and previous year in operating COPERS. The Schedule of Investment Expenses provides the reader with the cost to the Plan for managing and monitoring the Plan's assets. The administrative expenditures paid by the City of Phoenix are not recognized in the COPERS financial statements as they are not material to the financial statements as a whole.

Financial Analysis
(in thousands)

The evaluation of the Plan's net position provides a measurement tool in assessing the progress and performance of the Plan. COPERS' Net Position Restricted for Pensions as of June 30, 2018 was $2,554,514. This amount represents an increase of 8.5% from Net Position Restricted for Pensions of $2,353,607 as of June 30, 2017. The Net Position Restricted for Pensions as of June 30, 2016 was $2,151,421. The Net Position Restricted for Pensions held Cash & Cash Equivalents as of June 30, 2018 of $90,105 compared to $38,582 for June 30, 2017 resulting in an increase of $51,523. Cash & Cash Equivalents will fluctuate due to timing of investments managed by the individual fund managers. Uninvested cash is held in Cash & Cash Equivalents and may fluctuate from time to time. The Plan had liabilities of $141,657 on June 30, 2018 compared to $272,162 on June 30, 2017. This change was primarily attributable to the reduction in purchases of investments that were in process at the end of the prior fiscal year. The return on investments for fiscal years 2018, 2017 and 2016 was 7.10%, 7.30%, and .60%, respectively. The chart below outlines investment performance over the last three fiscal years.

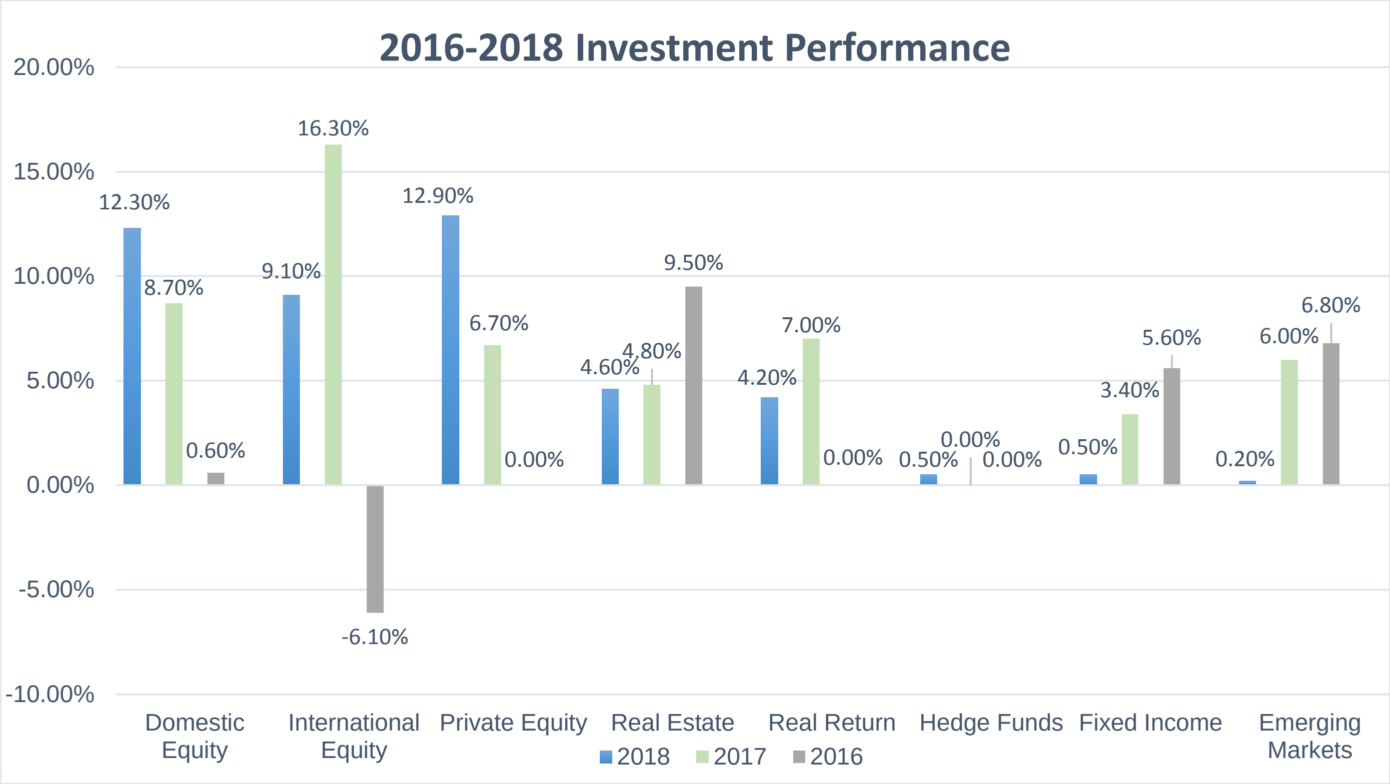


Table 1: COPERS Fiduciary Net Position for Benefits for June 30, 2018 and 2017 (in thousands)

	2018	2017	Change	% Change
Cash & Cash Equivalents	$ 90,105	$ 38,582	$ 51,523	133.5 %
Total Receivables	19,024	130,948	(111,924)	(85.5)
Total Investments	2,587,042	2,456,239	130,803	5.3
Total Assets	2,696,171	2,625,769	70,402	2.7
Total Liabilities	141,657	272,162	(130,505)	(48.0)
COPERS Net Position	**$2,554,514**	**$ 2,353,607**	**$ 200,907**	**8.5**

Table 2: COPERS Fiduciary Net Position for Benefits for June 30, 2017 and 2016 (in thousands)

	2017	2016	Change	% Change
Cash & Cash Equivalents	$ 38,582	$ 19,231	$ 19,351	100.6 %
Total Receivables	130,948	143,698	(12,750)	(8.9)
Total Investments	2,456,239	2,266,574	189,665	8.4
Total Assets	2,625,769	2,429,503	196,266	8.1
Total Liabilities	272,162	278,082	(5,920)	(2.1)
COPERS Net Position	**$2,353,607**	**$ 2,151,421**	**$ 202,186**	**9.4 %**

Reserves:

COPERS maintains five accounts to hold reserves for benefit payments. Additions to the reserves come from contributions (employer and member) and investment income. Distributions from the reserves include monthly pension benefits and increases to eligible pensions under the Pension Equalization Program and a supplemental post-retirement payment known as the "13th Check." A schedule of reserve account balances is included in Note 3 to the Financial Statements.

COPERS Activities:
(in thousands)

COPERS provides retirement pensions, survivor benefits, member contribution refunds, and disability benefits to qualified members and their beneficiaries. These benefits are financed through employer and member contributions and income on COPERS investments.

Net investment income, which includes net appreciation and depreciation in fair value of investments, bond interest, dividend income, net securities lending income and investment expenses for the fiscal year ended June 30, 2018 was $166,514. This compares to net investment income for June 30, 2017 and June 30, 2016 of $243,210 and $9,171, respectively. Total employer contributions were $229,006 in fiscal year 2018, compared to $152,153 in fiscal year 2017. The increase is primarily due to a one-time voluntary contribution of $70,000 by the City and increased Tier 3 contributions related to increased hiring. The employer contribution rate increased by .57% in fiscal year 2018. Deductions increased by 1.9% over the prior fiscal year, primarily as a result of an increase in the number of retirees. This compares to a 3.4% increase in deductions from June 30, 2016 to June 30, 2017. Benefit payments for the fiscal years 2018, 2017 and 2016 were $224,454, $220,276 and $213,047, respectively.

The summary of COPERS revenues (additions) and expenses (deductions) for the fiscal years ended June 30, 2018, 2017 and 2016 are provided in Table 3 and Table 4:

Table 3: Additions and Deductions to/from Fiduciary Net Position for the fiscal years ended June 30, 2018 and June 30, 2017 (in thousands)

	2018	2017	Change	% Change
Additions				
Employer Contributions	$ 229,006	$ 152,153	$ 76,853	50.5 %
Members' Contributions	33,340	30,870	2,470	8.0
Inter-System Transfers	484	43	441	1,025.6
Net Investment Income	166,239	242,888	(76,649)	(31.6)
Net Securities Lending Income	275	322	(47)	(14.6)
Total	**$ 429,344**	**$ 426,276**	**$ 3,067**	**0.7 %**
Deductions				
Benefit Payments	224,454	220,276	4,178	1.9 %
Refunds	3,472	3,227	245	7.6
Inter-System Transfers	134	207	(73)	(35.3)
Administrative Expense	377	380	(3)	(0.8)
Total	**$ 228,437**	**$ 224,090**	**$ 4,347**	**1.9 %**
Change in Net Position Restricted for Pensions	**200,907**	**202,186**	**(1,279)**	**(0.6) %**
Ending Net Position Restricted for Pensions	**$ 2,554,514**	**$ 2,353,607**	**$ 200,907**	**8.5 %**

Table 4: Additions and Deductions to/from Fiduciary Net Position for the fiscal years ended June 30, 2017 and June 30, 2016 (in thousands)

	2017	2016	Change	% Change
Additions				
Employer Contributions	$ 152,153	$ 119,844	$ 32,309	27.0 %
Members' Contributions	30,870	29,306	1,564	5.3
Inter-System Transfers	43	217	(174)	(80.2)
Net Investment Income	242,888	8,919	233,969	2,623.3
Net Securities Lending Income	322	252	70	27.8
Total	**$ 426,276**	**$ 158,538**	**$ 267,738**	**168.9 %**
Deductions				
Benefit Payments	220,276	213,047	$ 7,229	3.4 %
Refunds	3,227	3,047	180	5.9
Inter-System Transfers	207	315	(108)	(34.3)
Administrative Expense	380	234	146	62.4
Total	**$ 224,090**	**$ 216,643**	**$ 7,447**	**3.4 %**
Change in Net Position Restricted for Pensions	**202,186**	**(58,105)**	**260,291**	**(448.0) %**
Ending Net Position Restricted for Pensions	**$ 2,353,607**	**$ 2,151,421**	**$ 202,186**	**9.4 %**

Requests for Information:

This report is prepared to provide the Retirement Board, members, retirees and citizens with an overview of the plan, to assess COPERS' financial position and to show accountability for funds received. Questions regarding the information provided in this financial report or requests for additional information may be addressed to:

COPERS
200 W. Washington, 10th Floor
Phoenix, AZ 85003
(602) 534-4400
www.phoenix.gov/copers

Statement of Fiduciary Net Position as of June 30, 2018 and 2017 (in thousands)

	2018	2017
ASSETS		
Cash and Cash Equivalents	$ 90,105	$ 38,582
Receivables		
Due from the City of Phoenix	358	
City of Phoenix Contributions	5,560	4,988
Member Contributions	1,159	1,006
Interest and Dividends	1,545	1,541
Unsettled Broker Transactions - Sales	9,660	93,359
Unsettled Broker Transactions - Foreign Exchange Sales	98	29,719
Other	644	335
Total Receivables	19,024	130,948
Investments		
Temporary Investments from Securities Lending Collateral	108,991	90,569
Fixed Income	296,714	512,001
Domestic Equities and Other	1,174,010	592,444
Global Commingled	465,986	446,101
International Equities	71,814	244,881
Hedge Funds	122,339	254,936
Real Estate	347,188	315,307
Total Investments	2,587,042	2,456,239
Total Assets	2,696,171	2,625,769
LIABILITIES		
Payable for Securities Lending Collateral	108,991	90,569
Unsettled Broker Transactions - Purchases	30,963	150,076
Unsettled Broker Transactions - Foreign Exchange Purchases	98	29,719
Due to the City of Phoenix - Other	206	287
Investment Management Fees Payable	1,239	1,411
Other Payables	160	100
Total Liabilities	141,657	272,162
Net Position Restricted for Pensions	$ 2,554,514	$2,353,607

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

Statement of Changes in Fiduciary Net Position for the fiscal years ended June 30, 2018 and 2017 (in thousands)

	2018	2017
ADDITIONS		
Contributions		
City of Phoenix	$ 229,006	$ 152,153
Member	33,340	30,870
Inter-System Transfers	484	43
Total Contributions	262,830	183,066
Net Investment Income		
From Investing Activities		
Net Appreciation/(Depreciation) in Fair Value of Investments	150,689	228,354
Interest	7,439	6,696
Dividends	23,121	20,204
Other	2,063	4,386
Total Income from Investing Activities	183,312	259,640
Less Investing Activities Expense	(17,073)	(16,752)
Net Income from Investing Activities	166,239	242,888
From Security Lending Activities		
Security Lending Gross Income	1,348	761
Less Security Lenging Activity		
Agent Fees	(118)	(138)
Broker Rebates/Collateral Management Fees	(955)	(301)
Total Security Lending Expenses, net	(1,073)	(439)
Net Income from Security Lending Activities	275	322
Total Net Investment Income	166,514	243,210
Total Additions	429,344	426,276
DEDUCTIONS		
Benefit Payments	224,454	220,276
Refunds of Contributions	3,472	3,227
Inter-System Transfers	134	207
Administrative Expenses	377	380
Total Deductions	228,437	224,090
NET INCREASE/(DECREASE) IN NET POSITION	200,907	202,186
Net Position Restricted for Pensions		
Beginning of Year	2,353,607	2,151,421
End of Year	$ 2,554,514	$2,353,607

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

Note 1 - Summary of Significant Accounting Policies

The City of Phoenix Employees' Retirement Plan ("COPERS" or the "Plan") is a defined benefit single-employer public employees' retirement system for the City of Phoenix ("City") general municipal employees. The accounting policies of COPERS conform to accounting principles generally accepted in the United States of America ("GAAP") as applicable to governmental retirement plans.

a. Reporting Entity

COPERS prepares and distributes separate financial statements as required by the Charter of the City of Phoenix (Chapter XXIV, Article II, Employees' Retirement Law of 1953) ("Charter"). Its financial statements are also included as a component unit of the City due to the significance of COPERS' operational and financial relationships with the City. The City is the only non-employee contributor to the pension plan. Not all employees of the City are covered under COPERS. Police officers and firefighters are covered under the Arizona Public Safety Personnel Retirement System ("APSPRS") and elected officials under the Elected Officials Retirement Plan of Arizona ("EORPA"). APSPRS and EORPA were established by Arizona State Statute and are administered by an independent Board of Trustees. The City's involvement with these plans is limited to the administration of benefits for APSPRS through the City of Phoenix Fire and Police Local Boards and making the required annual contributions.

b. Basis of Accounting

COPERS' financial statements are prepared using the accrual basis of accounting using the economic resources measurement focus. Employee contributions are recognized as revenues in the period in which employee services are performed and the contributions are therefore earned. Employer contributions are recognized at the same time, as the City is formally committed to contributing the actuarially determined amount each year. Benefit payments received each month by retirees are recognized as an expense of the prior month, and refunds are recognized as expenses when due and payable, in accordance with the terms of the plan.

c. Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make a number of estimates and assumptions that affect the reported amounts of net position restricted for pensions and changes therein. Actual results could differ from those estimates.

d. Investments

Equity securities and fixed-income securities are reported at fair value (Note 8). Interest and dividend income is recognized on the accrual basis as earned. Purchases and sales of investments are recorded on a trade-date basis. Cash equivalents are determined by using a maturity of no more than 90 days at time of purchase. The fair value of an investment is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The fair values of investments are generally based on published market prices and quotations obtained from major investment firms.

Note 1 - Summary of Significant Accounting Policies (Continued)

In March of 2017, the Board significantly revised the Investment Policy Statement that was more than 10 years old. The Board felt these revisions were necessary to:

- Update the objectives and guidelines that govern the investment of COPERS' assets;
- Establish a long-term target asset allocation with a high likelihood of meeting COPERS' objectives; and
- Protect the financial health of COPERS through the implementation of a stable, long-term investment policy.

Significant areas of revision include modifying the asset allocation, reflecting the changes in the Phoenix City Charter that previously limited the types of investments COPERS could make, and adding prudent investor language. A comparison between the asset allocation used for this reporting period and the revised allocation is below:

Asset Class	FY 2017 Target	FY 2018 Target
U.S. Equity	18%	16%
Developed Market Equity (non-U.S.)	16%	9%
Public Emerging Market Equity	-	8%
Private Equity	3%	9%
Investment Grade Bonds	20%	15%
TIPS	-	7%
High Yield Bonds	-	5%
Bank Loans	-	3%
Emerging Market Bonds	5%	3%
Infrastructure	-	4%
Natural Resources	-	4%
Hedge Funds	15%	5%
Real Estate	15%	12%
GTAA	8%	-
Cash	-	-

In consultation with their investment manager and consulting actuary, the Board believes the revised asset allocation will have a greater probability of earning the assumed rate of return. The revised asset allocation was adopted during fiscal year 2017 and is being implemented in phases. Until fully realized, the effects of these changes is not known.

Note 2 - Description of Plan

a. Purpose

COPERS is a single-employer, defined benefit pension plan established by the City Charter. Its purpose is to provide retirement, disability retirement and survivor benefits for its members. Members are full-time employees on a work schedule which consists of the number of full-time hours per week designated for the class of employment for the employee's classification and which work schedule is intended to be continuous over a period of twelve months. All full-time classified civil service employees and full-time appointive officials of the City are required, as a condition of employment, to contribute to COPERS.

b. Administration

The general administration, management and operation of COPERS are vested in a nine-member Retirement Board consisting of three elected employee members, four statutory members, a citizen member and a retiree member. The Retirement Board appoints the Retirement Program Administrator, a civil service position, and contracts other services necessary to properly administer the Plan.

c. Plan Amendment and Termination

COPERS is administered in accordance with the Charter and can be amended or repealed only by a vote of the people. There are no provisions for termination of COPERS. Voters approved changes to the City of Phoenix retirement system at an election held on August 25, 2015. New employees hired on or after January 1, 2016 were placed in Tier 3. The employee contribution rate for Tier 3 is based on 50% of the actuarially determined rate or 11% whichever is lower.

d. Membership Data

	June 30	
	2018	**2017**
Current retirees, beneficiaries and survivors	6,974	6,822
Alternate payees	164	158
Terminated vested members	943	925
Active members:		
Tier 1	5,638	6,030
Tier 2	737	823
Tier 3	1,602	1,177
Total Members	16,058	15,935

Note 2 - Description of Plan (Continued)

e. Pension Benefits

Benefits are calculated on the basis of a given rate, final average salary and service credit. Members are eligible for retirement benefits at age 60 plus ten or more years of service credit, age 62 with five or more years of service credit, or where age and service credits equal 80 for Tier 1 employees and 87 for Tier 2 and 3 employees. The below table outlines the benefits for each tier.

Tier 1	Tier 2	Tier 3
• Up to 32.5 yrs service @ 2.0%	• Less than 20 yrs service @ 2.10%	• Less than 10 yrs service@1.85%
• 32.5 to 35.5 yrs service @ 1.0%	• 20 yrs but less than 25 yrs service @ 2.15%	• 10 yrs but less than 20 yrs service @ 1.9%
• 35.5 yrs service & over @ 0.5%	• 25 yrs but less than 30 yrs service @ 2.20%	• 20 yrs but less than 30 yrs service @ 2.0%
	• 30 yrs or more @ 2.30%	• 30 yrs or more @ 2.1%

A deferred pension is available at age 62 for members who have five or more years of service credit at time of separation and leave their accumulated contributions in COPERS.

A supplemental post-retirement payment and a permanent benefit increase (under the Pension Equalization Program) may be provided to Tier 1 and Tier 2 retirees if sufficient reserves are available at the end of the fiscal year. The reserve is funded if the five-year average investment return exceeds 8%.

f. Disability Benefits

A member who becomes permanently disabled for the performance of duty is eligible for a disability benefit if the disability is 1) by reason of a personal injury or disease and the member has ten or more years of service credit or 2) due to on-the-job injuries, regardless of service credit.

g. Survivor Benefits

Dependents of deceased members may qualify for survivor benefits if the deceased member had ten or more years of service credit or if the member's death was in the line of duty with the City and compensable under the Workmen's Compensation Act of the State of Arizona. Chapter XXIV, Section 25 of the Charter of the City of Phoenix specifies the dependents and conditions under which they qualify for survivor benefits.

h. Refunds

Upon separation from employment, a member or beneficiary not entitled to a pension may withdraw the member's contribution plus applicable interest. An interest rate of 3.75% for fiscal year 2018 was granted by the Retirement Board to be applied at June 30, 2018 to the members' mean account balances during the fiscal year. The acceptance of a refund cancels the individual's rights and benefits in COPERS. Employer contributions to COPERS are not refundable.

Note 2 - Description of Plan (Continued)

i. Tax Exempt Status of Member Contributions

COPERS has received a favorable letter of determination of qualification from the Internal Revenue Service under Section 401(a) of the Internal Revenue Code. Continued tax-exempt status of COPERS is contingent on future operations remaining in compliance with Section 401(a).

Under Internal Revenue Code Section 414(h)(2) and Revenue Ruling 81-36, effective January 1, 1985 the City of Phoenix authorized that a portion of its contributions be earmarked as being made by the members of COPERS, and "picked up" that portion of the designated active member contributions. The member contribution that is picked up by the City of Phoenix is treated as an employer contribution for federal and state income tax purposes and excluded from the member's gross income until distributed by COPERS.

Note 3 – Net Position Restricted for Pensions

Various accounts have been established to hold the reserves for benefit payments:

- The **Income Account** is used to account for COPERS' investment income and loss, including net appreciation or depreciation in fair value and miscellaneous income. At year-end, the Income Account is closed to the Employees' Savings Account, the Pension Accumulation Account, the Pension Reserve Account and the Pension Equalization Reserve Account, which results in no fund balance in the Income Account.

- The **Employees' Savings Account** is used to account for member contributions, member refunds, and the member portion of investment income. As a condition of employment, a member hired before July 1, 2013 is required to contribute 5% of his/her covered compensation; a member hired after this date is required to contribute 50% of the actuarially determined rate, while the City contributes the other 50%. Effective with the election on August 25, 2015, the employee contribution for Tier 2 and 3 cannot exceed 11%. Accumulated contributions receive regular interest that is computed at the end of each fiscal year on the mean balance in the members' accounts during the year. The rate of interest is established each year by the Board (3.75% in fiscal year 2018 and 2017). Transfers are made from the Employees' Savings Account to the Pension Reserve Account when a member retires or becomes eligible for disability benefits.

- The **Pension Accumulation Account** is used to account for employer contributions and for a portion of investment income. The Charter requires the City to contribute an amount that is determined annually by COPERS' retained actuaries. Contributions are based upon a level percentage of payroll. This contribution is over and above the member contributions made by the City. The Pension Accumulation Account may carry a negative balance as the City contribution rate includes a component for the unfunded actuarial liability (UAL). Transfers are made from the Pension Accumulation Account to the Pension Reserve Account when a member retires or becomes eligible for disability benefits.

- The **Pension Reserve Account** is used to account for distributions to retirees and the balance receives regular interest that is computed at the end of each fiscal year on the mean balance during the year. The rate of interest is the actuarial assumed rate.

- The **Pension Equalization Reserve Account** is used for funding increases to eligible pensions under the Pension Equalization Program and the "13th Check." The Pension Equalization Program was established on October 1, 1991, when voters of the City of Phoenix approved an amendment to the City Charter, allowing pension adjustments to be paid to retired members of COPERS. These adjustments are to be made exclusively from COPERS' investment earnings in excess of 8% (per Charter) over the preceding 5-year period, and may not exceed the Phoenix Area Consumer Price Index (CPI). This amendment was effective January 1, 1992, and will benefit only retirees who, as of January 1 of each year, have received at least 36 pension payments.

Note 3 – Net Position Restricted for Pensions (continued)

Following are the fiscal year-end reserve balances as of June 30, 2018 and 2017 respectively, based on amortized cost for fixed income investments and cost for equity investments (in thousands):

	2018	2017
Employees' Savings	$ 482,270	$ 469,443
Pension Accumulation	(1,340,973)	(1,180,969)
Pension Reserve	3,043,708	2,749,828
Pension Equalization Reserve	7,994	148
Convert to Fair Value	361,515	315,157
Total Based on Fair Value	$ 2,554,514	$ 2,353,607

Note 4 - Investment Fees (in thousands)

The investment costs paid from Plan assets were $16,951 and $16,752 for the fiscal years 2018 and 2017, respectively. This information is provided in greater detail in the Supplementary Information section of this document.

Fund Manager fees charged to the Plan for investments for actively managed funds are deducted from income earned and are not separately reflected. Consequently, Fund Manager fees are reflected as a reduction of investment return for such investments.

Note 5 - Funding Requirement Determinations and Actual Contributions (in thousands)

City of Phoenix contributions for fiscal year 2018 were $229,006, which is equivalent to 43.48% of the estimated annual active member payroll, compared to $152,153 or 29.19% for the fiscal year 2017. Member contributions for the fiscal years 2018 and 2017 were $33,340 and $30,870, respectively. The Tier 1 employee contribution rate is 5%. The Tier 2 and Tier 3 employee contribution rate is 11%.

Employer contributions are actuarially determined amounts, which together with member contributions are sufficient to cover both (i) normal costs of the plan and (ii) financing of unfunded actuarial costs over a selected period of future years. (See Note 6)

Note 6 – Funded Status and Funding Progress (as of most recent valuation)

Unfunded actuarial liabilities are determined annually by the consulting actuary, applying actuarial assumptions to reflect the time value of money (through discounts for interest) and the probability of payment (by means of decrements, such as for death, disability, withdrawal or retirement) between the valuation date and the expected date of payment.

The information presented in the required supplementary schedules was determined as part of the actuarial valuations at the date indicated. Additional information as of the latest actuarial valuation follows:

Description	**Methods/Assumptions**	
Valuation Date	**June 30, 2018**	**June 30, 2017**
Actuarial Cost Method	Individual Entry Age	Individual Entry Age
Amortization Method	Level Percentage of Payroll, Closed	Level Percentage of Payroll, Closed
Remaining Amortization Period	25 Years	25 Years
Actuarial Assumptions		
Investment Rate of Return	7.25%	7.25%
Projected Salary Increases (a)	3.0%-9.6%	3.0%-9.6%
Cost-of-Living Adjustments	1.25%	1.5%
Factors Affecting Trends:	None	None

(a) Includes inflation at 2.50% and merit and longevity rates based on age.

Note 6 – Funded Status and Funding Progress (as of most recent valuation) (continued)

The actuarial assumptions used for the June 30, 2018 and June 30, 2017 valuations, include the following:

1) Salary Scale – Salary increases are composed of a price inflation component, a real wage growth component and a merit or longevity component that varies by age. Growth in total payroll is assumed to be 3.00%

2) Multiple Decrement Tables:

    a) Death - For determination of member, retiree and beneficiary mortality, the MP-2015 Mortality Improvement Scale.

    b) Disability - Based upon 0.960 times the CalPERS Public Agency: Miscellaneous Ordinary Disability Incidence table for males.

    c) Withdrawal - Based upon COPERS' experience, measures the probability of members terminating employment for reasons other than retirement, death or disability.

The foregoing actuarial assumptions are based on the presumption that COPERS will continue as presently chartered. If COPERS is amended, different actuarial assumptions and other factors might be applicable in determining actuarial present values.

Note 6 – Funded Status and Funding Progress (as of most recent valuation) (continued)

The target allocation and best estimates of arithmetic real rates of return for each major asset class are summarized in the following table. The return rates are based on capital market assumptions by Meketa, COPERS' investment consultant.

Asset Class	Target Allocation	10-Year Expected Real Return Rate of Return
US Equity	26.70%	7.32%
International Equity	18.30%	8.30%
US Fixed Income	13.20%	2.58%
Emerging Markets Bonds	6.60%	5.52%
Real Return	6.80%	4.68%
Real Estate	13.60%	7.32%
Absolute Return (Hedge Funds)	4.80%	4.25%
Private Equity	4.50%	10.28%
TIPS	5.10%	0.00%
Cash	0.40%	1.51%

Actual returns may be lower due to volatility of returns. The long-term expected rate of return is based on Meketa's capital market assumptions with a 2.5% inflation assumption.

Discount Rate

The discount rate used to measure the total pension liability was 7.25%. The projection of cash flows used to determine the discount rate assumed that Tier 1 member contributions remain at 5% of payroll, Tier 2 and 3 member contributions are set equal to half of the total actuarially determined contribution rate, not to exceed 11%, and City contributions will be made at rates equal to the difference between the actuarially determined contribution rates and the member rates. Based on those assumptions, the pension plan's fiduciary net position was projected to be sufficient to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

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

The table below presents the net pension liability of the Plan calculated using the discount rate of 7.25%, as well as what the net pension liability would be if it were calculated using the discount rate that is 1.0% lower (6.25%) or 1.0% higher (8.25%) than the current rate at June 30, 2018. Changes in the discount rate affect the measurement of the TPL (Total Pension Liability). Lower discount rates produce a higher TPL and higher discount rates produce a lower TPL. Because the discount rate does not affect the measurement of assets, the percentage change in the NPL can be very significant for a relatively small change in the discount rate. A 1.0% decrease in the discount rate increases the TPL by approximately 12.1% and increases the NPL (Net Pension Liability) by approximately 30.6%. A 1.0% increase in the discount rate decreases the TPL by approximately 10.1% and decreases the NPL by approximately 25.6%. The table below shows the sensitivity of the NPL to the discount rate.

Note 6 – Funded Status and Funding Progress (as of most recent valuation) (continued)

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

	1% Decrease	Discount Rate	1% Increase
	6.25%	**7.25%**	**8.25%**
Total Pension Liability	$4,738,210	$4,226,046	$3,798,811
Plan Fiduciary Net Position	2,554,514	2,554,514	2,554,514
Net Pension Liability	$2,183,696	$1,671,532	$1,244,297

The Net Pension Liability as a percent of Plan Fiduciary Net Position was 60.5% and 57.0% at June 30, 2018 and June 30, 2017, respectively.

Note 7 - Funding Policy

As a condition of employment, COPERS members are required to contribute a percentage of their salary to COPERS as provided in Chapter XXIV, Section 27, of the City Charter. The below table outlines the contribution rates for Tiers 1, 2, and 3 for fiscal year 2017-2018.

Tier	Contribution Rate
Tier 1	5%
Tier 2	Capped at 11%
Tier 3	Capped at 11%

Present members' accumulated contributions at June 30, 2018 were $482,270, including interest compounded annually, compared to $469,443 at June 30, 2017, and are included in the Employee Savings Account as discussed on page 32. The City's funding policy is designed to provide annual contributions to COPERS in amounts that are estimated to remain a constant percentage of members' compensation each year, such that, when combined with members' contributions, all active member benefits will be fully funded as earned. Contributions by the City to the Plan are actuarially determined.

Note 8 – Investments

The Board has a duty to invest and manage the assets of the Plan solely in the interests of the members and beneficiaries. The Board shall invest and manage trust assets as a prudent investor would, by considering the purposes, terms, distribution requirements, and other circumstances of the Plan. In satisfying this standard, the Board shall exercise reasonable care, skill, and caution.

The Board's present policy has resulted in approximately 39.6% at fair value being invested in domestic common stocks as of June 30, 2018 or approximately 38.8% at cost. The City Charter does not contain any limitations on the percent invested in international equities. The Board’s investment policy has a target of 9% investment (at fair value) in international equity investments. As of June 30, 2018 approximately 18.3% was invested (at fair value) in international equity investments.

Note 8 - Investments (continued)

A summary of investments at June 30, 2018 and 2017 is as follows (in thousands):

	2018		2017	
	Fair Value	Amortized Cost	Fair Value	Amortized Cost
Temporary Investments from Securities Lending Collateral (Note 9)	$ 108,991	$ 108,991	$ 90,569	$ 90,569
Fixed Income	296,714	283,319	512,001	465,452
Domestic Equity	1,060,474	898,165	515,059	433,667
Private Equity	113,536	87,515	77,385	65,652
International Equities	71,814	42,978	244,881	181,539
Global Commingled	465,986	421,190	446,101	428,117
Hedge Funds	122,339	121,593	254,936	222,780
Real Estate	347,188	261,776	315,307	253,307
Total Investments	**$ 2,587,042**	**$ 2,225,527**	**$ 2,456,239**	**$ 2,141,083**
Cash and Cash Equivalents	90,105	90,105	38,582	38,581
Total	**$ 2,677,147**	**$ 2,315,632**	**$ 2,494,821**	**$ 2,179,664**

COPERS investments are managed by professional fund managers and are held by a plan custodian who is a COPERS agent.

Note 8 - Investments (continued)

The following schedule provides the fair value of each investment category at June 30, 2018 and 2017 (in thousands):

Investment Categories	2018 Fair Value	2017 Fair Value
Cash	$ 289	$ 2,590
Short-Term Investment Fund	89,816	35,992
Cash and Cash Equivalents	$ 90,105	$ 38,582
Temporary Investments from Securities Lending Collateral	$ 108,991	$ 90,569
Fixed Income:		
Futures	$ 124	$ 173
SWAPS	124	816
U S Government Guaranteed Securities	40,674	62,930
Government Agencies Securities	6,080	2,805
Mortgage Backed Securities-Residential	58,357	83,776
Asset Backed Securities	6,902	4,382
Municipal Bonds	-	3,990
Corporate Bonds	72,987	78,739
Corporate Bonds Commingled	-	12,808
Commingled Fixed Income	-	143,342
Foreign	8,315	14,920
Foreign Commingled	103,151	103,320
	$ 296,714	$ 512,001
Domestic Equities	$ 1,060,474	$ 515,059
Global Commingled	$ 465,986	$ 446,101
International Equities	$ 71,814	$ 244,881
Private Equity	$ 113,536	$ 77,385
Hedge Funds	$ 122,339	$ 254,936
Real Estate Funds	$ 347,188	$ 315,307
Total with Securities Lending Collateral	$ 2,677,147	$ 2,494,821

Note 8 – Investments (continued)

Custodial Credit Risk - Deposits
Custodial credit risk for deposits is the risk that in the event of a depository institution failure, a government will not be able to recover deposits or collateral held by an outside party. As of June 30, 2018, COPERS did not realize any losses related to custodial credit risk for deposits.

Annual Money-Weighted Rate of Return

The rate of return for the year ended June 30, 2018, which is the annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was 7.1%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

Custodial Credit Risk – Investments

Custodial credit risk for investments is the risk that in the event of a failure of a counterparty to a transaction, a government will not be able to recover the value of investment or collateral securities that are in the possession of an outside party. As of June 30, 2018, COPERS did not realize any losses due to custodial credit risk for investments or securities lending arrangements. Note 9 on page 42 provides detailed information regarding securities lending. COPERS' policy requires all investments to be collateralized and registered in COPERS' or its nominee's name.

Concentration of Credit Risk

Concentration of Credit Risk is the risk of loss attributed to the magnitude of a government's investment in a single issuer. COPERS' investment policy does not allow for an investment in any one issuer that is in excess of 5% of COPERS' total investments which includes futures, options and swaps, except investments issued or explicitly guaranteed by the U.S. government. As of June 30, 2018, COPERS did not have any investments with any one issuer in excess of 5%.

Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates may adversely affect the fair value of an investment or a deposit. COPERS' investment in foreign fixed income is managed by PIMCO and Western Asset. Both managers report dollar and non-dollar denominated holdings, and provide for direct ownership of the underlying security. Dollar and non-dollar denominated holdings accounted for 99.58% and 0.42%, respectively, of the foreign fixed income investments at June 30, 2018. For fiscal year ending June 30, 2017, dollar denominated and non-dollar denominated holdings accounted for 95.77% and 4.23%, respectively.

Note 8 – Investments (continued)

Foreign Currency Exposure June 30, 2018 and 2017
(in thousands)

Currency	Fixed Income Currency Contracts 2018	Fixed Income Currency Contracts 2017
Australian Dollar	$ -	$ 16
Brazilian Real	-	1,654
British Pound	7,871	455
Canadian Dollar	(8,538)	1,027
Chinese Reminbi	252,067	894
Euro	150,168	25
Icelandic Krona	-	5
Indian Rupee	-	216
Indonesia Rupiah	-	613
Japanese Yen	(54,453)	851
Mexican Peso	12,197	2,988
Russian Ruble	-	774
Swedish Krona	-	36
Totals	$ 359,312	$ 9,552

Commitments (in thousands)

In connection with the purchase of various real estate investments, COPERS had commitments totaling $505,881 as of June 30, 2018 and $670,890 as of June 30, 2017. Remaining unfunded commitments for real estate were $143,601 as of June 30, 2018 and $172,168 as of June 30, 2017. COPERS is not in any redemption queues. All non-core real estate is self-liquidating. COPERS also had $70,205 in unfunded alternative investment commitments.

Credit Risk

Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations. COPERS' investment policy permits purchasing any security that is included in the Barclays Capital US Aggregate Index and relies on the methodology used by Barclays Capital to determine if a security is investment grade. For fixed income securities and their futures or options derivatives, emphasis will be on high-quality securities.

COPERS currently has three managers responsible for fixed income investments. Longfellow Investment Management, MFS Heritage Trust Company ("MFS") and Western Asset Management Company ("Western") are active bond managers. As part of their portfolio, Longfellow and Western may enter into futures, options, and swaps contracts for hedging purposes and/or as a part of the overall portfolio strategy

Note 8 - Investments (continued)

and will be incidental to its securities trading activities for the account. Table I on page 42 provides information relating to the credit risk for COPERS' fixed income investments as of June 30, 2018 and 2017.

Interest Rate Risk

Interest rate risk is the risk that changes in interest rates adversely affect the fair value of an investment. Typically, the longer the maturity of an investment, the greater the sensitivity of its fair value to interest rate changes. COPERS' investment services agreement with Western directs them to maintain an average weighted duration of portfolio security holdings including futures and options positions within +/- 20% of the Barclays Capital US Aggregate Index. COPERS' investment management agreement with Longfellow specifies a weighted average duration of +/- 20% of the Barclays Capital US Aggregate Index. The investment management agreement with PIMCO requires a weighted average duration of +/- two years of the Barclays Capital US Aggregate Index. The investment management agreement MFS specifies a weighted average duration of +/- seven years of the JPMorgan Emerging Markets Bond Index.

Information about the interest rate risk exposure of COPERS is provided in Table I on page 41. COPERS assets include several collateralized mortgage obligations and mortgage-backed securities, which could be considered as highly sensitive to interest rate changes, depending upon the exercise of prepayment options.

COPERS' investment policy permits the following investments, which include investments that are considered to be highly sensitive to interest rate changes due to long maturities, prepayment options, coupon multipliers, reset dates and similar terms:

- Obligations issued or guaranteed by the U.S. Federal Government, U.S. Federal Agencies or U.S. government-sponsored corporations and agencies.
- Obligations of U.S. and non-U.S. corporations such as mortgage bonds, convertible and non-convertible notes and debentures.
- Mortgage-backed and asset-backed securities, swaps, forwards, options on swaps, and options on forwards.
- Obligations denominated in U.S. dollars of international agencies, supranational entities and foreign governments (or their subdivisions or agencies).
- Securities defined under Rule 144A and Commercial paper defined under Section 4(2) of the Securities Act of 1933.
- Bank Loans, TBA Securities and Mortgage Dollar Rolls.
- General obligation bonds, revenue bonds, improvement district bonds, or other evidences of indebtedness of any state of the United States, or any of the counties or incorporated cities, towns and duly organized school districts in the State of Arizona which are not in default as to principal and interest.

Note 8 – Investments (continued)

Table I: Credit Rating and Maturity for COPERS' Fixed Income Investments (in thousands)

	Credit Quality Ratings	2018 Fair Value	2018 Weighted Average Maturity (Years)	2017 Fair Value	2017 Weighted Average Maturity (Years)
Derivatives	Not Rated	$ 248	3.032	$ 845	9.474
Derivatives	A	-	-	144	7.397
Total Derivatives		**248**		**989**	
U.S. Government Guaranteed Securities	Not Rated	$ 1,739	0.295	$ 12,102	12.538
U.S. Government Guaranteed Securities	AAA	38,815	10.479	40,990	16.115
U.S. Government Guaranteed Securities	AA	-	-	5,688	11.087
U.S. Government Guaranteed Securities	A	9	23.937	4,034	9.174
U.S. Government Guaranteed Securities	BBB	111	12.146	116	13.246
Total U. S. Government Guaranteed		**40,674**		**62,930**	
Government Agency	Not Rated	$ 4,678	1.251	-	-
Government Agency	AA	1,402	3.262	$ 2,805	4.364
Total Government Agency		**6,080**		**2,805**	
Mortgage Backed	Not Rated	$ 41,881	28.083	$ 68,940	30.001
Mortgage Backed	AAA	9,004	16.458	9,285	24.732
Mortgage Backed	AA	2,959	12.940	1,505	10.105
Mortgage Backed	A	2,132	24.476	1,261	17.889
Mortgage Backed	BBB	1,914	22.743	376	16.971
Mortgage Backed	BB	-	-	819	17.113
Mortgage Backed	B	18	16.416	702	19.875
Mortgage Backed	CCC	449	17.527	710	18.252
Mortgage Backed	D	-	-	178	18.164
Total Mortgage Backed		**58,357**		**83,776**	
Asset Backed	Not Rated	$ 4,733	11.119		
Asset Backed	AAA	952	13.179	$ 2,120	3.184
Asset Backed	AA	180	5.071	93	28.603
Asset Backed	A	-	-	979	18.298
Asset Backed	BBB	582	14.091	-	-
Asset Backed	BB	-	-	258	18.499
Asset Backed	B	-	-	389	12.301
Asset Backed	CCC	455	28.921	543	27.263
Total Asset Backed		**6,902**		**4,382**	
Fixed Income Commingled	Not Rated	$ -	-	$ 143,342	6.000
Total Fixed Income Commingled		**-**		**143,342**	
Municipal Bonds	AAA	$ -	-	$ 375	20.101
Municipal Bonds	AA	-	-	3,081	22.769
Municipal Bonds	A	-	-	226	18.099

Note 8 – Investments (continued)

Table I: Credit Rating and Maturity for COPERS' Fixed Income Investments (in thousands) - Continued

	Credit Quality Ratings	Fair Value	Weighted Average Maturity (Years)	Fair Value	Weighted Average Maturity (Years)
Municipal Bonds	BBB	-	-	308	24.523
Total Municipal Bonds		**-**		**3,990**	
Corporate Bonds	Not Rated	$ 9,650	3.802	$ 27,567	13.543
Corporate Bonds	AAA	9,463	16.106	3,056	11.277
Corporate Bonds	AA	7,208	15.915	2,768	14.582
Corporate Bonds	A	16,400	11.383	11,418	8.071
Corporate Bonds	BBB	29,291	11.402	25,036	8.579
Corporate Bonds	BB	809	8.269	3,253	8.997
Corporate Bonds	B	100	31.482	4,756	12.965
Corporate Bonds	CCC	66	27.921	764	9.645
Corporate Bonds	D	-	-	121	29.970
Total Corporate Bonds		**72,987**		**78,739**	
Corporate Bonds Commingled	Not Rated	$ -	9.380	$ 12,808	10.376
Total Corporate Bonds Commingled		**-**		**12,808**	
Foreign	Not Rated	$ 212	4.679	$ 2,582	4.957
Foreign	AAA	498	2.636	520	3.636
Foreign	AA	512	8.893	1,717	7.675
Foreign	A	675	13.700	1,490	16.305
Foreign	BBB	6,205	19.012	3,815	12.579
Foreign	BB	-	21.049	4,358	14.203
Foreign	B	-	-	438	6.315
Foreign	CC	-	-	-	-
Foreign	CCC	213	5.567	-	-
Total Foreign		**8,315**		**14,920**	
Foreign Commingled	Not Rated	$ 103,151	7.200	$ 103,320	8.200
Total Foreign Commingled		**103,151**		**103,320**	
Total Fixed Investments by Maturity Date		$ 296,714		$ 512,001	

Note 9 – Securities Lending Program

State statutes and City Charter do not prohibit COPERS from participating in securities lending transactions, and COPERS has, via a Securities Lending Authorization Agreement effective May 6, 2015, authorized Bank of New York Mellon ("BNY") to lend its securities to broker-dealers and banks pursuant to a form of loan agreement.

During 2018 and 2017, BNY lent, on behalf of COPERS, certain securities held by BNY as custodian and received cash (United States and foreign currency), securities issued or guaranteed by the United States government and irrevocable letters of credit as collateral. BNY did not have the ability to pledge or sell collateral securities delivered absent a borrower default. Borrowers were required to deliver collateral for each loan equal to: (i) in the case of loaned securities denominated in United States dollars or whose primary trading market was located in the United States or sovereign debt issued by foreign governments, 100% of the fair value of the loaned securities; and (ii) in the case of loaned securities not denominated in United States dollars or

Note 9 – Securities Lending Program (continued)

whose primary trading market was not located in the United States, 105% of the fair value of the loaned securities.

At June 30, 2018 and 2017, COPERS had the following securities out-on-loan (in thousands).

June 30, 2018	Fair Value of Securities Lent	Cash Collateral Value	Non-Cash Collateral Value
U.S. Equities	$99,238	$84,568	$14,670
U.S. Debt Securities	9,753	5,940	3,813
Total	**$108,991**	**$90,508**	**$18,483**

June 30, 2017	Fair Value of Securities Lent	Cash Collateral Value	Non-Cash Collateral Value
U.S. Equities	$71,256	$60,008	$11,248
U.S. Debt Securities	18,743	5,620	13,123
Total U.S. Securities	**89,999**	**65,628**	**24,371**
Non-U.S. Fixed	570	570	-
Total	**$90,569**	**$66,198**	**$24,371**

During 2018 and 2017, COPERS and the borrowers maintained the right to terminate all securities lending transactions on demand. The cash collateral received on each loan was invested, together with the cash collateral of other qualified tax exempt plan lenders, in a liquidity pool and a duration pool. As of June 30, 2018, the collateral pool had a weighted average maturity (WAM) of 14 days and a weighted average life (WAL) of 96 days. Because the loans were terminable at will, their duration did not generally match the duration of the investments made with cash collateral.

Note 10 – Risk and Uncertainties

COPERS invests in various investment securities. Investment securities are exposed to various risks such as interest rate, market and credit risks. Due to the level of risk associated with certain investment securities, it is at least reasonably possible that changes in the values of investment securities will occur in the near term and such changes could materially affect the amounts reported in the statements of changes in fiduciary net position. Because the values of individual investments fluctuate with market conditions, the amount of investment gains or losses that COPERS will recognize in its future financial statements cannot be determined.

Note 11 – Funds To/From Other Systems

Under the provisions of Arizona Revised Statutes, Sections 38-730 and 38-922 as amended, transfers between COPERS and the Arizona State Retirement System ("ASRS") are allowed when the City hires an employee who was formerly covered by ASRS, or a COPERS member who separates from City of Phoenix employment goes to work for an entity that covers its employees under ASRS. Effective July 2011, an amendment in statute changed the calculation method of retirement service credit transfers between COPERS and ASRS. Previously, retirement service credits (time) would be transferred between systems without possible service reduction or member cost. Beginning July 2011, retirement service credit transfers are based on an actuarial present value (APV) methodology to the extent the prior retirement system is funded on a fair value basis. With this calculation method a member may have to pay for a portion of the transferred service or accept a reduced transfer of service credits.

Also, City employees previously employed by other government entities may purchase prior service credits

Note 12 – Interfund Balances

Because COPERS does not have a local bank account, the City of Phoenix Payroll Section acts as a paying and collecting agent for COPERS. Payroll issues pension payments and employee retirement contribution refunds from the City's bank account and handles payment reclamations through the City's bank account. This type of activity, if any, is reflected in the Statement of Fiduciary Net Position as a liability or receivable, as applicable.

Note 13 – Contingent Liabilities

COPERS is a party in pending litigation matters. While the final outcomes cannot be determined at this time, management is of the opinion that the final obligations, if any, for these legal actions will not have a material adverse effect on COPERS' financial position or change in net position.

Note 14 – Fair Value Measurements (in thousands)

Investment valuation
COPERS categorizes the fair value measurements of its investments based on the hierarchy established by generally accepted accounting principles. The fair value hierarchy, which has three levels, is based on the valuation inputs used to measure an asset's fair value: Level 1 inputs are quoted prices in active markets for identical assets; Level 2 inputs are significant other observable inputs; Level 3 inputs are significant unobservable inputs.

Investments
Investments, including derivative instruments that are not hedging derivatives, are measured at fair value on a recurring basis. Recurring fair value measurements are those that Governmental Accounting Standards Board (GASB) Statements require or permit in the statement of fiduciary net position at the end of each reporting period. Fair value investments measurements are as follows at June 30, 2018 and 2017 (in thousands).

Note 14 – Fair Value Measurements (in thousands) (continued)

	2018			
Investments by fair value level	**Total**	**Level 1**	**Level 2**	**Level 3**
Domestic Equities	1,060,474	538,342	-	522,132
International Equities	71,814	-	-	71,814
Fixed Income				
Futures	124	124	-	-
SWAPS	124	-	124	-
US Government and Agency Securities	46,754	38,134	8,620	-
Mortgage Backed Securities - Residential	58,357	-	58,357	-
Asset Backed Securities	6,902	-	6,902	-
Corporate Bonds	72,987	-	72,987	-
Foreign	8,315	-	8,315	-
Foreign Commingled	103,151	-	-	103,151
Total fixed income securities	296,714	38,258	155,305	103,151
Temporary Investments from Securities Lending	18,483		18,483	
Investments at fair value	**1,447,485**	**576,600**	**173,788**	**697,097**
Investments measured at the net asset value (NAV)				
Private Equity	113,536			
Hedge Funds	122,339			
Global Commingled	465,986			
Real Estate Funds	347,188			
Investments at net asset value	**1,049,049**			
Cash Equivalents in Securities Lending	90,508			
Total Investments	**$2,587,042**	**$ 576,600**	**$ 173,788**	**$ 697,097**

Note 14 – Fair Value Measurements (in thousands) (continued)

	2017			
Investments by fair value level	**Total**	**Level 1**	**Level 2**	**Level 3**
Domestic Equities	515,059	297,262	200	217,596
International Equities Commingled	244,881	-	-	244,881
Private Equity	77,385	-	-	77,385
Fixed Income				
Futures	173	173	-	-
SWAPS	816	-	816	-
US Government and Agency Securities	65,735	62,803	2,932	-
Mortgage Backed Securities - Residential	83,776	-	83,776	-
Asset Backed Securities	4,382	-	4,382	-
Municipal Bonds	3,990	-	3,990	-
Corporate Bonds	78,739	2,993	53,906	21,840
Corporate Bonds Commingled	12,808	-	-	12,808
Foreign	14,920	-	14,920	-
Foreign Commingled	103,320	-	-	103,320
Total fixed income securities	368,659	65,969	164,722	137,969
Temporary Investments from Securities Lending	66,198		66,198	
Investments at fair value	**1,194,797**	**363,231**	**231,120**	**600,446**
Investments measured at the net asset value (NAV)				
Private Equity	77,385			
Hedge Funds	254,936			
Commingled Fixed Income	143,342			
Global Commingled	446,101			
Real Estate Funds	315,307			
Investments at net asset value	**1,237,071**			
Cash Equivalents in Securities Lending	24,371			
Total Investments	**$2,456,239**	**$ 363,231**	**$ 231,120**	**$ 600,446**

Note 14 – Fair Value Measurements (in thousands) (continued)

Alternative investments measured at NAV include hedge funds, real estate, opportunistic and global fixed income. Below is a description of the various investment strategies:

- COPERS invests in three direct hedge funds which all have a global macro strategy.
- COPERS' portfolio consists of one comingled fixed income fund and two fixed income separate accounts. These accounts have a core-plus strategy.
- COPERS has two global commingled funds. One fund which has a global large cap growth mandate and the second fund which has a large cap value mandate.
- COPERS' real estate investments consist of two core real estate funds and 15 non-core real estate partnerships. The core funds permit redemptions with a 90-day notice, the non-core fund investments have a limited liquidity and redemptions are restricted.

Certain investments are reported at the net asset values calculated by the investment manager. These investments (in thousands), at June 30, 2018, detailed in the following table, are subject to capital calls and specific redemption terms:

	6/30/2018	Unfunded Commitments	Redemption Frequency	Redemption Notice Period
Hedge Funds	122,339	-	Quarterly	90 Days
Global Commingled	465,986	-	Monthly	30 Days
Private Equity	113,536	70,205	Quarterly	0-90 Days
Real Estate Funds	347,188	143,601	Quarterly	0 - 90 Days

Debt and equity securities categorized as Level 1 are valued based on prices quoted in active markets for those debts and securities. Debt and equity securities categorized as Level 2 are valued using matrix pricing techniques maintained by the various pricing vendors for these securities. Matrix pricing is used to value securities based on the relationship to benchmark quoted prices. Investment derivative instruments categorized as Level 2 are valued using market approaches that consider, as applicable, benchmark interest rates or foreign exchange rates. Mortgage-backed securities categorized as Level 2 are valued using discounted cash flow techniques. Debt and equity securities categorized as Level 3 are debt and securities whose stated market price is unobservable by the market place, many of these securities are priced by the issuers or industry groups for these securities. Collateralized debt obligations categorized as Level 3 are valued using consensus pricing. The fair value of international equity funds and related short-term investments classified as Level 3 represent the value of unit positions in funds that are not publicly traded on an exchange. Fair value of these securities can be impacted by redemption restrictions imposed by the fund managers.

Required Supplementary Information

The schedules of Required Supplementary Information started with one year of information as of the implementation of GASB 67 in 2014, but builds to 10 years of information. The schedule below shows the changes in Net Pension Liability and related ratios required by GASB. As more information becomes available, additional years will be displayed.

Schedule of Changes in Net Pension Liability and Related Ratios (in thousands)*

Total Pension Liability	2018	2017	2016	2015	2014
Service cost	$ 73,072	$ 72,876	$ 80,757	$ 75,310	$ 78,331
Interest (includes interest on service cost)	293,883	293,258	293,206	266,355	257,219
Changes of benefit terms	-	-	(3,229)	-	-
Differences between expected and actual experience	(42,785)	429	(76,891)	(31,009)	(20,336)
Changes of assumptions	-	2,420	(69,420)	254,870	-
Benefit payments, including refunds of member contributions	(227,576)	(223,667)	(216,193)	(204,403)	(179,877)
Net change in pension liability	**$ 96,594**	**$ 145,315**	**$ 8,230**	**$ 361,123**	**$ 135,337**
Total Pension liability - beginning	**4,129,452**	**3,984,137**	**3,975,907**	**3,614,784**	**3,479,447**
Total Pension liability - ending	**$ 4,226,046**	**$ 4,129,452**	**$ 3,984,137**	**$ 3,975,907**	**$ 3,614,784**
Plan Fiduciary Net Position					
Contributions - employer	$ 229,006	$ 152,153	$ 119,844	$ 117,092	$ 110,629
Contributions - member	33,340	30,870	29,523	27,861	27,760
Net investment income	166,514	243,210	9,171	47,148	298,736
Benefit payments, including refunds of member contributions and transfer outs	(227,576)	(223,667)	(216,409)	(204,403)	(179,877)
Administrative Expenses	(377)	(380)	(234)	(414)	(628)
Net change in plan fiduciary net position	**$ 200,907**	**$ 202,186**	**$ (58,105)**	**$ (12,716)**	**$ 256,620**
Plan fiduciary net position - beginning	**$ 2,353,607**	**$ 2,151,421**	**$ 2,209,526**	**$ 2,222,242**	**$ 1,965,622**
Plan fiduciary net position - ending	**$ 2,554,514**	**$ 2,353,607**	**$ 2,151,421**	**$ 2,209,526**	**$ 2,222,242**
Net Pension Liability	**$ 1,671,532**	**$ 1,775,845**	**$ 1,832,716**	**$ 1,766,381**	**$ 1,392,542**
Plan fiduciary net position as a percentage of the total pension liability	60.45%	57.00%	54.00%	55.57%	61.48%
Covered payroll	$ 526,667	$ 521,295	$ 473,974	$ 460,441	$ 485,227
Net pension liability as a percentage of covered payroll	317.38%	340.66%	386.67%	383.63%	286.99%

* May not add due to rounding

Required Supplementary Information (continued)

Schedule of Employer Contributions – Last 10 Fiscal Years (in thousands)

Fiscal Year	Actuarial Determined Contribution	Actual Contributions	Contribution Deficiency (Excess)	Covered Payroll		Actual Contributions As A Percentage of Covered Payroll
2017-18	$ 159,006	$ 229,006	$ (70,000)	$ 526,667		43.48%
2016-17	152,153	152,153	-	521,295		29.19%
2015-16	119,844	119,844	-	473,974		25.28%
2014-15	117,092	117,092	-	484,309	*	24.18%
2013-14	110,629	110,629	-	518,746	*	21.33%
2012-13	115,244	115,244	-	524,648		21.97%
2011-12	114,709	114,709	-	540,792		21.21%
2010-11	105,682	105,682	-	541,388		19.52%
2009-10	90,965	90,965	-	578,327		15.73%
2008-09	86,241	86,241	-	587,171		14.69%

*For fiscal years 2013-14 and 2014-15, the Plan's actuary was calculating covered payroll based on their assumption this was an estimated amount. For subsequent reports, the actuary began using actual amounts which slightly changed the amounts previously reported.

Schedule of Investment Returns for Year Ended June 30, 2018

	2018	2017	2016	2015	2014
Annual money-weighted rate of return, net of investment expenses	7.10%	7.30%	0.60%	2.19%	15.42%

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

Notes to the Required Supplementary Information (continued)

In July and August 2017, the COPERS Board adopted several new actuarial assumptions based upon the recommendations from its actuary, GRS, for the purpose of determining contribution rates. The 2017 adopted changes are:

1. The discount rate was lowered to 7.25%.
2. The rate of inflation was lowered to 2.50%.
3. The payroll growth rate lowered to 3.00%.
4. Pension Equalization Reserve (PER) was valued for future benefits payable through the PER as a 1.5% annual compound cost-of-living adjustment (COLA).

In August and October 2015, the COPERS Board adopted new actuarial assumptions and methods, based upon the recommendations from its actuary, Cheiron, for the purpose of determining contributions and to meet the GASB 67 implementation requirements to be applied to the financial reporting for the fiscal year ending June 30, 2015.

The 2015 adopted changes are the following:

1. PER was valued for future benefits payable through the PER as a 1.5% annual compound COLA. Amortization method for the unfunded actuarial liability (UAL) was amortized over a 20-year period as a level percentage of payroll with a four-year phase-in to the full amortization rate. Future gains and losses are amortized over closed 20-year periods as a level percentage of payroll from the valuation date in which they are first recognized. For Tier 1, members contribute 5% of pay and the City contributes the remainder of the total contribution rate. For the Tier 2, the members and the City each pay half of the total contribution rate.
2. Revised data tables for merit/salary increases, retirement rates, termination rates, disability incidence rates, and mortality rates.

In September 2013, the COPERS Board adopted new assumptions and methods, based upon the recommendations from its actuary, Cheiron, for the purpose of determining contributions and to meet the GASB 67 implementation requirements to be applied to the financial reporting for the fiscal year ending June 30, 2014.

The September 2013 adopted changes are the following:

1. Discount rate was lowered to 7.5% based on the expected return on assets.
2. Salary increase rate was changed for price inflation to 3.00%, real wage growth to 0.50% and wage inflation to 3.5%.
3. Amortization method for the unfunded actuarial liability (UAL) was amortized over a 25-year period as a level percentage of payroll with a four-year phase-in to the full amortization rate. Future gains and losses are amortized over closed 20-year periods as a level percentage of payroll from the valuation date in which they are first recognized. For Tier 1, members contribute 5% of pay and the City contributes the remainder of the total contribution rate. For the Tier 2, the members and the City each pay half of the total contribution rate.
4. The administrative expense assumption was added. In prior years, the discount rate was assumed to be net of administrative expenses.

Supplementary Information

Schedule of Investment Expenses for the Fiscal Years Ended June 30, 2018 and 2017 (in thousands)

(1) Fees for these managers are not paid separately as are fees to other fund managers; they are not included in the investment expenses report in the Statements of Changes in Fiduciary Net Position. The fees are a component of the overall performance of the investment.

Payee	Fees		Nature of Services
	2018	2017	
Aberdeen/Artio Global Investors	$ 236	$ 422	Investment Management
Cramer Rosenthal McGlynn	593	512	Investment Management
Eagle Asset	353	293	Investment Management
J P Morgan	929	948	Investment Management
MFS	534	513	Investment Management
Mondrian	501	426	Investment Management
SSgA FTSE RAFI DV EX US	72	64	Investment Management
SSgA FTSE RAFI US LOW VOL	96	90	Investment Management
SSgA US Agg Bond Index	10	-	Investment Management
SSgA US TIPS Index	20	-	Investment Management
Total	$ 3,345	$ 3,267	

Payee (1)			Nature of Services
	2018	2017	
Artisan Partners	$ 1,366	$ 1,159	Investment Management
Baillie Gifford	704	559	Investment Management
BH-DG	100	-	Investment Management
Carlson Capital	674	945	Investment Management
Fir Tree	783	819	Investment Management
Focus Senior Housing	226	-	Investment Management
GMO	727	676	Investment Management
HSI Real Estate V	542	500	Investment Management
JDM Partners	911	242	Investment Management
Longfellow	52	-	Investment Management
Morgan Stanley	806	800	Investment Management
Neuberger	594	594	Investment Management
Northwood GP, LLC IV	366	974	Investment Management
Northwood Series V	364	887	Investment Management
PAAMCO	468	1,322	Investment Management
PIMCO All Asset	1,553	1,430	Investment Management
PIMCO Total Return	327	416	Investment Management
RECAP III	86	114	Investment Management
RECAP IV	318	450	Investment Management
Robeco Investment Management	597	527	Investment Management
SC Core Fund	725	-	Investment Management
TA Associates	5	52	Investment Management
The Boston Company	354	320	Investment Management
Western Asset	257	249	Investment Management
Wheelock I	49	96	Investment Management
Wheelock II	276	355	Investment Management
Wheelock V	375	-	Investment Management
Total	$ 13,606	$ 13,486	

Supplementary Information (continued)

Schedule of Administrative Expenditures and Encumbrances (Non-GAAP Budgetary Basis) Paid by the City of Phoenix for the Fiscal Years Ended June 30, 2018 and 2017

	2018		2017	
	Original Budget	Actual	Original Budget	Actual
Personal Services				
Staff Salaries and Benefits	$ 1,086,459	$ 1,028,578	$ 998,374	$ 968,307
Insurance	202,893	187,741	196,064	199,770
Social Security and Medicare	77,236	69,535	72,015	67,143
Retirement Contributions	327,638	302,288	314,197	280,472
Total Personal Services	**$ 1,694,226**	**$ 1,588,142**	**$ 1,580,650**	**$ 1,515,692**
Professional Services				
Consultants	$ 30,500	$ 1,723	$ 500	$ 180
Audit and Accounting	82,000	83,268	106,610	116,038
Medical Advisors	-	-	-	16,720
Computer Services	143,885	143,885	126,276	126,276
Total Professional Services	**$ 256,385**	**$ 228,876**	**$ 233,386**	**$ 259,214**
Communications				
Printing	$ 10,500	$ 19,716	$ 9,500	$ 8,322
Postage and Mailing	9,600	9,849	11,000	9,940
Travel and Conferences	-	-	-	-
Telephone	655	875	1,102	2,580
Subscriptions and Memberships	1,700	2,078	1,500	1,912
Total Communications	**$ 22,455**	**$ 32,518**	**$ 23,102**	**$ 22,754**
Miscellaneous				
Supplies	$ 8,500	$ 4,178	$ 6,250	$ 5,999
Office Furniture	-	-	-	-
Insurance	-	-	-	-
Computer Equipment	1,500	474	600	1,505
Other	2,126	8,528	17,588	13,815
Total Miscellaneous	**$ 12,126**	**$ 13,180**	**$ 24,438**	**$ 21,319**
Total Administrative Expenditures and Encumbrances	**$ 1,985,192**	**$ 1,862,716**	**$ 1,861,576**	**$ 1,818,979**

Note: The above table represents administrative expenditures of COPERS that are budgeted and paid by the City of Phoenix through their general fund and are not part of COPERS' plan assets.

Administrative expenses recognized in the Statement of Changes in Fiduciary Net Position include the payment of fees for legal, medical, and actuarial services.

Schedule of Administrative Expenses (Plan Assets) for the Fiscal Years Ended June 30, 2018 and 2017

Payee	Fees Paid	
	2018	2017
Actuarial Consulting	$ 80,386	$ 143,531
Legal Services	155,473	94,431
Technology	141,319	141,587
Total	$ 377,179	$ 379,549

Investment Section

The **Investment Section** contains the Plan's report on investment activity, its investment policies, schedules of investment results and related information.

M E K E T A   I N V E S T M E N T   G R O U P

Boston MA
Chicago IL
Miami FL
Portland OR
San Diego CA
London UK

November 5, 2018

Board of Trustees
City of Phoenix Employees' Retirement System
c/o Scott Steventon
Acting Retirement Program Administrator
200 W. Washington Street, 10th Floor
Phoenix, AZ 85003

Dear Board Members:

Fiscal 2018 Recap

The fiscal year was largely a story of two environments. In 2017, we saw synchronized global growth, low volatility, tax cuts in the U.S. at year-end, and a weak U.S. dollar. During the last two quarters of 2017, most asset classes were up, particularly riskier ones. Emerging markets lead the way in Q3 (+7.9%[1]) and Q4 (+7.4%[1]). U.S. and international equities also posted strong returns over both quarters, while fixed income assets were largely positive but with more modest returns in the risk on environment.

The trends of 2017 persisted into early 2018, but the environment quickly changed. In 2018, we have seen volatility increase from its very low levels, interest rates and inflation rise, the U.S. dollar rebound, and trade tensions between the U.S. and others heat-up. In this environment, U.S. equities were one of the few asset classes to contribute to performance, while international equities and most fixed income asset classes detracted from performance. High yield bonds did post a modest gain (+0.2%[2]) in the first two quarters of 2018.

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

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

---

1 MSCI Emerging Markets Index.
2 Barclays High Yield.

5796 ARMADA DRIVE SUITE 110   CARLSBAD CA 92008
760 795 3450   fax 760 795 3445   www.meketagroup.com

November 5, 2018
Page 2 of 4

Within fixed income, positive returns in the final two quarters of 2017 moved to concerns over rising interest rates and inflation creating headwinds in 2018. In the U.S., the Federal Reserve increased interest rates for the seventh time in June to a range of 1.75% to 2.00% and continued to reduce its balance sheet. The rate increases contributed to the flattening of the U.S. yield curve during the fiscal year. Over the trailing year, TIPS (+2.1%) and high yield bonds[2] (+2.6%) increased, while the broad U.S. bond market, represented by the Barclays Aggregate Index, fell 0.4%. Similar to emerging market equities, returns for emerging market bonds in the second quarter of 2018 weighed on the fiscal year results. In this case, more dramatically as the 10.4% decline in the second quarter for emerging market bonds (as represented by JPM GBI-EM Global Diversified – Local Currency) led to a -2.3% return for the trailing year.

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

Fiscal 2018 Market Returns

Equity markets were very strong throughout the fiscal year with most major equity indexes posting returns in the high single digits to mid-teens. The Russell 3000 returned +14.8%, while the MSCI ACWI (ex. U.S.) and MSCI Emerging Markets returned +7.3% and +8.2%, respectively. Fixed income was mixed by credit quality as investment grade credits were slightly negative but lower-grade credits were positive. For the full fiscal year: Barclays Aggregate Bond Index returned -0.4%, Barclays TIPS Index returned +2.1%, S&P Leveraged Loan Index returned +3.7%, Barclays High Yield Index returned +2.6%, and JPM GBI-EM Global Diversified (unhedged emerging market bonds) returned -2.3%.

Alternative asset classes were positive for the fiscal year. NAREIT Equity returned +3.5%, Bloomberg Commodity Index returned +7.4%, Dow Jones Brookfield Global Infrastructure returned +2.5%, and S&P Global Natural Resources returned +24.8%. Private real estate and private equity continued to provide positive returns, as the National Council of Real Estate Fiduciaries (NCREIF) Property Index returned +7.2%, and the Cambridge Associates Private Equity Composite returned +2.6% for the fiscal year[1].

---

[1] Returns for real estate and private equity benchmarks are lagged one quarter due to the availability of data.

November 5, 2018
Page 3 of 4

Fiscal 2019 Outlook

Looking forward, there are several issues that we continue to monitor. First, is the potential for major central banks to tighten monetary policy at the same time. Second, in the U.S., equity markets remain extended and the latest economic cycle has been long. Also in the U.S., trade policy remains another key issue. Next, is the declining growth in China and the impact of trade tensions with the U.S. Finally, political uncertainty and ongoing structural issues remain a concern in Europe.

After an extended period of monetary support through low interest rates and bond purchases from banks (i.e., quantitative easing), we could be moving into a period where central banks pull back support at the same time. The U.S. is further along in that process with the Federal Reserve increasing interest rates and reducing its balance sheet. It is also largely expected that the European Central Bank (ECB) will end its quantitative easing by year-end. If central banks begin pulling back support this could put further upward pressure on rates, weigh on economic growth, and tighten liquidity.

The U.S. economy and equity markets have experienced a long period of growth since the Global Financial Crisis due in part to central bank support. Late cycle dynamics of low unemployment and rising inflation are in place and valuations are stretched for equites. It is inevitable that growth will eventually slow and equity markets pull back, but the question is when. Other key issues in the U.S. include policy uncertainty related to tariffs, immigration, and strategic alliances.

China has the second largest economy behind the U.S. After a long period of growth through government investment, it continues to manage a repositioning of its economy to one of consumption. This has led to a slowing of its economy and has hurt countries that depend on its trade. The recent trade tariffs between the U.S. and China is another key issue, which could have a disproportionately negative impact on China, as the U.S. is one of their largest export destinations. Another key issue in China remains the high debt levels, particularly in the corporate sector.

Europe continues to have the structural issue of having a single currency and central bank with fiscal policy resting with each individual country. Consequently, countries that are experiencing financial difficulties are unable to use the traditional tools of lowering interest rates and devaluing their currency to stimulate growth. This has caused tensions within the Eurozone as highlighted by the recent elections in Italy and the prior elections in Germany, as well as the on-going issues in Greece. Given the size of Italy's bond market and economy within the euro area a sovereign debt crisis or departure from the euro would have significant consequences.

We will continue to monitor these issues and others.

November 5, 2018
Page 4 of 4

Retirement System Investment Results and Asset Allocation

The fair value of the City of Phoenix Employees' Retirement System was $2.549 billion as of June 30, 2018. This was an increase of $200.0 million from June 30, 2017 due to $30.9 million in net cash inflows and positive investment performance. The System's net of fees return was +7.1% over the fiscal year, +6.3% over three years, +7.2% over five years, and +5.1% over ten years[1]. The System's current actuarial assumed rate of return is 7.25%.

As of June 30, 2018, the System's assets were allocated to U.S. equity (26.7%), developed market equity (18.3%), rate-sensitive (18.4%), credit (6.6%), real assets (13.6%), private equity (4.5%), hedge funds (4.8%), GTAA (6.8%), and cash (0.4%).

In March 2017, the Board approved a new asset allocation policy with an expected return of 7.26%, in line with the actuarial assumed rate of return of 7.25%. During the fiscal year, the System made great progress towards implementing the approved asset allocation policy. The System funded two new investment grade bond managers and a TIPS manager within the rate-sensitive asset class, two new high yield managers and a bank loan manager within the credit asset class, and trimmed hedge fund exposure to 4.8%. We look forward to continuing our work with Staff and the Board to move the Retirement System towards its new policy targets, with the ultimate goal of allowing the Retirement System to continue to meet its obligations to participants.

Sincerely,

Larry Witt, CFA
Senior Vice President

Stephen P. McCourt, CFA
Managing Principal

Laura B. Wirick, CFA, CAIA
Principal

Chris Theordor
Senior Associate

[1] Returns over one-year are annualized.

Outline of Investment Policies and Objectives
Adopted July, 1990 and subsequently amended

1. COPERS' asset allocation targets (at fair value) as of June 30, 2018 were 16.5% large cap domestic equities, 6.5% small/mid cap equities, 19.4% large cap international equities, 2.6 small/mid cap international equities, 20% domestic fixed income, 15.0% real estate, 5.0% emerging market debt, 5.0% real return and 10% long/short equity. In March 2017, the COPERS Board adopted a new asset allocation that more closely aligns the Board's risk tolerance and expected returns.

2. Each asset class will be broadly diversified to be similar to the market for the asset class. The market for equities shall be represented by the Russell 3000 Value Index, MSCI EAFE Index, MSCI Emerging Markets. The market for bonds shall be represented by the Barclays Capital Aggregate, Barclays High Yield, and the JPM EMBI Global Diversified Indices. The market for real estate shall be represented by the NCREIF ODCE Property Index.

3. Multiple managers will be employed. Allocations among the managers will be controlled by the Trustees to maintain both diversification and policy guidelines.

4. Investments will conform to the Phoenix City Charter, Chapter XXIV, Part II, Section 34 (See Note 8). All other investments are prohibited.

5. COPERS' main investment objective is to achieve a rate of return that exceeds inflation by at least 3% over time. The actuarial assumed rate of return is 7.25%.

Directed Brokerage Commissions

A directed brokerage commissions program was established by COPERS' Board on July 31, 1991. Becker, Burke Associates ("BBA") provided the directed brokerage commissions program through December 31, 2003. As of January 1, 2004, State Street Global Markets, LLC ("SSGM") became the provider of the commission recapture program. SSGM has agreed to allocate to the fund 80% of commissions for US trades executed with a network of brokers and 100% (above the "execution only" rate) for US trades directly with SSGM's Trading Desk, identified and designated by investment managers as "directed." Under this program, COPERS' equity managers are requested to execute trades to achieve best execution of fund transactions and to use best efforts to place trades with SSGM. For the fiscal year ended June 30, 2018, the total payments received from the directed brokerage commissions program under SSGM were $10,190.

Investment Services Under Contract (as of June 30, 2018)

Equity Managers

Artisan Partners	Ting Rattanaphasouk	San Francisco, CA
Baillie Gifford	Kathrin Hamilton	Edinburgh, Scotland
Cramer Rosenthal McGlynn	Clair Componi	New York, NY
Eagle Asset Management	Clay Lindsey	St. Petersburg, FL
GMO	Ryan Dawley	Berkeley, CA
Mondrian	Paul Ross	Boston, MA
Robeco Investment Management	William Supple	Philadelphia, PA
State Street Global Advisors	Megan Hart	San Francisco, CA
The Boston Company	Jerry Navarette	Boston, MA

Fixed Income Managers

Longfellow Investment Management	Corrine Larson	Boston, MA
MFS Institutional Advisors	Carolyn Lucey	Boston, MA
PIMCO	Matt Clark	Newport Beach, CA
Western Asset Management	Kevin Gore	Pasadena, CA

Hedge Fund Managers

Brevan Howard US LLC	William Cummings	New York, NY
Carlson Capital	Erin Kraxberger	Dallas, TX
Fir Tree Partners	Benjamin Ghriskey	New York, NY
PAAMCO	Jim Meehan	Irvine, CA

Transition Managers

Northern Trust Transition Management	Grant Johnsey	Chicago, IL
Russell Implementation Services, Inc	Steve Cauble	Seattle, WA
State Street Global Markets	James Doherty	Irvine, CA

Private Equity

Neuberger Berman	Kaci Boyer	Dallas, TX

Real Estate Managers

FOCUS Healthcare Partners	Michael Feinstein	Chicago, IL
Hammes Partners	Patrick Hammes	Brookfield, WI
JDM Partners	Mel Shultz	Phoenix, AZ
J.P. Morgan	Tom Klugherz	San Francisco, CA
Hemisferio Sul Investments	Diogo Bustani	Sao Paulo, BR
Morgan Stanley	Candice Todd	Atlanta, GA
Northwood Real Estate Partners	Jennifer Davis	New York, NY
RECAP II, III, IV, SC Core	Liwen Ho	Singapore, CH
TA Realty Associates	Tom Landry	Boston, MA
Wheelock Street Real Estate	Lawrence Settanni	Greenwich, CT

Real Return Managers

Research Affiliates LLC	Jeff Wilson	Newport Beach, CA

Real Estate Consultant

Alignium	Dan Krivinksas	Chicago, IL

Investment Consultant

Meketa Investment Group	Larry Witt	Carlsbad, CA

Schedule of Investment Results
For the Fiscal Year Ended June 30, 2018

	Annualized		
	1-Year	3-Years	5-Years
TOTAL PORTFOLIO:			
COPERS	7.1 %	6.3 %	7.2 %
Policy Benchmark	7.6	6.8	7.8
Meketa All Pension Plans > $1B median	7.7	6.4	7.4
EQUITY FUNDS			
Artisan Global Opportunities (3)	14.7	12.3	-
MSCI ACWI Ex US Index	10.7	8.2	-
Baillie Gifford	9.1	8.5	8.9
MSCI ACWI Ex USA	7.3	5.1	6.0
Cramer Rosenthal McGlynn	11.4	10.1	11.4
Russell 2000 Value Index	13.1	11.2	11.2
Eagle Asset Management	23.8	12.7	13.7
Russell 2000 Growth Index	21.9	10.6	13.6
GMO (1)	6.8	6.1	-
MSCI ACWI	10.7	8.2	-
Mondrian Investment Partners	13.4	9.4	9.1
MSCI World Small Cap Index	11.9	9.5	10.3
Robeco Investment Management	10.2	8.6	10.7
Russell 1000 Value Index	6.8	8.3	10.3
SSgA FTSE RAFI US Low Vol (2)	8.7	-	-
FTSE RAFI USD Lo Vol Index	8.6	-	-
SSgA US AGG Bond Index (5)	-	-	-
Barclays US Aggregate	-	-	-
SSgA US TIPS (4)	-	-	-
Barclays US Aggregate	-	-	-
The Boston Company	12.6	6.4	10.1
Russell Midcap Index	7.6	8.8	11.3
FIXED INCOME FUNDS			
Longfellow Core Fixed Income (7)	-	-	-
Barclays US Aggregate	-	-	-
MFS Heritage Trust (6)	(0.2)	4.5	4.7
JPMorgan EMBI Global Dvf'd	(1.6)	4.6	5.1
Western Asset Management	0.4	3.1	3.6
Barclays US Aggregate	(0.4)	1.7	2.3
PIMCO Total Return	0.3	2.4	2.3
Barclays US Aggregate	(0.4)	1.7	2.3
HEDGE FUND OF FUNDS			
BH-DG Systematic Trading (11)	-	-	-
Carlson (8)	3.2	2.2	-
Fir Tree International (10)	(0.7)	(3.6)	-
PAAMCO (9)	5.5	2.0	-
PRIVATE EQUITY FUNDS			
Neuberger Berman Sonoran (12)	12.9	8.3	-
REAL ESTATE FUNDS			
Core (13)	8.6	9.8	11.8
Non-Core (14)	12.5	11.4	12.0
NCREIF ODCE Index	8.4	9.4	11.0
REAL RETURN FUND			
PIMCO All Asset (15)	4.2	4.9	-
All Asset Index	4.1	4.2	-

Schedule of Investment Results
(Continued)

(1) GMO has been an international equity manager but the investments within GMO were restructured effective October 1, 2013 and performance figures of the restructured investments would not be representative of the benchmark.
(2) SSgA FTSE RAFI US Low Vol was added as an equity manager effective January 1, 2015. Performance figures would not be representative of the benchmark index.
(3) Artisan Global Opportunities was added as an equity manager effective December 1, 2014. Performance figures would not be representative of the benchmark index.
(4) SSgA US TIPS was added as an equity manager effective February 1, 2018. Performance figures would not be representative of the benchmark index.
(5) SSgA US AGG Bond Index Fund was added as an equity manager effective April 1, 2018. Performance figures would not be representative of the benchmark index.
(6) MFS Heritage Trust was added as a core plus fixed income manager effective February 1, 2013. Performance figures would not be representative of the benchmark index.
(7) Longfellow Core Fixed Income was added as a core plus fixed income manager effective May 1, 2018. Performance figures would not be representative of the benchmark index.
(8) Carlson was added as a hedge fund manager effective August 1, 2014. Performance figures would not be representative of the benchmark index.
(9) PAAMCO added as a hedge funds manager effective January 2, 2009. PAAMCO transition mandates from Long/Short Equity to Absolute Return as of January 1, 2014. Performance figures would not be representative of the benchmark index.
(10) Fir Tree International was added as a hedge fund manager effective August 1, 2014. Performance figures would not be representative of the benchmark index.
(11) BH-DG Systematic Trading was added as a hedge fund manager effective March 1, 2018. Performance figures would not be representative of the benchmark index.
(12) Neuberger Berman Sonoran was added as a private equity manager on April 1, 2015. Performance figures would not be representative of the benchmark index.
(13) Core Real Estate performance was reported as the gross time-weighted returns.
(14) Non-Core Real Estate performance was reported as the gross time-weighted returns.
(15) PIMCO All Asset added as a real return manager on December 1, 2013. Performance figures would not be representative of the benchmark index.

The calculations above were prepared by COPERS' consultant, using a time-weighted rate of return, based on fair value. Core and Non-Core real estate performance is calculated as an IRR.

Asset Allocation by Manager
As of June 30, 2018

Manager	Style	Management (in thousands)	% of Portfolio
CASH AND CASH EQUIVALENTS FUNDS			
The Boston Company	Mid Cap Value	$ 247	0.01 %
Brigade Capital Management	Fixed Income	65,000	2.53
COPERS Cash Account	Core Plus Fixed Income	9,561	0.37
COPERS PIMCO	Small Cap Value	636	0.02
Cramer Rosenthal McGlynn	Small Cap Growth	3,073	0.12
Eagle Asset Management	Core Plus Fixed Income	2,027	0.08
Longfellow Core Fixed	Core Plus Fixed Income	174	0.01
Robeco Investment Management	Large Cap Value	3,550	0.14
Western Asset Management	Core Plus Fixed Income	5,837	0.23
TOTAL CASH & CASH EQUIVALENT FUNDS		90,105	3.51
DOMESTIC EQUITIES FUNDS			
Baillie Gifford	Large Cap Growth	198,105	7.70
The Boston Company	Mid Cap Value	52,220	2.03
Cramer Rosenthal McGlynn	Small Cap Value	63,441	2.47
Eagle Asset Management	Small Cap Growth	69,363	2.70
FTSE RAFI DV EX US	Large Cap Core	79,089	3.08
FTSE RAFI US LOW VOL	Large Cap Core	155,818	6.07
Robeco Investment Management	Large Cap Value	155,214	6.04
STATE ST US AG BND IND	Bonds	156,416	6.09
STATE ST US TIPS IDX	Bonds	130,808	5.09
TOTAL DOMESTIC EQUITIES FUNDS		1,060,474	41.27
FIXED INCOME FUNDS			
Brigade Capital Management	Fixed Income	301	0.01
Longfellow Core Fixed	Core Plus Fixed Income	94,797	3.69
MFS Emerging Markets Debt	Emerging Markets Debt	103,152	4.02
Western Asset Management	Core Plus Fixed Income	98,464	3.83
TOTAL FIXED INCOME FUNDS		296,714	11.55
INTERNATIONAL COMMINGLED FUNDS			
Artisan Partners	International	175,099	6.82
GMO	International	117,275	4.57
PIMCO All Asset Custom Index	International	173,612	6.76
TOTAL INTERNATIONAL COMMINGLED FUNDS		465,986	18.15

Asset Allocation by Manager
As of June 30, 2018 (Continued)

Manager	Style	Management (in thousands)	% of Portfolio
INTERNATIONAL EQUITIES FUNDS			
Mondrian Investment Partners	International	71,814	2.80
TOTAL INTERNATIONAL EQUITIES FUNDS		71,814	2.80
REAL ESTATE FUNDS			
Cramer Rosenthal McGlynn	Non-Core Real Estate	1,527	0.06
Focus Sh Fund	Non-Core Real Estate	1,663	0.06
HSI Real Estate V	Non-Core Real Estate	8,332	0.32
JDM Opportunity Fund	Non-Core Real Estate	25,431	0.99
JPM Strategic Property	Core Real Estate	94,819	3.70
Morgan Stanley Prime Property	Core Real Estate	98,291	3.84
Northwood IV	Non-Core Real Estate	20,616	0.80
Northwood V	Non-Core Real Estate	26,048	1.01
RECAP III	Non-Core Real Estate	6,881	0.27
RECAP IV	Non-Core Real Estate	19,689	0.77
SC Core Fund LP	Non-Core Real Estate	14,201	0.55
TA Realty Associates	Non-Core Real Estate	55	0.00
Wheelock Street Partners	Non-Core Real Estate	3,882	0.15
Wheelock Street Partners II	Non-Core Real Estate	18,594	0.72
Wheelock Street Partnerts V	Non-Core Real Estate	7,159	0.28
TOTAL REAL ESTATE FUNDS		347,188	13.52
PRIVATE EQUITY FUNDS			
Neuberger	Private Equity	113,536	4.42
TOTAL PRIVATE EQUITY FUNDS		113,536	4.42
HEDGE FUNDS			
BH GD SYS TRD FD	Hedge Fund of Funds	26,686	1.04
Carlson Capital	Hedge Fund of Funds	40,583	1.58
Fir Tree Partners	Hedge Fund of Funds	50,512	1.97
PAAMCO	Hedge Fund of Funds	4,558	0.18
TOTAL HEDGE FUNDS		122,339	4.77
Total Portfolio Before Securities Lending		$ 2,568,156	100.00 %
Securities Lending		108,991	
TOTAL INVESTMENTS		$ 2,677,147	

List of Largest Assets Held
As of June 30, 2018 (dollars in thousands)

Ten Largest Bond Holdings (Fair Value)

Par Value	Description	Interest Rate	Due	Rating	Fair Value
$ 5,080	GNMA	4.50	07/20/2048	AAA	$ 5,280
3,000	GNMA	4.00	07/20/2048	AAA	3,074
2,590	US Treasury Note	2.00	02/15/2025	AAA	2,463
1,600	FNMA	4.00	07/01/2048	AAA	1,631
1,390	US Treasury Bond	3.75	11/15/2043	AAA	1,580
1,500	FNMA	3.50	07/01/2033	AAA	1,517
1,370	Federal Home Loans	-	08/14/2018	AAA	1,366
1,300	FNMA	4.50	08/01/2048	AAA	1,351
1,300	GNMA	3.00	07/20/2048	AAA	1,271
1,120	US Treasury Bill	-	11/15/2018	AAA	1,111

Ten Largest Stock Holdings (Fair Value)

Shares	Stock	Fair Value
241,039	Bank of America Corp	$ 6,795
58,511	JP Morgan Chase & Co	6,096
32,314	Berkshire Hathaway Inc	6,031
47,727	Johnson & Johnson	5,791
85,144	Citigroup Inc	5,697
119,814	Cisco Systems Inc	5,156
90,859	Wells Fargo & Co	5,037
36,517	Chevron Corp	4,616
111,397	Pfizer Inc	4,042

A complete list of portfolio holdings is available at the COPERS office.

Schedule of Investment Related Fees
For the Fiscal Year Ended June 30, 2018

	Management	Fees (1)
CASH AND CASH EQUIVALENTS FUNDS		
The Boston Company	$ 247	$ -
Brigade Capital Management	65,000	
COPERS Cash Account	9,561	-
COPERS PIMCO	636	-
Cramer Rosenthal McGlynn	3,073	-
Eagle Asset Management	2,027	-
Longfellow Core Fixed	174	
Robeco Investment Management	3,550	
Western Asset Management	5,837	-
TOTAL CASH & CASH EQUIVALENT FUNDS	90,105	-
DOMESTIC EQUITIES FUNDS		
Baillie Gifford	198,105	704
The Boston Company	52,220	354
Cramer Rosenthal McGlynn	63,441	593
Eagle Asset Management	69,363	353
FTSE RAFI DV EX US	79,089	73
FTSE RAFI US LOW VOL	155,818	96
Robeco Investment Management	155,214	596
STATE ST US AG BND IND	156,416	10
STATE ST US TIPS IDX	130,808	20
TOTAL DOMESTIC EQUITIES FUNDS	1,060,474	2,799
FIXED INCOME FUNDS		
Aberdeen	-	236
Brigade Capital Management	301	-
Longfellow Core Fixed	94,797	52
MFS Emerging Markets Debt	103,152	534
PIMCO Total Return	-	327
Western Asset Management	98,464	257
TOTAL FIXED INCOME FUNDS	296,714	1,406
GLOBAL COMMINGLED FUNDS		
Artisan Partners	175,099	1,367
GMO	117,275	727
PIMCO All Asset	173,612	1,553
TOTAL GLOBAL COMMINGLED FUNDS	465,986	3,647

Schedule of Investment Related Fees (in thousands)
For the Fiscal Year Ended June 30, 2018 (continued)

Manager		Management		Fees (1)
INTERNATIONAL EQUITIES FUNDS				
Mondrian International		71,814		501
TOTAL INTERNATIONAL EQUITIES		71,814		501
REAL ESTATE FUNDS				
Cramer Rosenthal McGlynn		1,526		-
Focus		1,664		227
HSI Real Estate V		8,332		542
JDM Opportunity Fund		25,431		911
JP Morgan Strategic Property		94,819		929
Morgan Stanley Prime Property		98,291		805
Northwood GP LLC IV		20,616		366
Northwood Series V		26,048		364
RECAP III		6,881		85
RECAP IV		19,689		319
SC Core		14,201		725
TA Realty Associates		55		5
Wheelock Street Partners		3,882		50
Wheelock Street Partners II		18,594		275
Wheelock Street Partners V		7,159		375
TOTAL REAL ESTATE		347,188		5,978
HEDGE FUNDS				
BH DG Sys Trd FD LP		26,686		101
Carlson Capital		40,583		675
Fir Tree Partners		50,512		782
PAAMCO		4,558		468
TOTAL HEDGE FUNDS		122,339		2,026
PRIVATE EQUITY				
Neuberger Berman		113,536		594
TOTAL PRIVATE EQUITY FUNDS		113,536		594
TOTAL SECURITIES LENDING **(2)**		108,991		
TOTAL INVESTMENTS	$	2,587,042	$	16,951
TOTAL CASH & CASH EQUIVALENTS AND INVESTMENTS	$	2,677,147		

(1) Does not represent contractual fee schedule and may include expenses other than management fees.
(2) No separate billing for the securities lending program, the fees are netted from the securities lending income.

Investment Summary
As of June 30, 2018

Type of Investment	Fair Value (in thousands)	Percent of Total Fair Value
Fixed Income:		
Asset Backed	$ 6,902	0.27 %
Corporate Bonds	72,987	2.84
Derivatives	248	0.01
Foreign Bonds	8,315	0.32
Foreign Bonds Commingled	103,152	4.02
Government Agency	6,079	0.24
Mortgage Backed	58,357	2.27
US Government Guaranteed	40,674	1.58
Total Fixed Income	296,714	11.55
Domestic Equities:		
Basic Materials	16,268	0.63
Commingled	641,147	24.97
Consumer Discretionary	9,922	0.39
Consumer Goods	10,781	0.42
Consumer Services	29,078	1.13
Corporate Bonds	648	0.03
Energy Related	2,854	0.11
Financials	83,812	3.26
Health Care	49,541	1.93
Industrials	54,612	2.13
Information Technology	14,181	0.55
International Equity	79,089	3.08
Oil and Gas	29,105	1.13
Technology	39,436	1.54
Total Domestic Equities	1,060,474	41.30
Real Estate:		
Asset Backed	193,110	7.52
Limited Partnership	41,429	1.61
Private Equity	41,159	1.60
Real Estate Fund	71,490	2.78
Total Real Estate	347,188	13.51
Hedge Funds:		
Corporate Bonds	4,558	0.18
Other	117,781	4.59
Total Hedge Funds	122,339	4.77
International Equities:		
Asset Backed	71,814	2.80
Global Commingled:		
Global Commingled	290,887	11.33
Other	175,099	6.82
Total Hedge Funds	465,986	18.15
Private Equity:		
Private Equity	113,536	4.42
Securities Lending	108,991	
Total Investments	$ 2,587,042	96.49 %
Cash and Cash Equivalents:		
Cash & Cash Equivalents	90,105	3.51
Total Investments, Cash & Cash Eqvuivalents	$ 2,677,147	100.00 %

Schedule of Commissions
For the Fiscal Year of June 30, 2018

Brokerage Firm	Number of Shares Traded	Total Commissions	Commissions Per Share
Goldman Sachs	996,390	23,756.63	0.024
Merrill Lynch	604,622	15,669.77	0.025
State Street	527,447	15,669.63	0.027
J.P. Morgan	465,421	12,658.98	0.040
National Financial	444,811	12,327.74	0.025
Jefferies & Company	663,224	12,295.30	0.026
Credit Suisse	464,539	11,560.64	0.029
All Other Brokers (1)	3,958,885	109,555.14	
Total	**$ 8,125,339**	**$ 213,493.83**	

(1) Includes brokers with total commissions less than $10,000 each.

Actuarial Section

The **Actuarial Section** contains the actuary's certification letter, supporting schedules prepared by the actuary and a summary of plan provisions.

GRS Retirement Consulting

P: 720.274.7270 | F: 303.694.0633 | www.grsconsulting.com

November 6, 2018

Mr. Scott Steventon
Acting Retirement Program Administrator
City of Phoenix Employees' Retirement System
200 W. Washington Street, 10th Floor
Phoenix, Arizona 85003

Re: City of Phoenix Employees' Retirement System Actuarial Certification

Dear Mr. Steventon:

At the request of the City of Phoenix Employees' Retirement System ("COPERS"), Gabriel Roeder Smith & Company (GRS) has performed the actuarial valuation of the benefits associated with the COPERS defined benefit pension plan. The information in the Actuarial Section is based on our annual actuarial valuation report, with the most recent valuation conducted as of June 30, 2018. The Actuarial Section is intended to be used in conjunction with the full report.

The information in the Financial Section is based on the GASB 67 and 68 valuation report, with the most recent report conducted as of June 30, 2018. The Financial Section is intended to be used in conjunction with the full report.

This letter and the schedules listed below represent GRS' certification of the funded status as required for the financial report for the fiscal year ended June 30, 2018. GRS prepared the following schedules (information prior to 2017 was provided by COPERS):

- Actuarial Section
  - Summary of Actuarial Assumptions and Methods
  - Schedule of Retirees Members Added To and Removed From Rolls
  - Solvency Test
  - Analysis of Financial Experience
  - Summary of Benefit Provisions
- Financial Section
  - Sensitivity of Net Pension Liability to Changes in Discount Rate
  - Schedule of Changes in Net Pension Liability and Related Ratios
  - Schedule of Employer Contributions

Data

The valuation was based upon information as of June 30, 2018, furnished by COPERS staff, concerning system benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not audit the

7900 East Union Avenue | Suite 650 | Denver, Colorado 80237-2746

Mr. Scott Steventon
November 6, 2018
Page 2

data. We are not responsible for the accuracy or completeness of the information provided by COPERS staff.

Actuarial Assumptions and Methods

The assumptions adopted by the COPERS Board were primarily based upon the prior actuary's analysis. The most recent experience study had covered the period of July 1, 2009 through June 30, 2014. The new assumptions were adopted in August of 2015. Updated mortality assumptions were adopted in October of 2015. In 2017 the Board accepted GRS's recommendation in the economic assumption analysis and directed GRS to use a 7.25% discount rate, a 2.50% inflation assumption and a 3.0% payroll growth assumption.

We believe the assumptions are internally consistent and are reasonable, based on the actual experience of COPERS.

The actuarial assumptions and methods used to develop the Net Pension Liability, Discount Rate Sensitivity, Schedule of Changes in the Net Pension Liability, and Schedule of Net Pension Liability, noted above, meet the parameters set forth in the disclosures presented in the Financial Section by Government Accounting Standards Board Statement No. 67 including the use of the Entry Age Normal actuarial cost method to calculate the total pension liability.

The results of the actuarial valuation are dependent upon the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. A review of the impact of a different set of assumptions on the funded status of COPERS is outside the scope of this actuarial valuation.

The current actuarial assumptions are outlined in the section titled "Summary of Actuarial Assumptions and Methods."

Benefits

There were no changes to the plan provisions during the past year. The current benefit provisions are outlined in the section titled "Summary of Benefit Provisions."

Funding Policy and Objectives

The Actuarially Determined Contribution is determined by taking the sum of the normal cost, a component to amortize the unfunded liability and a component to cover administrative expenses. The Board's current funding policy is to contribute an amount each year based on the most recently calculated Actuarially Determined Contribution.

The unfunded accrued liability is comprised of experience gains and losses, assumption changes and benefit changes. A base is established in each year for changes in the unfunded accrued liability arising from these sources. In September 2013, the Board adopted amortization payment methods that

GRS Retirement Consulting

Mr. Scott Steventon
November 6, 2018
Page 3

amortize the pre-assumption changes of July 1, 2013 over a closed 25-year period as a level percentage of payroll; amortizes the assumption change liability as of July 1, 2013 over a closed 25-year period as a level percentage of payroll; amortizes the assumption change liability as of July 1, 2015 over a closed 20-year period as a level percentage of payroll with a four-year phase in; and amortizes future gains and losses over a closed 20-year period. Future gains cannot be amortized over a period shorter than the period remaining on the 25-year amortization schedule. Since the 2017 actuarial valuation the actuarially determined contribution has increased from 37.99% of pay to 38.51% of pay. The increase is primarily due to phasing in the assumption change liability as of July 1, 2015 and a return on the actuarial value of assets that was lower than assumed. However, the rate did not increase as much as expected because the City contributed an additional $70 million to the System.

Assuming all actuarial assumptions are met, this method of payment of the unfunded liability will result in full funding of the unfunded accrued liability in 20 years. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions.

Certification

All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of, where applicable, the Internal Revenue Code, and ERISA.

The signing actuaries are independent of COPERS sponsor. Leslie Thompson is an Enrolled Actuary. All signing actuaries are Members of the American Academy of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries. Finally, all of the undersigned are experienced in performing valuations for large public retirement systems.

Respectfully submitted,

Gabriel, Roeder, Smith & Company

Leslie L Thompson

Leslie Thompson, FSA, FCA, EA, MAAA
Senior Consultant

Paul T Wood

Paul Wood, ASA, FCA, MAAA
Consultant

GRS Retirement Consulting

Supporting Schedules

Summary of Actuarial Assumptions and Methods

The assumptions were adopted by the City of Phoenix Employees' Retirement System based primarily upon the prior actuary's analysis. The most recent experience study had covered the period of July 1, 2009 through June 30, 2014. The new assumptions were adopted in August of 2015. Updated mortality assumptions were adopted in October of 2015. Additionally, updated economic assumptions were adopted July 1, 2017 and were used in the June 30, 2018 valuation.

Valuation Date

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

Actuarial Cost Method

The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the employer contribution rate is the sum of (i) the employer normal cost rate, and (ii) a rate that will amortize the unfunded actuarial liability.

1. The valuation is prepared on the projected benefit basis. The present value of each participant's expected benefit payable at retirement or termination is determined, based on age, service, sex, compensation, and the interest rate assumed to be earned in the future (7.25%). The calculations take into account the probability of a participant's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his terminating with a service benefit. Future salary increases are also anticipated. The present value of the expected benefits payable on account of the active participants is added to the present value of the expected future payments to retired participants and beneficiaries to obtain the present value of all expected benefits payable from the Plan on account of the present group of participants and beneficiaries.

2. The employer contributions required to support the benefits of the Plan are determined following a level percent of pay funding approach, and consist of a normal cost contribution and an unfunded accrued liability contribution, plus a component to cover administrative expenses.

3. The normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using the individual entry age actuarial cost method having the following characteristics of (i) the annual normal costs for each active member, payable from the date of entry into the system to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement, and (ii) each annual normal cost is constant percentage of the member's year-by-year projected covered pay.

4. The unfunded accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability. Amortization bases are established each year and amortized over periods in accordance with the following amortization methods.

    a. The UAL as of June 30, 2013, developed prior to implementing the September 2013 assumption changes, is amortized over a closed 25-year period as a level percentage of payroll.

Supporting Schedules (continued)

b. The impact of the September 2013 assumption changes on the UAL is amortized over a closed 25-year period as a level percentage of payroll with a four-year phase-in to the full amortization rate. The phase-in is calculated by multiplying the first year amortization payment by 25 percent. For the second year, the amortization schedule is recalculated reflecting the 25 percent payment in the first year and the remaining 24-year period and the calculated amortization payment is then multiplied by 50 percent. The process is repeated until the full amortization payment is made beginning in the fourth year of the 25-year period.

c. The impact of the August 2015 assumption changes on the UAL is amortized over a closed 20-year period as a level percentage of payroll with a four-year phase-in to the full amortization rate. The phase-in is calculated by multiplying the first year amortization payment by 25 percent. For the second year, the amortization schedule is recalculated reflecting the 25 percent payment in the first year and the remaining 19-year period and the calculated amortization payment is then multiplied by 50 percent. The process is repeated until the full amortization payment is made beginning in the fourth year of the 20-year period.

d. Future gains and losses are amortized over closed 20-year periods as a level percentage of payroll from the valuation date in which they are first recognized. However, gains will not be amortized over a shorter period than the remaining period on the amortization of the 2013 UAL.

Actuarial Value of Assets

The actuarial value of assets is determined by recognizing market value gains and losses over a four-year period. Gain and loss bases to be spread over the four-year period are determined by comparing expected returns based on the market value of assets and cash flows during the year to actual investment returns. The actuarial value of assets must be between 80 and 120% of market value.

Actuarial Assumptions

Economic Assumptions

1. Investment return: 7.25% per annum, compounded annually. Inflation is assumed to be 2.50%.

2. Salary increase rate: Individual salary increases are composed of a price inflation component, a real wage growth component, and a merit or longevity component that varies by age. The table below combines the various components of salary increases for sample ages. Growth in the total payroll is assumed to be 3.00%.

Supporting Schedules (continued)

Percentage Increase in Salary				
Age	**Price Inflation**	**Real Wage Growth**	**Merit or Longevity**	**Total**
20	2.50%	0.50%	6.60%	9.60%
25	2.50	0.50	5.00	8.00
30	2.50	0.50	3.65	6.65
35	2.50	0.50	2.60	5.60
40	2.50	0.50	1.85	4.85
45	2.50	0.50	1.25	4.25
50	2.50	0.50	0.75	3.75
55	2.50	0.50	0.40	3.40
60	2.50	0.50	0.15	3.15
65	2.50	0.50	0.00	3.00

3. COLA Due to Pension Equalization Reserve (PER): In September 2013, the Board first adopted an assumption valuing future benefits payable through the PER as a 1.5% annual compound cost-of-living adjustment (COLA). The PER only applies to Tier 1 and Tier 2 benefits. In August 2017, the assumption was lowered to 1.25% effective with the July 1, 2017 valuation.

Demographic Assumptions

1. Rates of Mortality for Healthy and Disabled Lives: Mortality rates are based on the sex-distinct employee and annuitant mortality tables described below, including adjustment factors applied to the published tables for each group. Half of active member deaths are assumed to be duty-related. Future mortality improvements are reflected by applying the MP-2015 projection scale on a generational basis to the adjusted base tables from the base year shown below.

(i) Non-Annuitant - CalPERS Employee Mortality Table without scale BB projection.

Gender	Adjustment Factor	Base Year
Male	1.054	2009
Female	1.112	2009

(ii) Healthy Annuitant - CalPERS Healthy Annuitant Mortality Table without scale BB projection.

Gender	Adjustment Factor	Base Year
Male	1.019	2009
Female	1.061	2009

(iii) Disabled Annuitant - RP2014 Disabled Annuitant Mortality Table without MP-2014 projection.

Supporting Schedules (continued)

Gender	Adjustment Factor	Base Year
Male	0.984	2006
Female	1.038	2006

Mortality - Sample Rates with Projections to 2018

	Probability of Death Pre-Retirement		Probability of Death Post-Retirement		Probability of Death Post-Disability	
Age	Men	Women	Men	Women	Men	Women
20	0.024%	0.016%	0.020%	0.014%	0.579%	0.190%
25	0.032	0.020	0.024	0.018	0.664	0.193
30	0.042	0.025	0.033	0.028	0.610	0.262
35	0.051	0.036	0.054	0.048	0.775	0.403
40	0.066	0.049	0.097	0.090	1.022	0.589
45	0.090	0.065	0.193	0.183	1.572	0.861
50	0.131	0.092	0.422	0.428	1.758	1.024
55	0.210	0.143	0.551	0.431	2.052	1.378
60	0.328	0.210	0.756	0.504	2.534	1.802
65	0.472	0.296	0.980	0.676	3.286	2.210
70	0.633	0.406	1.577	1.100	4.197	2.843
75	0.850	0.587	2.628	1.923	5.658	4.122
80	1.186	0.926	4.673	3.303	8.017	6.250
85	8.404	6.015	8.404	6.015	11.761	9.444
90	14.467	11.095	14.467	11.095	17.612	13.774

Disability Rates

2. The disability incidence rates are 0.960 times the CalPERS Public Agency Miscellaneous Ordinary Disability Incidence table for Males. Half of disabilities are assumed to be duty-related. Sample disability rates of active members are provided in the table below. The rates apply to both male and female COPERS members.

Sample Attained Ages	Probability of Disablement
25	0.0163%
30	0.0183
35	0.0471
40	0.1172
45	0.1834
50	0.2046
55	0.2122
60	0.2132

Supporting Schedules (continued)

3. Termination rates (for causes other than death, disability or retirement): Termination rates are based on age and service. Termination rates are not applied after a member becomes eligible for a retirement benefit. Rates at selected ages are shown.

Probability of Termination						
Years of Service						
Age	0	1	2	3	4	5+
20	17.00%	15.00%	9.00%	8.00%	6.25%	5.50%
25	17.00%	15.00%	9.00%	8.00%	6.25%	5.50%
30	15.00%	11.25%	8.00%	6.75%	5.25%	4.50%
35	15.00%	8.75%	7.00%	5.50%	4.50%	3.50%
40	15.00%	7.50%	6.25%	4.50%	4.00%	2.75%
45	15.00%	6.50%	5.50%	4.50%	4.00%	2.25%
50	15.00%	6.50%	5.50%	4.50%	4.00%	2.00%
55	15.00%	6.50%	5.50%	4.50%	4.00%	2.00%
60	15.00%	6.50%	5.50%	4.50%	4.00%	2.00%

4. **Retirement Rates**

Probability of Retirement				
Years of Service				
Age	< 15	15-24	25-31	≥ 32
50-51	0.00%	0.00%	40.00%	40.00%
52	0.00	0.00	35.00	40.00
53	0.00	0.00	32.50	32.50
54	0.00	22.50	27.50	32.50
55-58	0.00	22.50	27.50	32.50
59	0.00	22.50	22.50	42.50
60	10.00	22.50	22.50	42.50
61	17.00	22.50	27.50	42.50
62	17.00	30.00	32.50	42.50
63	17.00	25.00	32.50	42.50
64	17.00	25.00	37.50	42.50
65	30.00	32.50	40.00	42.50
66-69	25.00	32.50	40.00	42.50
70	100.00	100.00	100.00	100.00

Other Assumptions

1. Percent married: 90% of employees are assumed to be married.

Supporting Schedules (continued)

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

3. Unused Vacation and Compensatory Time: For Tier 1 and Tier 2 members, compensatory service credits and lump sum payments for unused vacation and compensatory time are assumed to increase the present value of normal retirement benefits by 9.0%. No increase to the present value of normal retirement benefits was assumed for Tier 3 members.

4. Member Contribution Crediting Rate: Member contributions are assumed to be credited with interest at 3.75% per annum.

Schedule of Retired Members Added To and Removed From Rolls

	Added to Rolls		Removed		Total			
Year Ended	Count	Annual Pensions*	Count	Annual Pensions*	Count	Annual Pensions*	Average Annual Pension	% Increase in Pensions
6/30/2009	426	$ 15,789	174	$ 3,002	4,669	$ 126,220	$ 27,034	11.3%
6/30/2010	432	15,259	170	3,206	4,931	138,273	28,042	9.5
6/30/2011	444	15,251	184	3,574	5,191	149,950	28,887	8.4
6/30/2012	448	14,488	161	4,174	5,478	160,294	29,256	6.9
6/30/2013	426	12,574	201	3,996	5,703	168,843	29,606	5.4
6/30/2014	597	21,948	145	3,232	6,155	187,559	30,473	11.1
6/30/2015	578	22,483	192	4,225	6,541	205,816	31,466	9.7
6/30/2016	375	11,573	182	4,329	6,734	213,061	31,640	3.5
6/30/2017	321	9,317	233	4,395	6,822	218,364	32,009	2.5
6/30/2018	370	11,314	218	4,825	6,974	225,644	32,355	3.3

***** Represents in thousands

Solvency Test (in thousands)

	Actuarial Accrued Liabilities for				Portion of Actuarial Liability Covered by Reported Assets		
Valuation Date	Active Member Contributions	Retirees and Beneficiaries and Vested Terminations	Members (Employer Financed Portion)	Actuarial Value Assets	(5)/(2)	[(5) - (2)]/(3)	[(5) - (2)] -(3)] /(4)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
6/30/2008	$ 433,742	$ 1,066,886	$ 912,737	$ 1,908,414	100.0%	100.0%	44.7%
6/30/2009	446,039	1,193,391	878,664	1,895,148	100.0%	100.0%	29.1%
6/30/2010	445,141	1,311,929	940,217	1,868,093	100.0%	100.0%	11.8%
6/30/2011	446,456	1,431,877	874,576	1,834,620	100.0%	96.9%	0.0%
6/30/2012	443,964	1,525,152	970,258	1,827,528	100.0%	90.7%	0.0%
6/30/2013	396,583	1,881,123	1,201,741	1,962,533	100.0%	83.2%	0.0%
6/30/2014	393,754	2,099,274	1,121,756	2,120,700	100.0%	82.3%	0.0%
6/30/2015	383,029	2,465,862	1,127,017	2,202,923	100.0%	73.8%	0.0%
6/30/2016	393,626	2,522,989	1,067,522	2,283,216	100.0%	74.9%	0.0%
6/30/2017	406,651	2,638,084	1,084,717	2,402,707	100.0%	75.7%	0.0%
6/30/2018	417,314	2,704,971	1,103,761	2,562,847	100.0%	79.3%	0.0%

Supporting Schedules (continued)

Analysis of Financial Experience (in thousands)

	Derivation for Year Ended June 30, 2018				
	2018	2017	2016	2015	2014
(1) UAAL at Start of Year	1,726,745	1,700,921	1,772,985	1,494,084	1,516,915
(2) Normal Cost for Year*	73,449	73,256	80,757	75,310	78,331
(3) Expected Contributions	(187,324)	(183,023)	(178,288)	(157,314)	(153,885)
(4) Assumed Investment Income Accrual on (1), (2) and (3)	121,133	123,527	129,383	109,037	110,987
(5) Expected UAAL Before Changes	1,734,003	1,714,681	1,804,836	1.521,117	1,552,347
(6) Effect of Assumption/Method Changes	-	2,420	(69,420)	254,870	-
(7) Effect of Benefit Changes	-	-	(3,229)	-	-
(8) Expected UAAL After Changes	1,734,003	1,717,101	1,732,187	1,775,987	1,552,347
(9) Actual UAAL	1,663,199	1,726,745	1,700,921	1,772,985	1,494,084
(10) Gain/Loss [8. - 9.]	70,804	(9,644)	31,266	3,002	58,263
(11) As % of AAL at Start of Year	1.71%	-0.24%	0.80%	0.10%	1.70%

	2013	2012	2011	2010	2009
(1) UAAL at Start of Year	1,111,845	918,289	829,195	622,946	504,950
(2) Normal Cost for Year*	71,828	77,366	80,099	78,731	83,089
(3) Expected Contributions	(143,502)	(133,822)	(119,613)	(116,482)	(98,157)
(4) Assumed Investment Income Accrual on (1), (2) and (3)	86,136	71,248	64,652	48,228	39,755
(5) Expected UAAL Before Changes	1,126,307	933,081	854,333	633,424	529,637
(6) Effect of Assumption/Method Changes	423,247	-	-	-	-
(7) Effect of Benefit Changes	-	-	-	-	-
(8) Expected UAAL After Changes	1,549,554	933,081	854,333	633,424	529,637
(9) Actual UAAL	1,516,915	1,111,845	918,289	829,195	622,946
(10) Gain/Loss [8. - 9.]	32,639	(178,764)	(63,956)	(195,771)	(93,309)
(11) As % of AAL at Start of Year	1.10%	-6.50%	-2.40%	-7.80%	-3.90%

*Includes administrative expenses for 2017

Summary of Benefit Provisions

Membership

Full-time employees of the City of Phoenix other than police officers, firefighters, or elected officials who are covered by another retirement system to which the City contributes.

Members who were hired before July 1, 2013, as well as members who joined the City between July 1, 2013 and December 31, 2015 who were members of ASRS prior to July 1, 2011 and did not withdraw their contributions are Tier 1 members.

Members hired into employment with the City between July 1, 2013 and December 31, 2015 who are not Tier 1 members are Tier 2 members.

Members hired into employment with the City on or after July 1, 2016 who are not Tier 1 members or Tier 2 members are Tier 3 members.

Final Average Compensation (FAC)

Tier 1/Tier 2
The average of annual compensation for the period of 3 consecutive years producing the highest average contained within the last 10 years immediately preceding retirement.

Tier 3
The average of annual compensation for the period of 5 consecutive years producing the highest average contained within the last 10 years immediately preceding retirement. Annual compensation will be limited to the first $125,000 of compensation, indexed to inflation (CPI-U) each January 1, commencing on January 1, 2017. For calendar year 2018, the annual compensation limit was $129,665.

Credited Service

Credited service is determined based on Section 14 of Chapter XXIV of the Phoenix City Charter as well as COPERS administrative policy number 43. In no case is more than a year of service credited to any member for all service rendered in any calendar year. The amount of service credited to members varies by Tier, as detailed below.

Tier 1
A member is credited with a month of service for each calendar month in which the member performs at least 10 days of City service. A member is credited with a year of service for any calendar year in which the member has at least 10 months of credited service. If a member has less than 10 months of credited service for any calendar year, they are credited for the actual number of months.

Tier 2/Tier 3
A member is credited with a month of service for each calendar month in which the member performs at least 20 days of City service. A member is credited with a year of service for any calendar year in which the member has at least 12 months of credited service. If a member has less than 12 months of credited service for any calendar year, they are credited for the actual number of months.

Summary of Benefit Provisions (continued)

Voluntary Retirement (no reduction for age)

Tier 1

Eligibility:
Sum of age and credited service equals 80 or more, age 60 with 10 or more years of credited service or age 62 with 5 or more years of credited service.

Annual Benefit:
Eligible unused sick leave service multiplied by 2% of FAC plus 2% of FAC times credited service up to 32.5 years plus 1% of FAC times service in excess of 32.5 years plus 0.5% of FAC times service in excess of 35.5 years. Minimum monthly pension is $250 ($500 if member has 15 or more years of service).

Tier 2/Tier3

Eligibility:
Sum of age and credited service equals 87 or more, age 60 with 10 or more years of credited service or age 62 with 5 or more years of credited service.

Annual Benefit:
Eligible unused sick leave service multiplied by 2% of FAC for Tier 2 members only plus FAC times credited service times the corresponding accrual rate:

Tier 2		Tier 3	
Years of Service	**Accrual Rate**	**Years of Service**	**Accrual Rate**
0 < Service ≤ 20	2.10%	0 < Service ≤ 10	1.85%
20 < Service ≤ 25	2.15%	10 < Service ≤ 20	1.90%
25 < Service ≤ 30	2.20%	20 < Service ≤ 30	2.00%
Service >30	2.30%	Service >30	2.10%

Note that for Tier 2 and Tier 3, the same accrual rate will apply for each year of service based on the total years of service.

Deferred Vested Retirement

Eligibility:
Termination of City employment prior to age 62 with 5 or more years of credited service.

Annual Benefit:
Accrued regular retirement amount based on credited service, unused sick leave service, and FAC at time of termination, payable beginning at age 62.

Duty Disability Retirement

Eligibility:
Total and permanent disability incurred in line of duty with the City.

Summary of Benefit Provisions (continued)

Annual Benefit:
Computed in the same manner as the regular retirement amount based on FAC and credited service at time of disability retirement. Minimum is 15% of FAC for Tier 1 members and 15.75% for Tier 2 and Tier 3 members. Maximum during workers' compensation period is difference between final compensation and annualized workers' compensation. At expiration of workers' compensation period, amount is recomputed to include years during which workers' compensation was paid.

Non-Duty Disability Retirement

Eligibility:
Total and permanent disability after 10 or more years of credited service.

Annual Benefit:
Computed in the same manner as the regular retirement amount based on FAC and credited service at time of disability retirement.

Pre-Retirement Duty Death Benefit

Eligibility:
Death in line of duty with the City and compensable under worker's compensation.

Annual Benefit:
To the spouse: Joint and 100% survivor actuarial equivalent of accrued regular retirement amount based on FAC and credited service and unused sick leave service at time of death. Minimum of 10 years of service is credited. To the children of a deceased member with 10 or more years of credited service: each child shall receive a monthly pension of $200 until adoption, marriage, death or attainment of age 18.

Pre-Retirement Non-Duty Death Benefit

Eligibility:
10 or more years of credited service.

Annual Benefit:
Same as Pre-Retirement Duty Death Benefit.

Refund of Contributions

Eligibility:
Termination of covered service employment prior to eligibility for any other benefits.

Annual Benefit:
No annual benefit. Accumulated member contribution with interest at no more than 3.75% annually after July 1, 2016.

Pension Equalization Reserve (PER)

The PER is credited with Excess Earnings, if any, each calendar year. Excess Earnings are defined as the excess over 8.0% of the annual average of the time-weighted rates of return for the immediately preceding five calendar years. The amounts credited to the PER are either used to fund

Summary of Benefit Provisions (continued)

percentage increases to pension amounts or one-time post retirement distribution benefits (13th checks).

On July 1 of each year, persons in receipt of a pension for at least 36 months receive a percentage increase based on the lesser of:

i. Phoenix area Consumer Price Index (CPI) and
ii. The amount the balance in the PER can fully fund

The increase, subject to the availability of funds in the PER, is payable beginning with the April 1 payment each year, retroactive to January 1 of the same year.

Also, after each plan year's return is known, all pensioners (excluding minors) as of the end of the plan year are eligible to receive a one-time post retirement distribution (13th check). The 13th check is a percentage of the pensioner's annual benefits based on the lesser of:

i. One half of the Phoenix area Consumer Price Index (CPI) and
ii. The excess of the rate of return over the assumed interest rate

The percentage cannot be more than three percent, but must be at least one percent and is subject to the availability of funds in the PER. The 13th check is payable on December 1.

The PER is only applicable for Tiers 1 and 2.

Projected Percentage

Actuarially determined normal cost rate plus an amortization rate on the unfunded actuarial liability and a rate for administrative expenses, stated as a percentage of projected member compensation.

Member Contribution Rates

Tier 1: 5% of pay
Tier 2/Tier 3: 50% of the Projected Percentage not to exceed 11% of pay on or after January 1, 2016

City Contribution Rates

Total Projected Percentage less Member Contribution Rates for each Tier.

Statistical Section

The section provides financial and demographic data pertaining to COPERS.

The purpose of the statistical section is to provide the reader with data which is considered to be pertinent to the financial and economic condition of the retirement plan. Each schedule is defined below with an explanation of the schedule and an identification of the source of the data.

Schedule of Changes in Fiduciary Net Position

This schedule provides the additions and deductions to the plan for the past ten years. The change in net position is provided to illustrate whether sufficient resources are available in the given fiscal year to cover plan benefits. This schedule is developed using the Statement of Changes in Fiduciary Net Position for the past ten years.

Schedule of Benefit Expenses by Type

This schedule provides the benefit expenses of the plan by type for the last ten years. COPERS benefits include payments for service retirement payments, disability benefits, death in service benefits, child benefits, payment to alternate payees and survivor benefits. This schedule is developed using reports from the City's accounting system. The expenses can be found in COPERS' Statement of Changes in Fiduciary Net Position for the past ten years.

Schedule of Refunds by Type

This schedule provides that annual amount of refunds issued to beneficiaries of deceased employees, and employees upon separation from City employment. This schedule is compiled using information from COPERS' database and the payroll system.

Schedule of Retired Members by Type of Benefit

This schedule provides the number of retired members within each monthly benefit category, by type of benefit. COPERS plan benefits include payments for deferred benefits, normal retirement benefits, disability benefits, survivor benefits, death benefits and payments to alternate payees. The schedule is developed using COPERS' database.

Schedule of Average Benefit Payment Amounts

This schedule provides the average benefit payments per years of credited service. This information is provided to illustrate how benefit payments increase as the years of credited service increases. This schedule is developed using COPERS' database.

Schedule of Changes in Fiduciary Net Position (in thousands)

Last Ten Fiscal Years

	2018	2017	2016	2015	2014
ADDITIONS					
Employer Contributions	$ 229,006	$152,153	$ 119,844	$ 117,092	$ 115,244
Member Contributions	33,340	30,870	29,306	27,861	28,815
Inter-System Transfers	484	43	217	199	160
Net Investment Income (Loss)	166,514	243,210	9,171	47,149	298,576
Total Additions	429,344	426,276	158,538	192,301	442,795
DEDUCTIONS					
Benefit Payments	224,454	220,276	213,047	201,178	177,447
Refunds of Contributions	3,472	3,227	3,047	3,004	2,192
Inter-System Transfers (Note 11)	134	207	315	421	238
Administrative Expenses	377	380	234	414	628
Total Deductions	228,437	224,090	216,643	205,017	180,505
CHANGE IN NET POSITION RESTRICTED FOR PENSIONS	$ 200,907	$202,186	$ (58,105)	$ (12,716)	$ 262,290

	2013	2012	2011	2010	2009
ADDITIONS					
Member Contributions	$ 27,738	$ 28,140	$ 28,648	$ 30,240	$ 31,774
Employer Contributions	110,094	105,682	90,965	86,241	66,383
Funds from Other Systems	105	4,030	4,999	4,619	2,411
Net Investment Income (Loss)	195,305	(5,664)	315,936	143,016	(375,388)
Total Additions	$ 333,242	$132,188	$ 440,548	$ 264,116	$(274,820)
DEDUCTIONS					
Benefit Payments	165,521	156,679	145,922	133,522	121,484
Refunds of Contributions	2,464	2,333	2,470	2,877	2,812
Funds to Other Systems	606	1,365	2,872	1,699	1,518
Administrative Expenses	389	328	251	402	477
Total Deductions	$ 168,980	$160,705	$ 151,515	$ 138,500	$ 126,291
CHANGE IN NET POSITION RESTRICTED FOR PENSIONS	$ 164,262	$ (28,517)	$ 289,033	$ 125,616	$(401,111)

Schedule of Benefit Expenses by Type
Last Ten Fiscal Years (in thousands)

Fiscal Year	Age & Service Benefits Retirees	Disability Benefits Retirees Death In Service	Duty	Non-Duty	Survivors	Deferred	Child	Alternate Payee	Total Benefits
2017-2018	$ 196,573	$ 3,281	$ 642	$ 3,426	$ 15,256	$ 3,085	$ 58	$ 2,133	$224,454
2016-2017	193,048	3,271	672	3,311	15,038	2,801	61	2,074	220,276
2015-2016	186,802	3,324	686	3,273	14,150	2,721	62	2,029	213,047
2014-2015	176,699	3,109	710	3,184	12,958	2,582	47	1,889	201,178
2013-2014	154,684	2,921	711	2,898	12,157	2,373	32	1,701	177,477
2012-2013	143,970	2,812	702	2,880	11,581	2,158	31	1,387	165,521
2011-2012	136,223	2,792	700	2,882	10,792	1,997	36	1,257	156,679
2010-2011	126,576	2,706	718	2,774	10,047	1,859	32	1,210	145,922
2009-2010	115,115	2,672	707	2,650	9,633	1,651	32	1,062	133,522
2008-2009	104,189	2,795	716	2,541	8,819	1,444	33	947	121,484

*Amounts shown are annualized amounts based on the June 30th payroll.

Refunds by type
(in thousands)

Fiscal Year	Beneficiaries	Separation	Total Refunds
2017-2018	$ 332	$ 3,140	$ 3,472
2016-2017	518	2,709	3,227
2015-2016	589	2,413	3,002
2014-2015	725	2,279	3,004
2013-2014	515	1,677	2,192
2012-2013	821	1,643	2,464
2011-2012	437	1,896	2,333
2010-2011	677	1,793	2,470
2009-2010	963	1,914	2,877
2008-2009	618	2,194	2,812

Schedule of Retired Members by Type of Benefit
As of June 30, 2018

Monthly Benefit	Number of Retirees	Type of Retirement						
		Deferred	Normal or Voluntary	Duty Disability	Non-Duty Disability	Survivor Payment	Death Benefit	Alternate Payee
Deferred	943	943	-	-	-	-	-	-
$1 - 300	98	-	47	1	-	14	22	14
301 – 400	135	-	89	6	1	27	3	9
401 – 500	135	-	87	7	3	29	1	8
501 – 600	138	-	96	4	4	22	3	9
601 – 700	159	-	85	3	9	47	5	10
701 – 800	173	-	99	2	10	40	8	14
801 – 900	187	-	116	5	21	28	9	8
901 – 1,000	175	-	97	1	14	48	4	11
1,001 – 1,100	202	-	122	4	12	42	10	12
1,101 – 1,200	194	-	124	1	15	36	5	13
1,201 – 1,300	172	-	122	1	14	22	4	9
1,301 – 1,400	177	-	116	-	15	30	7	9
1,401 – 1,500	177	-	129	3	5	29	9	2
1,501 – 2,000	822	-	631	13	39	89	31	19
2,001 – 2,500	877	-	752	2	13	89	12	9
2,501 – 3,000	774	-	698	-	10	52	10	4
3,001 – 4,000	1,173	-	1,094	-	9	56	13	1
4,001 – 5,000	666	-	638	-	2	18	6	2
5,001+	704	-	671	-	-	29	3	1
Totals	8,081	943	5,813	53	196	747	165	164

Schedule of Average Benefit Payment Amounts
By Year of Retirement

Retirement Effective Dates	Years of Credited Service					
For Fiscal Years Ending June 30:	5-9	10-14	15-19	20-24	25-29	30+
2018						
Average Monthly Benefit	$ 485.88	$1,247.90	$ 1,864.62	$2,831.05	$3,702.93	$4,536.18
Mean Monthly Final Average Compensation	3,717.43	5,233.92	5,715.12	6,283.43	6,669.52	6,924.99
Number of New Retirees	25.00	37.00	47.00	75.00	58.00	47.00
2017						
Average Monthly Benefit	$ 705.81	$ 973.60	$ 1,887.47	$2,534.96	$3,720.04	$3,945.87
Mean Monthly Final Average Compensation	4,447.09	4,259.10	5,826.38	5,694.16	6,652.33	6,235.95
Number of New Retirees	17.00	37.00	32.00	48.00	67.00	53.00
2016						
Average Monthly Benefit	$ 736.45	$1,275.96	$ 1,669.03	$2,597.60	$3,613.86	$4,779.84
Mean Monthly Final Average Compensation	4,573.73	5,203.89	5,076.77	5,891.97	6,582.60	7,289.30
Number of New Retirees	25.00	42.00	44.00	50.00	88.00	43.00
2015						
Average Monthly Benefit	$ 627.12	$1,198.23	$ 1,800.35	$2,832.46	$3,747.22	$4,451.39
Mean Monthly Final Average Compensation	4,394.71	4,918.77	5,272.00	6,355.55	6,642.33	6,734.34
Number of New Retirees	41.00	62.00	66.00	95.00	206.00	136.00
2014						
Average Monthly Benefit	$ 627.98	$1,171.08	$ 2,093.01	$2,620.92	$3,963.91	$4,471.11
Mean Monthly Final Average Compensation	4,149.40	4,891.54	6,133.52	5,746.43	6,986.39	6,578.83
Number of New Retirees	31.00	43.00	47.00	82.00	148.00	58.00
From July 1, 2014 to June 30, 2018						
Average Monthly Benefit	$ 636.65	$1,173.35	$ 1,862.90	$2,683.40	$3,749.59	$4,436.88
Mean Monthly Final Average Compensation	4,256.47	4,901.44	5,604.76	5,994.31	6,706.63	6,752.68
Number of New Retirees	27.80	44.20	47.20	70.00	113.40	67.40

City of Phoenix
Employees' Retirement System
200 W. Washington St, 10th Floor
Phoenix, AZ 85003

For additional copies, more information
or alternative format/reasonable accommodations,
call 602 534-4400, TTY: use 7-1-1.


FICTION
MICHAEL CONNELLY
ROBIN COOK