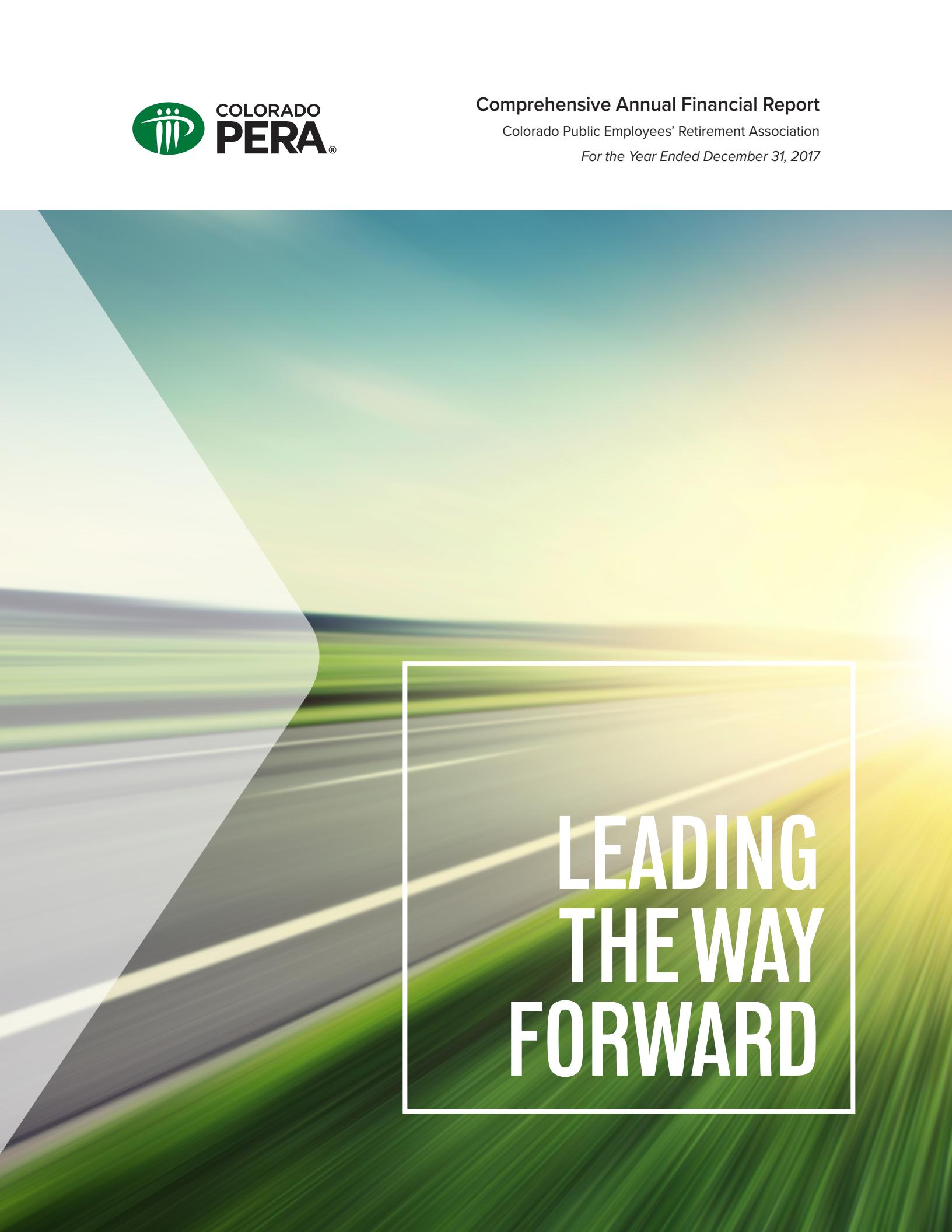




## Comprehensive Annual Financial Report

Colorado Public Employees' Retirement Association

*For the Year Ended December 31, 2017*

A photograph of a road with motion blur, showing streaks of green and yellow. A large white arrow points diagonally upwards and to the right, indicating a forward path. A white rectangular box is positioned in the lower right quadrant of the image, containing the text.

**LEADING  
THE WAY  
FORWARD**

# IN MEMORIAM



## Gregory W. Smith

1961–2017

*Former Colorado PERA Executive Director*

With sincere fondness and gratitude,  
Colorado PERA dedicates this  
*2017 Comprehensive Annual Financial Report*  
to former PERA Executive Director Gregory W. Smith.

Greg was a dedicated public servant who had an unwavering commitment to serving thousands of public employees in Colorado. He was a consummate professional and leader in the pension industry who will be long remembered for his many contributions and accomplishments. As a mentor and friend, he has left an indelible mark on many lives. PERA will be forever indebted to Greg.



*“I am honored to lead this organization that is vital to so many of Colorado’s current and former public employees. Like many of you, I come from a family of public employees and I am proud to continue not just the family tradition, but to also guide one of the best retirement systems in the nation.”*

Gregory W. Smith upon his selection as Colorado PERA’s sixth Executive Director in November 2012.



## Comprehensive Annual Financial Report

*For the Year Ended December 31, 2017*

Colorado Public Employees' Retirement Association

Prepared by Colorado PERA Staff



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# INTRODUCTORY SECTION



## Introductory Section

### LETTER OF TRANSMITTAL



June 22, 2018

Dear Colorado PERA Members, Benefit Recipients, Employers, and Members of the Board of Trustees:

I am pleased to present Colorado PERA's *Comprehensive Annual Financial Report (CAFR)* for the year ended December 31, 2017.

Throughout the past year, PERA remained focused on the work started in 2016 to reduce PERA's risk profile and ensure a more stable and secure retirement system for the more than 580,000 Coloradans who are serving and have served our state. Since 2010, PERA's funded status had declined due to changes in assumptions, such as lower mortality rates to more accurately reflect the membership's longer life expectancies and more conservative projected investment returns to reflect modern market conditions. Further contributing to PERA's funded status is the historic underpayment of the actuarially determined contribution (ADC). These factors put a strain on PERA's funded status by increasing the time PERA needed to become fully funded, which therefore increased PERA's risk profile.

With the PERA Board of Trustees' (Board) guidance and approval, PERA staff spent much of 2017 traveling throughout the state hosting in-person, telephone and online meetings and providing educational materials to explain PERA's funding position and solicit input from PERA's membership and other stakeholders. These efforts, along with the Board's extensive analysis and ongoing consultation with industry experts, came to fruition last fall with the Board's proposal for strengthening the fund.

The Board presented their recommendations to the 2018 Colorado General Assembly for meaningful and comprehensive changes to restore resilience and bring the plan to 100 percent funding within 30 years as required by statute. The proposed modifications included increases to contribution rates and a reduction of benefits that impact current and future members, retirees, and employers.

On March 7, 2018, Senate Bill (SB) 18-200 was introduced in the Colorado State Senate and incorporated many of the Board's recommendations. As the bill made its way through the legislative process, changes to the bill resulted in significant differences between the two versions passed by the House and Senate. At the end of the session, those differences were resolved through the work of a bipartisan conference committee tasked with formulating a compromise that could pass both houses. Ultimately, the conference committee reached an agreement and the General Assembly passed the bill on May 9, 2018, and it was signed by Governor Hickenlooper on June 4, 2018.

The changes included in this legislation will better address the unfunded liability and put PERA on the path to full funding within 30 years. With a stronger funded status, the plan can withstand future changes in external conditions whether there are economic downturns or demographic shifts. With SB 18-200, all divisions are projected to be fully funded within 30 years. On a projected basis, the amortization period for each division is as follows:

- State Division—27-year amortization period
- School Division—30-year amortization period
- Local Government Division—15-year amortization period
- Judicial Division—15-year amortization period
- Denver Public Schools (DPS) Division—17-year amortization period

SB 18-200 impacts all stakeholders—PERA members, retirees, and employers—and it resets the path toward full funding and financial resilience in several ways:

- Establishes an annual direct distribution from the State budget.
- Increases member contributions.
- Increases employer contributions.



Ron Baker  
Interim Executive Director

### LETTER OF TRANSMITTAL

- Suspends the annual increase (AI) for 2018 and 2019.
- Sets a lower AI cap and extends the waiting period to receive a first-time increase.
- Increases the retirement age.
- Increases the number of years to calculate a Highest Average Salary.
- Redefines PERA-includable salary to include cafeteria and qualified transportation plans (Section 125 and 132 plans) for future new members and to include unused sick leave payouts for all members.
- Implements an automatic adjustment provision for contributions, AIs, and the direct distribution to keep PERA on the path to full funding.

The Board recommended implementing the automatic adjustment provision, which is an innovative approach to pension funding that requires an adjustment to member and employer contribution rates and the AI percentage so the fund remains within its target of a 30-year funding goal. Previously, the only way contribution rates or AI percentages could change was through the passage of legislation by the General Assembly. Under SB 18-200, automatic changes are included in statute to ensure PERA remains on the path to pay off the unfunded liability. Beyond the Board's recommended components, the automatic adjustments as included in the new statute involve changes in member and employer contributions rates, the AI percentage, as well as an annual direct distribution from the State budget. This provision responds to economic or demographic events that could cause a projected deviation in the path toward a closed 30-year funding goal. If the fund is behind the 30-year goal, member and employer contribution rates will increase, the direct distribution will increase, and the AI percentage will be reduced. Conversely, if the fund has positive experience and is ahead of the target 30-year funding goal, member and employer contribution rates along with the direct distribution would decrease and there would be an increase in the AI percentage. (For more detailed information on SB 18-200, please see pages 99–100.)

Although the combination of benefit reductions and contribution increases are difficult, they were necessary to ensure the long-term retirement security of our membership. Even with these changes, PERA continues to provide a retirement benefit that is highly competitive when compared to other states, which provides employers with significant advantages in recruiting and retaining a high quality workforce.

With SB 18-200, PERA members and Colorado taxpayers will benefit from a stronger, more stable retirement fund. As a direct result of the passage of SB 18-200, S&P Global Ratings upgraded its outlook on Colorado's bond rating from negative to stable. In a report issued on June 7, 2018, rating analysts wrote that the rating agency had "revised the outlook on all our ratings to stable following the state's adoption of pension reform in its 2018 legislative session." The report goes on to call the automatic adjustment provision a "positive diversion from the state's current funding practice."

Given the importance of PERA and the risk posed by its current funded status, taking meaningful legislative action was the best option to return PERA to a stronger financial standing to meet potential future challenges. As such, PERA will continue to provide a sustainable retirement plan that supports the public employees who support all of us in many ways throughout Colorado.

### Report Contents and Structure

Our CAFR must comply with the reporting requirements under Title 24, Article 51, Section 204(8) of the Colorado Revised Statutes.

The compilation of this CAFR reflects the combined efforts of PERA staff and is the responsibility of PERA management. It is intended to provide complete and reliable information as a basis for making management decisions, determining compliance with legal provisions, and determining responsible stewardship of assets contributed by members and employers.

### Overview of Colorado PERA

Established in 1931, PERA operates by authority of the Colorado General Assembly and is administered under Title 24, Article 51 of the Colorado Revised Statutes. Initially covering all State employees, PERA has expanded to include all Colorado school districts, the State's judicial system, and many municipalities and other local government entities.

### Legislation

During the 2017 legislative session, six bills were introduced that would have impacted PERA, two of which were signed into law. The Board takes positions on legislation affecting PERA based on its fiduciary responsibility to act in the best interest of its membership.

#### ***House Bill 17-1176: PERA Retirees Employed By Rural School Districts***

This bill modifies the current PERA working after retirement provisions for certain retirees hired by an employer in the School Division if the following conditions are met:

- The employer that hires the PERA service retiree is a rural school district (as determined by the Department of Education) and the school district has 6,500 students or fewer enrollees in kindergarten through 12th grade.
- The school district hires the PERA service retiree to provide classroom instruction, school bus transportation, or as a school food services cook.
- The school district determines that there is a critical shortage of qualified teachers, school bus drivers, or school food services cooks, and that the PERA service retiree has specific experience, skills, or qualifications that would benefit the district.

A PERA service retiree who meets these criteria would not be subject to a reduction in his or her benefit if the retiree works beyond the current working after retirement limits as long as the retiree does not work for a PERA employer during the effective month of retirement. The retiree could not work after retirement without limitation for more than six consecutive years.

### LETTER OF TRANSMITTAL

The bill also requires the employer to make full payment of all PERA employer contributions, disbursements, and working retiree contributions. The bill would repeal and sunset these provisions effective July 1, 2023. By December 1, 2020, PERA is required to submit a report to the General Assembly regarding these additional working after retirement provisions.

The Board voted to oppose this bill, which was signed into law by Governor Hickenlooper on June 6, 2017.

#### ***House Bill 17-1265: PERA Judicial Division Total Employer Contributions***

This bill increases the Amortization Equalization Disbursement (AED) and Supplemental Amortization Equalization (SAED) for the Judicial Division. While the State, School, and DPS Divisions had AED and SAED increases after the passage of SB 10-001, the Judicial Division was exempt. For the calendar year beginning in 2019, the bill increases both the Judicial Division's AED and SAED to 3.40 percent of total payroll and requires both the AED and SAED payment to increase by 0.4 percent of total payroll at the start of each of the following four calendar years through 2023.

The Board voted to support this bill, which was signed by Governor Hickenlooper on May 25, 2017.

#### ***House Bill 17-1114: State Treasurer's Authority To Access PERA Public Employees' Retirement Association Information***

This bill would have authorized the State Treasurer, as a member of the PERA Board of Trustees, to review all PERA records or information. Under the proposed legislation, PERA could not deny the request based on the expenditure of staff time or the need to use outside resources to fill the request, or for any other reason. The State Treasurer would have been prohibited from using the provided records or information for personal use.

The Board voted to oppose this bill, and the bill was postponed indefinitely by the House Committee on State, Veterans, & Military Affairs.

#### ***Senate Bill 17-113: Cap Employer Contribution Rates For PERA Public Employees' Retirement Association Employers***

This bill would have required that for the calendar year beginning January 1, 2018, and for each calendar year thereafter, the total of the employer contribution, including the AED and SAED, for any employer would not exceed the total contribution rates for the 2018 calendar year. The AED and SAED would also have been capped at their amounts for the 2018 calendar year.

The Board voted to oppose this bill, and the bill was postponed indefinitely by the House Committee on State, Veterans, & Military Affairs.

#### ***Senate Bill 17-158: Modify Composition of PERA Public Employees' Retirement Association Board Of Trustees***

This bill would have changed the composition of PERA's Board by:

- Eliminating one elected Trustee position from the State Division.
- Eliminating two elected Trustee positions from the School Division.

- Requiring at least one elected Trustee each from both the State and School Divisions to be at least 20 years from retirement eligibility.
- Replacing the eliminated Trustee positions with three Trustees appointed by the Governor and confirmed by the Senate. (There are currently three Governor-appointed Trustees on the Board.) The additional appointed Trustees could not be PERA members or retirees and must have had significant experience and competence in investment management, finance, banking, economics, accounting, pension administration, or actuarial analysis. The number of elected Trustees from the Local Government and Judicial Divisions would not have changed. The State Treasurer would have remained on the Board, as would an ex officio Trustee from the DPS Division.

The Board voted to oppose this bill, and the bill was postponed indefinitely by the House Committee on State, Veterans, & Military Affairs.

#### ***Senate Bill 17-185: District Attorney Salary Compensation And PERA***

Among other provisions not related to PERA, this bill would have allowed the boards of county commissioners of the counties within a judicial district, in consultation with the District Attorney, to make a one-time irrevocable election to require an Assistant District Attorney to become a PERA member. If an Assistant District Attorney becomes a PERA member, the State would have paid 80 percent of the PERA employer contribution and the county would have paid 20 percent.

The Board did not take a position on this bill, and the bill was postponed indefinitely by the Senate Committee on Finance.

### Economic Condition and Outlook

The U.S. economy grew 2.3 percent year-over-year during 2017, driven by consumer spending and business investment, with consumer confidence continuing to climb on positive economic data. The unemployment rate is nearing historic lows and ended the year at 4.1 percent while also posting the longest streak in history for consecutive monthly jobs gains. With the economy at or near full employment, pressure on wage growth should continue. Headline inflation, a measure of total inflation in an economy, held steady at 2.1 percent at the end of the year led by rising energy prices, while core inflation, which does not include the more volatile components such as food and energy, ended the year slightly lower at 1.8 percent. The residential housing market continued to strengthen with rising prices, declining inventory of existing homes, and increasing housing starts being the common themes. The Federal Reserve (Fed) raised the fed funds rate three times in 2017, ending the year at a target range of 1.25 percent to 1.50 percent. The Fed also began to wind down the \$4.5 trillion balance sheet amassed while attempting to stimulate growth and inflation in the aftermath of the global recession.

The global economy grew at a better than forecasted estimated rate of 3.0 percent year-over-year during 2017 and marked the first year since the global recession in which most regions of the globe experienced economic growth. Euro area growth came in stronger than expected, developing economies benefited from both rebounding commodity

### LETTER OF TRANSMITTAL

prices and an increase in exports, and inflation in developed economies remained low. The U.S. dollar weakened during the year due to strong growth outside the U.S. and on expectations that global central banks would follow the Fed in normalizing monetary policy.

Closer to home, the Colorado economy continued to outperform the nation in 2017, ranking third among states in real gross domestic product growth, with every sector seeing gains in employment. The Colorado labor market continued to improve, ranking first nationally for labor force growth, and has now recorded almost seven consecutive years of both labor force growth and a declining unemployment rate. Colorado ranked second nationally for the lowest unemployment rate, ending the year at 2.5 percent. New construction in residential housing continues to increase year-over-year, but still lags the necessary number of new permits to meet demand driven largely by in-migration. Housing prices continue to rise due in part to increasing costs for new construction and record low levels of inventory in the market for existing homes.

### Investments

The Board's Investment Committee is responsible for assisting the Board in overseeing PERA's investment program.

Investment portfolio income is a significant source of revenue to PERA. In 2017, net investment income was \$8.3 billion compared with total member contributions of \$910 million and employer contributions of \$1.6 billion.

For the year ended December 31, 2017, the defined benefit funds had a time-weighted rate of return of 18.1 percent net-of-fees on a market value basis. PERA's annualized, net-of-fees, time-weighted, rates of return over the last three and five years were 8.8 percent and 9.5 percent, respectively, and over the last 10 years it was 6.0 percent. The 35-year annualized, gross-of-fees rate of return for the pooled investment assets was 9.5 percent.

Prudent funding and healthy investment returns are important to the financial soundness of PERA. Changes in the composition of the portfolio are reflected in the Investment Summary on page 133.

An integral part of the overall investment policy is the strategic asset allocation policy. The targeted strategic asset allocation is designed to provide appropriate diversification and balance expected total rates of return with the volatility of expected returns. Specifically, the fund is to be broadly diversified across and within asset classes to limit the volatility of the total fund investment returns and to limit the impact of large losses on individual investments. Both traditional and nontraditional assets are incorporated into the asset allocation mix.

In addition to asset class targets, the Board sets ranges within which asset classes are maintained. The permissible ranges in effect at the end of 2017 were adopted by the Board on March 20, 2015. The interim and long-term targeted asset allocation mix and the specified ranges for each asset class are presented on page 129. All of the asset classes were within their specified ranges at year end.

PERA's investment policy is summarized in the Colorado PERA Report on Investment Activity on page 129.

### Corporate Governance

As stewards of capital for our over 580,000 members and beneficiaries, corporate governance is one way we protect and grow our portfolio over the long term. PERA's corporate governance philosophy is centered on accountability, transparency, alignment of interest, and sustainability. PERA's approach to advocacy against impediments to strong corporate governance is to actively engage with companies on a wide range of issues that may impact shareholder value. To that end, we hold meetings with corporate management and vote proxies in accordance with PERA's proxy voting policy.

PERA has maintained its commitment to corporate governance reform through participation in the Council of Institutional Investors (CII) as well as several other coalitions of long-term shareholders. I was honored to be elected to the CII Board in March 2018, and my representation on the CII Board further supports PERA's commitment to corporate governance. PERA continues to actively advocate for comprehensive improvements to shareholder rights, rigorous federal oversight, and reforms that foster trust in the integrity of the global capital markets. We actively file comment letters to various regulatory agencies and legislative bodies to influence rules and regulations that may impact our investments and shareholder rights. In addition, PERA continues to be active in the securities litigation arena, fulfilling the Board's commitment to support corporate governance reforms such as transparency, accountability, and enforcement of shareholders' rights.

### Financial Information and Management Responsibility

PERA's financial statements are prepared by management, who is responsible for the integrity and fairness of the data presented, including the many amounts which must, out of necessity, be based on estimates and judgments. The CAFR was prepared to conform to the accounting principles generally accepted in the United States of America. Financial information presented through the annual report is consistent with that which is displayed in the basic financial statements.

Ultimate responsibility for the basic financial statements and annual report rests with PERA management; the Board provides an oversight role over financial reporting. The Board is assisted in its responsibilities by the Audit Committee, which consists of eight Board members and two independent outside members. The Audit Committee is responsible to oversee the adequacy and effectiveness of PERA's system of internal control and the accounting and financial reporting systems. A more detailed description of the Audit Committee's role can be found in their report on pages 14–15.

Management is responsible for establishing and maintaining adequate internal control over financial reporting. PERA's internal control over financial reporting are designed to provide reasonable, but not absolute assurance, regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The internal control over financial reporting includes those policies and procedures that:

- Pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of assets;

### LETTER OF TRANSMITTAL

- Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures are being made only in accordance with authorizations of management; and
- Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of assets that could have a material effect on the financial statements.

Management has concluded that, as of December 31, 2017, the system of internal controls over financial reporting is effective, however during the audit process, a deficiency was identified related to internal controls over financial reporting. Under C.R.S. Section 2-3-103(2), state auditor reports containing recommendations must be kept confidential and may be released to the public only upon the approval of the legislative audit committee. The legislative audit committee is scheduled for August 14, 2018. Management is committed to implementing corrective action to address the deficiency.

There are inherent limitations in the effectiveness of any system of internal control, including the possibility of human error, the circumvention or overriding of controls, and that the cost of a control should not exceed the benefits to be derived. Accordingly, even an effective internal control system may not prevent or detect misstatements and can provide only reasonable assurance with respect to financial statement preparation. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions or that the degree of compliance with the policies or procedures may deteriorate.

State law requires that the State Auditor conducts or causes to be conducted an annual audit of PERA. Pursuant to this requirement, the State Auditor selected CliftonLarsonAllen LLP in 2015 to perform the independent audit of PERA. Under the direction of the State Auditor, CliftonLarsonAllen LLP audited PERA's 2017 basic financial statements in accordance with auditing standards generally accepted in the United States of America and Government Auditing Standards. This audit is described in the Report of the Independent Auditors on pages 23–25 of the Financial Section. Management has provided the auditors with full and unrestricted access to PERA's staff to discuss their audit and related findings to facilitate independent validation of the integrity of the plan's financial reporting and to consider the effectiveness of internal controls.

The Financial Section of the CAFR also contains Management's Discussion and Analysis (MD&A) that serves as a narrative introduction, overview, and analysis of the basic financial statements. This Letter of Transmittal is designed to complement the MD&A and should be read in conjunction with it.

### GASB Statement Nos. 74 and 75

The Governmental Accounting Standards Board (GASB) issued two related Statements which substantially change the accounting and financial reporting of Other Post Employment Benefit (OPEB) plans for Colorado PERA and PERA-affiliated employers. GASB Statement No. 74 (GASB 74), "Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans" affects the financial statements of PERA and is effective for fiscal years beginning after June 15, 2016.

GASB Statement No. 75 (GASB 75), "Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions," affects certain financial statements of PERA-affiliated employers and is effective for fiscal years beginning after June 15, 2017. Many requirements of these new OPEB standards parallel the current pension standards (GASB 67 and 68).

PERA implemented the provisions of GASB 74 in this CAFR. GASB 74 enhances the standards for footnote disclosures and Required Supplementary Information (RSI) for OPEB plans. While no longer included in the schedules of RSI, information pertaining to the funded status of the Health Care Trust Fund and DPS Health Care Trust Fund continue to be presented in the Actuarial Section of this CAFR.

### Actuarial Results

Actuarial valuations involve assumptions about the probability of events far into the future in order to estimate the financial and actuarial status of the defined benefit trust funds. Two types of actuarial valuations are required to be performed for PERA's five defined benefit pension and two OPEB trust funds: one for financial accounting and reporting purposes and the other for funding purposes. The results of both actuarial valuations are included in this CAFR. The actuarial valuations performed for financial accounting and reporting purposes are prepared in accordance with governmental accounting standards. Pension liabilities, OPEB liabilities, and other related amounts calculated in accordance with these standards emphasize the costs incurred by PERA-affiliated employers for providing benefits to their employees as part of the employment-exchange process. Assets are required to be stated at fair value and the liabilities are determined using a consistent, standardized methodology, which allows for transparency and the comparability of amounts calculated for financial accounting and reporting purposes across U.S. governmental defined benefit pension and OPEB systems.

The actuarial valuations for funding purposes are prepared in accordance with Actuarial Standards of Practice and the Board's pension and OPEB funding policies. Liabilities and other actuarial metrics are calculated for the purpose of determining a systematic approach to pre-funding costs of the five defined benefit pension and two OPEB plans, as well as to assess the adequacy of moneys that are available to pay post-employment benefits earned by the membership. Pre-funding future liabilities defrays the ultimate cost of providing benefits as dollars held in the trust funds generate investment returns. The amount of actuarial accrued liability (AAL) in excess of the actuarial value of assets is referred to as the unfunded actuarial accrued liability (UAAL). The ratio of assets to AAL represents the funded status of each plan.

Although some of the objectives and calculation methodologies of these valuations are similar, the liabilities calculated for financial reporting purposes and funding purposes are notably different for three of the five defined benefit pension trust funds. The UAAL calculated for purposes of systematically funding the five defined benefit pension trust funds was \$28.8 billion compared to the liabilities calculated for accounting and financial reporting purposes of \$54.6 billion, a difference of \$25.8 billion. This difference is attributed primarily to a provision of GASB 67 which requires that a lower discount rate be used in certain

### LETTER OF TRANSMITTAL

circumstances to calculate the value of liabilities in today's dollars for purposes of financial accounting and reporting. The discount rate determination for 2017 resulted in a lower rate for three out of the five defined benefit pension trust funds compared to the discount rate used to calculate the liabilities for funding purposes. When calculating the AAL for purposes of funding, the discount rate used is equal to the long-term expected rate of return set by the Board.

Information on certain actuarial metrics that assess the moneys required to systematically fund the five defined benefit pension and two OPEB trust funds can be found in the MD&A on pages 37–40 of the Financial Section. A comprehensive discussion of the results of the actuarial valuation performed for financial accounting and reporting purposes can be found in the MD&A on pages 45–51, as well as in Notes 10 and 11 of the Financial Section. A comprehensive discussion of the results of the actuarial valuations performed for funding purposes, as well as other analysis utilized by PERA can be found below and also in the Actuarial Section.

### Funding

On December 31, 2017, the funded ratio for PERA's five defined benefit pension trust funds was 61.3 percent compared to 58.1 percent on December 31, 2016. The unfunded liability as of December 31, 2017, was \$28.8 billion, a decrease of approximately \$3.4 billion from the previous year. The improvement in the funded ratio in 2017 is attributable mainly to the reforms enacted by SB 18-200, to the extent applicable, as described in the Actuarial Section, and the investment gains on the actuarial value of assets reflecting higher than the long-term expected rate of return during 2017. The assumptions used to determine the funded ratio and unfunded liability are long-term assumptions and periodically need to be adjusted to reflect changes in demographics and market conditions.

The development and ongoing review of a pension funding policy are responsibilities of the Board. PERA's current pension funding policy was initially adopted by the Board in March 2015, and revised in January 2018, for the five defined benefit pension trust funds. The Board adopted a similarly structured OPEB funding policy in January 2018. Both policies focus on the determination of an actuarially determined contribution reflecting closed and layered 30-year amortization periods. The purpose of each policy is three-fold: (1) to define the overall funding benchmarks of the trust fund, (2) to assess the adequacy of the contribution rates which are set by the Colorado Legislature by comparing each trust fund's statutorily set contribution rate to an actuarially determined contribution benchmark, and (3) to define the annual actuarial metrics which will assist in assessing the sustainability of the plan. The results of these three items help guide the Board when considering whether to pursue or support proposed contribution and benefit legislation.

A goal in each of the Board's pension and OPEB funding policies is the achievement of a combined Division Trust Fund and a combined Health Care Trust Fund actuarial funded ratio equal to or greater than 110 percent.

Investment income is the most significant driver of the funded status in a defined benefit plan. To understand the significance of this assumption, a sensitivity analysis is included in the Actuarial Section

on pages 179–180 regarding the Division Trust Funds and pages 200–201 regarding the Health Care Trust Funds. Additional information on PERA's funded ratio, unfunded liabilities, and actuarial assumptions may be found in the Actuarial Section starting on page 155 for the Division Trust Funds and on page 188 for the Health Care Trust Funds.

Employer contributions are also a driver of the funded status. In 2017, actual employer contributions received pursuant to statute for the five defined benefit pension trust funds were \$195.2 million less than the actuarially determined contributions required. During the past 15 years, this contribution deficiency totaled \$4.9 billion. See page 39 of the MD&A for additional details.

The actuarial valuation is a valuable tool to help the Board assess the health of the system, but this is just a snapshot view on one day as of December 31, 2017. Another way of understanding PERA's financial condition was adopted by the Colorado General Assembly's Legislative Audit Committee in 2015. By using the "signal light" methodology, which was developed exclusively for PERA, the funded status may be categorized based on an expanded spectrum of signal light colors ranging from dark green to dark red, with dark green indicating a well-funded position to dark red, indicating potential insolvency in the near future. PERA updates the signal light indicators each year, following the release of its CAFR. Last year, all divisions were categorized in the orange designation, meaning that a corrective action plan should be developed to reduce the period of time it will take to reach full funding. The results of this methodology as of December 31, 2016, supported the Board's call to action and proposed recommendations to the General Assembly to address PERA's funded status. Considering the contribution and benefit provision changes that ultimately were enacted through SB 18-200, as of December 31, 2017, the signal light designation is green for the State and School Divisions and dark green for the Local Government, Judicial, and DPS Divisions.

PERA's actuaries also perform annual actuarial projections for each division based upon generating future valuations with the underlying actuarial assumptions. Considering the changes to contributions and benefit provisions enacted through SB 18-200 and the current year's financial results, the number of years projected to completely amortize unfunded liabilities as of December 31, 2017, compared to December 31, 2016, decreased 31 years for the State Division, 48 years for the School Division, 40 years in the Local Government Division, 39 years in the Judicial Division, and 39 years in the DPS Division.

### PERAPLus 401(k)/457 and Defined Contribution Retirement Plans

PERA offers members opportunities to save for retirement through the PERAPLus 401(k), PERAPLus 457, and Defined Contribution (DC) Retirement Plans. As of December 31, 2017, there were a total of 167 employers who recognized the value of offering more choices in savings by affiliating into the PERAPLus 457 Plan since its inception. The Roth option was added to the PERAPLus 401(k) and 457 Plans at the end of 2014. As of December 31, 2017, there were a total of 61 PERA employers who have adopted the Roth option since its inception. The Roth option in these plans offers advantages over a Roth IRA, including higher contribution limits and no income-based contribution limitations.

### LETTER OF TRANSMITTAL

The fiduciary net position of the PERAPlus 401(k) Plan, PERAPlus 457 and DC Plans increased for the year ended December 31, 2017. The PERAPlus 401(k), PERAPlus 457, and DC Retirement Plans earned \$469.2 million, \$105.0 million, and \$29.4 million of investment income with a fiduciary net position of \$3.3 billion, \$865.6 million, and \$211.1 million, respectively.

#### Colorado Mile High Fund

In October 2012, PERA introduced the Colorado Mile High Fund, an investment vehicle that makes millions of dollars available for qualifying opportunities within Colorado's business community. The creation of the Colorado Mile High Fund earmarks capital for businesses that have a nexus to Colorado. The primary focus of this fund is private equity and venture capital opportunities structured as co-investments with financial sponsors. The fund may also consider uniquely structured capital formation opportunities from private equity and venture capital firms targeting Colorado-based opportunities. PERA uses an external manager and adheres to the same investment and underwriting criteria for this fund as it uses in its overall private equity program.

PERA and its adviser have reviewed more than 70 investment opportunities resulting from an active deal sourcing effort that has included discussions with scores of representatives from prospective investment opportunities. As part of its community outreach, PERA has participated in events such as The Mountain Life Science Investor & Partnering Conference, Rocky Mountain Private Fund Advisers Summit, Boulder Business After Hours, Boulder Chamber's Esprit Event, the Silicon Flatirons Fall Private Equity Conference, and the Rocky Mountain Corporate Growth Conference.

As of year-end 2017, the Colorado Mile High Fund had committed approximately 60 percent of the fund's total capital to six co-investments. Three co-investments were sold, generating gains in the portfolio. The three remaining co-investments are in the health care, industrial, and consumer discretionary sectors.

The current market value of the Colorado Mile High fund is just over \$22 million, with a future commitment of around \$20 million. Applicable amounts are reflected in the Private Equity section of the Profile of Investments in Colorado schedule, found on page 138.

#### PERACare Health Benefits Program

The voluntary PERACare program has several plans providing health care, dental, and vision coverage to PERA members and retirees. PERA focuses on designing plans that are competitive, cost-effective, and valuable to members. PERA also participates in a number of value-based programs designed to support improving the patient experience of care, improving the health of populations, and reducing the per capita cost of health care (known as the "Triple Aim").

In April 2015, PERA introduced PERACare Select, a fixed-price hip and knee replacement benefit for Anthem pre-Medicare enrollees. For members who use PERACare Select providers and hospitals for their surgeries, PERACare Select waives the deductible and/or coinsurance depending on the plan. In 2017, 90 members used the benefit without any cost for their surgeries. PERA saved an average of \$16,800 per PERACare Select surgery for \$1,512,000 in savings.

#### Total Compensation Philosophy

PERA recognizes that its people are its primary asset and its principal source of competitive advantage. PERA offers competitive compensation, performance recognition, disability benefits, and life insurance as well as comprehensive, affordable, and high-quality medical, dental, and vision care programs. PERA's Defined Benefit Plan along with two additional retirement savings options are an excellent affordable way for employees to reach their retirement security goals.

PERA strives to maintain a competitive total rewards package by partnering with consultants to stay abreast of current employment trends and analyzing relevant market data. PERA's total rewards programs are designed to attract, engage, and retain valued employees while motivating extraordinary performance.

#### Recognition of Achievements

The Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to PERA for its CAFR for the year ended December 31, 2016. This was the 32nd consecutive year that PERA has achieved this prestigious award. In order to be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized CAFR. This report must satisfy both generally accepted accounting principles and applicable legal requirements.

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

The GFOA also awarded PERA an Award for Outstanding Achievement in Popular Annual Financial Reporting for its *Popular Annual Financial Report* for the year ended December 31, 2016. The Award for Outstanding Achievement in Popular Annual Financial Reporting is a prestigious national award recognizing conformance with the highest standards for preparation of state and local government popular reports.

In order to receive an Award for Outstanding Achievement in Popular Annual Financial Reporting, a government unit must publish a Popular Annual Financial Report, whose contents conform to program standards of creativity, presentation, understandability, and reader appeal.

An award for Outstanding Achievement in Popular Annual Financial Reporting is valid for a period of one year only. PERA has received a Popular Award for the last 15 consecutive years. We believe our current report continues to conform to the Popular Annual Financial Reporting requirements, and we are submitting it to the GFOA.

#### PPCC Standards Award Program

The Public Pension Coordinating Council (PPCC) presented PERA with its Recognition Award for Administration for meeting professional standards in 2017 for plan administration as set forth in the Public Pension Standards. This is the 15th consecutive year that PERA has received this annual award. The PPCC is a coalition of three national associations that represent public retirement systems and administrators—the National Association of State Retirement Administrators, National Council on Teacher Retirement, and National

### LETTER OF TRANSMITTAL

Conference on Public Employee Retirement Systems. These three associations represent more than 500 of the largest pension plans in the U.S.

#### Employer Affiliation

In 2017, the Colorado River BOCES was formed as a new Board of Cooperative Educational Services and began reporting independently from DeBeque School District 49-JT, Garfield County School District 16, and Garfield County School District RE-2. PERA welcomes the Colorado River BOCES and its employees.

#### Management Changes

In February 2018, Luc Hatlestad joined PERA as the Director of Communications, filling the vacant position after Tara May was promoted to Chief Communications Officer in January 2017. Previously, he was a Content Director at IBM. Luc is responsible for developing comprehensive communications strategies among PERA's external audiences.

#### Board Composition

PERA is governed by a 16-member Board of Trustees; 11 are elected by the membership for staggered four-year terms and serve without compensation except for necessary expenses. In addition, there are three Governor-appointed Trustees confirmed by the Senate who receive limited compensation. The State Treasurer serves as a voting ex officio Trustee, and the DPS Division seat serves as a non-voting ex officio Trustee.

In April 2017, Trustee Roger P. Johnson was confirmed by the Senate after being reappointed to the Board in July 2016 by Governor Hickenlooper. Trustee Johnson was originally appointed to the Board in 2015.

In June 2017, Trustee Carole Wright left the Board after not seeking re-election. She served on the Board in the retiree Trustee position since 2005. On behalf of the PERA Executive Team, we thank Trustee Wright for her leadership and valuable advocacy on behalf of public educators.

Due to Trustee Wright's departure from the Board, Julie Friedemann was appointed to the Board in March 2017 to the retiree Trustee position elected by the retired members of the School, Local Government, and Judicial Divisions because she was the only candidate duly nominated and eligible to be elected to that position. Trustee Friedemann is a retired mathematics teacher from the Jefferson County Public Schools and began serving a four-year term in July 2017.

Also effective July 1, 2017, and following the May 2017 Board election, Trustee Marcus Pennell began serving another four-year term after being re-elected by School Division members. Trustee Pennell is a physics teacher in the Jefferson County School District. In addition, School Division members elected Tina Mueh to fill the seat formerly held by Guillermo Barriga. Trustee Mueh is a middle school science teacher currently serving as a teacher on special assignment in the Boulder Valley School District and will serve a four-year term.

The Board also approved the appointment of Guillermo Barriga to fill a School Division vacancy when Trustee Karl Fisch resigned his seat in May 2017. Trustee Barriga served on the Board since 2016 and will serve a one-year term, effective July 1, 2017.

Due to the retirement of Trustee Fisch who also served as Vice Chairman, the Board nominated and elected Trustee Pennell as Vice Chairman and he immediately assumed this position at the June 23, 2017, Board meeting.

In April 2018, Trustee Susan G. Murphy was confirmed by the Senate after being reappointed to the Board in October 2017 by the Governor. Trustee Murphy was originally appointed to the Board in 2007.

#### Memoriam

On December 12, 2017, PERA lost Gregory W. Smith, a friend, colleague, and leader who touched the lives of many. Greg passed away while vacationing with his family in Hawaii. Greg served for five years as PERA's Executive Director after being named to the position by the Board in November 2012. He joined PERA as General Counsel in February 2002 and in 2009, was promoted to Chief Operating Officer in addition to his role as General Counsel. He worked at PERA for more than 15 years and for several years prior to that he served as PERA's external private sector legal counsel.

Greg was renowned for his extensive knowledge of the public pension industry and his passion for ensuring the retirement security of hundreds of thousands of Colorado's public employees. Throughout his career, Greg served on national industry boards, including the National Institute on Retirement Security, the Council of Institutional Investors, the National Council on Teacher Retirement, and the National Association of Public Pension Attorneys.

It is with profound gratitude and sorrow that I recognize and memorialize Greg's passion for his work, his commitment to public employees, and his many contributions and accomplishments at PERA.

#### Acknowledgements

The cooperation of our affiliated employers is essential to the success of PERA and we thank the staff and management of these employers for their continuing support.

Copies of this CAFR are provided to all PERA-affiliated employers and other interested parties; a summary (Popular Annual Financial Report) will be sent to members and benefit recipients. An electronic version of both publications is available on the PERA website at [www.copera.org](http://www.copera.org).

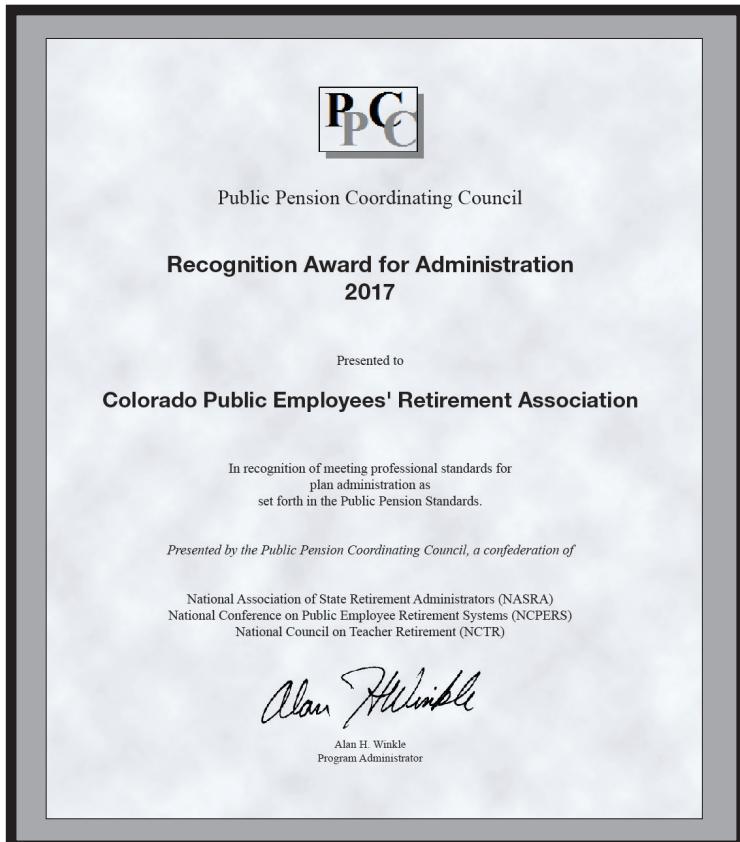
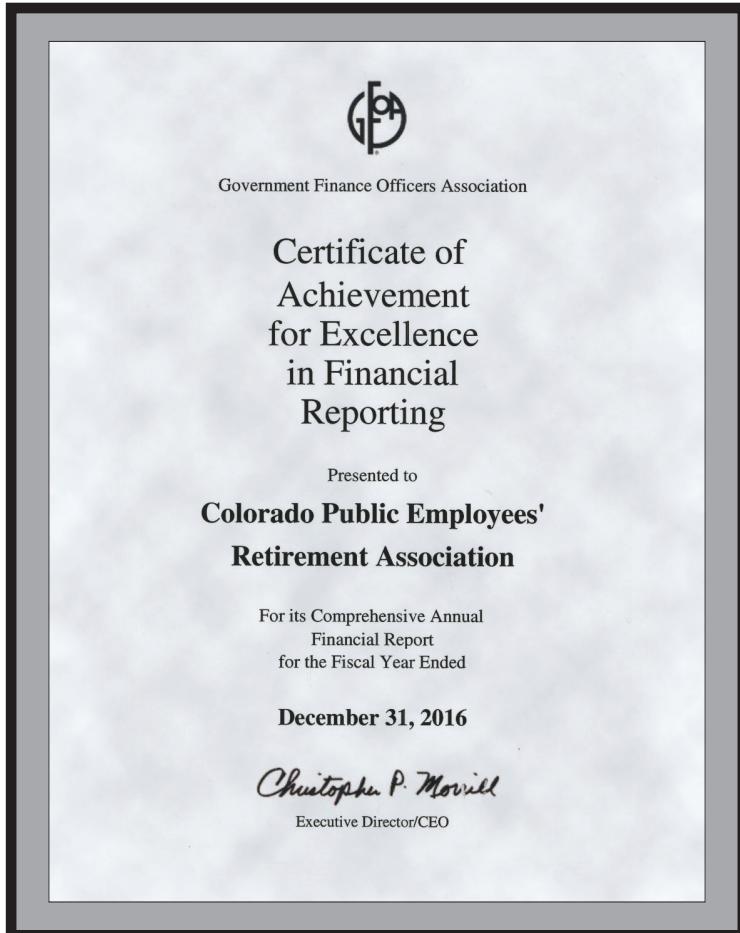
I also thank the PERA staff and Board of Trustees for their commitment and efforts to ensure that PERA meets the needs of all public employees in Colorado. It is a true honor to serve our members and beneficiaries as Interim Executive Director.

Respectfully submitted,

*Ron Baker*

*Colorado PERA Interim Executive Director*

## PROFESSIONAL AWARDS



## BOARD CHAIRMAN'S REPORT



**Timothy M. O'Brien**  
Board Chairman

June 22, 2018

### Dear Colorado PERA Members, Benefit Recipients, and Employers:

On behalf of the Board of Trustees (Board), I am pleased to present Colorado PERA's *Comprehensive Annual Financial Report* for the year ended December 31, 2017.

During 2017, the Board remained focused on developing a corrective action plan given the financial standing of PERA after making changes to core assumptions in 2016. While these assumption changes were necessary, they resulted in an increase in the unfunded liability requiring PERA to recommend measures that would improve the plan's funded status as well as reduce the time required to become fully funded.

As the Board developed its plan of action, it consulted with various actuarial and financial experts. In addition, significant efforts were made to ensure that a range of stakeholders were included in the conversation. A statewide outreach effort in 2017, known as the PERAtour, included opportunities for engagement through community meetings, a dedicated website, and telephone town halls. Thousands of PERA members, retirees, and other stakeholders participated.

During the PERAtour, discussions centered around core principles to provide guidance as the Board considered any future plan changes. We heard from stakeholders that PERA should be a retirement plan that calculates retirement benefits in line with career paths and contributions, allows retirees to maintain their standard of living throughout their lifetime, is fair and attractive to future public employees, serves as a tool for employers to recruit and retain top quality talent, and requires shared responsibility among members, retirees, and employers.

In September 2017, following the conclusion of the PERAtour educational phase, the PERA Board voted 14-1 to endorse a comprehensive package of reforms designed to reduce the overall risk profile of the plan and improve PERA's funded status. This package incorporated the core principles from PERAtour discussions.

The Board's proposal supported three types of changes to the plan and one structural change:

- Increasing contribution rates from employees and employers.
- Modifying benefits, including raising the minimum age for full service retirement eligibility to 65 as well as reducing and suspending the annual increase (AI) for a few years.
- Aligning contributions, service credit, and benefits by changing key definitions for service credit accrual and PERA-includable salary.
- Implementing an automatic adjustment provision that would make necessary changes to the contribution rates and AI to keep PERA on a path to full funding in 30 years.

In December 2017, just a few months after the Board's recommendations were proposed, we received the shocking news that PERA Executive Director Gregory W. Smith passed away while on vacation. PERA lost a true leader and dedicated servant to the public workforce. For more than 15 years, Greg worked on behalf of the PERA membership, first as General Counsel and later as Executive Director. Those who knew Greg knew that he loved his family, was a proud fourth-generation Coloradan, and was fully dedicated to PERA and its members. Greg was a frequent guest at meetings with PERA members and employers, and often mentioned that the best part of his job was the opportunity he had to personally interact with the people he served. He will be remembered by all of us for his exceptional oration skills, deep knowledge of the law, and good-natured personality.

The Board named Ron Baker as Interim Executive Director and he will serve until a permanent executive director is named. The Board formed an ad hoc committee in January 2018 to start the search for a permanent executive director.

### BOARD CHAIRMAN'S REPORT

In spite of the personal loss we all experienced with Greg's passing, the Board did not lose sight of our fiduciary responsibility and remained committed to working with policy makers to establish a broad understanding of the changes needed to ensure a sustainable retirement for Colorado's public employees. As such, the Board directed PERA staff to continue to serve as a resource to the Colorado General Assembly as it considered Senate Bill (SB) 18-200, which was introduced on March 7, 2018, and passed on May 9, 2018.

The reforms proposed and ultimately adopted impact all stakeholders—PERA members, employers, and retirees—and solidify the path toward full funding and financial resilience. Many of the Board's recommendations, including employer and employee contribution increases and modifications to the AIs paid to retirees, were included in the legislation. Also included was the Board's recommendation to incorporate an automatic adjustment mechanism that will write in statute changes to contributions and the AI, as necessary, without the need to seek additional legislative activity.

We understand that these changes will not be easy, but PERA will be stronger because of the comprehensive modifications enacted by the General Assembly and signed into law by Governor Hickenlooper. This legislation would not have been possible without the dedicated leadership of the bill sponsors, Senators Jack Tate and Kevin Priola, and in the House, Majority Leader KC Becker and Representative Dan Pabon.

As the legislative session was drawing to a close, PERA's returns for 2017 were finalized and investments generated an 18.1 percent return. While this return outperforms the Total Fund Policy Benchmark, which had a 16.0 percent return for the year, it is important to note that the PERA investment portfolio will outperform in some years and underperform in others in conjunction with varying market conditions. While solid investment performance and meeting investment assumptions are important to overall funding, they are not the only factors. PERA needs to be armed with resiliency to withstand any turbulence in the markets. The changes incorporated with SB 18-200 will strengthen and enhance PERA's ability to meet the obligations to our membership.

Working on behalf of all members are the PERA Trustees. I would like to formally recognize Carole Wright who left the Board in July 2017 after 15 years of service to the PERA membership. Carole served on the Board in a Retiree seat since 2005 and embodied the highest qualities of a Trustee which earned her the admiration and esteem of her fellow Trustees. On behalf of the Board, I thank Carole for her dedication and many contributions.

The Board also welcomed new and returning Trustees to the Board. New Trustees include Julie Friedemann and Tina Mueh. Julie is a retired mathematics teacher from Jefferson County Public Schools and is in the Retiree seat previously held by Carole Wright. Tina is a middle school science teacher currently serving as a teacher on special assignment in the Boulder Valley School District and is in the School Division seat formerly held by Guillermo Barriga. Returning Trustees include Marcus Pennell and Guillermo Barriga. Marcus began serving another four-year term after being re-elected by School Division members, and Guillermo was appointed to fill a School Division vacancy when Karl Fisch resigned his seat in May 2017.

I wish to thank all of the Trustees for their tireless efforts and dedication as we continue to work on behalf of all members, beneficiaries, and employers. I also extend my appreciation to other constituencies for their continued support of PERA. As Trustees, we are committed to leading necessary change and providing lasting retirement security for Colorado's public employees.

Sincerely,

*Timothy M. O'Brien  
Chairman, Colorado PERA Board of Trustees*

## REPORT OF THE COLORADO PERA AUDIT COMMITTEE



As described more fully in its Charter, the purpose of the Colorado PERA Audit Committee (Audit Committee) is to assist the Board of Trustees (Board) in fulfilling its fiduciary responsibilities as they relate to accounting policies and financial reporting, the system of internal control, PERA's *Standards of Professional and Ethical Conduct*, the internal audit process, and the practices of the Director of Internal Audit. Management is responsible for the preparation, presentation, and integrity of PERA's financial statements; accounting and financial reporting principles; internal control; and procedures designed to reasonably ensure compliance with accounting standards, applicable laws, and regulations. PERA has a full-time Internal Audit Division that reports functionally to the Audit Committee. The Internal Audit Division is responsible for independently and objectively reviewing and evaluating the effectiveness and efficiency of PERA's system of internal control.

CliftonLarsonAllen LLP, PERA's Independent Auditor, is responsible for performing an independent audit of PERA's financial statements in accordance with generally accepted auditing standards and the standards applicable to financial audits contained in Government Auditing Standards issued by the Comptroller General of the United States. In accordance with law, the State Auditor has ultimate authority and responsibility for selecting, evaluating, and, when appropriate, replacing PERA's Independent Auditor. In 2015, the State Auditor selected CliftonLarsonAllen LLP to perform the independent audit of PERA's annual financial statements, commencing with the year ended December 31, 2015.

The Audit Committee serves a Board-level oversight role in which it provides advice, counsel, and direction to management and to the Internal Audit function on the basis of the information it receives, discussions with management and Internal Audit, and the experience of the Audit Committee's members in business, financial, and accounting matters. In this role, the Audit Committee also reviews the audit plan of the Independent Auditor, the results of the audit, and the status of management's actions to implement recommendations from the audit.

The Audit Committee believes that a candid, substantive, and focused dialogue with the internal auditors and the Independent Auditor is fundamental to the Audit Committee's oversight responsibilities. To support this belief, the Audit Committee periodically meets separately with both the Director of Internal Audit and the Independent Auditor, without management present. In the course of its discussions in these meetings, the Audit Committee asked a number of questions intended to bring to light any areas of potential concern related to PERA's financial reporting and internal control. These questions include, but are not limited to:

- Are there any significant accounting judgments, estimates, or adjustments made by management in preparing the financial statements that would have been made differently had the Independent Auditor prepared and been responsible for the financial statements?
- Based on the Independent Auditors' experience, and their knowledge of PERA, do PERA's financial statements fairly present to users, with clarity and completeness, PERA's financial position and performance for the reporting period in accordance with generally accepted accounting principles?
- Based on the Independent Auditors' experience, and their knowledge of PERA, has PERA implemented internal control and internal audit procedures that are appropriate for PERA?
- Are the Independent Auditor and internal auditors getting the support they need from management to execute their duties?

Questions raised by the Audit Committee regarding these matters were answered to the Audit Committee's satisfaction.

The Audit Committee had an agenda for 2017 that included the following items:

- Recommending the *Comprehensive Annual Financial Report (CAFR)* to the Board for its approval;
- Reviewing and approving the plan and budget of the Internal Audit Division;
- Reviewing the adequacy of resources made available to the Internal Audit Division;
- Reviewing the scope, objectives, and timing of the annual independent audit of PERA's financial statements;

## REPORT OF THE COLORADO PERA AUDIT COMMITTEE

- Providing input into the Executive Director's annual performance evaluation of the Director of Internal Audit;
- Reviewing PERA's compliance with its *Standards of Professional and Ethical Conduct*;
- Meeting with the Independent Auditor separately, without management present;
- Meeting separately with the Executive Director, Director of Internal Audit, Chief Financial Officer, and General Counsel; and
- Meeting with the Director of Internal Audit and with management to discuss the effectiveness of PERA's internal control.

The Audit Committee has reviewed and discussed the audited financial statements for the year ended December 31, 2017, with management and the Independent Auditor. Management represented to the Audit Committee that PERA's audited financial statements were prepared in accordance with U.S. generally accepted accounting principles, and the Independent Auditor represented that their presentations to the Audit Committee included the matters required by auditing standards on auditor communication to be discussed with the Independent Auditor. This review included a discussion with management of the quality (not merely the acceptability) of PERA's accounting principles, the reasonableness of significant estimates and judgments, and the clarity of disclosure in PERA's financial statements, including the disclosures related to critical accounting estimates.

In reliance on these reviews and discussions, and the reports of the Independent Auditor, the Audit Committee has recommended to the Board, and the Board has approved PERA's CAFR for the year ended December 31, 2017.

Audit Committee as of June 22, 2018

*Robert Lamb, Chairman*

*William Bain*

*Tom Hall*

*Roger Johnson*

*Warren Malmquist*

*Susan G. Murphy*

*Timothy M. O'Brien*

*Marcus Pennell*

*Hon. Walker Stapleton*

*Lynn E. Turner*

## BOARD OF TRUSTEES

By State law, the management of the public employees' retirement fund is vested in the Board of Trustees (Board). The Board is composed of the following 16 Trustees:

- Nine members elected by members from their respective Divisions to serve on the Board for four-year terms; four from the School Division, three from the State Division, one from the Local Government Division, and one from the Judicial Division.
- Two retirees elected by retirees to serve on the Board for four-year terms.
- Three Trustees appointed by the Governor and confirmed by the State Senate.
- The State Treasurer.
- One ex officio (non-voting) member or retiree elected by members and retirees of the Denver Public Schools (DPS) Division to serve on the Board for a four-year term.

If a Board member resigns, a new Trustee is appointed from the respective Division for the remainder of the year until the next election.



**Timothy M. O'Brien**  
*Chairman*  
Elected by Retirees  
Retired Colorado State Auditor  
Office of the State Auditor  
*Current term expires June 30, 2019*



**Karl Fisch**  
Elected by School Members  
Director of Technology  
Littleton Public Schools  
Retired June 2017



**Marcus Pennell**  
*Vice Chairman*  
Elected by School Members  
Physics Teacher  
Jefferson County School District  
*Current term expires June 30, 2021*



**Julie Friedemann**  
Appointed to Retiree seat  
Retired Teacher  
Jefferson County School District  
*Current term expires June 30, 2021*



**Honorable Will Bain**  
Elected by Judicial Members  
Judge  
4th Judicial District  
*Current term expires June 30, 2019*



**Amy Grant**  
Non-voting, Ex officio member  
Elected by DPS Division members and retirees  
Former Chair of the Denver Public Schools  
Retirement System Board  
Secretary  
DPS JROTC Program  
*Current term expires June 30, 2020*



**Guillermo Barriga**  
Appointed to fill a vacancy in the  
School Division  
Project Manager, Metro Migrant  
Education Program  
Aurora Public Schools  
*Current term expires June 30, 2018*



**David Hall**  
Elected by State Members  
Sergeant and Legislative Liaison  
Colorado State Patrol  
*Current term expires June 30, 2020*

### BOARD OF TRUSTEES



#### **Roger P. Johnson**

Appointed by the Governor  
*Current term expires July 10, 2020*



#### **Susan G. Murphy**

Appointed by the Governor  
*Current term expires July 10, 2021*



#### **Carolyn Jonas-Morrison**

Elected by State Members  
College Level Math Faculty  
Pikes Peak Community College  
*Current term expires June 30, 2018*



#### **William N. Parker**

Elected by School Members  
International Baccalaureate Coordinator  
and Literacy Teacher  
Brighton School District 27J  
*Current term expires June 30, 2020*



#### **Suzanne E. Kubec**

Reappointed to State Division seat  
Liability Claims Manager  
State Office of Risk Management  
*Current term expires June 30, 2021*



#### **Ryan Parsell**

Deputy State Treasurer  
Delegated Substitute for the State Treasurer  
*Continuous term effective January 2011*



#### **Robert Lamb**

Elected by Local Government Members  
Finance Division Director  
Boulder County  
*Current term expires June 30, 2018*



#### **Honorable Walker Stapleton**

Ex officio member  
State Treasurer  
*Continuous term effective January 2011*



#### **Maryann Motza**

Elected by State Members  
Social Security Administrator for the State  
Retired January 2017



#### **Lynn E. Turner**

Appointed by the Governor  
*Current term expires July 10, 2018*



#### **Tina Mueh**

Elected by School Members  
Middle School Science Teacher  
on Special Assignment  
Boulder Valley School District  
*Current term expires June 30, 2021*

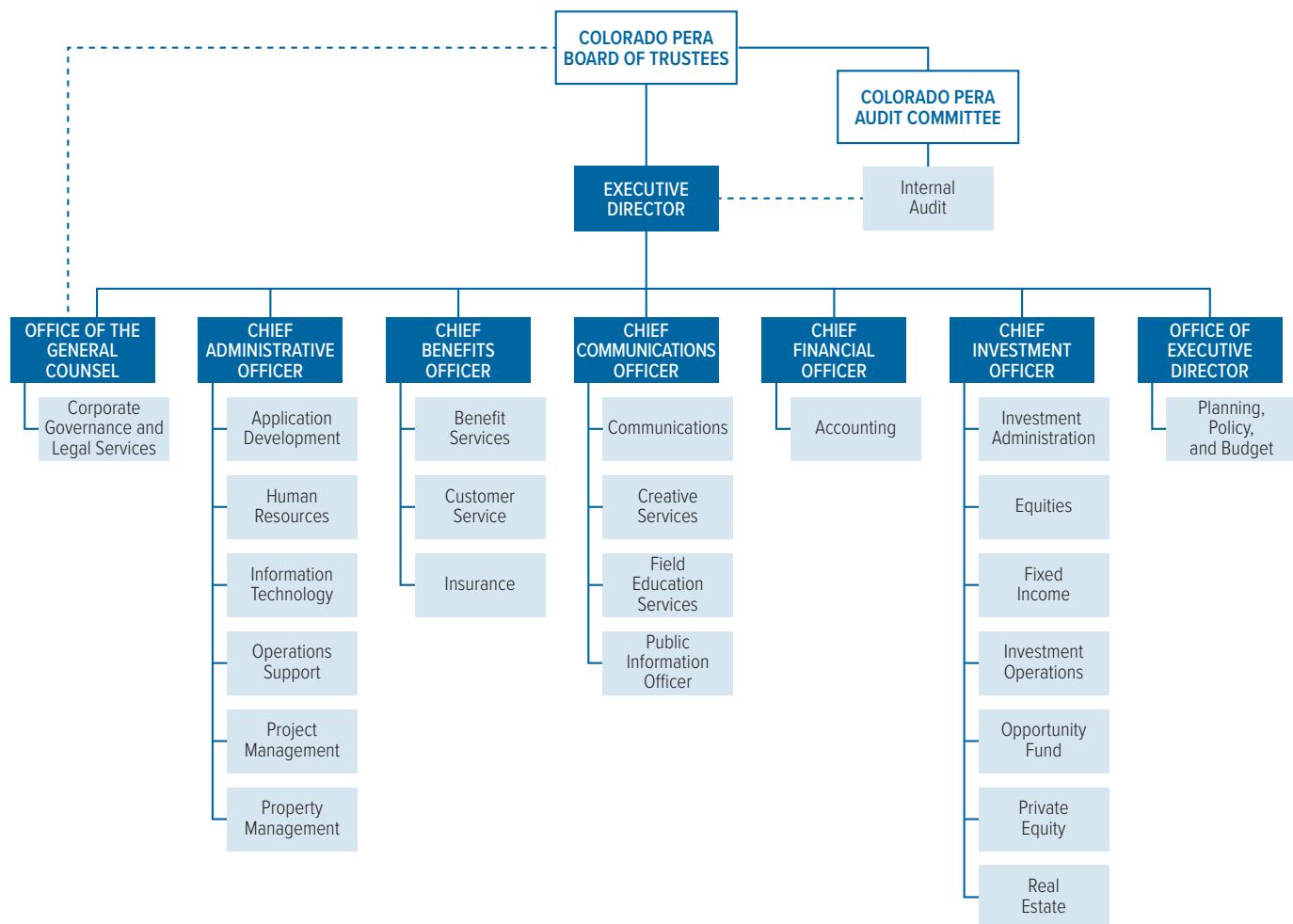


#### **Carole Wright**

Elected by Retirees  
Retired Teacher  
Aurora Public Schools  
Term expired June 30, 2017

## ADMINISTRATIVE ORGANIZATIONAL CHART

As of June 1, 2018



## COLORADO PERA EXECUTIVE MANAGEMENT



### Ron Baker—Interim Executive Director/Chief Administrative Officer

Donna Baros—*Chief Benefits Officer*  
Adam Franklin—*General Counsel*  
David Mather—*Director of Internal Audit*  
Tara May—*Chief Communications Officer*  
Amy C. McGarrity—*Chief Investment Officer*  
Lawrence Mundy—*Chief Financial Officer*  
Karl Paulson—*Director of Planning, Policy, and Budget*

Kevin Carpenter—*Director of Information Technology*  
Aubre Castillo—*Director of Operations Support*  
Jack Dillman—*Director of Facilities*  
Rich Krough—*Director of Application Development*  
Angela Setter—*Director of Human Resources Project Management Division*



### Donna Baros—Chief Benefits Officer

Lisa Bishop—*Director of Customer Service*  
Matt Carroll—*Director of Benefit Services*  
Jessica Linart—*Director of Insurance*



### Adam Franklin—General Counsel

Luz Rodriguez—*Director of Corporate Governance and Legal Services Staff Attorneys*



### Tara May—Chief Communications Officer

Luc Hatlestad—*Director of Communications*  
Katie Kaufmanis—*Public Information Officer*  
Madalyn Knudsen—*Director of Creative Services*  
Kirsten Strausbaugh—*Director of Field Education Services*



### Amy C. McGarrity—Chief Investment Officer

Tom Liddy—*Director of Investment Operations*  
Jim Liptak—*Director of Equities*  
C.H. Meili—*Director of Real Estate*  
Tim Moore—*Director of Private Equity*  
Gary Ratliff—*Director of Opportunity Fund*  
Mark Walter—*Director of Fixed Income Investment Administration Division*



### Lawrence Mundy—Chief Financial Officer

*Accounting Division*

## CONSULTANTS

### Governance Consultant

*Cortex Applied Research, Inc.*  
2489 Bloor Street West  
Suite 304  
Toronto, ON M6S 1R6, Canada

### Health Care Program Consultant

*IMA Financial Group, Inc.*  
1705 17th Street  
Suite 100  
Denver, CO 80202

### Independent Auditors

*CliftonLarsonAllen LLP*  
370 Interlocken Boulevard  
Suite 500  
Broomfield, CO 80021

### Investment Performance Consultants

*Aon Hewitt Investment Consulting, Inc.*  
200 East Randolph Street  
Suite 1500  
Chicago, IL 60601

*The Northern Trust Company*  
50 South LaSalle Street  
Chicago, IL 60603

### Investments—Portfolio Consultant

*Aon Hewitt Investment Consulting, Inc.*  
200 East Randolph Street  
Suite 1500  
Chicago, IL 60601

### Investments—Real Estate Performance

*Aon Hewitt Investment Consulting, Inc.*  
200 East Randolph Street  
Suite 1500  
Chicago, IL 60601

### Master Custodian

*The Northern Trust Company*  
50 South LaSalle Street  
Chicago, IL 60603

### Pension and Health Care Program Actuary

*Cavanaugh Macdonald Consulting, LLC*  
3550 Busbee Parkway  
Suite 250  
Kennesaw, GA 30144

### Pharmacy Benefits Consultants

*Wilkinson Benefit Consultants*  
1812 West Burbank Boulevard  
Suite 143  
Burbank, CA 91506

### Risk Management

*IMA of Colorado*  
1705 17th Street  
Suite 100  
Denver, CO 80202

### Voluntary Investment Program, Defined Contribution Retirement, and Deferred Compensation Plan Investment and Performance Consultant

*RVK, Inc.*  
1211 SW 5th Avenue  
Suite 900  
Portland, OR 97204

### Voluntary Investment Program, Defined Contribution Retirement, and Deferred Compensation Plan Service Provider

*Voya Institutional Plan Services, LLC*  
30 Braintree Hill Office Park  
Braintree, MA 02184

A list of PERA's Investment Brokers/Advisers, the Schedule of Commissions, and other information related to investment expenses can be found in the Investment Section on pages 131–132.



# FINANCIAL SECTION



### REPORT OF THE INDEPENDENT AUDITORS



**CliftonLarsonAllen**

CliftonLarsonAllen LLP  
CLAConnect.com

#### INDEPENDENT AUDITORS' REPORT

Board of Trustees  
Colorado Public Employees' Retirement Association  
Denver, Colorado

##### **Report on the Financial Statements**

We have audited the accompanying financial statements of Colorado Public Employees' Retirement Association (Colorado PERA), as of and for the year ended December 31, 2017, and the related notes to the financial statements, which collectively comprise Colorado PERA's basic financial statements, as listed in the table of contents. We have also audited the financial statements of each individual fund of Colorado PERA as of and for the year ended December 31, 2017 as displayed in Colorado PERA's basic financial statements.

##### ***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.

##### ***Auditors' Responsibility***

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

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



## REPORT OF THE INDEPENDENT AUDITORS

Board of Trustees  
Colorado Public Employees' Retirement Association

### ***Opinion***

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of Colorado PERA as of December 31, 2017, and the respective changes in its fiduciary net position for the year then ended in accordance with accounting principles generally accepted in the United States of America. In addition, in our opinion, the financial statements referred to previously present fairly, in all material respects, the respective fiduciary net position of each individual fund of Colorado PERA as of December 31, 2017, and the respective changes in fiduciary net position thereof for the year then ended in conformity with accounting principles generally accepted in the United States of America.

### ***Report on Summarized Comparative Information***

We have previously audited Colorado PERA's 2016 financial statements, and we expressed an unmodified audit opinion on those audited financial statements in our report dated June 23, 2017. In our opinion, the summarized comparative information presented herein as of and for the year ended December 31, 2016, is consistent, in all material respects, with the audited financial statements from which it has been derived.

### ***Other Matters***

#### *Required Supplementary Information*

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis, the division trust funds' schedules of changes in net pension liability, net pension liability, employer contributions, and investment returns and related notes, and the health care trust funds' schedules of changes in net OPEB liability, net OPEB liability, employer contributions, and investment returns and related notes, 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.

#### *Supplementary and Other Information*

Our audit was conducted for the purpose of forming an opinion on Colorado PERA's basic financial statements. The schedules of administrative expenses, other additions, other deductions, investment expenses and payments to consultants (supplementary information) and the introductory, investment, actuarial and statistical sections, as listed in the table of contents, are presented for purposes of additional analysis and are not a required part of the basic financial statements.

REPORT OF THE INDEPENDENT AUDITORS

Board of Trustees  
Colorado Public Employees' Retirement Association

The supplementary information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the supplementary information is fairly stated, in all material respects, in relation to the basic financial statements as a whole.

The introductory, investment, actuarial and statistical sections, as listed in the table of contents, have not been subjected to the auditing procedures applied in the audit of the basic financial statements, and accordingly, we do not express an opinion or provide any assurance on them.

**Other Reporting Required by Government Auditing Standards**

In accordance with *Government Auditing Standards*, we have also issued our report dated June 22, 2018 on our consideration of Colorado PERA's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of PERA's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering Colorado PERA's internal control over financial reporting and compliance.

*CliftonLarsonAllen LLP*

**CliftonLarsonAllen LLP**

Denver, Colorado  
June 22, 2018



## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

This Management's Discussion and Analysis (MD&A) section provides a narrative overview and analysis of the financial activities of the Colorado Public Employees' Retirement Association (PERA) for the year ended December 31, 2017. Please consider the information presented here in conjunction with additional information in the Letter of Transmittal starting on page 3 of this *Comprehensive Annual Financial Report* (CAFR) and with the basic financial statements of PERA on pages 58–61.

In addition to historical information, this MD&A includes forward-looking statements, which involve certain risks and uncertainties. PERA's actual results, performance, and achievements may differ materially from the results, performance, and achievements expressed or implied in such forward-looking statements, due to a wide range of factors, including changes in interest rates, changes in the capital markets, general economic conditions, and legislative changes, as well as other factors.

PERA administers the following plans:

Plan Name	Type of Plan
<b>Defined Benefit Pension Plans</b>	
<i>(Division Trust Funds)</i>	
State Division Trust Fund	Cost-sharing multiple-employer
School Division Trust Fund	Cost-sharing multiple-employer
Local Government Division Trust Fund	Cost-sharing multiple-employer
Judicial Division Trust Fund	Cost-sharing multiple-employer
Denver Public Schools (DPS) Division Trust Fund	Single-employer
<b>Defined Benefit Other Postemployment Benefit Plans</b>	
<i>(Health Care Trust Funds)</i>	
Health Care Trust Fund (HCTF)	Cost-sharing multiple-employer
Denver Public Schools Health Care Trust Fund (DPS HCTF)	Single-employer <sup>1</sup>
<b>Defined Contribution Plans</b>	
Voluntary Investment Program	Multiple-employer
Defined Contribution Retirement Plan	Multiple-employer
<b>Deferred Compensation Plan</b>	
Deferred Compensation Plan	Multiple-employer
<b>Private Purpose Trust Fund</b>	
Life Insurance Reserve	Multiple-employer

<sup>1</sup> New guidance under GASB Statement No. 74 classifies a primary government and its component units as one employer. As a result, the type of plan was changed from cost-sharing multiple-employer to single-employer due to the implementation of GASB 74. For all other purposes, the definition of an employer is governed by Title 54, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

This MD&A is organized into the following two sections:

(1) Defined Benefit Funds and (2) Defined Contribution Pension and Deferred Compensation Trust Funds. The Defined Benefit Funds section includes the discussion and analysis of the Division Trust

Funds, Health Care Trust Funds, and the Life Insurance Reserve. The Defined Contribution Pension and Deferred Compensation Trust Funds section includes discussion and analysis of the Voluntary Investment Program, the Defined Contribution Retirement Plan, and the Deferred Compensation Plan.

Since the end of 2007, PERA's funded status has declined from 75.1 percent to 58.1 percent at the end of 2016. During this time, the 2008 global financial crisis further necessitated major pension reform and the enactment of Senate Bill (SB) 10-001 in 2010 significantly affected benefit and eligibility provisions, the payment structure of annual increases, and employer funding mechanisms to address PERA's funded status. Between 2010 and 2015, PERA's funded status was negatively affected primarily by the recognition of adverse economic experience and the adoption of more conservative actuarial assumptions. The adverse economic experience recognized during this time was primarily due to the four-year smoothing of the large investment loss from 2008 in years 2010 and 2011. More conservative economic and demographic actuarial assumptions were also adopted during this time to better reflect anticipated future behaviors, longevity, and economic conditions. Further contributing to PERA's funded status is the historic underpayment of the actuarially determined contribution (ADC). For the year-ended December 31, 2015, PERA had a funded status of 62.1 percent. For the year-ended December 31, 2016, actuarial results showed a significant decrease to PERA's funded status primarily due to the adoption of new mortality tables reflecting the expectation of increased longevity of the membership and a more conservative assumed investment rate of return of 7.25 percent.

To address PERA's risk profile and funded status, the Colorado PERA Board of Trustees (Board) brought forth to the membership, employers, and the General Assembly, the need to consider additional reforms for the 2018 Legislative Session. After a statewide stakeholder tour leading up to the 2018 Legislative Session, the Board proposed a comprehensive package of proposed changes to plan provisions for the General Assembly's consideration to achieve the following goals of:

- 100 percent funding in 30 years.
- Shared responsibility among members, retirees, and employers.
- Preservation of the defined benefit plan.

The Colorado General Assembly passed significant pension reform through SB 18-200: *Concerning Modifications To the Public Employees' Retirement Association Hybrid Defined Benefit Plan Necessary To Eliminate with a High Probability the Unfunded Liability of the Plan Within the Next Thirty Years*. The bill was signed into law by Governor Hickenlooper on June 4, 2018. SB 18-200 makes changes to the plans administered by PERA with the goal of eliminating the unfunded actuarial accrued liability (UAAL) of the Division Trust Funds and thereby reach a 100 percent funded ratio for each division within

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

the next 30 years. Due to the magnitude of the changes to plan provisions promulgated by SB 18-200, the actuarial valuation for funding purposes in the Actuarial Section of this CAFR, includes, to the extent applicable, the changes to statutory provisions. More information about the results of the 2017 actuarial valuation for funding purposes can be found in this MD&A on pages 39–40 and in the Actuarial Section on pages 155–187.

Governmental accounting standards require net pension liabilities for financial reporting purposes be measured using the plan provisions in effect at the pension plan's year-end and disclosure of a subsequent event for significant changes to plan provisions after year-end. The net pension liabilities measured using plan provisions in effect at December 31, 2017, and related discussion and analysis can be found in this MD&A on pages 45–51. Financial disclosures prepared in accordance with Governmental Accounting Standards Board (GASB) Statement No. 67 can be found in Note 10 of the Notes to the Financial Statements on pages 92–95. Essential to understanding the significance of SB 18-200, a detailed summary of this bill has been disclosed as a subsequent event in Note 12 of the Notes to the Financial Statements on pages 99–100. A full copy of the bill can be found online at [www.leg.colorado.gov](http://www.leg.colorado.gov).

### Basic Retirement Equation

$$\text{Investment Income} + \text{Contributions} = \text{Benefits Paid} + \text{Expenses}$$

$$(I + C = B + E)$$

At the most basic level, in the long run, a retirement plan must balance the money coming in through investment earnings and contributions against the money going out through benefit and expense payments.

$$I + C = B + E$$

Where:

- I** is investment income
- C** is contribution inflows
- B** is benefits paid
- E** is expenses

During any year in the life of a plan, one side of the equation will be greater than the other with the goal that they will balance in the long run. The Statements of Changes in Fiduciary Net Position on pages 60–61 detail the contributions, investment income, benefit payments, and expenses for all of the fiduciary funds PERA administers.

Over the past 35 years (January 1, 1983, to December 31, 2017), the funds grew by \$45,728,000. The components of the change in fiduciary net position (FNP) are shown below for this 35-year period. During this time, the number of members and benefit recipients grew over 390 percent from 118,860 to 584,070.

### CHANGE IN FIDUCIARY NET POSITION (35-YEAR PERIOD)

I – Investment income	\$66,981,000
C – Contributions	41,606,000
C – Plan transfers	2,764,000
Subtotal	111,351,000
B – Benefits	64,726,000
E – Expenses	897,000
Subtotal	65,623,000
<b>Change in fiduciary net position</b>	<b>\$45,728,000</b>

For the year ended December 31, 2017, the FNP of the defined benefit funds increased by \$5,304,147 or 12.1 percent. The increase was principally due to the strong financial markets where the total fund realized an annual return of 18.1 percent versus the total fund benchmark's annual return of 16.0 percent. The custom benchmark for the total fund comprises 53.5 percent of the Global Equity Custom Benchmark; 23.5 percent of the Fixed Income Custom Benchmark; 8.5 percent of the Private Equity Custom Benchmark; 8.5 percent of the Real Estate Custom Benchmark; 5.0 percent of the Opportunity Fund Benchmark; and 1.0 percent of the ICE BofAML U.S. 3-Month Treasury Bill Index. Benefits and expenses exceeded contributions by \$2,390,116. The breakdown of the net change in FNP is shown below for the year ended December 31, 2017.

### 2017 CHANGE IN FIDUCIARY NET POSITION

I – Investment income	\$7,694,263
C – Contributions	2,433,016
Subtotal	10,127,279
B – Benefits	4,762,421
E – Expenses	60,711
Subtotal	4,823,132
<b>Change in fiduciary net position</b>	<b>\$5,304,147</b>

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
(*Dollars in Thousands*)

## Financial Reporting Highlights

The FNP for all defined benefit funds administered by PERA increased \$5,304,147 during calendar year 2017.

### FIDUCIARY NET POSITION

Trust Fund	2017 Change Fiduciary Net Position	2017 Ending Fiduciary Net Position
State Division	\$1,597,522	\$15,223,702
School Division	2,781,684	25,362,730
Local Government Division	509,580	4,283,086
Judicial Division	40,958	329,862
DPS Division	352,063	3,478,040
HCTF	15,994	276,222
DPS HCTF	3,971	22,308
Life Insurance Reserve	2,375	19,066
<b>Total</b>	<b>\$5,304,147</b>	<b>\$48,995,016</b>

### CHANGE IN FIDUCIARY NET POSITION

Trust Fund	(C) Contributions and Other Additions	+ (I) Net Investment Income	– (B) – (E) Benefits, Expenses, and Other Deductions	= Change in Fiduciary Net Position
State Division	\$836,257	\$2,391,683	\$1,630,418	\$1,597,522
School Division	1,256,899	3,982,275	2,457,490	2,781,684
Local Government Division	136,165	669,011	295,596	509,580
Judicial Division	15,322	51,173	25,537	40,958
DPS Division	88,268	548,585	284,790	352,063
HCTF	92,933	44,990	121,929	15,994
DPS HCTF	7,172	3,305	6,506	3,971
Life Insurance Reserve	—	3,241	866	2,375
2017 change in fiduciary net position	\$2,433,016	\$7,694,263	\$4,823,132	\$5,304,147
2016 change in fiduciary net position	\$2,436,794	\$3,038,026	\$4,752,625	\$722,195
2015 change in fiduciary net position	\$2,289,511	\$669,349	\$4,563,650	(\$1,604,790)
2014 change in fiduciary net position	\$2,313,846	\$2,474,349	\$4,337,188	\$451,007
2013 change in fiduciary net position	\$2,022,072	\$6,091,243	\$4,192,436	\$3,920,879
2013–2017 change in fiduciary net position	\$11,495,239	\$19,967,230	\$22,669,031	\$8,793,438

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

### Investment Highlights

#### Analysis of Investment Income

Basic Funding Equation: I + C = B + E

#### INVESTMENT INCOME

Trust Fund	Net Appreciation/ (Depreciation) in Fair Value	Interest and Dividends	Real Estate, Private Equity, and Oppty Fund Net Operating Inc	Investment Expenses	Net Securities Lending Income	Net Investment Income
State Division	\$2,098,257	\$259,791	\$84,547	(\$53,693)	\$2,781	\$2,391,683
School Division	3,493,453	432,790	140,848	(89,448)	4,632	3,982,275
Local Government Division	586,821	72,769	23,682	(15,040)	779	669,011
Judicial Division	44,881	5,571	1,812	(1,151)	60	51,173
DPS Division	481,309	59,564	19,385	(12,311)	638	548,585
HCTF	39,472	4,886	1,590	(1,010)	52	44,990
DPS HCTF	2,896	362	118	(75)	4	3,305
Life Insurance Reserve	2,843	352	115	(73)	4	3,241
<b>2017 Total</b>	<b>\$6,749,932</b>	<b>\$836,085</b>	<b>\$272,097</b>	<b>(\$172,801)</b>	<b>\$8,950</b>	<b>\$7,694,263</b>
<b>2016 Total</b>	<b>\$2,124,689</b>	<b>\$808,744</b>	<b>\$256,216</b>	<b>(\$161,800)</b>	<b>\$10,177</b>	<b>\$3,038,026</b>
<b>2015 Total</b>	<b>(\$216,959)</b>	<b>\$807,322</b>	<b>\$233,535</b>	<b>(\$165,392)</b>	<b>\$10,843</b>	<b>\$669,349</b>
<b>2014 Total</b>	<b>\$1,563,843</b>	<b>\$854,332</b>	<b>\$205,078</b>	<b>(\$159,923)</b>	<b>\$11,019</b>	<b>\$2,474,349</b>
<b>2013 Total</b>	<b>\$5,215,751</b>	<b>\$806,954</b>	<b>\$203,399</b>	<b>(\$145,422)</b>	<b>\$10,561</b>	<b>\$6,091,243</b>

The largest inflow into a retirement plan over the long term comes from investment income. Over the past 35 years, even with the large losses in 2008, investment income represents 60 percent of the inflows into PERA, and over the past 10 years it represents 52 percent of the inflows.

#### Investment Performance

##### Money-Weighted Rate of Return

A money-weighted rate of return considers the effect of timing of transactions that increase the amount of defined benefit plan investments (such as contributions) and those that decrease the amount of defined benefit plan investments (such as benefit payments). Additionally, the money-weighted rate of return provides information that is comparable with the long-term assumed rate of return on the pooled investment assets.

For the year ended December 31, 2017, the net-of-fees, money-weighted rate of return on the pooled investment assets was 18.1 percent, which was higher than the actuarial assumed rate of 7.25 percent.

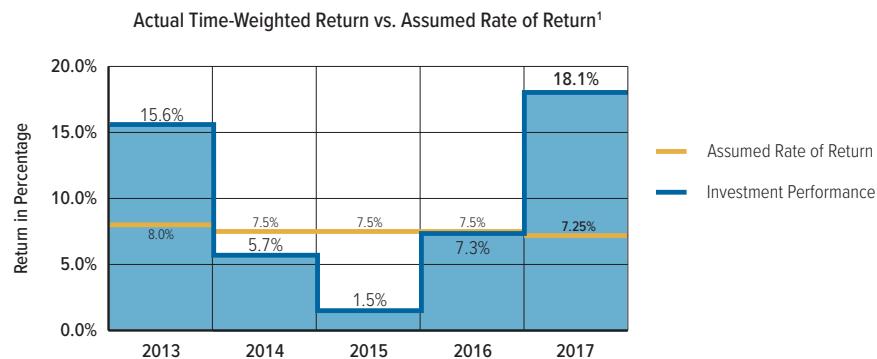
##### Time-Weighted Rates of Return

The time-weighted rate of return considers investment performance of a hypothetical dollar invested from the beginning of an investment period to the period's end. The effect of timing on varying amounts invested due to, for example, the receipt of contributions or the payments of benefits is not considered. This methodology allows PERA to compare its investment performance with relevant benchmark returns, as well as its performance with other pension plans, as shown on the next page.

For the year ended December 31, 2017, the net-of-fees, time-weighted rate of return on the pooled investment assets was 18.1 percent compared to 7.3 percent for the year ended December 31, 2016. The net-of-fees, annualized rate of return for the pooled investment assets was 9.5 percent for the past five years and 6.0 percent for the past 10 years. The 35-year annualized, gross-of-fees, rate of return for the pooled investment assets was 9.5 percent. It is important to note that market returns and volatility will vary from year to year for the total fund and across various asset classes.

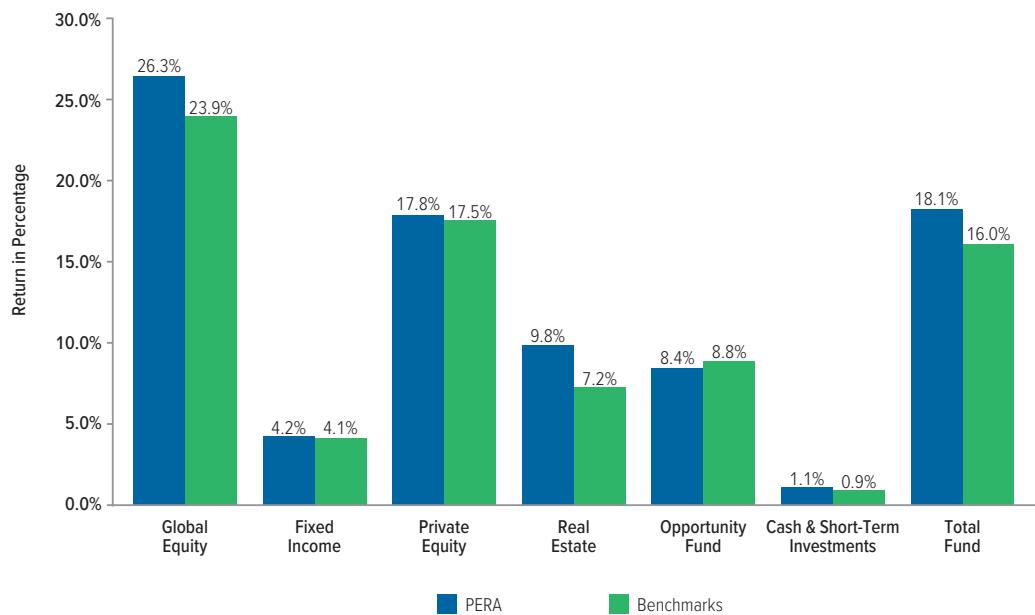
## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)



<sup>1</sup> In November 2016, the assumed rate of return was lowered to 7.25 percent effective January 1, 2017.

## 2017 Actual Time-Weighted Returns vs. Benchmarks



Note: Aon Hewitt Investment Consulting, Inc., the Board's investment consultant, provides the investment returns based on data made available by PERA's custodian, The Northern Trust Company. Listed above are the one-year, net-of-fees, time-weighted rates of return for each asset class and their respective benchmarks.

As of April 1, 2004, PERA adopted a policy benchmark, which is a passive representation of the asset allocation policy. As of December 31, 2017, the policy benchmark is a combination of 53.5 percent of the Global Equity Custom Benchmark; 23.5 percent of the Fixed Income Custom Benchmark; 8.5 percent of the Private Equity Custom Benchmark; 8.5 percent of the Real Estate Custom Benchmark; 5.0 percent of the Opportunity Fund Benchmark; and 1.0 percent of the ICE BofAML U.S. 3-Month Treasury Bill Index. For more information, see the Schedule of Investment Results on page 134 and the Fund Performance Evaluation on pages 136–137 of the Investment Section.

The total fund outperformed the policy benchmark's return by 210 basis points for the year ended December 31, 2017. Global Equity and Real Estate were the primary contributors to the outperformance. The outperformance of the Global Equity portfolio was due to strong manager performance and superior stock selection. The Opportunity

Fund asset class was a slight detractor to overall performance. Asset allocation, or the variance in the actual weights of the various asset classes versus the target weights, produced a positive impact to the total fund return in 2017.

For the year ended December 31, 2017, PERA's total fund returned 18.1 percent net-of-fees, compared to the BNY Mellon Performance and Risk Analytics' and Investment Metrics' Median Public Fund Universe return of 15.6 percent. As of December 31, 2017, the BNY Mellon Performance and Risk Analytics' and Investment Metrics' Median Public Fund Universe measure was comprised of 106 public pension funds with assets of approximately \$2.1 trillion. PERA's total fund returned 8.8 percent, 9.5 percent, and 6.0 percent on a three-, five-, and ten-year annualized basis, respectively, compared with the BNY Mellon Performance and Risk Analytics' and Investment Metrics' Median Public Fund Universe returns of 7.4 percent, 8.6 percent, and 5.5 percent, respectively.

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

The Board is responsible for setting the strategic asset allocation of the plan, which is believed to be the most important factor influencing long-term investment performance and portfolio volatility. Staff is responsible for execution of the strategic asset allocation, and uses a combination of active and passive investment management within the public asset classes (Global Equities and Fixed Income). Staff believes that over PERA's long-term investment horizon, a combination of active and passive management remains an appropriate structure.

### Asset Allocation

The Board is responsible for the investment of PERA's funds with the following statutory limitations: the aggregate amount of moneys invested in corporate stocks and fixed income securities convertible into stock cannot exceed 65 percent of the then book value of the fund; no investment in common and/or preferred stock of any single corporation can exceed 5 percent of the then book value of the fund; the fund cannot acquire more than 12 percent of the outstanding stock or bonds of any single corporation; and the origination of mortgages or deeds of trust on real residential property is prohibited.

As a fiduciary of the funds, the Board is responsible to carry out its investment functions solely in the interest of the PERA members and benefit recipients and for the exclusive purpose of providing benefits.

In 2014, the Board commissioned an asset/liability study prepared by Aon Hewitt Investment Consulting, Inc. (Aon Hewitt). The objective of the study was to determine the optimal strategic asset allocation policy that would ultimately allow PERA to meet its benefit obligations, while also ensuring that PERA incurs appropriate levels of risk. On March 20, 2015, the Board voted to change the strategic asset allocation policy of the fund effective July 1, 2015. This strategic asset allocation contains a long-term target allocation and specific ranges within which each asset class may operate. Because the long-term target allocation will be achieved over time, an initial interim target allocation was approved as of July 1, 2015. This interim target allocation was revised as of July 1, 2016. It was reviewed and retained without changes on June 23, 2017. PERA staff and Aon Hewitt are responsible for annually recommending interim policy targets to the Board until the long-term target allocation is achieved.

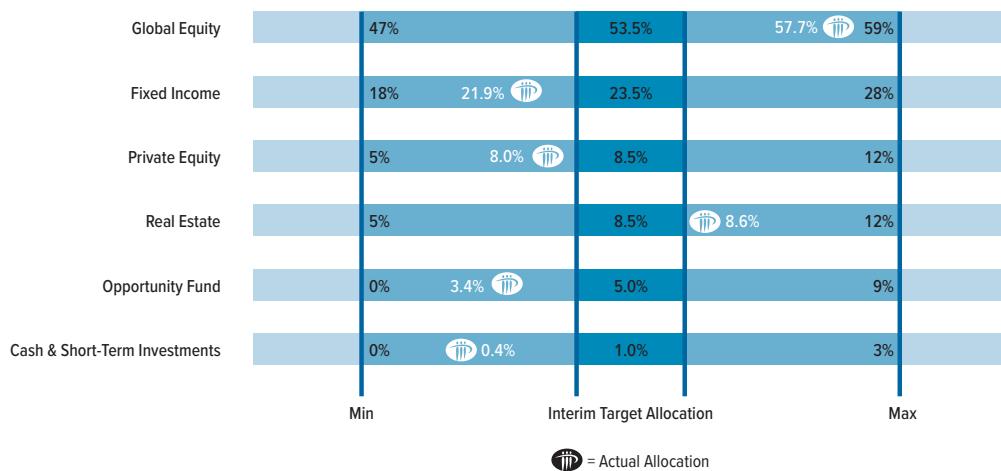
### ASSET ALLOCATION VS. TARGETS AND RANGES<sup>1</sup>

	Actual Asset Allocation As of 12/31/2016 <sup>2</sup>	Actual Asset Allocation As of 12/31/2017 <sup>2</sup>	Interim Asset Allocation Target During 2017	Long-Term Asset Allocation	Target Range During 2017
Global Equity	55.9%	57.7%	53.5%	53.0%	47.0% – 59.0%
Fixed Income	22.7%	21.9%	23.5%	23.0%	18.0% – 28.0%
Private Equity	8.4%	8.0%	8.5%	8.5%	5.0% – 12.0%
Real Estate	9.0%	8.6%	8.5%	8.5%	5.0% – 12.0%
Opportunity Fund	2.6%	3.4%	5.0%	6.0%	0.0% – 9.0%
Cash & Short-Term Investments	1.4%	0.4%	1.0%	1.0%	0.0% – 3.0%

<sup>1</sup> See Note 5 of the Notes to the Financial Statements for detailed disclosures about each asset class.

<sup>2</sup> Asset allocation decisions are made based on the total holdings of the portfolios within each asset class. Therefore, the investment receivables, payables, accruals, securities lending collateral, securities lending obligations, and cash and short-term investments are allocated back to the investment portfolios that hold them for purposes of the table above and chart below.

December 31, 2017, Asset Allocation Permissible Ranges vs. Actual Allocation



**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
(*Dollars in Thousands*)**Sudan Divestment**

Following the 2007 legislative session, former Governor Ritter signed into law House Bill (HB) 07-1184: *Sudan Divestment by Public Pension Plans*, which imposed targeted divestment from companies with active business operations in Sudan. As a result of this legislation, PERA was required to create a list of scrutinized companies at least every six months and to prohibit investments in these companies. The establishment of the list required PERA to engage the companies on the list to warn them of potential divestment and to encourage the companies to change their activities in Sudan. PERA was also required to engage the managers of actively managed indirect investments in companies on the list and request removal of scrutinized companies or ask the manager to create a similar fund that did not contain the identified companies. A similar request was sent to the managers in PERA's defined contribution and deferred compensation trust funds. PERA also contacted its private equity managers to alert them of the Scrutinized Companies List.

In 2017, PERA submitted its annual required report to elected officials on June 30, 2017.

In October 2017, the United States Secretary of State issued a report that confirmed the Government of Sudan's positive actions during 2017 and lifted all sanctions against the Government of Sudan. This lifting of sanctions triggered the repeal clause in the Colorado divestment legislation, and therefore the Sudan divestment statute was repealed by operation of law.

**Anti-BDS Divestment**

During the 2016 legislative session, Governor Hickenlooper signed into law HB 16-1284: *Divest From Companies With Prohibitions Against Israel*, which imposes divestment from companies engaging in actions that are politically motivated and are intended to penalize, inflict economic harm on, or otherwise limit commercial relations with the State of Israel including, but not limited to, the boycott of, divestment from, or imposition of sanctions on the State of Israel. As a result of this legislation, PERA is required to create a list of restricted companies, review it on a biannual basis, and prohibit investments in these companies going forward. The law requires PERA to engage companies on the list to warn them of potential divestment. PERA is required to sell, redeem, divest, or withdraw all direct holdings within 12 months after the company's most recent appearance on the list of restricted companies.

At least annually, PERA is required to report on its website information regarding investments sold, redeemed, divested, or withdrawn in compliance with this law.

More information regarding Anti-BDS Divestment can be obtained from the PERA website at [www.copera.org](http://www.copera.org).

**Iran-Related Investment Policy**

On January 18, 2008, the Board adopted the Iran-related investment policy. This policy outlines a phased strategy to address PERA's direct public investments in foreign companies doing business in the Islamic Republic of Iran. The strategy addresses and includes a number of actions, up to and including possible divestment. PERA recognizes the federal government has sole responsibility for the conduct of American foreign policy. PERA is acting out of a fiduciary concern for the welfare of its members' assets, which requires a broad horizon and sensitivity to the potential risks posed by investment in Iran.

As part of this policy, PERA creates a list of public companies doing business in Iran that meet certain criteria. PERA engages with those companies to better understand their involvement in Iran and enacts a moratorium on direct public investments. PERA staff evaluates the companies' responses and determines if they have taken sufficient steps to minimize risk to PERA. Should adequate mitigation of risk not be possible, the Board will direct staff to divest current public investments in the companies.

More information regarding the Iran-related investment policy can be obtained from the PERA website at [www.copera.org](http://www.copera.org).

**Commitments**

As of December 31, 2017, PERA had commitments for future investments in Private Equity of \$2,578,176, in Real Estate of \$843,374, and in the Opportunity Fund of \$687,352.

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

### Contributions

#### Analysis of Contributions

Basic Funding Equation: I + C = B + E

#### Statutory Contributions

#### TOTAL CONTRIBUTIONS FOR DIVISION AND HEALTH CARE TRUST FUNDS

Trust Fund	Employer Contributions <sup>1</sup>	Member Contributions	Purchased Service	Retiree Health and Life Premiums	Federal Health Care Subsidies	Employer Disaffiliation Payment	Other	Total Contributions and Other
State Division	\$563,977	\$228,978	\$27,442	\$—	\$—	\$—	\$15,860	\$836,257
School Division	857,740	368,740	30,313	—	—	—	106	1,256,899
Local Government Division	78,291	50,472	6,325	—	—	1,063	14	136,165
Judicial Division	8,080	3,955	908	—	—	—	2,379	15,322
DPS Division	27,578	54,354	2,466	—	—	—	3,870	88,268
HCTF	83,077	—	—	—	—	96	9,760	92,933
DPS HCTF	6,930	—	—	—	—	—	242	7,172
2017 Total	<b>\$1,625,673</b>	<b>\$706,499</b>	<b>\$67,454</b>	<b>\$—</b>	<b>\$—</b>	<b>\$1,159</b>	<b>\$32,231</b>	<b>\$2,433,016</b>
2016 Total	<b>\$1,522,319</b>	<b>\$687,202</b>	<b>\$58,152</b>	<b>\$144,759</b>	<b>\$—</b>	<b>\$—</b>	<b>\$24,362</b>	<b>\$2,436,794</b>
2015 Total	<b>\$1,409,632</b>	<b>\$665,662</b>	<b>\$61,383</b>	<b>\$134,148</b>	<b>\$—</b>	<b>\$—</b>	<b>\$18,686</b>	<b>\$2,289,511</b>
2014 Total	<b>\$1,306,596</b>	<b>\$640,531</b>	<b>\$53,040</b>	<b>\$109,901</b>	<b>\$—</b>	<b>\$190,000</b>	<b>\$13,778</b>	<b>\$2,313,846</b>
2013 Total	<b>\$1,203,725</b>	<b>\$614,431</b>	<b>\$50,963</b>	<b>\$119,083</b>	<b>\$16,294</b>	<b>\$—</b>	<b>\$17,576</b>	<b>\$2,022,072</b>

<sup>1</sup> Employer contributions include the employer statutory rate, AED, and SAED, less an offset of 14.56 percent in 2017 for the DPS Division as required by C.R.S. § 24-51-412 *et seq.*

Member and employer contribution rates are set in statute and are thus determined by the Colorado General Assembly. See pages 239-244 in the Statistical Section for the Schedule of Contribution Rate History. Member contributions for the Division Trust Funds increased from \$687,202 in 2016 to \$706,499 in 2017. Over the past 35 years, member contributions represent 17 percent of the inflows into the Division Trust Funds.

Employer contributions for the Division Trust Funds, the HCTF, and the DPS HCTF increased from \$1,522,319 in 2016 to \$1,625,673 in 2017. Employer contributions increased due to increases in payroll and increases in the Amortization Equalization Disbursement (AED) and Supplemental Amortization Equalization Disbursement (SAED). Over the past 35 years, employer contributions represent 20 percent of the inflows into the Division Trust Funds, HCTF, and the DPS HCTF.

#### MEMBER CONTRIBUTION RATES FOR 2017

Trust Fund	January 1–December 31
State Division (except State Troopers)	8.00%
State Division (State Troopers)	10.00%
School Division	8.00%
Local Government Division	8.00%
Judicial Division	8.00%
DPS Division	8.00%
HCTF	0.00%
DPS HCTF	0.00%

#### EMPLOYER CONTRIBUTION RATES FOR 2017

Trust Fund	Actuarially Determined Contribution <sup>1</sup>	Actual Employer Contribution Rate	Health Care Contribution Rate	AED	SAED	DPS PCOP Offset	Contribution Rate Available for Funding
State Division (except State Troopers)	22.71%	10.15%	(1.02%)	5.00%	5.00%	—	19.13%
State Division (State Troopers)	22.71%	12.85%	(1.02%)	5.00%	5.00%	—	21.83%
School Division	22.54%	10.15%	(1.02%)	4.50%	5.00%	—	18.63%
Local Government Division	11.92%	10.00%	(1.02%)	2.20%	1.50%	—	12.68%
Judicial Division	22.54%	13.66%	(1.02%)	2.20%	1.50%	—	16.34%
DPS Division	10.28%	10.15%	(1.02%)	4.50%	5.00%	(14.56%)	4.07%
HCTF	1.08%	—	1.02%	—	—	—	1.02%
DPS HCTF	0.68%	—	1.02%	—	—	—	1.02%

<sup>1</sup> Actuarially determined contribution (ADC) rates for 2017 are based on the 2015 actuarial valuation.

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

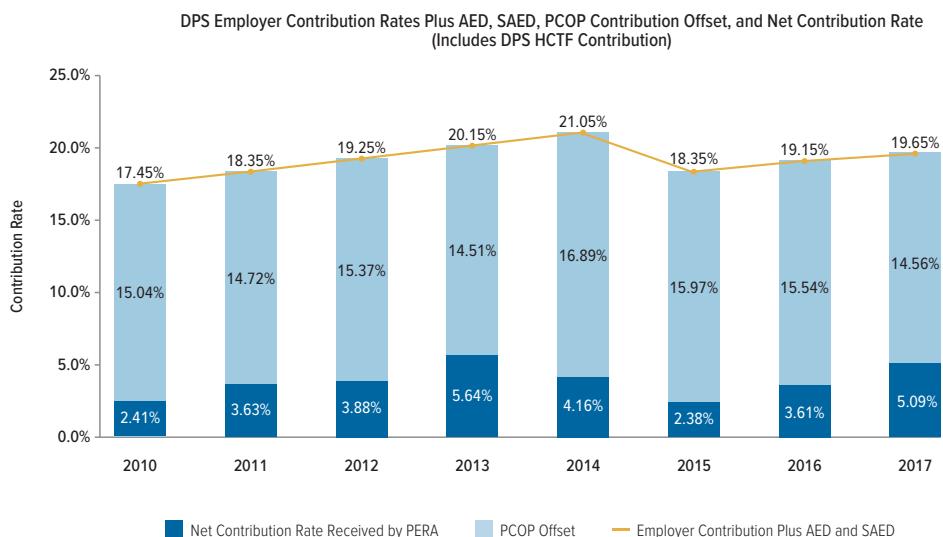
Colorado Revised Statutes (C.R.S.) § 24-51-412 *et seq.* provides for an offset to the DPS Division employer contribution rate. The offset, expressed as a percentage of payroll, is equal to the annual assumed payment obligations for pension certificates of participation (PCOPs) issued in 1997 and 2008, including subsequent refinancing by the Denver Public Schools at a fixed effective annual interest rate of 8.50 percent. At a minimum, the DPS Division employer contribution rate must be sufficient to fund the DPS HCTF (1.02 percent) and the Annual Increase Reserve (AIR) (1.00 percent) applicable to the DPS Division. The annual increase (AI) is a post-retirement, cost-of-living adjustment meeting certain criteria as described in Note 1 of the Notes to the Financial Statements. The staff of Denver Public Schools calculated the PCOP offset rate of 14.56 percent for 2017 and 14.18 percent for 2018.

C.R.S. § 24-51-401(1.7) (e) recognizes the effort to equalize the funded status of the DPS Division and the School Division of PERA over a 30-year period beginning January 1, 2010. The basis of the funded status for this purpose is represented by the ratio of UAAL to payroll for each division. Beginning January 1, 2015, and every fifth year thereafter, the bill requires a true-up calculation and actuarial projection to confirm the equalization of the funded status of these two divisions. In the event a true-up calculation does not project

equalization between these divisions over the 30-year period, the Board shall recommend an adjustment of the DPS Division employer contribution rate to the Colorado General Assembly. The PCOP offset in the DPS Division will be a significant contributor to lowering the funded ratio, until such time that the employer contribution rate is adjusted. An adjustment to the DPS Division employer contribution rate may result in a significant increase or decrease in the total contributions paid by the DPS Division employers.

As described above, C.R.S. § 24-51-401(1.7) created a mechanism to reduce the funded ratio of the DPS Division at its inclusion into PERA in 2010 to the funded ratio of the School Division by 2040. The funded ratio is the actuarial value of assets divided by actuarial accrued liability (AAL). This mechanism involves offsetting the employer contributions into the DPS Division Trust Fund by the amount of the PCOP payments. It is expected that the equalization will occur in approximately 22 years. The DPS Division had a funded ratio of 88.3 percent at its inclusion into PERA. As of December 31, 2017, the funded ratio of the DPS Division was 79.7 percent. This funded ratio is expected to decrease as a result of the equalization effort.

Employer contribution rates, PCOP offset rates, and net contribution rates for the DPS Division are shown in the chart below.



## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

### Prospective Contribution Information

Based on the current covered payroll for the School and DPS Divisions, the SAED increase from 2017 to 2018 would cause contributions to grow by \$22,357 and \$3,291, respectively. The AED and the SAED are set to increase in future years for the Judicial Division due to the passage of HB 17-1265 in 2017, as presented below. With the passage of SB 10-001 in 2010, the AED and the SAED can be adjusted based on the year-end funded status within a particular Division Trust Fund. If a particular Division Trust Fund

reaches a funded status of 103 percent, a decrease in the AED and SAED is mandated and if it subsequently falls below a funded status of 90 percent, an increase is mandated. For the Local Government and Judicial Divisions, if the funded ratio reaches 90 percent and subsequently falls below 90 percent, an increase in the AED and SAED is mandated. Increases cannot exceed the maximum allowable limitations shown in the table below.

### FUTURE AED AND SAED RATES

Trust Fund	2018 Rates		Future Annual Increases in Rates Prescribed by Colorado Revised Statutes		Maximum Allowable Limitations	
	AED	SAED	AED	SAED	AED	SAED
State Division	5.00%	5.00%	N/A	N/A	5.00%	5.00%
School Division	4.50%	5.50%	N/A	N/A	4.50%	5.50%
Local Government Division	2.20%	1.50%	N/A	N/A	5.00%	5.00%
Judicial Division	2.20%	1.50%	Yes <sup>1</sup>	Yes <sup>2</sup>	5.00%	5.00%
DPS Division <sup>3</sup>	4.50%	5.50%	N/A	N/A	4.50%	5.50%

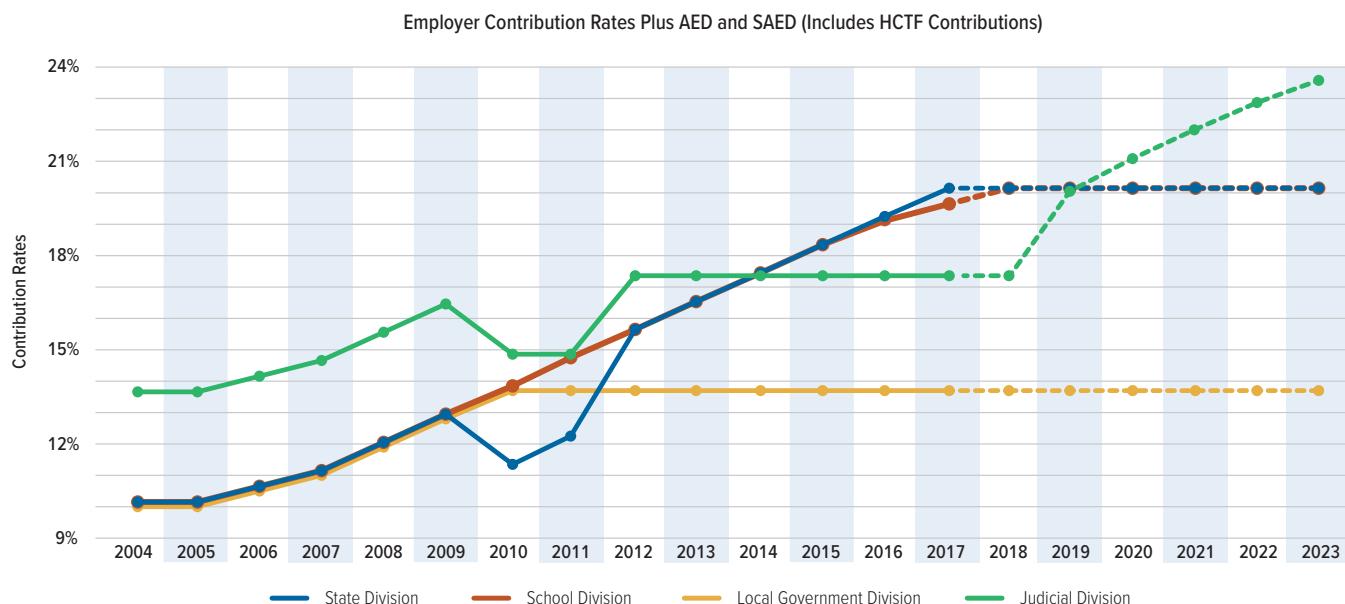
<sup>1</sup> For the calendar year beginning in 2019, C.R.S. § 24-51-411(4.5) increases the AED payment to 3.40 percent of PERA-includable salary and requires the AED payment to increase by 0.4 percent at the start of each of the following four calendar years through 2023 at which time the AED payment will be 5.00 percent of PERA-includable salary.

<sup>2</sup> For the calendar year beginning in 2019, C.R.S. § 24-51-411(7.5) increases the SAED payment to 3.40 percent of PERA-includable salary and requires the SAED payment to increase by 0.4 percent at the start of each of the following four calendar years through 2023 at which time the SAED payment will be 5.00 percent of PERA-includable salary.

<sup>3</sup> DPS Division employers are permitted to reduce the AED and SAED by the PCOP offset, as specified in C.R.S. § 24-51-412 *et seq.*

The chart below illustrates the employer contribution rates, including AED and SAED for the five Division Trust Funds based on the contribution rates prescribed by Colorado statute up to December 31, 2017. It is important to note that SB 18-200 requires an annual direct distribution from the State in the amount of \$225 million (actual dollars) beginning on July 1, 2018, an increase to the employer

contribution rates of 0.25 percent on July 1, 2019, and adjustments to employer contribution rates based on certain statutory parameters which are not included in the chart below. More information about future adjustments in contributions can be found in Note 12 in the Notes to the Financial Statements on pages 99–100.



Note: The 2010 and 2011 contributions for the State and Judicial Divisions include the 2.50 percent rate swap required by SB 10-146, and extended through June 30, 2012, by SB 11-076. Information on the DPS Division contribution rates can be found on page 35.

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

### Contribution Analysis

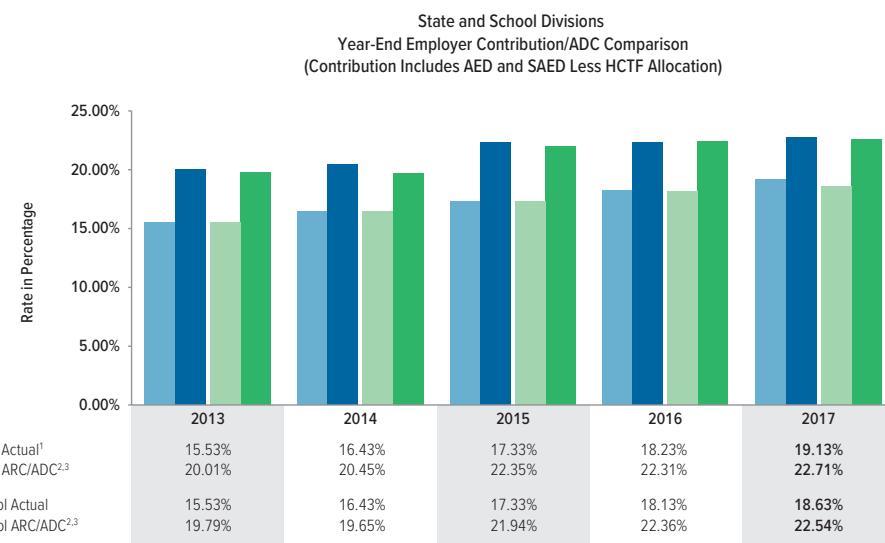
#### Funding Policies

PERA implemented GASB Statement No. 67 and GASB Statement No. 74 in 2014 and 2017, respectively. These Statements established a decided shift in financial disclosure requirements from a funding-based approach to an accounting-based approach. To accommodate the financial disclosure requirements promulgated by these Statements, separate actuarial valuations are performed for funding and accounting purposes. The disclosure and use of the annual required contribution (ARC) as a funding benchmark is no longer a required reporting element. This philosophical shift necessitated the development and use of a plan-specific ADC benchmark against which to gauge the adequacy of PERA's statutory contribution rates. In response to these changes, the Board adopted a revised pension funding policy in March 2015, later amended in January 2018, with regard to the Division Trust Funds, and a revised Other Postemployment Benefit (OPEB) funding policy in January 2018 with regard to the Health Care Trust Funds. The purpose of each funding policy is three-fold: (1) to define the overall funding benchmarks of the trust funds, (2) to assess the adequacy of the

contribution rates which are set by the Colorado Legislature by comparing each fund's statutorily set contribution rate to an ADC benchmark, and (3) to define the annual actuarial metrics which will assist the Board in assessing the sustainability of the plans. The results of these three items are intended to help guide the Board when considering whether to pursue or support proposed contribution and benefit legislation. Based on the pension funding policy, which considers a layered, 30-year closed amortization period, effective December 31, 2014, the ADC calculated in the December 31, 2017, actuarial valuation for funding purposes will be the benchmark to gauge the adequacy of 2019 contributions. Based on the OPEB funding policy, which considers a layered, 30-year closed amortization period, effective December 31, 2017, the ADC calculated in the December 31, 2017, actuarial valuation for funding purposes will be the benchmark to gauge the adequacy of the 2019 contributions. More information about the pension and OPEB funding policies can be found in the Actuarial Section on pages 155 and 188.

### Actuarially Determined Contribution (ADC)

#### History



<sup>1</sup> Actual rates are for non-State Troopers.

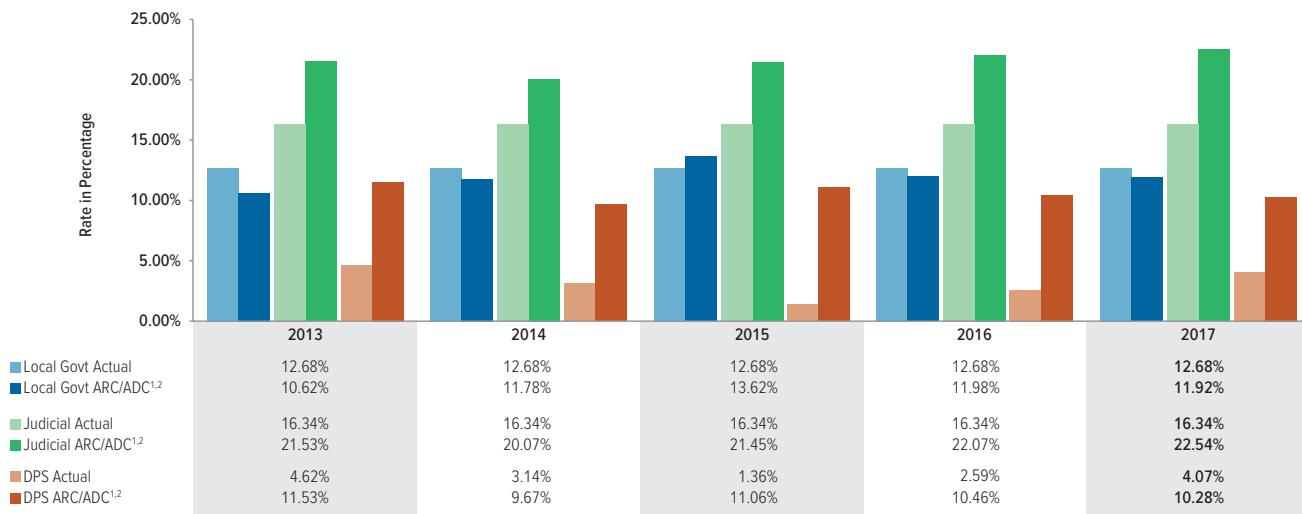
<sup>2</sup> The rates shown for 2013 reflect the ARC rates under GASB 25.

<sup>3</sup> ADC rates for 2014, 2015, 2016, and 2017 are based on the 2012, 2013, 2014, and 2015 actuarial valuations, respectively. The 2012 and 2013 actuarial valuations determined the ARC rates under the parameters promulgated by GASB 25.

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

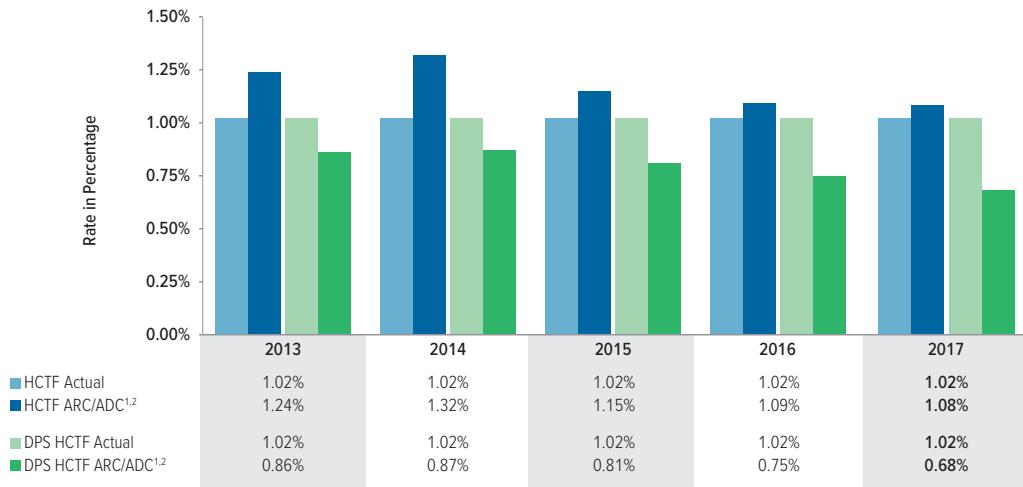
Local Government, Judicial, and DPS Divisions  
Year-End Employer Contribution/ADC Comparison  
(Contribution Includes AED and SAED Less HCTF Allocation)



<sup>1</sup> The rates shown for 2013 reflect the ARC rates calculated under GASB 25.

<sup>2</sup> ADC rates for 2014, 2015, 2016, and 2017 are based on the 2012, 2013, 2014, and 2015 actuarial valuations, respectively. The 2012 and 2013 actuarial valuations determined the ARC rates under the parameters promulgated by GASB 25.

HCTF and DPS HCTF  
Year-End Employer Contribution/ADC Comparison



<sup>1</sup> The rates shown for years 2013–2016 reflect the ARC rates calculated under GASB 43.

<sup>2</sup> ADC rates for 2017 are based on the 2015 actuarial valuation. The 2015 actuarial valuation determined the ARC rates under parameters promulgated by GASB 43.

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

### Contribution Deficiency/(Excess)

Governmental accounting standards require the disclosure of the amount of contributions recognized by the defined benefit plan, the ADC amount, and the difference between these two amounts as Required Supplementary Information (RSI). An annual contribution deficiency arises when actual contributions are less than the ADC. The ADC is calculated using the investment rate of return and discount rate assumptions according to the Board's funding policy. The ADC for 2017 was determined based on the results of the December 31, 2015, actuarial valuation. The 10-year schedules illustrating the annual contribution deficiency can be found in the RSI on pages 107–109 and 117–118.

Contribution deficiency/(excess) on an actuarial funding basis is determined through a similar process. Each year, the actuaries assess the increase or decrease to the expected unfunded liability by comparing the dollars expected to come into each fund versus the actual amounts received. This calculation for funding purposes is slightly different than the GASB approach in that it considers

additional contributions occurring during each year from all sources, as well as the timing of contributions made during the year. Taking all these factors into consideration results in a total contribution deficiency of \$195.2 million for the Division Trust Funds in 2017. During the past 15 years, shortfalls in funding for the Division Trust Funds totaled \$4.9 billion. Even with SB 10-001, which resulted in lower contribution deficiencies for the Division Trust Funds since being signed into law, annual contribution deficiencies continued to occur due to the adoption of closed amortization periods, the timing of future contribution increases prescribed by Colorado statute, and the portion of membership under the revised benefit structure. Beginning July 1, 2020, and each year thereafter, SB 18-200 requires, as necessary, adjustments to member contributions, employer contributions, the direct distribution from the State, and the AI based on certain statutory parameters. This bill provision is designed to help mitigate future contribution deficiencies and to keep PERA on the path to full funding in 30 years.

### CONTRIBUTION DEFICIENCY/(EXCESS)

(Dollars in Millions)

Trust Fund	2013	2014	2015	2016	2017	Cumulative Deficiency/(Excess) 2003–2017
State Division	\$102.5	\$88.1	\$116.7	\$59.9	\$32.2	\$1,617.6
School Division	165.0	120.2	187.7	144.4	133.0	2,412.1
State and School Division	N/A	N/A	N/A	N/A	N/A	685.5 <sup>1</sup>
Local Government Division	(9.9)	(196.5) <sup>2</sup>	8.4	(3.3)	(7.1) <sup>3</sup>	(206.2)
Judicial Division	2.2	1.7	2.6	(0.1)	(0.2)	19.6
DPS Division	41.9	41.8	65.5	48.7	37.3	390.3 <sup>4</sup>
<b>Total Division Trust Funds</b>	<b>\$301.7</b>	<b>\$55.3</b>	<b>\$380.9</b>	<b>\$249.6</b>	<b>\$195.2</b>	<b>\$4,918.9</b>
HCTF	(\$10.8)	\$7.6 <sup>2</sup>	\$0.1	(\$3.6)	(\$5.0) <sup>3</sup>	(\$88.1)
DPS HCTF	(1.7)	(1.1)	(1.6)	(2.2)	(2.6)	(11.2) <sup>4</sup>
<b>Total OPEB Trust Funds</b>	<b>(\$12.5)</b>	<b>\$6.5</b>	<b>(\$1.5)</b>	<b>(\$5.8)</b>	<b>(\$7.6)</b>	<b>(\$99.3)</b>

<sup>1</sup> The State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

<sup>2</sup> Includes the receipt of the disaffiliation payment for Memorial Health System. See Note 2, "2014 Changes in Assumptions or Other Inputs Since 2013" in the Notes to the RSI—Division Trust Funds for more information on the lawsuit resolution for Memorial Health System.

<sup>3</sup> Includes the receipt of the disaffiliation payment for Cunningham Fire Protection District. See Note 1, "2017 Changes in Plan Provisions Since 2016," in the Notes to the RSI—Division Trust Funds for more information.

<sup>4</sup> The DPS Division and DPS HCTF were established on January 1, 2010.

### Future ADC

Using the funding policy approved by the Board on March 20, 2015, and the 2016 actuarial funding valuation based on an assumed 7.25 percent investment rate of return and discount rate, the 2018 actuarially determined employer contributions needed to meet the layered, 30-year closed amortization period for the Division Trust Funds are as follows:

- State Division Trust Fund—26.30 percent
- School Division Trust Fund—26.80 percent
- Local Government Division Trust Fund—14.27 percent

- Judicial Division Trust Fund—27.26 percent
- DPS Division Trust Fund—13.50 percent

Using GASB 43 as a guide and the 2016 actuarial valuation based on an assumed 7.25 percent investment rate of return and discount rate, the 2018 annual required employer contributions needed to meet a 30-year amortization period for the Health Care Trust Funds are as follows:

- HCTF—1.12 percent
- DPS HCTF—0.67 percent

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

Using the funding policy approved by the Board on March 20, 2015, as amended, and the 2017 actuarial funding valuation based on an assumed 7.25 percent investment rate of return and discount rate, the 2019 actuarially determined employer contributions needed to meet the layered, 30-year closed amortization period for the Division Trust Funds are as follows:

- State Division Trust Fund—23.28 percent
- School Division Trust Fund—23.59 percent
- Local Government Division Trust Fund—10.75 percent
- Judicial Division Trust Fund—21.90 percent
- DPS Division Trust Fund—11.14 percent

Using the funding policy approved by the Board on January, 2018, and the 2017 actuarial funding valuation based on an assumed 7.25 percent investment rate of return and discount rate, the 2019 actuarially determined employer contributions needed to meet the layered, 30-year closed amortization period for the Health Care Trust Funds are as follows:

- HCTF—1.11 percent
- DPS HCTF—0.60 percent

### Amortization of Unfunded Actuarial Accrued Liabilities

The following table to the right shows the amortization periods for the Division Trust Funds. The amortization periods for the School and DPS Divisions consider the future additional contributions of the SAED in 2018. The amortization period for the Judicial Division considers the future additional contributions of AED and SAED which are scheduled to begin in 2019. The amortization periods for the five Division Trust Funds do not include the full effect of legislation enacted in 2006 and 2010. This legislation includes plan changes designed to lower the normal cost over time as new members are added to PERA's population, to allow a greater proportion of the employers' contribution to be used to amortize the unfunded liability. Additionally, these amortization periods do not reflect the full effect of changes to plan provisions required by SB 18-200. This legislation also is designed to lower the normal cost for future new members and increase future contributions to the plan in order to further accelerate the amortization of the unfunded liability. The significant increase in the amortization periods from 2015 to 2016 is primarily due to the adoption of updated mortality tables, which recognize the increased life expectancy of the membership, as well as the Board's adoption of a more conservative assumed long-term investment rate of return effective for the December 31, 2016, actuarial valuation. More information about the mortality tables used to determine the AAL for each Division and the Board's changes in actuarial assumptions can be found in the Actuarial Section on pages 156–157. Additionally, no adjustment has been made to the DPS Division for the current PCOP offset.

However, considering anticipated reductions in the future PCOP offset to DPS employer contribution requirements for the cost of certain PCOPs as currently structured, the realized amortization period is expected to be lower if the DPS Division's statutory employer contribution amounts are maintained at their current level. Colorado statutes call for a "true-up" in 2020 and every five years following, with the express purpose of adjusting the total DPS employer contribution rate to ensure equalization of the ratio of UAAL over payroll between the DPS and School Divisions at the end of the 30-year period beginning January 1, 2010.

This significant decrease in amortization periods from 2016 to 2017 for the Division Trust Funds is primarily due to changes in AI plan provisions required by SB 18-200. These provisions immediately extend the AI waiting period from one to three years, temporarily suspend the AI for years 2018 and 2019, and sets the AI cap at 1.5 percent effective July 1, 2020.

Trust Fund	2015 Amortization Period With Future AED and SAED Increases	2016 Amortization Period With Future AED and SAED Increases	2017 Amortization Period With Future AED and SAED Increases
	2015 Amortization Period	2016 Amortization Period	2017 Amortization Period
State Division	44 Years	65 Years	33 Years
School Division	46 Years	128 Years	38 Years
Local Government Division	28 Years	42 Years	22 Years
Judicial Division	Infinite	Infinite	24 Years
DPS Division	Infinite	Infinite	Infinite

Trust Fund	2015 Amortization Period	2016 Amortization Period	2017 Amortization Period
HCTF	35 Years	37 Years	37 Years
DPS HCTF	14 Years	13 Years	11 Years

C.R.S. § 24-51-211 states that the amortization period of 30 years shall be deemed actuarially sound.

As stated by Cavanaugh Macdonald Consulting, LLC (CMC), in the Actuary's Certification Letter on pages 149–154 in the Actuarial Section of the CAFR:

"...The results of the December 31, 2017 funding valuation, combined with financial projections of all Division Trust Funds reflecting anticipated growth in active membership and a lower cost benefit structure for new members, indicate that the goal of funding 100% of the actuarial accrued liability under the PERA revised benefit structure created by SB 18-200, is achievable within a projection period of 30 years."

"The employer contribution rate, combined with anticipated future employee growth and service purchase transfers, is sufficient to eventually finance the HCTF's and DPS HCTF's benefits."

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
(*Dollars in Thousands*)

**Summary of Benefits and Expenses**

**Analysis of Benefits and Expenses**

Basic Funding Equation: I + C = B + E

**TOTAL DEDUCTIONS BY TRUST FUND**

Trust Fund	Benefit Payments	Refunds	Disability and Life Insurance Premiums <sup>1</sup>	Administrative Expenses <sup>1</sup>	Other	Total Deductions <sup>1</sup>
State Division	\$1,554,290	\$58,696	\$2,035	\$11,745	\$3,652	\$1,630,418
School Division	2,334,003	74,637	3,347	23,019	22,484	2,457,490
Local Government Division	274,258	14,530	430	2,541	3,837	295,596
Judicial Division	25,250	7	41	86	153	25,537
DPS Division	271,189	10,277	378	2,857	89	284,790
HCTF	102,665	—	—	19,162	102	121,929
DPS HCTF	5,694	—	—	808	4	6,506
Life Insurance Reserve	—	—	373	493	—	866
<b>2017 Total</b>	<b>\$4,567,349</b>	<b>\$158,147</b>	<b>\$6,604</b>	<b>\$60,711</b>	<b>\$30,321</b>	<b>\$4,823,132</b>
<b>2016 Total</b>	<b>\$4,516,566</b>	<b>\$147,420</b>	<b>\$6,748</b>	<b>\$59,508</b>	<b>\$22,383</b>	<b>\$4,752,625</b>
<b>2015 Total</b>	<b>\$4,320,646</b>	<b>\$162,172</b>	<b>\$6,569</b>	<b>\$57,461</b>	<b>\$16,802</b>	<b>\$4,563,650</b>
<b>2014 Total</b>	<b>\$4,094,840</b>	<b>\$170,882</b>	<b>\$7,143</b>	<b>\$52,048</b>	<b>\$12,275</b>	<b>\$4,337,188</b>
<b>2013 Total</b>	<b>\$3,937,030</b>	<b>\$185,313</b>	<b>\$6,872</b>	<b>\$47,831</b>	<b>\$15,390</b>	<b>\$4,192,436</b>

<sup>1</sup> The totals prior to 2017 include the Life Insurance Reserve which was added to this schedule in 2017.

**AVERAGE MONTHLY BENEFIT BY DIVISION<sup>1,2</sup>**

(*In Actual Dollars*)

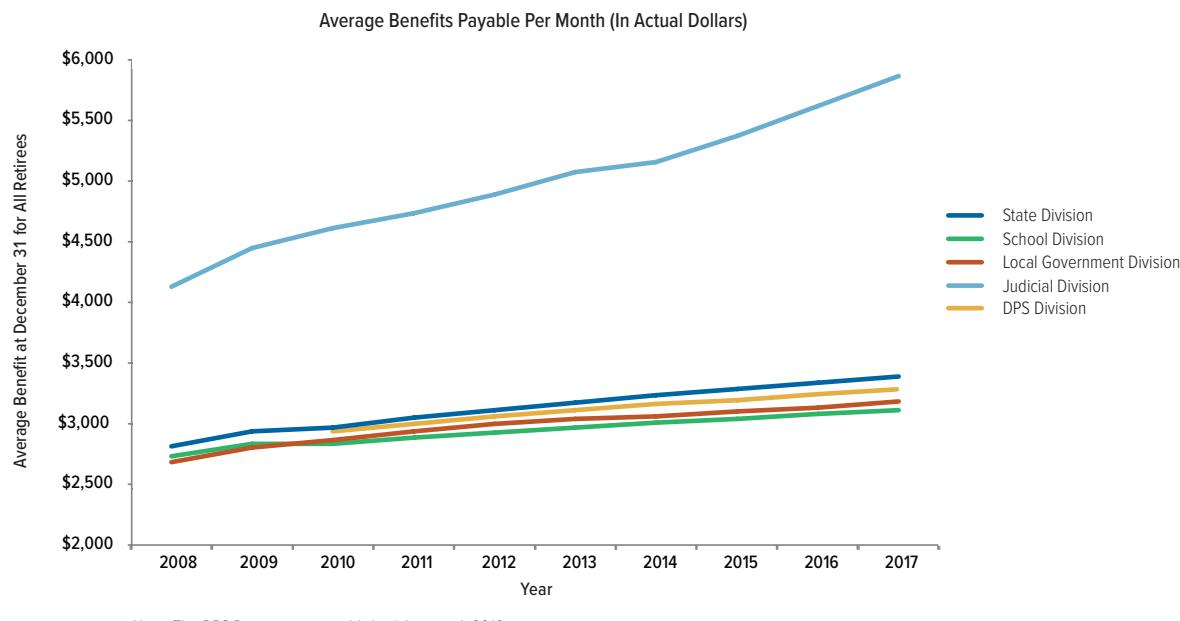
	State Division	School Division	Local Government Division	Judicial Division	DPS Division
<b>For All Retirees Year Ended</b>					
2013	\$3,185	\$2,980	\$3,044	\$5,077	\$3,121
2014	3,241	3,019	3,067	5,158	3,169
2015	3,294	3,052	3,114	5,379	3,206
2016	3,345	3,086	3,145	5,624	3,248
<b>2017</b>	<b>3,397</b>	<b>3,115</b>	<b>3,188</b>	<b>5,864</b>	<b>3,290</b>
<b>For Members Who Retired During the Year</b>					
2013	\$2,837	\$2,455	\$2,509	\$6,857	\$2,776
2014	2,760	2,405	2,352	4,969	2,593
2015	2,828	2,293	2,750	7,030	2,493
2016	2,812	2,303	2,467	6,192	2,520
<b>2017</b>	<b>2,866</b>	<b>2,304</b>	<b>2,669</b>	<b>7,747</b>	<b>2,608</b>

<sup>1</sup> Most employees working for PERA-affiliated employers do not earn Social Security benefits.

<sup>2</sup> Includes disability retirements, but not survivor benefits.

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)



Note: The DPS Division was established January 1, 2010.

### PERA Benefit Payments<sup>1,2</sup>

At the end of 2017, PERA was paying benefits to more than 118,000 retired public employees and their beneficiaries who received an average benefit of \$3,204 per month. For benefit recipients, this may be the primary source of retirement income as most PERA benefit recipients do not qualify for Social Security payments. Approximately 68.5 percent of recipients receive less than \$50,000 a year in PERA benefits, as the graph below demonstrates. Slightly

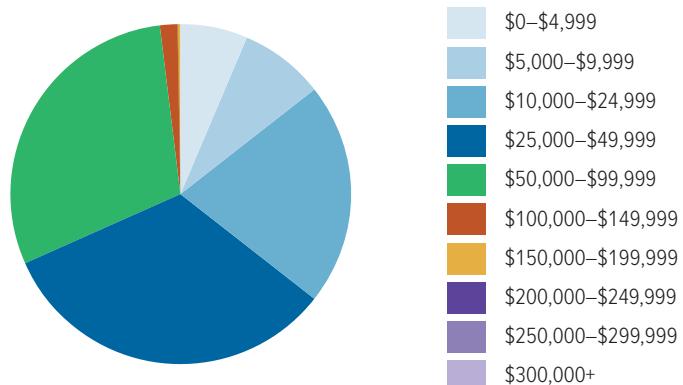
less than 1.7 percent (1,994) of PERA benefit recipients receive an annual benefit payment of \$100,000 or more. Generally, these benefit recipients had high salaries and a significant number of years of service credit.

<sup>1</sup> Includes amounts paid under replacement benefit arrangements.

<sup>2</sup> Does not include deferred survivors and benefits that ended or were suspended in 2017.

### PERA BENEFIT PAYMENTS BY DOLLAR AMOUNT OF ANNUAL BENEFIT/NUMBER OF BENEFIT RECIPIENTS

Benefit Range <sup>1</sup>	Number of Benefit Recipients <sup>2</sup>
\$0–\$4,999	7,855
\$5,000–\$9,999	9,291
\$10,000–\$24,999	25,100
\$25,000–\$49,999	38,638
\$50,000–\$99,999	35,280
\$100,000–\$149,999	1,814
\$150,000–\$199,999	132
\$200,000–\$249,999	38
\$250,000–\$299,999	6
\$300,000+	4
<b>Total Benefit Recipients</b>	<b>118,158</b>



<sup>1</sup> Includes amounts paid under replacement benefit arrangements.

<sup>2</sup> Does not include 322 deferred survivors.

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

**RATIO OF ACTIVE MEMBERS TO RETIREES AND BENEFICIARIES**

Year Ended	State Division	School Division	Local Government Division	Judicial Division	DPS Division
2013	1.58	2.10	1.94	1.03	2.26
2014	1.54	2.06	1.87	1.01	2.30
2015	1.49	2.00	1.80	0.97	2.34
2016	1.46	1.96	1.80	0.93	2.30
<b>2017</b>	<b>1.41</b>	<b>1.91</b>	<b>1.73</b>	<b>0.88</b>	<b>2.27</b>

The decline in the ratio of active members to retirees and beneficiaries is reflective of the aging population. By itself, a declining ratio of active members to retirees and beneficiaries does not pose a problem to a Division Trust Fund's actuarial condition. However, to the extent that a plan is underfunded, a low or declining ratio of active members to retirees and beneficiaries, coupled with increasing life expectancy, can complicate the Division Trust Fund's ability to move toward full funding, as fewer active, contributing members, relatively, are available to amortize the unfunded liability.

**RATIO OF BENEFIT PAYMENTS TO CONTRIBUTIONS**

Trust Fund	Employer Contributions	Member Contributions	Total Contributions	Benefit Payments	Ratio of Benefits/Contributions				
					2017	2016	2015	2014	2013
State Division	\$563,977	\$228,978	\$792,955	\$1,554,290	2.0	2.0	2.0	2.1	2.1
School Division	857,740	368,740	1,226,480	2,334,003	1.9	1.9	1.9	2.0	2.0
Local Government Division	78,291	50,472	128,763	274,258	2.1	2.1	2.1	2.1	2.0
Judicial Division	8,080	3,955	12,035	25,250	2.1	1.9	1.8	1.9	1.9
DPS Division	27,578	54,354	81,932	271,189	3.3	3.8	4.4	3.8	3.5

**Prospective Benefit Provisions**

SB 18-200 modifies the definition of Highest Average Salary (HAS) for the five Division Trust Funds, the definition of salary, retirement eligibility, and the eligibility for and rates of the AI. See Note 12 in the Notes to the Financial Statements for a detailed summary of changes to benefit provisions required by SB 18-200.

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
(*Dollars in Thousands*)**Other Changes—Defined Benefit Funds****Cash and Short-Term Investments**

For the year ended December 31, 2017, PERA had cash and short-term investments of \$599,632, a decrease of \$391,146 from 2016. The decrease was primarily due to a reduced overall need for liquidity at year-end.

**Securities Lending Collateral and Obligations**

For the year ended December 31, 2017, PERA had securities lending collateral of \$1,225,059 and securities lending obligations of \$1,224,017, an increase of \$278,479 and \$277,332, respectively, from 2016. The securities lending collateral and obligations increased due to an increase in the market value of securities on loan.

**Investment Settlements and Income Receivables**

For the year ended December 31, 2017, PERA had receivables of \$638,482, an increase of \$153,071 from 2016. The increase was primarily due to higher pending settlement of fixed income investment sales at year-end.

**Investment Settlements and Other Liabilities**

For the year ended December 31, 2017, PERA had investment settlements and other liabilities of \$759,017, an increase of \$289,645 from 2016. The increase was primarily due to higher pending settlements of fixed income investment purchases at year-end.

**Other Additions and Other Deductions—Division Trust Funds**

For the year ended December 31, 2017, other additions increased by \$7,331 and other deductions increased by \$8,341. These changes are primarily due to recording interfund transfers at retirement as an addition for the State, Judicial, and DPS Divisions and a deduction for the School and Local Government Divisions. The amount of interfund transfers, and whether they are recorded as other additions or deductions, depends on the number of retirements where the member has earned service credit in more than one division.

**Benefit Payments—Health Care Trust Funds**

Benefit payments decreased from \$256,410 in 2016 to \$108,359 in 2017. The decrease was primarily due to the change in classification of retiree health care premiums due to the implementation of GASB Statement 74. Retiree health care premiums received in 2017 reduce the amount of benefit payments reported in the Deductions section of the Statements of Changes in Fiduciary Net Position for the HCTF and DPS HCTF. Previously, retiree health care premiums related to HCTF and DPS HCTF were reported in the Additions section of the Statement of Changes in Fiduciary Net Position. See Note 2 to the Notes to the Financial Statements for additional information regarding the classification of retiree health care premiums.

**Other Deductions—Health Care Trust Funds**

For the year ended December 31, 2017, other deductions decreased by \$403. The decrease was primarily due to lower expenses resulting from the discontinuation of the Affordable Care Act's transitional reinsurance program.

**Life Insurance Premiums—Life Insurance Reserve**

Life insurance premiums increased from \$306 in 2016 to \$373 in 2017. The increase was due to premium expenses which are based on covered lives, age, and the amount of insurance coverage. The premium expense increases as covered-participants age.

**Administrative Expenses—Life Insurance Reserve**

Administrative expenses decreased from \$1,032 in 2016 to \$493 in 2017. The decrease was primarily due to higher enrollee life insurance premiums which covered the cost to administer the life insurance program during 2017.

**GASB OPEB Project—Implementation of GASB Statement No. 74**

In June 2015, GASB issued Statement No. 74, "Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans." GASB 74 addresses reporting by OPEB plans that administer benefits on behalf of governments. The new OPEB standard parallels the pension standard issued in 2012—GASB Statement No. 67, "Financial Reporting for Pension Plans."

The Statement requires more extensive note disclosures and RSI related to the measurement of the OPEB liabilities for which assets have been accumulated. GASB 74 is effective for periods beginning after June 15, 2016, and PERA has implemented GASB 74 in this CAFR.

**Actuarial Valuations: Accounting Versus Funding**

Separate actuarial valuations are prepared for accounting and funding purposes for the Division Trust Funds and Health Care Trust Funds. The purpose of the funding valuation is to guide the Board's actions necessary to ensure the long-term sustainability of the funds. The funding valuation aids this action by allowing PERA to assess the sufficiency of the current statutory contribution rates to meet current and future benefit obligations. One of the key measurements in the funding valuation is the UAAL which is the difference between the actuarial value of assets and AALs. Information pertaining to the funding valuation for the Division Trust Funds can be found in the Actuarial Section on pages 155–187 and for the Health Care Trust Funds on pages 188–204.

The actuarial valuation for accounting purposes emphasizes the obligation an employer incurs to employees through the employment-exchange process. The primary purpose of the valuation for accounting purposes is to provide a consistent, standardized methodology that allows comparability of amounts

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

*(Dollars in Thousands)*

and increased transparency of liabilities across U.S. pension and OPEB plans complying with GASB 67 and GASB 74. One of the key measurements in the accounting valuation which assesses the pension liabilities for financial reporting purposes is the net pension liability (NPL). The NPL is the difference between the FNP and the total pension liability (TPL). Similarly, one of the key measurements in the accounting valuation which assesses the OPEB liabilities for financial reporting purposes is the net OPEB liability (NOL). The NOL is the difference between the FNP, which includes the fair value of assets and the total OPEB liability (TOL). The individual components which collectively comprise the FNP can be found in the Statements of Fiduciary Net Position on pages 58–59.

The objectives of each actuarial valuation require different approaches for determining the pension and OPEB liabilities for financial reporting purposes and the UAAL for funding purposes. The pension and OPEB liabilities calculated for purposes of financial reporting are determined in accordance with GASB 67 and GASB 74, respectively. These standards require the benefit provisions in effect on December 31, 2017, to be used in the calculation of liabilities for financial reporting purposes. On the other hand, the UAAL is determined in accordance with Actuarial Standards of Practice (ASOPs) and the Board's funding policies. PERA is permitted by the ASOPs to use the most up-to-date benefit provisions in the calculations of the UAAL for funding purposes and has chosen to do so in this CAFR.

There are a number of additional differences between these two approaches, such as the determination of the rate used to discount projected benefit payments. In the determination of pension and OPEB liabilities for financial reporting purposes, governmental accounting standards require that the long-term expected rate of return on the investments of the plan should be applied only to available plan assets that are expected to be invested using a strategy to achieve that return. If there comes a point in the projections when plan FNP and contributions attributable to active and inactive employees are no longer projected to be greater than or equal to projected benefit payments related to those employees and administrative expenses (crossover point), then from that point forward the plan will be required to discount the projected benefit payments using a presumed borrowing rate. Governmental accounting standards require a tax-exempt, high-quality, 20-year municipal general obligation bond index rate to be used for this purpose. In determination of the UAAL, ASOPs and the Board's funding policies require that the long-term expected rate of return is used to discount projected benefit payments.

Another notable difference between these two approaches is the measure of plan assets used to determine the pension and OPEB liabilities produced for purposes of financial reporting and the UAAL. Governmental accounting standards require that plan assets are

measured using the fair value of assets to determine the pension and OPEB liabilities produced for financial reporting purposes. ASOPs permit the use of a market-related value, which smooths changes in the fair value over time to determine the UAAL. The Board's funding policies require a four-year smoothed fair value of assets be utilized.

The comparative analysis in the following section of this MD&A for the Health Care Trust Funds reflects the shift from a funding-based approach to an accounting-based approach due to the implementation of GASB 74 in this CAFR.

### Actuarial Summary

CMC prepared the December 31, 2017, actuarial valuations for the Division Trust Funds and Health Care Trust Funds for purposes of complying with GASB 67 and GASB 74, respectively. These actuarial valuations, based on a set of actuarial assumptions, examine each fund's assets as compared to actuarial liabilities, compare past and future trends, and calculate the collective liabilities produced for purposes of financial reporting.

The Board studies all economic and demographic actuarial assumptions at least every five years and approves changes, as necessary, to those assumptions. Recently, the Board has reviewed the economic assumptions on a more frequent basis. The Board last completed an experience study in 2016, and the next planned experience study will be in 2020. The actuarial assumptions in effect for the December 31, 2017, actuarial valuation were adopted by the Board during the November 18, 2016, meeting based on the 2016 experience analysis and the October 28, 2016, actuarial assumptions workshop. However, it should be noted that the discount rate assumption was changed to 4.72 percent, 4.78 percent, and 5.41 percent for the State, School, and Judicial Divisions, respectively, in accordance with GASB 67.

The actuarial valuations prepared for purposes of complying with GASB 67 and GASB 74 were based on member data as of December 31, 2016. As permitted by governmental accounting standards, generally accepted actuarial techniques were applied to roll forward the TPL and TOL, based upon this member data, to December 31, 2017. The roll-forward procedures to determine the TPL considered service cost associated with accruing benefits for the year, interest on the TPL, and benefits and refunds paid to recipients during the year. Similarly, the roll-forward procedures to determine the TOL considered service cost associated with accruing benefits for the year and interest on the TOL. The impact of actuarial experience and changes in actuarial assumptions and other inputs were also considered in the roll-forward calculations to determine the TPL and TOL.

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
*(Dollars in Thousands)*

**STATUS OF COLORADO PERA DIVISION TRUST FUNDS**

	12/31/2016	12/31/2017 <sup>1</sup>
<b>State Division Trust Fund</b>		
Total pension liability	\$31,994,311	\$35,241,684
Fiduciary net position	13,626,180	15,223,702
<b>Net pension liability</b>	<b>\$18,368,131</b>	<b>\$20,017,982</b>
Fiduciary net position as a percentage of the total pension liability	42.6%	43.2%
Discount rate	5.26%	4.72%
<b>School Division Trust Fund</b>		
Total pension liability	\$52,354,913	\$57,699,176
Fiduciary net position	22,581,046	25,362,730
<b>Net pension liability</b>	<b>\$29,773,867</b>	<b>\$32,336,446</b>
Fiduciary net position as a percentage of the total pension liability	43.1%	44.0%
Discount rate	5.26%	4.78%
<b>Local Government Division Trust Fund</b>		
Total pension liability	\$5,123,847	\$5,396,516
Fiduciary net position	3,773,506	4,283,086
<b>Net pension liability</b>	<b>\$1,350,341</b>	<b>\$1,113,430</b>
Fiduciary net position as a percentage of the total pension liability	73.6%	79.4%
Discount rate	7.25%	7.25%
<b>Judicial Division Trust Fund</b>		
Total pension liability	\$543,150	\$561,946
Fiduciary net position	288,904	329,862
<b>Net pension liability</b>	<b>\$254,246</b>	<b>\$232,084</b>
Fiduciary net position as a percentage of the total pension liability	53.2%	58.7%
Discount rate	5.18%	5.41%
<b>DPS Division Trust Fund</b>		
Total pension liability	\$4,221,449	\$4,374,550
Fiduciary net position	3,125,977	3,478,040
<b>Net pension liability</b>	<b>\$1,095,472</b>	<b>\$896,510</b>
Fiduciary net position as a percentage of the total pension liability	74.0%	79.5%
Discount rate	7.25%	7.25%
<b>All Division Trust Funds<sup>2</sup></b>		
Total pension liability	\$94,237,670	\$103,273,872
Fiduciary net position	43,395,613	48,677,420
<b>Net pension liability</b>	<b>\$50,842,057</b>	<b>\$54,596,452</b>
Fiduciary net position as a percentage of the total pension liability	46.0%	47.1%

<sup>1</sup> Governmental accounting standards require the pension liabilities for financial reporting purposes be measured using the plan provisions in effect at the pension plan's year-end. See Note 12 in the Notes to the Financial Statements for more information on SB 18-200.

<sup>2</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
(Dollars in Thousands)

**STATUS OF COLORADO PERA HEALTH CARE TRUST FUNDS**

	12/31/2016	12/31/2017
<b>Health Care Trust Fund</b>		
Actuarial accrued liability <sup>1</sup>	\$1,556,762	\$1,575,822
Assets held to pay those liabilities <sup>2</sup>	260,228	276,222
<b>Unfunded actuarial accrued liability</b>	<b>\$1,296,534</b>	<b>\$1,299,600</b>
Funded ratio	16.7%	17.5%
Discount rate	7.25%	7.25%
<b>DPS Health Care Trust Fund</b>		
Actuarial accrued liability <sup>1</sup>	\$72,845	\$73,267
Assets held to pay those liabilities <sup>2</sup>	18,337	22,308
<b>Unfunded actuarial accrued liability</b>	<b>\$54,508</b>	<b>\$50,959</b>
Funded ratio	25.2%	30.4%
Discount rate	7.25%	7.25%
<b>All Health Care Trust Funds<sup>3</sup></b>		
Actuarial accrued liability <sup>1</sup>	\$1,629,607	\$1,649,089
Assets held to pay those liabilities <sup>2</sup>	278,565	298,530
<b>Unfunded actuarial accrued liability</b>	<b>\$1,351,042</b>	<b>\$1,350,559</b>
Funded ratio	17.1%	18.1%

<sup>1</sup> The AAL was based on the 2016 valuation which used GASB 43 as guidance, as well as the Board's funding policy dated November 2007. The total OPEB liability was calculated in accordance with GASB 74.

<sup>2</sup> The assets held to pay those liabilities and the FNP both represent the fair value of the investments.

<sup>3</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**SCHEDULE OF CHANGES IN NET PENSION LIABILITY<sup>1</sup>**

	State Division Trust Fund	School Division Trust Fund	Local Government Division Trust Fund	Judicial Division Trust Fund	DPS Division Trust Fund	All Division Trust Funds <sup>2</sup>
2016 Net pension liability	\$18,368,131	\$29,773,867	\$1,350,341	\$254,246	\$1,095,472	\$50,842,057
Service cost	518,360	954,368	75,417	14,364	91,986	1,654,495
Interest	1,640,426	2,690,433	360,995	27,480	295,838	5,015,172
Changes of benefit terms	—	—	(110)	—	—	(110)
Differences between expected and actual experience	416,731	564,155	125,585	16,644	47,121	1,170,236
Changes of assumptions or other inputs	2,286,877	3,547,294	—	(14,394)	—	5,819,777
Contributions—employer	(563,977)	(857,740)	(78,291)	(8,080)	(27,578)	(1,535,666)
Contributions—employer disaffiliation	—	—	(1,063)	—	—	(1,063)
Contributions—active member (includes purchased service)	(256,420)	(399,053)	(56,797)	(4,863)	(56,820)	(773,953)
Net investment income	(2,391,683)	(3,982,275)	(669,011)	(51,173)	(548,585)	(7,642,727)
Administrative expense	11,745	23,019	2,541	86	2,857	40,248
Other	(12,208)	22,378	3,823	(2,226)	(3,781)	7,986
<b>2017 Net pension liability</b>	<b>\$20,017,982</b>	<b>\$32,336,446</b>	<b>\$1,113,430</b>	<b>\$232,084</b>	<b>\$896,510</b>	<b>\$54,596,452</b>

<sup>1</sup> Governmental accounting standards require the net pension liabilities for financial reporting purposes be measured using the plan provisions in effect at the pension plan's year-end. See Note 12 in the Notes to the Financial Statements for more information on SB 18-200.

<sup>2</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

(Dollars in Thousands)

SCHEDULE OF CHANGES IN NET OPEB LIABILITY

	Health Care Trust Fund	DPS Health Care Trust Fund	All Health Care Trust Funds <sup>1</sup>
2016 Unfunded actuarial accrued liability (UAAL) <sup>2</sup>	\$1,296,534	\$54,508	\$1,351,042
2016 Adjustment to UAAL <sup>3</sup>	—	—	—
2016 Net OPEB liability	1,296,534	54,508	1,351,042
Service cost	20,036	1,591	21,627
Interest	108,625	5,057	113,682
Changes of benefit terms	5	—	5
Differences between expected and actual experience	7,354	(35)	7,319
Changes of assumptions or other inputs	—	—	—
Contributions—employer	(83,077)	(6,930)	(90,007)
Contributions—employer disaffiliation	(96)	—	(96)
Purchased service transfers	(7,260)	(84)	(7,344)
Net investment income	(44,990)	(3,305)	(48,295)
Administrative expense <sup>4</sup>	2,469	157	2,626
<b>2017 Net OPEB liability</b>	<b>\$1,299,600</b>	<b>\$50,959</b>	<b>\$1,350,559</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

<sup>2</sup> The 2016 UAAL shown above is based on the fair value of investments.

<sup>3</sup> Represents the required adjustment to the UAAL to compute the 2016 net OPEB liability in accordance with GASB 74.

<sup>4</sup> Excludes administrative and other health care claims processing fees.

SUMMARY OF THE RATIOS OF FIDUCIARY NET POSITION TO TOTAL PENSION LIABILITY<sup>1, 2</sup>

Trust Fund	2013	2014	2015	2016	2017 <sup>3</sup>
State Division	61.0%	59.8%	56.1%	42.6%	<b>43.2%</b>
School Division	64.0%	62.8%	59.2%	43.1%	<b>44.0%</b>
Local Government Division	77.6%	80.7%	76.9%	73.6%	<b>79.4%</b>
Judicial Division	77.4%	66.9%	60.1%	53.2%	<b>58.7%</b>
DPS Division	86.3%	83.9%	79.3%	74.0%	<b>79.5%</b>
<b>Total Division Trust Funds<sup>4</sup></b>	<b>65.2%</b>	<b>64.2%</b>	<b>60.4%</b>	<b>46.0%</b>	<b>47.1%</b>

<sup>1</sup> The ratio for 2013 represents the total fair value of assets available to pay benefits divided by the actuarial accrued liabilities. The ratios for 2014 through 2017 are computed by dividing the FNP by the TPL.

<sup>2</sup> The AAL for 2013 was based on actuarial valuations which used GASB 25 and the Board's funding policy dated November 2007 as guidance. The TPL for years 2014 through 2017 is based on the actuarial valuations prepared in accordance with GASB 67.

<sup>3</sup> Governmental accounting standards require the TPL for financial reporting purposes be measured using the plan provisions in effect at the pension plan's year-end. See Note 12 in the Notes to the Financial Statements for more information on SB 18-200.

<sup>4</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

SUMMARY OF THE RATIOS OF FIDUCIARY NET POSITION TO TOTAL OPEB LIABILITY<sup>1, 2, 3</sup>

Trust Fund	2013	2014	2015	2016	2017
HCTF	20.2%	20.2%	17.8%	16.7%	<b>17.5%</b>
DPS HCTF	21.5%	22.4%	22.6%	25.2%	<b>30.4%</b>
<b>Total Health Care Trust Funds<sup>4</sup></b>	<b>20.3%</b>	<b>20.3%</b>	<b>18.0%</b>	<b>17.1%</b>	<b>18.1%</b>

<sup>1</sup> The ratios for 2013 through 2016 are computed by dividing the total fair value of assets available to pay benefits by actuarial accrued liabilities. The ratios for 2017 are computed by dividing the FNP by the total OPEB liability.

<sup>2</sup> The AAL for years 2013 through 2016 was based on actuarial valuations which used GASB 43 and the Board's funding policy dated November 2007 as guidance. The total OPEB liability for 2017 is based on the actuarial valuation which was prepared in accordance with GASB 74.

<sup>3</sup> The ratios for years 2013 through 2016 have been restated to include the actual fair value of assets for improved comparability. The ratios contained in this schedule in previous annual reports used the actuarial value of assets, which calculated the value of the assets by spreading any market gains or losses above or below the assumed rate of return over four years.

<sup>4</sup> The data in this table has been aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

## MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)

*(Dollars in Thousands)*

The ratios listed on the previous page give an indication of a plan's ability to meet its current and future obligations in accordance with GASB 67 and GASB 74. As an example, for every \$1.00 of the TPL or earned benefits for the School Division Trust Fund as of December 31, 2017, approximately \$0.44 of assets is available for payment based on the actual fair value of assets. These benefits earned will be payable over the life span of members after their retirement and therefore, it is not necessary that the TPL or earned benefits equal the fair value of assets at any given moment in time.

### Sensitivity of Actuarial Valuation to Changes in Assumed Investment Rate of Return and Discount Rate

The most important long-term driver of a defined benefit plan is investment income. Currently, the long-term expected rate of return assumption is 7.25 percent. The investment return assumption and the discount rate for liabilities, as mandated by governmental accounting standards, are based on an estimated long-term investment return for the plan, with consideration given to the nature and mix of current and expected investments as long as projections of plan investments indicate that assets are available to pay benefit obligations. At the point in the projections when plan FNP and contributions related to active and inactive employees are no longer projected to be greater than or equal to projected benefit payments related to those employees and administrative expenses (crossover point), then from that point forward the defined benefit plan is required to discount the projected benefit payments using a presumed borrowing rate. Governmental accounting standards require a tax-exempt, high-quality 20-year municipal general obligation bond index rate to be used for this purpose.

Based on the projection test required by GASB, assets are available to pay all future benefit obligations of the Local Government Division Trust Fund, DPS Division Trust Fund, the HCTF, and DPS HCTF. As a result, the discount rate used to determine the liabilities produced for financial reporting purposes equals the long-term expected rate of return assumption of 7.25 percent. The projection test indicates assets will be insufficient to cover a portion of future benefit obligations for the State, School, and Judicial Division Trust Funds. As a result, for 2017, the blended discount rates of 4.72 percent, 4.78 percent, and 5.41 percent were used to determine the NPL of the State, School, and Judicial Division Trust Funds, respectively. For 2016, the blended discount rates of 5.26 percent, 5.26 percent, and 5.18 percent were used to determine the NPL of the State, School, and Judicial Division Trust Funds, respectively. The statutory plan provisions in effect at the

December 31, 2017, measurement date were used in the projection tests to determine the discount rates. There are a number of methods to assess the sufficiency of assets available to pay future benefits and the projection test required by GASB does not necessarily reflect a plan's actual ability or inability to cover future benefit obligations.

The long-term expected return on plan assets is reviewed as part of regular experience studies prepared every four to five years for PERA. Recently, this assumption has been reviewed more frequently. The most recent analyses regarding the long-term outlook on the expected rate of return were outlined in presentations to the Board by the retained actuary, the Board's investment consultant, and an additional external actuarial firm during the October 28, 2016, actuarial assumptions workshop. As a result of the October 28, 2016, workshop and the November 18, 2016, Board meeting, the Board decreased the long-term expected return on plan assets from 7.50 percent per year, compounded annually, net of investment expenses to 7.25 percent per year, compounded annually, net of investment expenses. Several factors were considered in establishing the long-term rate of return assumption, including long-term historical data, estimates inherent in current market data, market forecasts from the Board's investment consultant, as well as the 2016 survey of capital market assumptions by Horizon Actuarial Services, LLC, and a log-normal distribution analysis in which best estimate ranges of expected future real rates of return (expected return, net of investment expense and inflation) were developed for each major asset class. These ranges were combined to estimate the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and then adding expected inflation. The mean overall investment rate of return based on this modeling process was 7.47 percent. One standard deviation range around the mean was 5.71 percent to 9.26 percent, which represents 68.2 percent of the possible outcomes. Two standard deviations range around the mean was 4.03 percent to 11.02 percent, which represents 95.4 percent of the possible outcomes.

To understand the importance of the long-term assumed investment rate of return, which is used to determine the discount rate, a 1.0 percent fluctuation in the discount rate would change the liabilities produced for financial reporting purposes and related ratios for the Division Trust Funds and Health Care Trust Funds as shown in the tables on the next two pages.

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
(Dollars in Thousands)

**1.0 PERCENT DECREASE IN DISCOUNT RATE**

Trust Fund	Discount Rate	Fiduciary Net Position as a Percentage of the Total Pension Liability	Net Pension Liability
State Division <sup>1</sup>	3.72%	37.9%	\$24,903,807
School Division <sup>1</sup>	3.78%	38.3%	40,846,431
Local Government Division	6.25%	70.7%	1,773,333
Judicial Division <sup>1</sup>	4.41%	52.5%	298,430
DPS Division	6.25%	71.1%	1,410,777
<b>Total Division Trust Funds<sup>2</sup></b>		<b>41.3%</b>	<b>\$69,232,778</b>

<sup>1</sup> Reflects a blended discount rate as required by GASB 67.

<sup>2</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Trust Fund	Discount Rate	Fiduciary Net Position as a Percentage of the Total OPEB Liability	Net OPEB Liability
HCTF	6.25%	15.9%	\$1,461,159
DPS HCTF	6.25%	27.8%	\$58,073
<b>Total Health Care Trust Funds<sup>1</sup></b>			<b>\$1,519,232</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**CURRENT DISCOUNT RATE**

Trust Fund	Discount Rate	Fiduciary Net Position as a Percentage of the Total Pension Liability	Net Pension Liability
State Division <sup>1</sup>	4.72%	43.2%	\$20,017,982
School Division <sup>1</sup>	4.78%	44.0%	32,336,446
Local Government Division	7.25%	79.4%	1,113,430
Judicial Division <sup>1</sup>	5.41%	58.7%	232,084
DPS Division	7.25%	79.5%	896,510
<b>Total Division Trust Funds<sup>2</sup></b>		<b>47.1%</b>	<b>\$54,596,452</b>

<sup>1</sup> Reflects a blended discount rate as required by GASB 67.

<sup>2</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Trust Fund	Discount Rate	Fiduciary Net Position as a Percentage of the Total OPEB Liability	Net OPEB Liability
HCTF	7.25%	17.5%	\$1,299,600
DPS HCTF	7.25%	30.4%	50,959
<b>Total Health Care Trust Funds<sup>1</sup></b>			<b>\$1,350,559</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
(*Dollars in Thousands*)

**1.0 PERCENT INCREASE IN DISCOUNT RATE**

Trust Fund	Discount Rate	Fiduciary Net Position as a Percentage of the Total Pension Liability	Net Pension Liability
State Division <sup>1</sup>	5.72%	48.7%	\$16,007,019
School Division <sup>1</sup>	5.78%	50.0%	25,401,780
Local Government Division	8.25%	88.4%	563,306
Judicial Division <sup>1</sup>	6.41%	65.2%	175,676
DPS Division	8.25%	88.1%	470,853
<b>Total Division Trust Funds<sup>2</sup></b>		<b>53.3%</b>	<b>\$42,618,634</b>

<sup>1</sup> Reflects a blended discount rate as required by GASB 67.

<sup>2</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Trust Fund	Discount Rate	Fiduciary Net Position as a Percentage of the Total OPEB Liability	Net OPEB Liability
HCTF	8.25%	19.2%	\$1,161,705
DPS HCTF	8.25%	33.2%	44,878
<b>Total Health Care Trust Funds<sup>1</sup></b>			<b>\$1,206,583</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Note: The time-weighted, net-of-fees, annualized rate of return for the pooled investment assets was 9.5 percent for the past five years and 6.0 percent for the past 10 years. The 35-year annualized gross-of-fees rate of return for the pooled investment assets was 9.5 percent.

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
*(Dollars in Thousands)*

**DEFINED CONTRIBUTION PENSION AND DEFERRED COMPENSATION TRUST FUNDS**

**Financial Reporting Highlights**

The FNP for the Voluntary Investment Program, the Defined Contribution Retirement Plan, and the Deferred Compensation Plan increased \$603,108 for the year ended December 31, 2017. The increase in FNP for the three trust funds was principally due to positive investment returns arising from the global stock markets.

**FIDUCIARY NET POSITION**

	2017 Change in Fiduciary Net Position	2017 Ending Fiduciary Net Position
Voluntary Investment Program	\$445,508	\$3,275,171
Defined Contribution Retirement Plan	43,683	211,089
Deferred Compensation Plan	113,917	865,599
<b>Total</b>	<b>\$603,108</b>	<b>\$4,351,859</b>

**CHANGES IN FIDUCIARY NET POSITION**

	(C) Contributions and Other Additions	+ (I) Net Investment Income (Loss)	– (B) – (E) Benefits Expenses, and Other Deductions	= Change in Fiduciary Net Position
Voluntary Investment Program	\$142,582	\$469,233	\$166,307	\$445,508
Defined Contribution Retirement Plan	25,759	29,372	11,448	43,683
Deferred Compensation Plan	57,648	105,027	48,758	113,917
<b>2017 change in fiduciary net position</b>	<b>\$225,989</b>	<b>\$603,632</b>	<b>\$226,513</b>	<b>\$603,108</b>
<b>2016 change in fiduciary net position</b>	<b>\$212,476</b>	<b>\$270,906</b>	<b>\$211,432</b>	<b>\$271,950</b>
<b>2015 change in fiduciary net position</b>	<b>\$208,613</b>	<b>(\$20,666)</b>	<b>\$214,063</b>	<b>(\$26,116)</b>
<b>2014 change in fiduciary net position</b>	<b>\$203,878</b>	<b>\$227,077</b>	<b>\$194,890</b>	<b>\$236,065</b>
<b>2013 change in fiduciary net position</b>	<b>\$190,844</b>	<b>\$529,858</b>	<b>\$187,310</b>	<b>\$533,392</b>
<b>2013–2016 change in fiduciary net position</b>	<b>\$1,041,800</b>	<b>\$1,610,807</b>	<b>\$1,034,208</b>	<b>\$1,618,399</b>

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
(*Dollars in Thousands*)

**Investment Highlights**

*Voluntary Investment Program, the Defined Contribution*

*Retirement Plan, and the Deferred Compensation Plan*

*Investment Options*

The current investment funds for the three plans are the PERAdvantage Capital Preservation Fund, PERAdvantage Fixed Income Fund, PERAdvantage Real Return Fund, PERAdvantage U.S. Large Cap Stock Fund, PERAdvantage International Stock Fund, PERAdvantage U.S. Small and Mid Cap Stock Fund, PERAdvantage Socially Responsible Investment (SRI) Fund, PERAdvantage Income Fund, PERAdvantage 2020 Fund, PERAdvantage 2025 Fund, PERAdvantage 2030 Fund, PERAdvantage 2035 Fund, PERAdvantage 2040 Fund, PERAdvantage 2045 Fund, PERAdvantage 2050 Fund, PERAdvantage 2055 Fund, PERAdvantage 2060 Fund, and TD Ameritrade Self-Directed Brokerage Account. Each PERAdvantage option is made up of one or more underlying portfolios.

*Investment Income*

For the year ended December 31, 2017, the Defined Contribution Pension and Deferred Compensation Trust Funds had investment income of \$603,632, an increase of \$332,726 from 2016. The increase was primarily due to positive investment returns arising from the domestic and international stock markets.

*Other Deductions*

For the year ended December 31, 2017, the Defined Contribution Pension and Deferred Compensation Trust Funds had other deductions of \$2,225, an increase of \$352 from 2016. The increase was primarily due to more members opting for professional asset management services and an increase in total assets under professional management.

*Defined Contribution Plan Eligibility*

SB 18-200 expands eligibility for new members hired on or after January 1, 2019, in the Local Government Division and to new members hired on or after January 1, 2019, who are classified college and university employees in the State Division. See Note 12 in the Notes to the Financial Statements for more information on SB 18-200.

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
*(Dollars in Thousands)*

**COMPARATIVE FINANCIAL STATEMENTS**

**Defined Benefit Pension Trust Funds**

The five defined benefit funds provide retirement, survivor, and disability benefits to the employees of affiliated State, School, Local Government, Judicial, and DPS employers. Benefits are funded by member and employer contributions and by earnings on investments.

**DEFINED BENEFIT PENSION TRUST FUNDS FIDUCIARY NET POSITION**

	December 31, 2017	December 31, 2016	% Change
<b>Assets</b>			
Cash and short-term investments	\$595,444	\$983,637	(39.5%)
Securities lending collateral	1,216,502	939,759	29.4%
Receivables	771,680	608,206	26.9%
Investments, at fair value	47,995,647	42,201,694	13.7%
Capital assets, net of accumulated depreciation	14,180	15,038	(5.7%)
<b>Total assets</b>	<b>50,593,453</b>	<b>44,748,334</b>	<b>13.1%</b>
<b>Liabilities</b>			
Investment settlements and other liabilities	700,566	412,858	69.7%
Securities lending obligations	1,215,467	939,863	29.3%
<b>Total liabilities</b>	<b>1,916,033</b>	<b>1,352,721</b>	<b>41.6%</b>
<b>Fiduciary net position</b>	<b>\$48,677,420</b>	<b>\$43,395,613</b>	<b>12.2%</b>

**DEFINED BENEFIT PENSION TRUST FUNDS CHANGES IN FIDUCIARY NET POSITION**

	For the Year Ended December 31, 2017	For the Year Ended December 31, 2016	% Change
<b>Additions</b>			
Employer contributions	\$1,535,666	\$1,434,771	7.0%
Member contributions	706,499	687,202	2.8%
Purchased service	67,454	58,152	16.0%
Employer disaffiliation	1,063	—	100.0%
Investment income	7,642,727	3,016,481	153.4%
Other	22,229	14,898	49.2%
<b>Total additions</b>	<b>9,975,638</b>	<b>5,211,504</b>	<b>91.4%</b>
<b>Deductions</b>			
Benefit payments	4,458,990	4,260,156	4.7%
Refunds	158,147	147,420	7.3%
Disability insurance premiums	6,231	6,442	(3.3%)
Administrative expenses	40,248	38,492	4.6%
Other	30,215	21,874	38.1%
<b>Total deductions</b>	<b>4,693,831</b>	<b>4,474,384</b>	<b>4.9%</b>
<b>Change in fiduciary net position</b>	<b>5,281,807</b>	<b>737,120</b>	<b>616.5%</b>
<b>Fiduciary net position</b>			
Beginning of year	43,395,613	42,658,493	1.7%
End of year	<b>\$48,677,420</b>	<b>\$43,395,613</b>	<b>12.2%</b>

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
(*Dollars in Thousands*)

## Other Postemployment Benefit Funds

The HCTF and the DPS HCTF provide a health care premium subsidy to participating PERA benefit recipients and their eligible beneficiaries who choose to enroll in one of the PERA health care plans. They are funded by amounts contributed by employers during an employee's working life based on a percentage of pay and by earnings on investments.

### OTHER POSTEMPLOYMENT BENEFIT FUNDS FIDUCIARY NET POSITION

	December 31, 2017	December 31, 2016	% Change
<b>Assets</b>			
Cash and short-term investments	\$3,933	\$6,702	(41.3%)
Securities lending collateral	8,036	6,402	25.5%
Receivables	33,989	38,058	(10.7%)
Investments, at fair value	317,024	287,521	10.3%
<b>Total assets</b>	<b>362,982</b>	<b>338,683</b>	<b>7.2%</b>
<b>Liabilities</b>			
Investment settlements and other liabilities	56,423	53,715	5.0%
Securities lending obligations	8,029	6,403	25.4%
<b>Total liabilities</b>	<b>64,452</b>	<b>60,118</b>	<b>7.2%</b>
<b>Fiduciary net position</b>	<b>\$298,530</b>	<b>\$278,565</b>	<b>7.2%</b>

### OTHER POSTEMPLOYMENT BENEFIT FUNDS CHANGES IN FIDUCIARY NET POSITION

	For the Year Ended December 31, 2017	For the Year Ended December 31, 2016	% Change
<b>Additions</b>			
Employer contributions	\$90,007	\$87,548	2.8%
Employer disaffiliation	96	—	100.0%
Retiree health care premiums	— <sup>1</sup>	144,759	(100.0%)
Investment income	48,295	20,256	138.4%
Other	10,002	9,464	5.7%
<b>Total additions</b>	<b>148,400</b>	<b>262,027</b>	<b>(43.4%)</b>
<b>Deductions</b>			
Benefit payments	108,359 <sup>1</sup>	256,410	(57.7%)
Administrative expenses	19,970	19,984	(0.1%)
Other	106	509	(79.2%)
<b>Total deductions</b>	<b>128,435</b>	<b>276,903</b>	<b>(53.6%)</b>
Change in fiduciary net position	19,965	(14,876)	234.2%
Fiduciary net position			
Beginning of year	278,565	293,441	(5.1%)
End of year	<b>\$298,530</b>	<b>\$278,565</b>	<b>7.2%</b>

<sup>1</sup> Classification of retiree health care premiums has been changed due to the implementation of GASB 74. See Note 2 in the Notes to the Financial Statements for additional information.

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
*(Dollars in Thousands)*

## Private Purpose Trust Fund

PERA offers an optional life insurance program where members can purchase varying amounts of coverage. The Life Insurance Reserve is an accumulation of dividends received in the past from the insurance company based upon plan experience. The investment income from the Life Insurance Reserve is used to pay the current administrative costs of the plan.

### LIFE INSURANCE RESERVE FIDUCIARY NET POSITION

	December 31, 2017	December 31, 2016	% Change
<b>Assets</b>			
Cash and short-term investments	\$255	\$439	(41.9%)
Securities lending collateral	521	419	24.3%
Receivables	272	215	26.5%
Investments, at fair value	20,567	18,836	9.2%
<b>Total assets</b>	<b>21,615</b>	<b>19,909</b>	<b>8.6%</b>
<b>Liabilities</b>			
Investment settlements and other liabilities	2,028	2,799	(27.5%)
Securities lending obligations	521	419	24.3%
<b>Total liabilities</b>	<b>2,549</b>	<b>3,218</b>	<b>(20.8%)</b>
<b>Fiduciary net position</b>	<b>\$19,066</b>	<b>\$16,691</b>	<b>14.2%</b>

### LIFE INSURANCE RESERVE CHANGES IN FIDUCIARY NET POSITION

	For the Year Ended December 31, 2017	For the Year Ended December 31, 2016	% Change
<b>Additions</b>			
Investment income	\$3,241	\$1,289	151.4%
<b>Total additions</b>	<b>3,241</b>	<b>1,289</b>	<b>151.4%</b>
<b>Deductions</b>			
Life insurance premiums	373	306	21.9%
Administrative expenses	493	1,032	(52.2%)
<b>Total deductions</b>	<b>866</b>	<b>1,338</b>	<b>(35.3%)</b>
Change in fiduciary net position	2,375	(49)	4,946.9%
<b>Fiduciary net position</b>			
Beginning of year	16,691	16,740	(0.3%)
End of year	<b>\$19,066</b>	<b>\$16,691</b>	<b>14.2%</b>

**MANAGEMENT'S DISCUSSION AND ANALYSIS (UNAUDITED)**  
(*Dollars in Thousands*)

## Defined Contribution Pension and Deferred Compensation Trust Funds

PERA administers two defined contribution pension trust funds and a deferred compensation trust fund. The Voluntary Investment Program and the Deferred Compensation Plan provide benefits at retirement to members of PERA who have voluntarily made contributions during their employment. The Defined Contribution Retirement Plan provides benefits at retirement to eligible employees who selected this plan. Eligibility applies to certain new employees of State agencies and departments, most community colleges, and the District Attorney within each Judicial District, and if authorized by the county and the District Attorney, the attorneys within each Judicial District. See Note 12 in the Notes to the Financial Statements for information on changes to future eligibility.

### DEFINED CONTRIBUTION PENSION AND DEFERRED COMPENSATION TRUST FUNDS FIDUCIARY NET POSITION

	December 31, 2017	December 31, 2016	% Change
<b>Assets</b>			
Cash and short-term investments	\$36,137	\$38,666	(6.5%)
Receivables	107,480	99,804	7.7%
Investments, at fair value	4,240,758	3,645,084	16.3%
<b>Total assets</b>	<b>4,384,375</b>	<b>3,783,554</b>	<b>15.9%</b>
<b>Liabilities</b>			
Investment settlements and other liabilities	32,516	34,803	(6.6%)
<b>Total liabilities</b>	<b>32,516</b>	<b>34,803</b>	<b>(6.6%)</b>
<b>Fiduciary net position</b>	<b>\$4,351,859</b>	<b>\$3,748,751</b>	<b>16.1%</b>

### DEFINED CONTRIBUTION PENSION AND DEFERRED COMPENSATION TRUST FUNDS CHANGES IN FIDUCIARY NET POSITION

	For the Year Ended December 31, 2017	For the Year Ended December 31, 2016	% Change
<b>Additions</b>			
Employer contributions	\$19,431	\$17,826	9.0%
Member contributions	203,802	191,892	6.2%
Investment income	603,632	270,906	122.8%
Other	2,756	2,758	(0.1%)
<b>Total additions</b>	<b>829,621</b>	<b>483,382</b>	<b>71.6%</b>
<b>Deductions</b>			
Refunds	219,679	205,056	7.1%
Administrative expenses	4,609	4,503	2.4%
Other	2,225	1,873	18.8%
<b>Total deductions</b>	<b>226,513</b>	<b>211,432</b>	<b>7.1%</b>
<b>Change in fiduciary net position</b>	<b>603,108</b>	<b>271,950</b>	<b>121.8%</b>
<b>Fiduciary net position</b>			
Beginning of year	3,748,751	3,476,801	7.8%
End of year	\$4,351,859	\$3,748,751	16.1%

## STATEMENTS OF FIDUCIARY NET POSITION

As of December 31, 2017, with Comparative Combined Totals for 2016  
(Dollars in Thousands)

	State Division Trust Fund	School Division Trust Fund	Local Government Division Trust Fund	Judicial Division Trust Fund	Denver Public Schools Division Trust Fund	Total Defined Benefit Pension Plans
<b>Assets</b>						
<b>Cash and short-term investments</b>						
Cash and short-term investments	\$185,983	\$310,429	\$52,439	\$4,023	\$42,570	\$595,444
Securities lending collateral	379,968	634,210	107,135	8,219	86,970	1,216,502
<b>Total cash and short-term investments</b>	<b>565,951</b>	<b>944,639</b>	<b>159,574</b>	<b>12,242</b>	<b>129,540</b>	<b>1,811,946</b>
<b>Receivables</b>						
Benefit	63,257	56,240	8,225	1,876	7,641	137,239
Interfund	131	218	37	3	30	419
Investment settlements and income	198,033	330,541	55,837	4,284	45,327	634,022
<b>Total receivables</b>	<b>261,421</b>	<b>386,999</b>	<b>64,099</b>	<b>6,163</b>	<b>52,998</b>	<b>771,680</b>
<b>Investments, at fair value</b>						
Fixed income	3,246,058	5,418,055	915,257	70,216	742,982	10,392,568
Global equity	8,710,336	14,538,573	2,455,961	188,413	1,993,686	27,886,969
Private equity	1,208,180	2,016,594	340,658	26,134	276,537	3,868,103
Real estate	1,308,733	2,184,429	369,010	28,309	299,552	4,190,033
Opportunity fund	517,859	864,367	146,015	11,202	118,531	1,657,974
Multi-asset class funds	—	—	—	—	—	—
Self-directed brokerage	—	—	—	—	—	—
<b>Total investments, at fair value</b>	<b>14,991,166</b>	<b>25,022,018</b>	<b>4,226,901</b>	<b>324,274</b>	<b>3,431,288</b>	<b>47,995,647</b>
<b>Capital assets, at cost, net of accumulated depreciation of \$27,724 and \$26,201 at December 31, 2017, and 2016, respectively</b>						
<b>Total assets</b>	<b>15,822,665</b>	<b>26,361,771</b>	<b>4,451,478</b>	<b>342,709</b>	<b>3,614,830</b>	<b>50,593,453</b>
<b>Liabilities</b>						
Investment settlements and other liabilities	219,319	365,370	61,348	4,635	49,894	700,566
Securities lending obligations	379,644	633,671	107,044	8,212	86,896	1,215,467
Interfund	—	—	—	—	—	—
<b>Total liabilities</b>	<b>598,963</b>	<b>999,041</b>	<b>168,392</b>	<b>12,847</b>	<b>136,790</b>	<b>1,916,033</b>
<b>Commitments and contingencies (Note 7)</b>						
Fiduciary net position restricted for pensions, and held in trust for deferred compensation benefits, other postemployment benefits, and private purpose trust fund participants	\$15,223,702	\$25,362,730	\$4,283,086	\$329,862	\$3,478,040	\$48,677,420
<b>Fiduciary Net Position Restricted for:</b>						
Defined benefit pension plan benefits	\$15,223,702	\$25,362,730	\$4,283,086	\$329,862	\$3,478,040	\$48,677,420
Defined contribution pension plan benefits	—	—	—	—	—	—
Deferred compensation plan benefits	—	—	—	—	—	—
Other postemployment benefits	—	—	—	—	—	—
Private purpose trust fund participants	—	—	—	—	—	—
Fiduciary net position restricted for pensions, and held in trust for deferred compensation benefits, other postemployment benefits, and private purpose trust fund participants	\$15,223,702	\$25,362,730	\$4,283,086	\$329,862	\$3,478,040	\$48,677,420

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

**STATEMENTS OF FIDUCIARY NET POSITION**

As of December 31, 2017, with Comparative Combined Totals for 2016  
(Dollars in Thousands)

Voluntary Investment Program	Defined Contribution Retirement Plan	Deferred Compensation Plan	Health Care Trust Fund	Denver Public Schools Health Care Trust Fund	Life Insurance Reserve	COMBINED TOTAL 2017	COMBINED TOTAL 2016
\$23,112	\$4,145	\$8,880	\$3,649	\$284	\$255	<b>\$635,769</b>	\$1,029,444
—	—	—	7,454	582	521	<b>1,225,059</b>	946,580
23,112	4,145	8,880	11,103	866	776	<b>1,860,828</b>	1,976,024
68,241	3,820	17,034	28,304	1,494	—	<b>256,132</b>	246,675
—	—	—	3	—	—	<b>422</b>	634
14,022	545	3,818	3,885	303	272	<b>656,867</b>	498,974
82,263	4,365	20,852	32,192	1,797	272	<b>913,421</b>	746,283
532,538	20,855	230,383	63,680	4,965	4,453	<b>11,249,442</b>	10,403,446
1,907,416	81,350	423,170	170,878	13,323	11,951	<b>30,495,057</b>	26,159,614
—	—	—	23,702	1,848	1,658	<b>3,895,311</b>	3,659,660
—	—	—	25,675	2,002	1,795	<b>4,219,505</b>	3,922,626
—	—	—	10,159	792	710	<b>1,669,635</b>	1,159,828
730,737	98,784	172,997	—	—	—	<b>1,002,518</b>	816,057
23,659	2,740	16,129	—	—	—	<b>42,528</b>	31,904
3,194,350	203,729	842,679	294,094	22,930	20,567	<b>52,573,996</b>	46,153,135
—	—	—	—	—	—	<b>14,180</b>	15,038
3,299,725	212,239	872,411	337,389	25,593	21,615	<b>55,362,425</b>	48,890,480
24,286	1,092	6,716	53,719	2,704	2,028	<b>791,111</b>	503,541
—	—	—	7,448	581	521	<b>1,224,017</b>	946,685
268	58	96	—	—	—	<b>422</b>	634
24,554	1,150	6,812	61,167	3,285	2,549	<b>2,015,550</b>	1,450,860
<b>\$3,275,171</b>	<b>\$211,089</b>	<b>\$865,599</b>	<b>\$276,222</b>	<b>\$22,308</b>	<b>\$19,066</b>	<b>\$53,346,875</b>	<b>\$47,439,620</b>
<b>\$—</b>	<b>\$—</b>	<b>\$—</b>	<b>\$—</b>	<b>\$—</b>	<b>\$—</b>	<b>\$48,677,420</b>	<b>\$43,395,613</b>
<b>3,275,171</b>	<b>211,089</b>	<b>865,599</b>	<b>276,222</b>	<b>22,308</b>	<b>19,066</b>	<b>3,486,260</b>	<b>2,997,069</b>
<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>865,599</b>	<b>751,682</b>
<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>298,530</b>	<b>278,565</b>
<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>19,066</b>	<b>16,691</b>
<b>\$3,275,171</b>	<b>\$211,089</b>	<b>\$865,599</b>	<b>\$276,222</b>	<b>\$22,308</b>	<b>\$19,066</b>	<b>\$53,346,875</b>	<b>\$47,439,620</b>

## STATEMENTS OF CHANGES IN FIDUCIARY NET POSITION

For the Year Ended December 31, 2017, with Comparative Combined Totals for 2016  
(Dollars in Thousands)

	State Division Trust Fund	School Division Trust Fund	Local Government Division Trust Fund	Judicial Division Trust Fund	Denver Public Schools Division Trust Fund	Total Defined Benefit Pension Plans
<b>Additions</b>						
<b>Contributions</b>						
Employers	\$563,977	\$857,740	\$78,291	\$8,080	\$27,578	\$1,535,666
Members	228,978	368,740	50,472	3,955	54,354	706,499
Purchased service	27,442	30,313	6,325	908	2,466	67,454
Retiree health care premiums	—	—	—	—	—	—
Employer disaffiliation	—	—	1,063	—	—	1,063
<b>Total contributions</b>	<b>820,397</b>	<b>1,256,793</b>	<b>136,151</b>	<b>12,943</b>	<b>84,398</b>	<b>2,310,682</b>
<b>Investment income</b>						
Net appreciation in fair value of investments	2,098,257	3,493,453	586,821	44,881	481,309	6,704,721
Interest	95,426	158,971	26,729	2,046	21,879	305,051
Dividends	164,365	273,819	46,040	3,525	37,685	525,434
Real estate, private equity, and opportunity fund net operating income	84,547	140,848	23,682	1,812	19,385	270,274
Less investment expense	(53,693)	(89,448)	(15,040)	(1,151)	(12,311)	(171,643)
<b>Net income from investing activities</b>	<b>2,388,902</b>	<b>3,977,643</b>	<b>668,232</b>	<b>51,113</b>	<b>547,947</b>	<b>7,633,837</b>
Securities lending income	3,034	5,054	850	65	696	9,699
Less securities lending expense	(253)	(422)	(71)	(5)	(58)	(809)
<b>Net income from securities lending</b>	<b>2,781</b>	<b>4,632</b>	<b>779</b>	<b>60</b>	<b>638</b>	<b>8,890</b>
<b>Net investment income</b>	<b>2,391,683</b>	<b>3,982,275</b>	<b>669,011</b>	<b>51,173</b>	<b>548,585</b>	<b>7,642,727</b>
<b>Other additions</b>	<b>15,860</b>	<b>106</b>	<b>14</b>	<b>2,379</b>	<b>3,870</b>	<b>22,229</b>
<b>Total additions</b>	<b>3,227,940</b>	<b>5,239,174</b>	<b>805,176</b>	<b>66,495</b>	<b>636,853</b>	<b>9,975,638</b>
<b>Deductions</b>						
<b>Benefits</b>						
Benefits paid to retirees/cobeneficiaries	1,539,439	2,318,392	271,880	24,926	269,582	4,424,219
Benefits paid to survivors	14,851	15,611	2,378	324	1,607	34,771
Benefits paid on behalf of health care participants	—	—	—	—	—	—
<b>Total benefits</b>	<b>1,554,290</b>	<b>2,334,003</b>	<b>274,258</b>	<b>25,250</b>	<b>271,189</b>	<b>4,458,990</b>
Refunds of contribution accounts, including match and interest	58,696	74,637	14,530	7	10,277	158,147
Disability and life insurance premiums	2,035	3,347	430	41	378	6,231
Administrative expenses	11,745	23,019	2,541	86	2,857	40,248
Other deductions	3,652	22,484	3,837	153	89	30,215
<b>Total deductions</b>	<b>1,630,418</b>	<b>2,457,490</b>	<b>295,596</b>	<b>25,537</b>	<b>284,790</b>	<b>4,693,831</b>
<b>Net increase in fiduciary net position</b>	<b>1,597,522</b>	<b>2,781,684</b>	<b>509,580</b>	<b>40,958</b>	<b>352,063</b>	<b>5,281,807</b>
Fiduciary net position restricted for pensions, and held in trust for deferred compensation benefits, other postemployment benefits, and private purpose trust fund participants						
Beginning of year	13,626,180	22,581,046	3,773,506	288,904	3,125,977	43,395,613
End of year	<b>\$15,223,702</b>	<b>\$25,362,730</b>	<b>\$4,283,086</b>	<b>\$329,862</b>	<b>\$3,478,040</b>	<b>\$48,677,420</b>

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

## STATEMENTS OF CHANGES IN FIDUCIARY NET POSITION

For the Year Ended December 31, 2017, with Comparative Combined Totals for 2016  
(Dollars in Thousands)

Voluntary Investment Program	Defined Contribution Retirement Plan	Deferred Compensation Plan	Health Care Trust Fund	Denver Public Schools Health Care Trust Fund	Life Insurance Reserve	COMBINED TOTAL	
						2017	2016
\$5,072 135,303	\$14,309 11,411	\$50 57,088	\$83,077 —	\$6,930 —	\$— —	\$1,645,104 910,301	\$1,540,145 879,094
—	—	—	—	—	—	67,454	58,152
—	—	—	—	—	—	—	144,759
—	—	—	96	—	—	1,159	—
140,375	25,720	57,138	83,173	6,930	—	2,624,018	2,622,150
433,937 8,543 30,848	28,136 349 1,142	95,965 4,046 6,111	39,472 1,795 3,091	2,896 133 229	2,843 129 223	7,307,970 320,046 567,078	2,356,172 313,428 539,284
— (4,095)	— (255)	— (1,095)	1,590 (1,010)	118 (75)	115 (73)	272,097 (178,246)	256,216 (166,345)
469,233	29,372	105,027	44,938	3,301	3,237	8,288,945	3,298,755
—	—	—	57	4	4	9,764	11,301
—	—	—	(5)	—	—	(814)	(1,124)
—	—	—	52	4	4	8,950	10,177
469,233 2,207	29,372 39	105,027 510	44,990 9,760	3,305 242	3,241 —	8,297,895 34,987	3,308,932 27,120
611,815	55,131	162,675	137,923	10,477	3,241	10,956,900	5,958,202
—	—	—	—	—	—	4,424,219	4,227,126
—	—	—	—	—	—	34,771	33,030
—	—	—	102,665	5,694	—	108,359	256,410
—	—	—	102,665	5,694	—	4,567,349	4,516,566
162,019	10,593	47,067	—	—	—	377,826	352,476
—	—	—	—	—	373	6,604	6,748
2,877	739	993	19,162	808	493	65,320	64,011
1,411	116	698	102	4	—	32,546	24,256
166,307	11,448	48,758	121,929	6,506	866	5,049,645	4,964,057
445,508	43,683	113,917	15,994	3,971	2,375	5,907,255	994,145
2,829,663	167,406	751,682	260,228	18,337	16,691	47,439,620	46,445,475
<b>\$3,275,171</b>	<b>\$211,089</b>	<b>\$865,599</b>	<b>\$276,222</b>	<b>\$22,308</b>	<b>\$19,066</b>	<b>\$53,346,875</b>	<b>\$47,439,620</b>

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

## Note 1—Plan Description

## Organization

Colorado PERA was established in 1931. The statute relating to PERA is Title 24, Article 51 of the Colorado Revised Statutes (C.R.S.). PERA administers the following plans:

Plan Name	Type of Plan
<b>Defined Benefit Pension Plans</b>	
<i>(Division Trust Funds)</i>	
State Division Trust Fund	Cost-sharing multiple-employer
School Division Trust Fund	Cost-sharing multiple-employer
Local Government Division Trust Fund	Cost-sharing multiple-employer
Judicial Division Trust Fund	Cost-sharing multiple-employer
Denver Public Schools (DPS) Division Trust Fund	Single-employer
<b>Defined Benefit Other Postemployment Benefit Plans</b>	
<i>(Health Care Trust Funds)</i>	
Health Care Trust Fund (HCTF)	Cost-sharing multiple-employer
Denver Public Schools Health Care Trust Fund (DPS HCTF)	Single-employer <sup>1</sup>
<b>Defined Contribution Plans</b>	
Voluntary Investment Program	Multiple-employer
Defined Contribution Retirement Plan	Multiple-employer
<b>Deferred Compensation Plan</b>	
Deferred Compensation Plan	Multiple-employer
<b>Private Purpose Trust Fund</b>	
Life Insurance Reserve	Multiple-employer

<sup>1</sup> New guidance under GASB Statement No. 74 classifies a primary government and its component units as one employer. As a result, the type of plan was changed from cost-sharing multiple-employer to single-employer due to the implementation of GASB 74. For all other purposes, the definition of an employer is governed by Title 54, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

## Membership—Division Trust Funds-Defined Benefit Pension Plans

Benefit recipients and members of PERA consisted of the following as of December 31, 2017, with comparative combined totals for 2016:

	State Division	School Division	Local Government Division	Judicial Division	DPS Division	As of December 31, 2017 <sup>1</sup>	As of December 31, 2016 <sup>1</sup>
						2017	2016
Retirees and beneficiaries	39,364	64,327	7,369	376	7,044	118,480	114,609
Terminated employees entitled to benefits but not yet receiving benefits	6,788	16,439	2,741	9	1,596	27,573	26,283
Inactive members	75,350	120,037	23,937	5	10,919	230,248	218,786
Active members							
Vested general employees	29,982	66,939	6,020	262	7,052	110,255	110,174
Vested State Troopers	676	—	—	—	—	676	653
Non-vested general employees	24,832	56,051	6,750	70	8,939	96,642	95,681
Non-vested State Troopers	196	—	—	—	—	196	183
Total active members	55,686	122,990	12,770	332	15,991	207,769	206,691
<b>Total</b>	<b>177,188</b>	<b>323,793</b>	<b>46,817</b>	<b>722</b>	<b>35,550</b>	<b>584,070</b>	<b>566,369</b>

Responsibility for the organization and administration of these plans rests with the PERA Board of Trustees (Board). The Board is composed of the following 16 Trustees:

- Nine members elected by members from their respective Divisions to serve on the Board for four-year terms; four from the School Division, three from the State Division, one from the Local Government Division, and one from the Judicial Division.
- Two retirees elected by retirees to serve on the Board for four-year terms.
- Three Trustees appointed by the Governor and confirmed by the State Senate.
- The State Treasurer.
- One ex officio (non-voting) member or retiree elected by members and retirees of the DPS Division to serve on the Board for a four-year term.

Listed below is the number of active participating employers for the five Division Trust Funds. Guidance under the Governmental Accounting Standards Board (GASB) Statement No. 67 classifies a primary government and its component units as one employer.

Division	As of December 31, 2017 <sup>1</sup>
State	32
School	234
Local Government	140
Judicial	2
DPS	1
<b>Total employers</b>	<b>409</b>

<sup>1</sup> This employer count is presented for purposes of complying with GASB 67 only.

**NOTES TO THE FINANCIAL STATEMENTS***(Dollars in Thousands)***Membership—Voluntary Investment Program and Defined Contribution Retirement Plan**

See Note 8.

**Membership—Deferred Compensation Plan**

See Note 8.

**Membership—Health Care Trust Funds**

See Note 9.

**Benefit Provisions—Division Trust Funds**

Plan benefits are specified in Title 24, Article 51 of the C.R.S. and applicable provisions of the federal Internal Revenue Code (IRC). Colorado State law provisions may be amended from time to time by the Colorado General Assembly.

The Colorado General Assembly passed significant pension reform through Senate Bill (SB) 18-200: *Concerning Modifications To the Public Employees' Retirement Association Hybrid Defined Benefit Plan Necessary To Eliminate with a High Probability the Unfunded Liability of the Plan Within the Next Thirty Years*. The bill was signed into law by Governor Hickenlooper on June 4, 2018. SB 18-200 makes changes to certain benefit provisions of the plans administered by PERA. As these changes to benefit provisions were not in effect at the end of 2017, a detailed summary of the changes required by SB 18-200 have been disclosed as a subsequent event in Note 12 on pages 99–100.

**Plan Eligibility**

All employees of PERA employers who work in a position eligible for PERA membership must be covered by PERA, except for employees who are hired into a position that makes them eligible for a choice between enrolling in the PERA Defined Benefit Plan or the PERA Defined Contribution Retirement Plan (PERAChoice).

PERAChoice eligibility applies to certain new employees of State agencies and departments, most community colleges, and the District Attorney within each Judicial District. If authorized by the county and the District Attorney, the attorneys within that Judicial District may have access to PERAChoice. If an eligible employee does not make a choice of which plan he or she would like to participate in within 60 days of the starting date of employment, the employee is automatically enrolled in the PERA Defined Benefit Plan. Between month 13 and month 72 of participation in their original plan, employees may make a one-time, irrevocable election to switch to the other plan. After the 72nd month of participation, this option to switch plan participation no longer exists.

Some positions within PERA-affiliated employers are not eligible for PERA membership and may be covered by another separate retirement program.

**Benefit Provisions**

The Division Trust Funds have various benefit provisions depending upon the member's date of hire or upon the member's date of retirement. The differences in plan benefit provisions are detailed in the following pages in this note as of December 31, 2017. On January 1, 2010, the Denver Public Schools Retirement System (DPSRS) merged with PERA. On that date, all liabilities and assets of DPSRS transferred to and became liabilities and assets of the DPS Division of PERA. The benefit provisions of DPSRS were incorporated into PERA as the DPS benefit structure. The benefit provisions of existing members of PERA on the merger date and all new hires post-merger date are identified as the PERA benefit structure.

**Member Accounts**

During 2017, members contributed 8 percent of their PERA-includable salary to their member accounts; State Troopers and Colorado Bureau of Investigation (CBI) agents contributed 10 percent.

State law authorizes the Board to determine annually the interest to be credited to member accounts, but in no event may the Board specify a rate that exceeds 5 percent. Effective January 1, 2009, the annual rate was set at 3 percent and has been reconfirmed each November since adoption.

**Service Credit**

Members earn service credit for each month of work performed as an employee of a PERA-affiliated employer for which salary is earned for such services.

A full month of service credit is earned for each month of work where the salary earned by the employee is equal to or greater than 80 multiplied by the federal minimum hourly wage in effect for that month. Earned salary which is less than this amount results in a partial month of service credit.

Eligible members may purchase additional service credit based upon (1) other employment that is not covered by PERA or another retirement program or (2) the service credit forfeited as the result of a withdrawn PERA member account. Such service credit purchases are subject to limits in State and federal law. The amounts used to purchase service credit are credited to the member's account and may include tax-paid funds and eligible rollovers of tax-deferred funds. Such amounts are eligible for an interest accrual, but no match if the member account is refunded in a lump-sum distribution.

**Refund or Distribution Provisions**

Upon termination of employment with all PERA employers, members have the following options concerning their member account:

- Leave the account invested in the Division Trust Funds for a future distribution or retirement benefit; however, a distribution must begin by April 1 following the year in which the member reaches age 70½.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

- Request a distribution of the member account plus an applicable match. Such a distribution cancels the refunding member's service credit and any benefit entitlements associated with the account. The distribution may be taken as cash with the resulting tax consequences or as a rollover to an eligible qualified plan.

**Matching Amounts**

Members under the PERA benefit structure who withdraw their accounts on or after reaching retirement eligibility or age 65 receive their member account plus a 100 percent match on eligible amounts. For members under the PERA benefit structure who withdraw their accounts before reaching retirement eligibility, all contributions received prior to January 1, 2011, are eligible for the 50 percent match regardless of how much service credit the member has earned. However, contributions received after January 1, 2011, will not be eligible for the 50 percent match until the member earns five years of service credit.

Members under the DPS benefit structure who terminated employment on or after January 1, 2001, and withdraw their accounts on or after reaching retirement eligibility receive their member account plus a 100 percent match on eligible amounts. Members under the DPS benefit structure who withdraw their accounts before reaching retirement eligibility receive a refund of their member accounts, but do not receive any match.

Members reaching retirement eligibility who choose to take a retirement benefit are entitled to a minimum monthly benefit which incorporates the member's account plus a 100 percent match on eligible amounts, annuitized into a monthly benefit using PERA's expected rate of return.

**Highest Average Salary**

Plan benefits, described below, generally are calculated as a percentage of the member's three-year Highest Average Salary (HAS). The following conditions apply to the HAS calculation:

- For all members of the PERA benefit structure, except judges, who were eligible to retire as of January 1, 2011, who were hired before January 1, 2007, and who retire on or after January 1, 2009:*

HAS is determined by the highest annual salaries associated with four periods of 12 consecutive months of service credit. The four 12-month periods selected do not have to be consecutive nor do they have to include the last four years of membership. The lowest of the four periods becomes a base year used as a starting point for a 15 percent cap on annual salary increases for the next three periods used to determine the applicable HAS. This salary cap applies regardless of when the annual salaries used in the HAS calculation occurred.

- For all members of the PERA benefit structure, except judges, who were not eligible to retire as of January 1, 2011, or members of the PERA benefit structure who are hired on or after January 1, 2007, regardless of the date of retirement:* HAS is determined by the highest annual salaries associated with four periods of 12 consecutive months of service credit. The four 12-month periods selected do not have to be consecutive nor do they have to include the last four years of membership. The lowest of the four periods becomes a base year used as a starting point for an 8 percent cap on annual salary increases for the next three periods used to determine the applicable HAS. This salary cap applies regardless of when the annual salaries used in the HAS calculation occurred.
- For members of the Judicial Division Trust Fund (judges) regardless of the date of hire or the date of retirement:* HAS is one-twelfth of the highest annual salary associated with one period of 12 consecutive months of service credit.
- For members of the DPS benefit structure who are eligible to retire as of January 1, 2011:* HAS is the average monthly salary of the 36 months of earned service having the highest salaries.
- For members of the DPS benefit structure who are not eligible to retire as of January 1, 2011:* HAS is determined by the highest annual salaries associated with four periods of 12 consecutive months of service credit. The four 12-month periods selected do not have to be consecutive nor do they have to include the last four years of membership. The lowest of the four periods becomes a base year used as a starting point for an 8 percent cap on annual salary increases for the next three periods used to determine the applicable HAS. This salary cap applies regardless of when the annual salaries used in the HAS calculation occurred.

**Service Retirement Benefits—PERA Benefit Structure**

Upon termination of PERA-covered employment and reaching eligibility for service retirement benefits, a member may begin receipt of benefits as shown below and on the next page.

**Service Retirement Eligibility for Members  
(Other Than State Troopers) Hired Before July 1, 2005,  
With Five Years of Service Credit on January 1, 2011**

Age Requirement (in years)	Service Credit Requirement (in years)
50	30
55	Age and Service = 80 or more
60	20
65	5
65	Less than 5 but 60 payroll postings <sup>1</sup>

<sup>1</sup> Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

**Service Retirement Eligibility for Members  
(Other Than State Troopers) Hired On or After July 1, 2005,  
But Before January 1, 2007,  
With Five Years of Service Credit on January 1, 2011**

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
55	Age and Service = 80 or more
60	20
65	5
65	Less than 5 but 60 payroll postings <sup>1</sup>

<sup>1</sup> Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

**Service Retirement Eligibility for Members  
(Other Than State Troopers) Hired on or After January 1, 2007,  
But Before January 1, 2011,  
With Five Years of Service Credit on January 1, 2011**

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
55	30
55	Age and Service = 85 or more
60	25
65	5
65	Less than 5 but 60 payroll postings <sup>1</sup>

<sup>1</sup> Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

**Service Retirement Eligibility for Members  
(Other Than State Troopers) Hired Before January 1, 2011,  
With Less Than Five Years of Service Credit on January 1, 2011**

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
55	30
55	Age and Service = 85 or more
60	25
65	5
65	Less than 5 but 60 payroll postings <sup>1</sup>

<sup>1</sup> Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

**Service Retirement Eligibility for Members  
(Other Than State Troopers) Hired on or After January 1, 2011,  
But Before January 1, 2017, or Hired on or After January 1, 2017,  
Whose Most Recent 10 Years of Service are in the School or DPS Divisions**

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
58	30
58	Age and Service = 88 or more
60	28
65	5
65	Less than 5 but 60 payroll postings <sup>1</sup>

<sup>1</sup> Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

**Service Retirement Eligibility for Members  
(Other Than State Troopers) Hired on or After January 1, 2017,  
Whose Most Recent 10 Years of Service are not in the School or DPS Divisions**

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
60	30
60	Age and Service = 90 or more
65	5
65	Less than 5 but 60 payroll postings <sup>1</sup>

<sup>1</sup> Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

**Service Retirement Eligibility for State Troopers**

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	30
50	25
55	20
60	Age and Service = 80 or more
65	5
65	Less than 5 but 60 payroll postings <sup>1</sup>

<sup>1</sup> Retiring members who are age 65 and have less than five years of service credit and less than 60 payroll postings will receive a service retirement benefit under the Money Purchase Formula only.

The service retirement benefit for all retiring members is the greater of the Defined Benefit Formula or the Money Purchase Formula as explained below:

• **Defined Benefit Formula**

HAS multiplied by 2.5 percent and then multiplied by years of service credit. The service retirement benefit is limited to 100 percent of HAS.

• **Money Purchase Formula**

Values the retiring member's account plus a 100 percent match on eligible amounts as of the member's retirement date. This amount is then annuitized into a monthly benefit using the retiring member's life expectancy, expected rates of return, and other actuarial factors.

In all cases, a service retirement benefit cannot exceed the maximum benefit amount allowed by federal law.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

**Reduced Service Retirement—PERA Benefit Structure**

Reduced service retirement benefits are calculated in the same manner as a service retirement benefit with a reduction for each month prior to the member's first eligible date for a service retirement. The benefit calculation reduction factors applicable to members who were eligible to retire as of January 1, 2011, are specified in C.R.S. § 24-51-605.

**Reduced Service Retirement Eligibility**

Age Requirement (in years)	Service Credit Requirement (in years)
50	25
50      —(State Troopers only)—	20
55	20
60	5

For members not eligible to retire as of January 1, 2011, the early retirement reduction factors used to determine the reduced service retirement benefit reflect an actuarial equivalent reduction.

**Service Retirement and Reduced Service Retirement Benefits—DPS Benefit Structure**

Members in the DPS benefit structure are eligible to receive a monthly retirement benefit when they meet the age and service requirements listed below. If the member has less than five years of service credit under the DPS benefit structure, the member does not have the option to apply for a benefit and the member is only eligible for a refund of his or her account.

If the member has five years of service credit as of January 1, 2011, the following age and service requirements apply:

**Service Retirement Benefit**

Age Requirement (in years)	Service Credit Requirement (in years)
50	30
55	25 <sup>1</sup>
65	5

<sup>1</sup>15 years must be earned service credit

**Reduced Service Retirement Benefit**

Age Requirement (in years)	Service Credit Requirement (in years)
Less than 50	30
Less than 55	25
55	15

If the member does not have five years of service credit as of January 1, 2011, the following age and service requirements apply:

**Service Retirement Benefit**

Age Requirement (in years)	Service Credit Requirement (in years)
Any Age	35
55	30 <sup>1</sup>
55	Age and Service = 85 or more <sup>1</sup>
60	25
65	5

<sup>1</sup> 20 years must be earned service credit

**Reduced Service Retirement Benefit**

Age Requirement (in years)	Service Credit Requirement (in years)
50	25
55	20
60	5

The service retirement benefit for all retiring members is the greater of the two calculations as explained below:

- HAS multiplied by 2.5 percent and then multiplied by years of service credit.
- \$15 (actual dollars) times the first 10 years of service credit plus \$20 (actual dollars) times service credit over 10 years plus a monthly amount equal to the annuitized member balance (which may include matching dollars if eligible) using the retiring member's life expectancy, expected rates of return, and other actuarial factors.

In all cases, a service retirement benefit is limited to 100 percent of HAS and also cannot exceed the maximum benefit amount allowed by federal law.

**Disability Program**

Eligible active members, other than judges, with five or more years of earned service credit are covered by the PERA Disability Program. Judges are immediately covered under the disability program. The earned service credit requirement may be waived for State Troopers who become disabled as the result of injuries in the line of duty.

Medical determinations for the disability program are outsourced to a separate disability program administrator, Unum. Applicants found to be disabled receive payments under one of two tiers:

- **Short-Term Disability:** Disability applicants are eligible for short-term disability payments if they are found to be mentally or physically incapacitated from performance of essential job duties after reasonable accommodation, and who are medically unable to earn at least 75 percent of their pre-disability earnings from any job, but who are not totally and permanently incapacitated from regular and substantial gainful employment. PERA's short-term disability program is an insurance product with PERA's disability program administrator, and payments are made directly to the individual from PERA's disability program administrator. The maximum income replacement is 60 percent of the member's pre-disability PERA salary for up to 22 months.

- **Disability Retirement Benefits:** Disability applicants who are found to be totally and permanently mentally or physically incapacitated from regular and substantial gainful employment are eligible for disability retirement benefits. These benefits are paid by PERA for as long as the disability retiree remains disabled. The benefit is calculated as a percentage of the disabled member's HAS using accrued, and in some cases, projected service credit.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

**Benefit Options**

Service retirees in the PERA benefit structure and all members in either the DPS benefit structure or the PERA benefit structure who meet the requirements of a disability retirement may elect to receive their retirement or disability retirement benefits in the form of a single-life benefit payable for the retiree's lifetime only or one of two joint-life benefits payable for the lifetime of the retiree with a continuing benefit paid upon the retiree's death to the retiree's cobeneficiary. Such option designations may only be changed under limited conditions specified in State law. The options are as follows:

- *Option 1:* A single-life benefit payable for the life of the retiree and, upon the death of the retiree, no further monthly benefits are payable.
- *Option 2:* A joint-life benefit payable for the life of the retiree and, upon the death of the retiree, one-half of the benefit becomes payable to the cobeneficiary of the retiree for life. Upon the death of the cobeneficiary prior to the death of the retiree, an Option 1 benefit becomes payable to the retiree.
- *Option 3:* A joint-life benefit payable for the life of the retiree and, upon the death of the retiree, the same benefit becomes payable to the cobeneficiary of the retiree for life. Upon the death of the cobeneficiary prior to the death of the retiree, an Option 1 benefit becomes payable to the retiree.

Options 2 and 3 are the actuarial equivalent of Option 1.

Service retirees in the DPS benefit structure have the following options:

- *Option A:* A single-life benefit payable for the life of the retiree and, upon the death of the retiree, no further monthly benefits are payable.
- *Option B:* A single-life benefit, reduced from an Option A benefit to provide benefits to designated beneficiaries for a fixed period of time after retirement. As part of the retirement calculation, a guaranteed payment period is determined and if the retiree dies before the guaranteed period ends, the benefit will continue to the Option B beneficiary(ies) for the remainder of the guaranteed period. If the death of the retiree occurs after the guaranteed period, the benefit ends.
- *Option P2:* A joint-life benefit payable for the life of the retiree and, upon the death of the retiree, one-half of the benefit becomes payable to the cobeneficiary of the retiree for life. Upon the death of the cobeneficiary prior to the death of the retiree, an Option A benefit becomes payable to the retiree.
- *Option P3:* A joint-life benefit payable for the life of the retiree and, upon the death of the retiree, the same benefit becomes payable to the cobeneficiary of the retiree for life. Upon the death of the cobeneficiary prior to the death of the retiree, an Option A benefit becomes payable to the retiree.

Options B, P2, and P3 are the actuarial equivalent of Option A.

**Survivor Benefits Program—PERA Benefit Structure**

Members who have at least one year of earned service credit are covered by the PERA survivor benefits program. This one-year requirement is waived if a member's death is job-incurred.

In the event of the covered member's death, monthly survivor benefits may be paid to the qualified survivors of the deceased. Qualified survivors generally include minor children, a surviving spouse, dependent parents, or a cobeneficiary (for deceased members who were eligible for retirement at the time of death).

Monthly benefits are specified in statute and vary based upon the deceased's HAS, years of service credit, the qualified survivor to whom benefits are to be paid, and the number of qualified survivors receiving benefits.

If at the time of death, a member has less than one year of earned service credit or with no qualified survivors, the deceased's named beneficiary or the estate receives a lump-sum payment of the deceased member's account plus a 100 percent match on eligible amounts.

**Survivor Benefits Program—DPS Benefit Structure**

Active members who have at least five years of continuous service under the DPS benefit structure prior to the date of death and DPS disability retirements (prior to age 65) are covered by the survivor benefits program applicable to the DPS benefit structure.

In the event of the covered member's death, the member's qualified survivors are eligible for survivor benefits as long as the named beneficiary(ies) waive their right to receive a refund of the member's contributions. Qualified survivors generally include minor children, a surviving spouse, or dependent parents.

Monthly benefits are specified in statute and vary based upon the deceased's HAS, years of service credit, the qualified survivor to whom benefits are to be paid, and the number of qualified survivors receiving benefits.

If at the time of death, a member has not met the eligibility requirements for the DPS benefit structure survivor benefits program that are specified in statute, the member's named beneficiary(ies) will receive a lump-sum payment of the deceased member's account without a match.

**Annual Increases**

On an annual basis, eligible benefit recipients receive post-retirement, cost-of-living adjustments called annual increases (AI). The AI eligibility and amounts are determined by the date the retiree or deceased member began membership in PERA.

The AI provisions are explained below.

- For benefit recipients of the PERA benefit structure who began membership before January 1, 2007, and whose benefit is paid based on a retirement date prior to January 1, 2011, and benefit recipients of the DPS benefit structure whose benefit is paid based on a retirement date prior to January 1, 2011:

- *Payment Month:* The AI is paid in July.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

- **Eligibility:** The benefit recipient has been receiving benefits for at least seven months immediately preceding the July in which the AI is to be paid.
- **AI Amount:** The AI is 2 percent per year unless PERA has a negative investment year in which case, for the next three years, the AI becomes the lesser of 2 percent or the average of the monthly Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) amounts for the prior calendar year. The amount of the first AI will be prorated from the month of retirement to the first AI payment date.
- For benefit recipients of the PERA benefit structure who began membership before January 1, 2007, and whose benefit is paid based on a retirement date on or after January 1, 2011, and benefit recipients of the DPS benefit structure whose benefit is paid based on a retirement date on or after January 1, 2011, the following eligibility criteria is required:
  - **Payment Month:** The AI is paid in July.
  - **Eligibility:** For full service retirees, disability retirees, and reduced service retirees who are eligible to receive a benefit on January 1, 2011, and survivor benefit recipients, the benefit recipient has received benefit payments for the 12 months prior to the July in which the AI is to be paid.

For reduced service retirees who are not eligible to retire as of January 1, 2011: A reduced service retiree is eligible to receive the AI in July of the year in which both of the following conditions are met: (1) the retiree has received benefit payments for 12 months prior to the July in which the AI is to be paid and (2) as of January 1 of the year the AI is paid, the retiree has either reached age 60 or the age and service Rule for unreduced service retirement applicable to the retiree's Plan.

- **AI Amount:** The AI is 2 percent per year unless PERA has a negative investment year in which case, for the next three years, the AI becomes the lesser of 2 percent or the average of the monthly CPI-W amounts for the prior calendar year.
- For benefit recipients of the PERA benefit structure who began membership on and after January 1, 2007:
  - **Payment Month:** The AI is paid in July.
  - **Eligibility:** For full service retirees, disability retirees, and survivor benefit recipients: The benefit recipient becomes eligible in July of the calendar year following the calendar year in which the benefit recipient has received 12 months of benefit payments.

A reduced service retiree is eligible to receive the AI in July of the year in which both of the following conditions are met: (1) as of January 1 of the year the AI is to be paid, the retiree has received 12 months of benefit payments in the prior calendar year and (2) as of January 1 of the year the AI is paid, the retiree has either reached age 60 or the age and service Rule for unreduced service retirement applicable to the retiree's Plan.

- **AI Amount:** The AI is the lesser of 2 percent or the average of the monthly CPI-W amounts for the prior calendar year. In no case can the sum of AIs paid to a Division's benefit recipients exceed 10 percent of the divisional Annual Increase Reserve (AIR).

**Changes to the 2 percent AI Cap:** If PERA's overall funded status is at or above 103 percent, the AI cap of 2 percent will increase by 0.25 percent per year. If after PERA's overall funded status reaches 103 percent and it subsequently drops below 90 percent, the AI cap will decrease by 0.25 percent per year, but will never drop below 2 percent.

***Indexing of Benefits***

Inactive members, who meet the following conditions, have their benefit amounts increased by the applicable AI granted by PERA from their date of membership termination to their effective date of retirement.

- Covered by the plan as of December 31, 2006;
- Eligible to retire as of January 1, 2011;
- Have 25 or more years of service credit; and
- Have not started receiving monthly benefits.

***Suspending Benefits***

If a retiree suspends retirement on or after January 1, 2011, returns to membership, and earns at least one year of service credit, a separate benefit will be earned. In this case, the retiree may opt to refund the contributions remitted with interest and an applicable match or receive a second, separate benefit. The original benefit will not be recalculated. Individuals who suspended retirement prior to January 1, 2011, are eligible to have their original benefit recalculated upon re-retirement.

If less than one year of service credit is earned during the return to membership, the retiree will be required to refund the contributions remitted with interest and an applicable match before the original benefit will resume.

***Working After Retirement Without Suspending Benefits***

- **Retiree Contributions:** With a few statutory exceptions, employers are required to remit employer contributions, Amortization Equalization Disbursement (AED), and Supplemental Amortization Equalization Disbursement (SAED) on salary earned by retirees who work for them, but do not suspend retirement and return to membership. Beginning January 1, 2011, working retirees are required to make contributions at a percentage equal to the member contribution rate. Under C.R.S. § 24-51-101(53), working retiree contributions are nonrefundable and are not deposited into member accounts. PERA deposits these contributions into the employer reserve.
- **Limits on Working After Retirement:** With a few statutory exceptions, retirees may work up to 110 days/720 hours per calendar year for a PERA employer with no reduction in benefits.

**NOTES TO THE FINANCIAL STATEMENTS***(Dollars in Thousands)*

In addition, each employer assigned to the School Division Trust Fund, DPS Division Trust Fund, and each Higher Education Institution assigned to the State Division Trust Fund may designate on a calendar year basis, up to 10 service retirees who may work up to 30 additional days for a total of 140 days/916 hours in a calendar year. The employer contributions, AED, SAED, and working retiree contributions are due on all salary earned.

- **PERA Retirees Employed By Rural School Districts:** Through June 30, 2023, a service retiree who is a teacher, a school bus driver, or a school food services cook and who is hired by an employer in the School Division that satisfies the criteria below may receive salary without a reduction in retirement benefits for any length of employment in a calendar year if the service retiree has not worked for any PERA employer during the month of the effective date of retirement.
  - The employer that hires the service retiree is a rural school district as determined by the Department of Education based on certain criteria and the school district enrolls 6,500 students or fewer in kindergarten through 12th grade;
  - The school district hires the service retiree for the purpose of providing classroom instruction or school bus transportation to students enrolled by the district or for the purpose of being a school food services cook; and
  - The school district determines that there is a critical shortage of qualified teachers, school bus drivers, or school food services cooks, as applicable, and that the service retiree has specific experience, skills, or qualifications that would benefit the district.

The following provisions concerning employment for the service retiree also apply:

- Is not required to resume PERA membership upon termination of employment.
- Will not have a benefit recalculation reflecting additional service credit or any increase in HAS.
- Will not receive a PERA health care premium subsidy during employment.
- May not be employed by the school district from which he or she retired until two years after retirement if he or she retired without a full service retirement benefit.
- May not receive salary without reduction in benefits and without limitation in a calendar year for more than six consecutive years.

In addition, the employer that hires the service retiree is required to provide full payment of all PERA employer contributions, disbursements, and working retiree contributions.

**Benefit Provisions—Voluntary Investment Program and Defined Contribution Retirement Plan**

See Note 8.

**Benefit Provisions—Deferred Compensation Plan**

See Note 8.

**Benefit Provisions—Health Care Trust Funds**

See Note 9.

**Life Insurance Reserve**

PERA offers an optional life insurance program where members can purchase varying amounts of coverage. The Life Insurance Reserve is an accumulation of dividends received in the past from the insurance company based upon plan experience. The investment income from the Life Insurance Reserve is used to pay the current administrative costs of the plan.

**Termination of PERA**

If PERA is partially or fully terminated for any reason, C.R.S. § 24-51-217 provides that the rights of all members and benefit recipients to all benefits on the date of termination, to the extent then funded, will become nonforfeitable.

**Note 2—Summary of Significant Accounting Policies****Reporting Entity**

The Board oversees all funds included in the financial statements of PERA and has the ability to influence operations. The Board's responsibilities include designation of management, membership eligibility, investment of funds, and accountability for fiscal matters.

PERA is an instrumentality of the State of Colorado (State); it is not an agency of State government. In addition, it is not subject to administrative direction by any department, commission, board, bureau, or agency of the State. Accordingly, PERA's financial statements are not included in the financial statements of any other organization.

**Basis of Presentation**

The accompanying financial statements are prepared in accordance with accounting principles generally accepted in the United States of America that apply to governmental accounting for fiduciary funds.

PERA implemented the provisions of GASB Statement No. 74, "Financial Reporting for Post-employment Benefit Plans Other Than Pension Plans" for the year ended December 31, 2017. GASB 74 replaces the requirements of Statement No. 43, "Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans." This new Other Postemployment Benefit (OPEB) reporting standard parallels the pension standard issued in 2012—GASB Statement No. 67, "Financial Reporting for Pension Plans." GASB 74 requires OPEB

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

plans to disclose information about the components of the net OPEB liability (NOL) and related ratios, including the OPEB plan's fiduciary net position (FNP) to total OPEB liability, as well as significant assumptions and other inputs used to measure the total OPEB liability (TOL). Information is also required to be disclosed about the sensitivity of the NOL to changes in the discount rate, and when applicable, changes to the healthcare cost trend rate. While no longer included in the schedules of Required Supplementary Information (RSI), information pertaining to the funded status of the HCTF and DPS HCTF are presented in the Actuarial Section of this CAFR.

PERA implemented the provisions of GASB Statement No. 85, "Omnibus 2017," for the year ended December 31, 2017. GASB 85 addresses several issues identified during the implementation and application of certain GASB pronouncements. OPEB related issues applicable to PERA's Health Care Trust Funds addressed in this new standard include the presentation of payroll-related measures in the schedules of RSI by OPEB plans.

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

#### ***Classification of Retiree Health Care Premiums***

Due to the implementation of GASB 74, retiree health care premiums received in 2017 reduce the amount of benefit payments reported in the Deductions section of the Statements of Changes in Fiduciary Net Position for the HCTF and DPS HCTF. Previously, retiree health care premiums related to HCTF and DPS HCTF were reported in the Additions section of the Statement of Changes in Fiduciary Net Position. This change in classification has no effect on the measurement of the retiree health care received or the individual funds' FNP.

#### **Basis of Accounting**

The accompanying financial statements for the defined benefit and defined contribution pension trust funds (DB and DC trust funds), the deferred compensation trust fund, the private purpose trust fund, the HCTF, and the DPS HCTF are prepared using the economic resources measurement focus and the accrual basis of accounting. The preparation of financial statements in conformity with accounting principles generally accepted in the United States of America requires PERA to use estimates and assumptions that affect the accompanying financial statements and disclosures. Actual results could differ from those estimates. Member and employer contributions are recognized as revenues in the period

in which the compensation becomes payable to the member and the employer is statutorily committed to pay these contributions to the DB and DC trust funds, the deferred compensation trust fund, the HCTF, and the DPS HCTF. Benefits and refunds are recognized when due and payable.

#### **Fund Accounting**

The financial activities of the State Division Trust Fund, the School Division Trust Fund, the Local Government Division Trust Fund, the Judicial Division Trust Fund, the DPS Division Trust Fund, the HCTF, the DPS HCTF, the Life Insurance Reserve, the Voluntary Investment Program, the Defined Contribution Retirement Plan, and the Deferred Compensation Plan are recorded in separate funds. The State, School, Local Government, Judicial, and DPS Division Trust Funds maintain separate accounts, and all actuarial determinations are made using separate division-based information.

The Division Trust Funds, the HCTF, the DPS HCTF, and the Life Insurance Reserve pool their investments into a combined investment portfolio. Investment value and earnings of the investment pool are allocated among the funds based on each fund's percentage ownership. As of December 31, 2017, the ownership percentages of each fund are shown in the table below.

Trust Fund	Ownership Percentages
State Division	31.02%
School Division	51.77%
Local Government Division	8.74%
Judicial Division	0.67%
DPS Division	7.10%
HCTF	0.61%
DPS HCTF	0.05%
Life Insurance Reserve	0.04%
<b>Total</b>	<b>100.00%</b>

The administrative activities and operating assets and liabilities are pooled and recorded in a Common Operating Fund. Expenses incurred and net operating assets are allocated from the Common Operating Fund to the Division Trust Funds based on administrative staff workload devoted to these funds and the ratio of the number of active and retired members in each division to the total for all the Division Trust Funds. Expenses are allocated to the HCTF and DPS HCTF based on administrative fees charged to participants. Expenses are allocated to the Voluntary Investment Program, the Defined Contribution Retirement Plan, and the Deferred Compensation Plan based on administrative staff workload and the ratio of FNP of each program or plan to the total for the program and plans. Expenses are allocated to the Life Insurance Reserve based on administrative staff workload.

#### **Fair Value of Investments**

Plan investments are presented at fair value in the Statements of Fiduciary Net Position. See Note 5 for additional information.

**NOTES TO THE FINANCIAL STATEMENTS**  
(*Dollars in Thousands*)

**Note 3—Interfund Transfers and Balances**

Interfund transfers of assets take place on a regular basis between the Division Trust Funds. The transfers occur upon the initiation of a retirement or survivor benefit where the member earned or purchased service in another division in addition to the Fund that is

paying the benefit. Transfers also occur from the Division Trust Funds to the Health Care Trust Funds to allocate a portion of the amount paid by members to purchase service credit. The transfers for the year ended December 31, 2017, consisted of the following amounts:

**INTERFUND TRANSFERS**

	State Division Trust Fund	School Division Trust Fund	Local Government Division Trust Fund	Judicial Division Trust Fund	DPS Division Trust Fund	HCTF	DPS HCTF
Transfers in from other Funds for retirements	\$32,101	\$16,900	\$4,451	\$3,199	\$10,830	\$—	\$—
Transfers out to other Funds for retirements	(16,104)	(36,371)	(7,212)	(821)	(6,973)	—	—
Transfers in from other Funds for survivor benefits	5	102	128	—	—	—	—
Transfers out to other Funds for survivor benefits	(230)	(5)	—	—	—	—	—
Transfers out to Health Care Trust Funds for purchased service credit	(2,859)	(3,047)	(1,200)	(153)	(84)	—	—
Transfers in to Health Care Trust Funds for purchased service credit	—	—	—	—	—	7,259	84

As of December 31, 2017, interfund balances existed between funds due to unreimbursed internal operating expenses. The interfund balances consisted of the following amounts:

**INTERFUND BALANCES**

Trust Fund	Amount
State Division	\$131
School Division	218
Local Government Division	37
Judicial Division	3
DPS Division	30
Voluntary Investment Program	(268)
Defined Contribution Retirement Plan	(58)
Deferred Compensation Plan	(96)
HCTF	3

**NOTES TO THE FINANCIAL STATEMENTS**  
(*Dollars in Thousands*)

## Note 4—Contributions

### Division Trust Funds—Defined Benefit Pension Plans

Members and employers are required to contribute to PERA at a rate set by Colorado statute. The contribution requirements of plan members and affiliated employers are established under C.R.S. § 24-51-401 *et seq.* Colorado State law provisions may be amended from time to time by the Colorado General Assembly.

The Colorado General Assembly passed significant pension reform through SB 18-200: *Concerning Modifications To the Public Employees' Retirement Association Hybrid Defined Benefit Plan Necessary To Eliminate with a High Probability the Unfunded Liability of the Plan Within the Next Thirty Years*. The bill was signed into law by Governor Hickenlooper on June 4, 2018. SB 18-200 makes changes to contribution provisions of the defined benefit pension plans administered by PERA. As these changes to contribution provisions were not in effect at the end of 2017, a detailed summary of the changes required by SB 18-200 have been disclosed as a subsequent event in Note 12 on pages 99–100.

During 2017, members were required to contribute 8 percent of their PERA-includable salary (State Troopers contribute 10 percent). PERA records these contributions in individual member accounts. Member contributions are tax-deferred for federal and Colorado income tax purposes, effective July 1, 1984, (January 1, 1986, for members of the DPS benefit structure) and January 1, 1987, respectively. Prior to those dates, contributions were on an after-tax basis. PERA-affiliated employers contribute a percentage of active member covered payrolls at employer rates ranging from 10.00 percent to 13.66 percent.

Employers that rehire a PERA retiree as an employee or under any other work arrangement (working retiree) are required to report and pay employer contributions on the amounts paid to the working retiree. In addition, effective January 1, 2011, working retirees are required to make contributions at a percentage of salary equal to the member contribution rate. However, under C.R.S. § 24-51-101(53), these contributions are not member contributions, are not deposited into a member account, and therefore, are nonrefundable to the working retiree.

For purposes of deferring federal income tax imposed on salary, member contributions and working retiree contributions shall be treated as employer contributions pursuant to the provisions of 26 U.S.C. § 414 (h)(2), as amended. For all other purposes, these contributions shall be treated as member contributions and working retiree contributions as described above.

Beginning January 1, 2006, employers are required to pay the AED, and beginning January 1, 2008, employers are required to pay the SAED. The employers pay these amounts on the PERA-includable salary for all employees working for the employer who are members of PERA, or who are eligible to elect to become members of PERA on or after January 1, 2006, including any amounts paid in connection with the employment of a retiree by an employer. PERA uses these payments to help amortize the unfunded actuarial accrued liability

(UAAL). The AED and SAED are set to increase in future years for certain Division Trust Funds, as described in the table on the next page. SB 10-001 provides for adjustment of the AED and SAED based on the year-end funded status within a particular Division Trust Fund. If a particular Division Trust Fund reaches a funded status of 103 percent, a decrease in the AED and SAED is mandated and if it subsequently falls below a funded status of 90 percent, an increase in the AED and SAED is mandated. For the Local Government and Judicial Divisions, if the funded ratio reaches 90 percent and subsequently falls below 90 percent, an increase in the AED and SAED is mandated. AED and SAED rates cannot exceed the maximums listed in the table on the next page.

C.R.S. § 24-51-412 permits a pension certificates of participation (PCOP) offset to the DPS Division employer contribution rate. The offset, expressed as a percentage of covered payroll, is equal to the annual assumed payment obligations for PCOPs issued in 1997 and 2008, including subsequent refinancing, by the DPS at a fixed effective annual interest rate of 8.50 percent. At a minimum, the DPS Division employer rate, after applying the PCOP offset, must be sufficient to fund the DPS HCTF and the AIR contribution rates applicable to the DPS Division. The staff of Denver Public Schools provided the PCOP offset rate of 14.56 percent for 2017, which is reviewed and analyzed by PERA staff.

C.R.S. § 24-51-401(1.7) (e) recognizes the effort to equalize the funded status of the DPS Division and the School Division, using the actuarial valuation for funding purposes as a basis. As of December 31, 2017, the funded ratio of the DPS Division is 79.7 percent and the funded ratio of the School Division is 59.4 percent. Beginning January 1, 2015, and every fifth year thereafter, the statute requires a true-up calculation to confirm the equalization of the funded status of these two divisions, which is based on the ratio of UAAL over payroll (currently 363.8 percent for the School Division and 126.2 percent for the DPS Division). The true-up calculation is an actuarial projection to assure the funded status of these divisions will be equal in 30 years from 2010. In the event a true-up calculation does not project equalization between these divisions over the 30-year period, the Board shall recommend an adjustment of the DPS Division employer contribution rate to the Colorado General Assembly. An adjustment to the DPS Division contribution rate may result in a significant increase or decrease in the total contributions paid by the DPS Division employers.

As described above, C.R.S. § 24-51-401(1.7) created a mechanism to reduce the funded ratio of the DPS Division from 88.3 percent at its inclusion into PERA in 2010 to the funded ratio of the School Division by 2040. The funded ratio is the actuarial value of assets divided by actuarial accrued liabilities (AALs). This mechanism involves offsetting the employer contributions into the DPS Division Trust Fund by the amount of the PCOP payments. It is expected that the equalization will occur in approximately 22 years.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

PERA-affiliated employers forward the contributions to PERA for deposit. PERA transfers a portion of these contributions, equal to 1.02 percent of the reported salaries, into the HCTF or DPS HCTF for health care benefits. Beginning in 2007, the AIR was created within each division for the purpose of funding future benefit increases. Funding for this reserve comes from the employer contributions and is calculated at 1.0 percent of the salary reported for members in the PERA benefit structure hired on or after January 1, 2007. As of December 31, 2017, post-retirement benefit increases for these members are limited to a maximum of 2.0 percent compounded

annually, subject to the availability of assets in the AIR for each division. As of December 31, 2017, the value of the AIR was \$118,323 in the State Division, \$157,810 in the School Division, \$33,234 in the Local Government Division, \$1,403 in the Judicial Division, and \$25,373 in the DPS Division. The remainder of these contributions is transferred into a trust fund established for each division for the purpose of meeting current benefit accruals and future benefit payments.

The combined employer contribution rates for retirement and health care benefits along with the member contribution rates from January 1, 2017, through December 31, 2017, are shown below:

## CONTRIBUTION RATES

Division Trust Fund	Membership	Employer Contribution Rate	AED	SAED	PCOP Offset	Total Contribution Rate Paid by Employer	Member Contribution Rate
State	All members						
	(except State Troopers)	10.15%	5.00%	5.00%	—	20.15%	8.00%
State	State Troopers	12.85%	5.00%	5.00%	—	22.85%	10.00%
School	All members	10.15%	4.50%	5.00%	—	19.65%	8.00%
Local Government	All members	10.00%	2.20%	1.50%	—	13.70%	8.00%
Judicial	All members	13.66%	2.20%	1.50%	—	17.36%	8.00%
DPS	All members	10.15%	4.50%	5.00%	(14.56%)	5.09%	8.00%

## FUTURE AED AND SAED RATES

Division Trust Fund	2018 Rates		Future Annual Increases in Rates Prescribed by Colorado Revised Statutes		Maximum Allowable Limitations	
	AED	SAED	AED	SAED	AED	SAED
State	5.00%	5.00%	N/A	N/A	5.00%	5.00%
School	4.50%	5.50%	N/A	N/A	4.50%	5.50%
Local Government	2.20%	1.50%	N/A	N/A	5.00%	5.00%
Judicial	2.20%	1.50%	Yes <sup>1</sup>	Yes <sup>2</sup>	5.00%	5.00%
DPS <sup>3</sup>	4.50%	5.50%	N/A	N/A	4.50%	5.50%

<sup>1</sup> For the calendar year beginning in 2019, C.R.S. § 24-51-411(4.5) increases the AED payment to 3.40 percent of PERA-includable salary and requires the AED payment to increase by 0.4 percent at the start of each of the following four calendar years through 2023 at which time the AED payment will be 5.00 percent of PERA-includable salary.

<sup>2</sup> For the calendar year beginning in 2019, C.R.S. § 24-51-411(7.5) increases the SAED payment to 3.40 percent of PERA-includable salary and requires the SAED payment to increase by 0.4 percent at the start of each of the following four calendar years through 2023 at which time the SAED payment will be 5.00 percent of PERA-includable salary.

<sup>3</sup> DPS Division employers are permitted to reduce the AED and SAED by the PCOP offset, as specified in C.R.S. § 24-51-412 *et seq.*

Funding of the plan assumes statutory contributions will be made on a timely basis. Any significant reduction in contributions would have an impact on the ability of the plan to make benefit payments in the future.

## Replacement Benefit Arrangements

IRC § 415 limits the amount of the benefit payable to a retiree or survivor in a defined benefit plan. In some cases, the IRC limit is lower than the benefit calculated under the plan provisions. For 2017, this limit is set at \$215,000 (actual dollars) for retirees who are age 62 or older. This dollar amount is actuarially decreased for retirees younger than 62. IRC § 415(m) allows a government plan to set up a "qualified governmental excess benefit arrangement" to pay the difference to those retirees. To accomplish this, PERA has entered into agreements with the employers who last employed the affected retirees. Under the agreement, the employer pays

the benefit difference to the retiree from a portion of the current employer contributions. In 2017, employers under these agreements used current employer contributions to pay retirees \$2,926 in the State Division; \$995 in the School Division; \$1,757 in the Local Government Division; \$0 in the Judicial Division, and \$0 in the DPS Division.

## Contributions—Voluntary Investment Program and Defined Contribution Retirement Plan

See Note 8.

## Contributions—Deferred Compensation Plan

See Note 8.

## Contributions—Health Care Trust Funds

See Note 9.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

### Note 5—Investments

#### Investment Authority

Under C.R.S. § 24-51-206, the Board has complete responsibility for the investment of PERA's funds, with the following investment limitations:

- The aggregate amount of moneys invested in corporate stocks or corporate bonds, notes, or debentures that are convertible into corporate stock or in investment trust shares cannot exceed 65 percent of the then book value of the fund.
- No investment of the fund in common or preferred stock (or both) of any single corporation can exceed 5 percent of the then book value of the fund.
- The fund cannot acquire more than 12 percent of the outstanding stock or bonds of any single corporation.
- The origination of mortgages or deeds of trust on real residential property is prohibited.

Additionally, C.R.S. § 24-54.8-202 imposes targeted divestment from companies that have economic prohibitions against Israel. C.R.S. § 24-54.8-101 imposed targeted divestment from companies with active operations in Sudan. In October 2017, the United States Secretary of State issued a report that confirmed the Government of Sudan's positive actions during 2017 and lifted all sanctions against the Government of Sudan. This lifting of sanctions triggered the repeal clause in the Colorado divestment legislation, and therefore the Sudan divestment statute was repealed by operation of law.

#### Colorado PERA Board's Statutory Fiduciary Responsibility

By State law, the management of PERA's retirement fund is vested in the Board who is held to the standard of conduct of fiduciaries in discharging their responsibilities. According to C.R.S. § 24-51-207(2), the Board, as fiduciaries, must carry out their functions solely in the interest of PERA members and benefit recipients and for the exclusive purpose of providing benefits.

#### Investment Committee

The Investment Committee is responsible for assisting the Board in overseeing the PERA investment program. Specific responsibilities include recommending to/advising the Board of the following:

- Written statements of investment policy and philosophy for the fund, and any amendments thereto.
- Strategies to achieve the investment goals and objectives of PERA.
- New investment mandates.
- Use of internal or external management for the investment mandates.
- On any other investment matters and make recommendations for Board action when necessary.

#### Overview of Investment Policy

PERA's investment policy is established and may be amended by a majority vote of the Board. The policy outlines the investment philosophy and guidelines within which the fund's investments will be managed, and includes the following:

- Strategic asset allocation is the most significant factor influencing long-term investment performance and asset volatility.
- The fund's liabilities are long-term and the investment strategy will therefore be long-term in nature.
- The asset allocation policy will be periodically re-examined to ensure its appropriateness to the then prevailing liability considerations.
- As a long-term investor, PERA will invest across a wide spectrum of investments in a prudent manner.
- Active management may be expected to add value over passive investment alternatives under appropriate conditions.

The Board determines the strategic asset allocation policy for the fund. In 2014, the Board commissioned an asset/liability study prepared by Aon Hewitt Investment Consulting, Inc. (Aon Hewitt). The objective of the study was to determine the optimal strategic asset allocation policy that would ultimately allow PERA to meet its benefit obligations, while also ensuring that PERA incurs appropriate levels of risk. On March 20, 2015, the Board voted to change the strategic asset allocation policy of the fund effective July 1, 2015. This strategic asset allocation contains a long-term target allocation and specific ranges within which each asset class may operate. Because the long-term target allocation will be achieved over time, an initial interim target allocation was approved as of July 1, 2015. This interim target allocation was revised as of July 1, 2016. It was reviewed again and retained without changes on June 23, 2017. PERA staff and Aon Hewitt are responsible for annually recommending interim policy targets to the Board until the long-term target allocation is achieved.

#### ASSET ALLOCATION TARGETS AND RANGES

	Interim Asset Allocation Target During 2017	Long-Term Asset Allocation	Target Range During 2017
Global Equity	53.5%	53.0%	47.0% – 59.0%
Fixed Income	23.5%	23.0%	18.0% – 28.0%
Private Equity	8.5%	8.5%	5.0% – 12.0%
Real Estate	8.5%	8.5%	5.0% – 12.0%
Opportunity Fund	5.0%	6.0%	0.0% – 9.0%
Cash and Short-Term Investments	1.0%	1.0%	0.0% – 3.0%

**NOTES TO THE FINANCIAL STATEMENTS***(Dollars in Thousands)*

The asset/liability study considered expected investment returns, risks, and correlations of returns. The characteristics of the fund's liabilities were analyzed in conjunction with expected investment risks and returns. The targeted strategic asset allocation is designed to provide appropriate diversification and to balance the expected total rate of return with the volatility of expected returns. The asset allocation targets are adhered to through the implementation of a rebalancing policy. Investments are managed and monitored in a manner which seeks to balance return and risk within the asset/liability framework. The Chief Investment Officer is authorized to execute investment transactions on behalf of the Board. Assets are managed both internally and externally. In making investment decisions, the Board and staff utilize external experts in various fields including risk and performance analysis, portfolio construction, and other important investment functions and issues.

**Investment Performance**

For the year ended December 31, 2017, the net-of-fees, money-weighted rate of return on the pooled investment assets was 18.1 percent.

A money-weighted rate of return considers the effect of timing of transactions that increase the amount of pension plan investments (such as contributions) and those that decrease the amount of pension plan investments (such as benefit payments). Additionally, the money-weighted rate of return provides information that is comparable with the long-term assumed rate of return on the pooled investment assets.

**Fair Value**

Investments are measured at fair value in accordance with GASB 72. Fair value is defined as the amount for which an investment could be sold in an orderly transaction between market participants at the measurement date in the principal or most advantageous market of the investment. This Statement establishes a three-tier, hierachal disclosure framework which prioritizes and

ranks the level of market price observability used in measuring fair value. The hierarchy is based on the valuation inputs used to measure the fair value of the investment and gives the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements). Inputs refer broadly to the assumptions that market participants would use in pricing the asset or liability, including assumptions about risk, for example, the risk inherent in a particular valuation technique used to measure fair value (such as a pricing model) and/or the risk inherent in the inputs to the valuation technique. The categorization of investments within the hierarchy is based upon the pricing transparency of the instrument and should not be perceived as the particular investment's risk. The three-tier framework is summarized below:

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

Investments in certain entities that calculate a net asset value (NAV) per share (or its equivalent) sometimes do not have a readily determinable fair value. For these investments, governmental accounting standards permit establishment of fair value using a practical expedient based on the NAV per share (or its equivalent).

The table on the next page presents PERA's investments within the hierachal framework, as well as investments where fair value is determined using the practical expedient, as of December 31, 2017.

**NOTES TO THE FINANCIAL STATEMENTS**  
(*Dollars in Thousands*)

**INVESTMENTS MEASURED AT FAIR VALUE**

	12/31/2017	Fair Value Measurements Using		
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
<b>Fixed Income</b>				
U.S. corporate bonds	\$2,694,439	\$—	\$2,692,874	\$1,565
U.S. government treasuries	2,674,864	2,674,864	—	—
U.S. government mortgage-backed securities	2,288,377	12,746	2,275,631	—
Non-U.S. corporate bonds	711,304	—	711,042	262
Non-U.S. government/agency bonds	550,763	—	550,763	—
Non-agency MBS/CMBS	226,510	—	226,389	121
U.S. government agencies	91,885	—	91,885	—
U.S. municipal bonds	89,407	—	69,018	20,389
Fixed income mutual fund	8,894	8,894	—	—
<b>Total fixed income investments</b>	<b>9,336,443</b>	<b>2,696,504</b>	<b>6,617,602</b>	<b>22,337</b>
<b>Global Equity</b>				
Public market investments <sup>1</sup>				
Information technology	5,950,755	5,931,721	18,763	271
Financials	4,858,354	4,822,698	35,524	132
Consumer discretionary	4,052,304	4,041,814	10,490	—
Industrials	3,742,794	3,720,154	22,605	35
Health care	3,316,215	3,289,487	24,739	1,989
Consumer staples	2,196,986	2,183,371	13,615	—
Energy	1,507,187	1,502,149	4,763	275
Materials	1,371,671	1,357,773	13,849	49
Real estate	966,563	965,075	1,487	1
Utilities	612,802	612,802	—	—
Telecommunication services	586,053	586,053	—	—
Equity mutual funds	279,711	279,711	—	—
Non-public market investments and other	462	—	—	462
<b>Total global equity investments</b>	<b>29,441,857</b>	<b>29,292,808</b>	<b>145,835</b>	<b>3,214</b>
Real estate	685,090	—	—	685,090
Self-directed brokerage	42,528	42,420	108	—
<b>Total investments by fair value level</b>	<b>\$39,505,918</b>	<b>\$32,031,732</b>	<b>\$6,763,545</b>	<b>\$710,641</b>
<b>Investments Measured at the NAV</b>				
Fixed income	1,526,271			
Global equity	1,053,200			
Multi-asset class funds	1,002,518			
Private equity	3,895,311			
Real estate	3,534,415			
Opportunity fund	1,669,635			
<b>Total investments measured at the NAV</b>	<b>12,681,350</b>			
<b>Total investments measured at fair value</b>	<b>\$52,187,268</b>			

<sup>1</sup> Approximately \$107,000 of public market investments are classified in Level 2 due to the election of fair value pricing for an international equity portfolio. This election employs the use of intra-day movements of the Russell 1000 index as a factor in pricing individual equities positions to ensure equitability between participants in the PERAdvantage International Stock Fund.

**NOTES TO THE FINANCIAL STATEMENTS**  
(*Dollars in Thousands*)

**RECONCILIATION OF INVESTMENT LEVELING DISCLOSURE TO THE STATEMENTS OF FIDUCIARY NET POSITION**

	<b>Investments by Fair Value Level</b>	<b>Investments Measured at the NAV</b>	<b>Stable Value Fund<sup>1</sup></b>	<b>Fixed Income Classified as Short-Term Investments</b>	<b>Statements of Fiduciary Net Position Combined Total</b>
Fixed income	\$9,336,443	\$1,526,271	\$422,979	(\$36,251)	\$11,249,442
Global equity	29,441,857	1,053,200	—	—	30,495,057
Private equity	—	3,895,311	—	—	3,895,311
Real estate	685,090	3,534,415	—	—	4,219,505
Opportunity fund	—	1,669,635	—	—	1,669,635
Multi-asset class funds	—	1,002,518	—	—	1,002,518
Self-directed brokerage	42,528	—	—	—	42,528
<b>Total</b>	<b>\$39,505,918</b>	<b>\$12,681,350</b>	<b>\$422,979</b>	<b>(\$36,251)</b>	<b>\$52,573,996</b>

<sup>1</sup> The Stable Value Fund is the underlying investment in the PERAdvantage Capital Preservation Fund which is available to participants in the two defined contribution and the deferred compensation funds. The value of the investment is based on the contract value, which approximates fair value. Contract value represents what is owed to the plan participants and what the shares of the stable value fund are being bought and sold for.

Global equity investments classified in Level 1 of the hierachal framework include securities which trade on a national or international exchange. These investments are primarily valued at the official closing price or last reported sales price of the instrument according to the rules of the exchange. Mutual funds classified in Level 1 of the hierachal framework include instruments which trade on a national exchange and the fund's NAV is the basis for the fund's transactions. Fixed income securities classified as Level 1 include U.S. Treasuries and U.S. mortgage-backed securities purchased in the to-be-announced forward market. These securities are valued using the bid price, which is the price prospective buyer(s) are prepared to pay to purchase the security. Self-directed brokerage is an investment vehicle available to participants in PERA's Voluntary Investment Program, Defined Contribution Retirement Plan, and Deferred Compensation Plan. Equity investments contained in the self-directed brokerage accounts trade on an exchange, and therefore are classified in Level 1 of the hierachal framework.

Global equity investments classified in Level 2 of the hierachal framework include securities valued using a theoretical price which utilizes a standardized formula to derive a price from a related security or from the intra-day movement of a market index. Fixed income investments classified as Level 2 typically do not trade on a national or international exchange and their fair value is based on equivalent values of the same or of comparable securities with similar yield and risk, otherwise known as matrix pricing. Fixed income

investments contained in the self-directed brokerage are typically valued using a matrix pricing approach, and therefore are classified in Level 2 of the hierachal framework.

Global equity public market investments classified in Level 3 of the hierachal framework are valued using one or more unobservable inputs. This includes instruments that have been delisted from an exchange, instruments where trading has been suspended, and the instrument lacks recent transaction information. Global equity non-public market investments are typically received as a distribution from PERA's private equity fund investments and are valued by the partnership at the time of distribution. Fixed income securities classified in Level 3 of the hierachal framework include instruments that are in default and instruments whose values are estimated, out of necessity, using unobservable inputs due to lack of comparable securities in the market place. Real estate investments classified in Level 3 of the hierachal framework were valued by an independent appraiser.

Typically, pricing information for public market investments is made available to PERA by independent, third-party pricing services and other third-party vendors.

The table on the next page presents PERA's unfunded commitments, the investment redemption frequency and redemption notice period as of December 31, 2017, for PERA investments measured at the NAV.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

## INVESTMENTS MEASURED AT THE NET ASSET VALUE

	12/31/17	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period
Fixed income commingled funds	\$1,526,271	\$—	Daily	1–3 days
Global equity commingled funds	1,053,200	—	Daily	1–3 days
Multi-asset class commingled funds	1,002,518	—	Daily	1–3 days
Private equity partnerships	3,895,311	2,578,176	Not Eligible	N/A
<b>Private real estate<sup>1</sup></b>				
Directly held joint ventures	478,188	76,844	Not Eligible	N/A
Real estate partnerships	988,029	362,738	Not Eligible	N/A
Commingled open-end funds	2,068,198	149,489	Daily, Monthly, Quarterly	30–90 days
<b>Opportunity fund</b>				
Opportunity fund partnerships	590,711	687,352	Quarterly, Biennial	30–180 days
Commingled open-end funds	1,078,924	—	Daily, Monthly, Biennial	5–180 days
<b>Total investments measured at the NAV</b>	<b>\$12,681,350</b>	<b>\$3,854,599</b>		

<sup>1</sup> PERA has \$254,303 in unfunded commitments related to real estate presented in Level 3 of the hierachal framework.

The fair value of the investments in fixed income, global equity, and multi-asset class commingled funds has been determined using NAV of the units held at December 31, 2017. Commingled funds are only offered to a limited group of investors, and the most significant element of the NAV is the fair value of the underlying investment holdings of the fund. Unit values are determined by dividing each fund's net assets by the number of units outstanding on the valuation date. Fixed income commingled funds include nine funds that seek results which correspond generally to the price and yield performance of a particular index or to produce returns in excess of the total rate of return of a particular benchmark. Global equity commingled funds include five funds which primarily consist of investments whose objective is to produce returns that either match or exceed the total rate of return of a particular benchmark. Multi-asset class commingled funds include 10 target date retirement funds which are broadly diversified across global asset classes, where asset allocations become more conservative over time with the objective of providing for retirement outcomes consistent with investor preferences throughout the savings and drawdown phase. Additionally, this asset class also includes one fund whose objective is to produce returns that exceed inflation.

Private equity partnerships include 180 private equity limited partnership funds, with various strategies including: buyout, venture capital, generalist debt, mezzanine debt, distressed debt, secondary funds, fund-of-funds, and energy-related strategies. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of PERA's ownership interest in partners' capital. The most significant element of NAV is the fair value of the investment holdings. The valuation techniques vary based on investment type and involve a certain degree of expert judgment. These holdings are valued by the general partners in conjunction with management, investment advisers, and valuation specialists and are generally audited annually. These investments cannot be redeemed during the term of the partnership. Typically, private equity partnerships have an approximate life of 10 years, with the first four to six years typically deemed as the investment period where capital

is deployed. The remaining years are typically the harvest period in which distributions are received through the liquidation of the underlying assets of the fund. The fair value for these investments could differ significantly if a ready market for these assets existed.

Private real estate includes 85 funds that invest primarily in U.S. institutional quality commercial real estate across a broad range of real estate asset types and locations. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of PERA's ownership interest in partners' capital. The most significant element of NAV is the fair value of the investment holdings. The valuation techniques vary based on investment type and involve a certain degree of expert judgment. These holdings are valued by the general partners in conjunction with management, investment advisers, and valuation specialists and are generally audited annually. There are 58 real estate limited partnership funds, which are considered illiquid as these investments cannot be redeemed during the term of the partnership. As a result, investors are subject to redemption restrictions which generally limit distributions and restrict the ability of limited partners to exit a partnership investment prior to dissolution. There are eight directly owned joint venture investments which consist of industrial, multifamily, office, and retail assets in various locations throughout the U.S. These investments are considered illiquid due to redemption restrictions. There are 19 real estate commingled open-ended funds which are considered liquid real estate funds by nature of the open-end structure of the fund. Open-end funds generally offer periodic distributions of net cash flow, which investors may elect to reinvest. Additionally, open-end funds generally offer daily and monthly redemption windows for requesting portions, or all, of PERA's investments. Four of the open-ended funds contain a two- and three-year lock-out period with respect to redemptions. Distributions from each fund will generally be received as the underlying investments of the funds are liquidated, but distributions are also generally made at the discretion of the general partner. The fair value for these investments could differ significantly if a ready market for these assets existed.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

The Opportunity Fund includes 19 funds that invest in timber, risk parity, tactical, credit, global macro, multi strategy, and other opportunistic strategies. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of PERA's ownership interest in partners' capital. The most significant element of NAV is the fair value of the investment holdings. The valuation techniques vary based on investment type and involve a certain degree of expert judgment. These holdings are valued by the general partners in conjunction with management, investment advisers, and valuation specialists and are generally audited annually. There are 10 partnerships within the Opportunity Fund that are considered illiquid as these investments cannot be redeemed during the term of the partnership. Illiquid funds represent approximately 23 percent of the value of the Opportunity Fund. There are six investments within the Opportunity Fund that are considered liquid by nature of the open-end structure of the fund. Open-end funds generally offer periodic distributions of net cash flow, which investors may elect to reinvest. Additionally, open-end funds generally offer daily and monthly redemption windows for requesting portions, or all, of PERA's investments. Distributions from each fund will be received as the underlying investments of the funds are liquidated. It is expected that the underlying assets of the funds will be liquidated over the next two to 10 years. The fair value for these investments could differ significantly if a ready market for these assets existed.

**Cash and Short-Term Investments**

Cash balances represent both operating cash accounts and investment cash on deposit held by banks. To maximize investment income, the float caused by outstanding checks is invested, thus causing a possible negative book balance. Negative book balances are reflected in the liabilities section of the Statements of Fiduciary Net Position.

The carrying value of cash and short-term investments at December 31, 2017, in the Statements of Fiduciary Net Position includes short-term fixed income securities of \$36,251 and deposit and short-term investment funds of \$599,518 for a total of \$635,769. PERA considers fixed income securities with a remaining maturity of 12 months or less to be short-term investments.

The table below presents the PERA combined total deposits and short-term investment funds as of December 31, 2017.

	Carrying Value	Bank Balance
Deposits with banks (held in accounts insured by the FDIC)	\$10,042	\$10,015
Deposits held at bank (uncollateralized, held by PERA's agent in PERA's name)	13,336	13,336
Short-term investment funds held at bank (shares in commingled funds, held by PERA's agent in PERA's name)	576,140	576,140
<b>Total deposits and short-term investment funds</b>	<b>\$599,518</b>	<b>\$599,491</b>

**Securities Lending Transactions**

C.R.S. § 24-51-206 and Board policies permit PERA to lend its securities to broker-dealers and other entities with a simultaneous agreement to return the collateral for the same securities in the future. PERA utilized two lending agents in 2017, its custodian, The Northern Trust Company (Northern Trust) and Deutsche Bank AG, New York Branch (Deutsche Bank).

Northern Trust primarily lends international equity and fixed income securities for cash collateral. U.S. securities are loaned versus collateral valued at 102 percent of the fair value of the securities plus any accrued interest. Non-U.S. securities are loaned versus collateral valued at 105 percent of the fair value of the securities plus any accrued interest. Collateral is marked-to-market daily.

Northern Trust invests the cash collateral related to PERA's loaned securities in a separate account, the PERA Custom Fund, according to guidelines stipulated by PERA. As of December 31, 2017, the total fair value of securities on loan with Northern Trust cannot exceed \$600,000. Northern Trust's Senior Credit Committee sets borrower credit limits.

Deutsche Bank is a third-party lending agent for PERA. Deutsche Bank invests the cash collateral related to PERA's loaned securities in a separate account according to guidelines stipulated by PERA. Deutsche Bank lends domestic and international equities for cash collateral. U.S. securities are loaned versus collateral valued at a minimum of 102 percent of the fair value of the securities. International securities are loaned versus collateral valued at a minimum of 105 percent of the fair value of the securities. Collateral is marked-to-market daily. As of December 31, 2017, the total market value of securities on loan with Deutsche Bank cannot exceed \$1,250,000. Borrower credit limits are assigned by Deutsche Bank's Global Credit Risk Department.

As of December 31, 2017, the aggregate of the difference between the cash collateral investment value, including certain receivables and payables related to the securities lending program and the cash collateral received, was \$1,042.

The table below details the balances relating to the securities lending transactions at December 31, 2017.

Securities Lent for Cash Collateral	Fair Value of Underlying Securities	Cash Collateral Received	Cash Collateral Investment Value
Cash and cash equivalents	\$—	\$—	\$1,219,055
Fixed income	217,023	221,616	6,004
Global equity	977,747	1,002,401	—
<b>Total</b>	<b>\$1,194,770</b>	<b>\$1,224,017</b>	<b>\$1,225,059</b>

As of December 31, 2017, the fair value of securities lent was \$1,194,770, the value of associated cash collateral received was \$1,224,017, and the cash collateral investment value, including certain receivables and payables related to the securities lending

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

program was \$1,225,059. PERA's income, net of expenses from securities lending, was \$8,950 for the year ended December 31, 2017. Included in net securities lending income for the year ended December 31, 2017, is \$214 from commingled funds.

As of December 31, 2017, PERA had no credit risk exposure to borrowers because the associated value of the collateral held exceeded the value of the securities loaned. The contracts with PERA's lending agents provide that the lending agents will indemnify PERA if loaned securities are not returned and PERA suffers direct losses due to a borrower's default or the lending agent's noncompliance with the contract. PERA had no losses on securities lending transactions resulting from the default of a borrower or the lending agent for the year ended December 31, 2017. PERA has limited the total fair value of securities outstanding to one borrower to 25 percent of the total fair value of all securities outstanding in the program.

PERA or the borrower may terminate any security loan on demand. Though every loaned security may be sold and reclaimed at any time from the borrower, the weighted average loan life of overall loans outstanding at Northern Trust was approximately 46 days and at Deutsche Bank was approximately 118 days as of December 31, 2017. At Northern Trust and Deutsche Bank, all loans were made on an overnight (one day) basis throughout 2017. The PERA Custom Fund had a weighted average maturity (to the next reset date) of 11 days as of December 31, 2017. Deutsche Bank invests PERA's cash collateral in a separate account, which as of December 31, 2017, had a weighted average maturity of 24 days. The weighted average maturity of a security or instrument is, in the case of a fixed rate security or instrument, the date on which final payment is due or the principal amount may be recovered through demand (if applicable). In the case of a floating or variable rate security or instrument, weighted average maturity is the shorter of the period of time remaining until either the next readjustment of the interest rate or the principal amount may be recovered through demand (if applicable). Since the majority of securities loans are made on an overnight basis, there is usually a difference between the weighted average maturity of the investments made with the cash collateral provided by the borrower and the maturities of the securities loans.

As of December 31, 2017, reinvested securities lending collateral of \$1,225,059 primarily consisted of repurchase agreements totaling \$1,219,055 valued at par, and accordingly were not classified within the fair value hierarchical framework. At December 31, 2017, \$6,004 of the \$1,225,059 in reinvested securities lending collateral consisted of fixed income investments and were considered to be Level 2 investments in the fair value hierarchical framework. Fixed income investments classified as Level 2 typically do not trade on a national or international exchange and their fair value is based on equivalent values of the same or of comparable securities with similar yield and risk, otherwise known as matrix pricing.

**Custodial Credit Risk**

Governmental accounting standards limit the disclosure of custodial credit risk to investment securities that are uninsured, held in physical or book entry form, are not registered in PERA's name, and are held by either the counterparty or the counterparty's trust department or agent but not in PERA's name. Disclosure of custodial credit risk is also required when deposits are not covered by depository insurance and are uncollateralized, collateralized with securities held by the pledging financial institution, or collateralized with securities held by the pledging financial institution's trust department or agent but not in PERA's name.

To mitigate custodial credit risk, PERA's custodial credit risk policy has requirements governing how securities are held by the master custodian and for the effective management of cash balances. To further minimize custodial credit risk, periodic reviews are required to be completed on the master custodian's credit quality and capital levels. Additionally, assessments of counterparty risk are completed periodically using internal analysis and information obtained from third-party research and rating agency reports.

Northern Trust is the master custodian for the majority of PERA's securities. At December 31, 2017, there were no investments, or collateral securities subject to custodial credit risk. At December 31, 2017, there were \$13,333 of foreign currency deposits held at Northern Trust which were uninsured and uncollateralized and, therefore, exposed to custodial credit risk.

**Concentration of Credit Risk**

Concentration of credit risk is the risk of loss that may be attributed to the magnitude of PERA's investment in a single issuer. C.R.S. § 24-51-206(3) requires that no investment of the fund in common or preferred stock, or both, of any single corporation shall be of an amount which exceeds 5 percent of the then book value of the fund, nor shall the fund acquire more than 12 percent of the outstanding stock or bonds of any single corporation. The 12 percent requirement does not apply to governmental securities (U.S. Treasuries, sovereigns, etc.), Government Sponsored Enterprise securities (agencies including FNMA, FHLMC, etc.), mortgage-backed securities (agency or non-agency), commercial mortgage-backed securities (CMBS), asset-backed securities, or municipal securities. There is no single issuer exposure that comprises 5 percent of the then book value of the fund and no holdings greater than 12 percent of the outstanding stock or bonds of any single corporation at December 31, 2017.

**RECONCILIATION OF CREDIT AND INTEREST RATE RISK DISCLOSURES TO FINANCIAL STATEMENTS**

	As of December 31, 2017
Fixed income	\$11,249,442
Fixed income securities classified as short-term	36,251
<b>Total fixed income securities</b>	<b>\$11,285,693</b>

**NOTES TO THE FINANCIAL STATEMENTS***(Dollars in Thousands)***Credit Risk**

Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligation. As of December 31, 2017, PERA held investments across the credit ratings spectrum, with the majority invested in investment grade issuers defined as having a minimum rating of Baa3/BBB-/BBB-, issued by Moody's, Standard and Poor's (S&P), and Fitch, respectively. PERA's credit risk policy is as follows: Fixed income portfolios generally have guidelines that establish limits on holdings within each credit rating category. Some investment grade managers are allowed to purchase below investment grade securities, but in general are limited to no more than 5 percent exposure to below investment grade securities, and are generally limited to Ba3/BB-/BB- or better. For portfolio managers that can invest in below investment grade securities, there are limits on investments in the lowest ratings categories. For some portfolios, securities rated below B3/B-/B- generally cannot exceed the portfolio's benchmark weighting of securities rated below B3/B-/B- plus 5 percent. In other portfolios, there is a floor of Caa3/CCC-/CCC- or better at the time of purchase. The table on the next page provides Moody's credit quality ratings for PERA's fixed income holdings as of December 31, 2017.

**NOTES TO THE FINANCIAL STATEMENTS**  
(*Dollars in Thousands*)

**CREDIT QUALITY RATING DISPERSION SCHEDULE**

Quality Rating Moody's	Total	U.S. Corporate Bonds	U.S. Govt Mortgage-Backed Securities	Non-U.S. Corporate Bonds	Non-U.S. Govt/Agency Bonds	Stable Value Fund	Non-Agency MBS/CMBS	U.S. Govt Agencies <sup>1</sup>	U.S. Municipal Bonds
Aaa	\$483,860	\$22,444	\$11,783	\$—	\$181,802	\$—	\$180,240	\$81,567	\$6,024
Aa1	107,299	69,942	—	—	15,797	—	6,184	—	15,376
Aa2	90,208	21,821	—	17,371	34,353	—	95	—	16,568
Aa3	93,825	55,614	—	6,432	3,097	—	4,647	—	24,035
A1	176,581	72,047	—	70,610	27,063	—	—	—	6,861
A2	248,077	211,307	—	16,122	9,235	—	—	—	11,413
A3	666,887	542,436	—	105,440	19,011	—	—	—	—
Baa1	432,486	385,492	—	46,994	—	—	—	—	—
Baa2	339,887	172,082	—	120,301	47,504	—	—	—	—
Baa3	441,688	287,635	—	74,528	79,525	—	—	—	—
Ba1	283,077	187,986	—	73,684	21,407	—	—	—	—
Ba2	136,315	92,764	—	30,729	12,822	—	—	—	—
Ba3	209,878	154,763	—	42,957	12,158	—	—	—	—
B1	146,278	122,887	—	17,691	5,700	—	—	—	—
B2	120,786	82,071	—	13,407	25,308	—	—	—	—
B3	134,406	107,206	—	17,673	9,527	—	—	—	—
Caa1	86,492	59,637	—	24,365	2,490	—	—	—	—
Caa2	27,794	24,204	—	1,416	2,174	—	—	—	—
Caa3	2,505	1,034	—	200	1,271	—	—	—	—
Not rated <sup>2</sup>	2,079,134	21,067	1,508,393	31,384	40,519	422,979	35,344	10,318	9,130
<b>Subtotal</b>	<b>\$6,307,463</b>	<b>\$2,694,439</b>	<b>\$1,520,176</b>	<b>\$711,304</b>	<b>\$550,763</b>	<b>\$422,979</b>	<b>\$226,510</b>	<b>\$91,885</b>	<b>\$89,407</b>
U.S. govt treasuries	2,674,864								
Explicit U.S. govt agencies <sup>3</sup>	768,201								
Fixed income commingled funds <sup>2,4</sup>	1,526,271								
Fixed income mutual funds <sup>2</sup>	8,894								
<b>Total</b>	<b><u>\$11,285,693</u></b>								

<sup>1</sup> Includes bonds issued by Federal Home Loan Bank, Federal Home Loan Mortgage Corporation, Federal National Mortgage Association, and other government-sponsored agencies.

<sup>2</sup> Not rated by Moody's.

<sup>3</sup> Bonds issued by the Government National Mortgage Association.

<sup>4</sup> The fair value and average fund credit quality ratings as reported by the commingled fund managers are as follows: \$941,246—Aaa; \$83,712—Aa2; \$83,721—A1; and \$417,592—A3.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

**Interest Rate Risk**

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. PERA's policy is to manage its exposure to fair value losses arising from changes in interest rates by requiring that the duration of individual portfolios stays within defined bands of the duration of each portfolio's benchmark. PERA utilizes effective duration as the primary measure of interest rate risk within its fixed income investments. Duration

estimates the sensitivity of a bond's price to interest rate changes. Effective duration makes assumptions regarding the most likely timing and amounts of variable cash flows arising from such investments as callable bonds, mortgage-backed securities, and variable-rate debt.

Effective duration for PERA's fixed income holdings as of December 31, 2017, is shown in the table below:

**INTEREST RATE RISK—EFFECTIVE DURATION**

	Fair Value Total	Fair Value Duration Not Available	Fair Value Duration Available	Effective Weighted Duration in Years
U.S. corporate bonds	\$2,694,439	\$6,416	\$2,688,023	6.92
U.S. government treasuries	2,674,864	—	2,674,864	6.24
U.S. government mortgage-backed securities	2,288,377	2,005	2,286,372	3.67
Fixed income commingled funds	1,526,271	—	1,526,271	5.78
Non-U.S. corporate bonds	711,304	830	710,474	5.68
Non-U.S. government/agency bonds	550,763	2,486	548,277	5.36
Stable value fund	422,979	—	422,979	3.50
Non-agency MBS/CMBS	226,510	475	226,035	5.61
U.S. government agencies	91,885	—	91,885	3.35
U.S. municipal bonds	89,407	6,633	82,774	11.77
Fixed income mutual fund	8,894	—	8,894	5.34
<b>Total</b>	<b>\$11,285,693</b>	<b>\$18,845</b>	<b>\$11,266,848</b>	<b>5.64</b>

**Mortgage-Backed Securities**

PERA invests in residential and commercial mortgage-backed securities which are reported at fair value in the Statements of Fiduciary Net Position under Investments at fair value, fixed income. PERA invests in mortgage-backed securities for diversification and to enhance fixed income returns.

A residential mortgage-backed security depends on the underlying pool of single-family mortgage loans to provide the cash flow to make principal and interest payments on the security. Mortgage-backed securities are subject to credit risk, the risk that the borrower will be unable to meet its obligations. In many cases, the payment of principal and interest is guaranteed by an agency of the U.S. Government, or a Government Sponsored Enterprise. While these guarantees reduce credit risk, residential mortgage-backed securities are also subject to prepayment risk as the timing of principal and interest payments remains uncertain. A decline in interest rates can result in call risk as prepayments accelerate, which reduces the weighted average life of the security. Alternatively, an increase in interest rates can result in extension risk as prepayment rates decline, which may cause the weighted average life of a mortgage investment to be longer than anticipated.

CMBS depend on underlying pools of commercial real estate loans to provide the cash flow to make principal and interest payments on the security. CMBS are subject to credit risk, the risk that the borrower will be unable to meet its obligations. These loans are typically for a fixed term, cannot be repaid early by the borrower without penalty and, accordingly, have lower prepayment risk than residential mortgage-backed securities.

To reduce PERA's counterparty credit risk while trading residential mortgage-backed securities, PERA has entered into Master Securities Forward Transaction Agreements with some counterparties which require margin collateral to be pledged or received when the change in net value of unsettled trades exceeds an agreed-upon threshold. As of December 31, 2017, the change in net value of all unsettled trades was below the agreed upon thresholds, and as a result, no collateral was pledged or held in relation to unsettled trades of mortgage-backed securities.

As of December 31, 2017, the fair value of residential and commercial mortgage-backed securities was \$2,262,647 and \$252,240, respectively, which excludes the fair value of mortgage-backed securities held in commingled funds.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

## Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely impact the fair value of an investment or a deposit. PERA's currency risk exposure resides primarily within the Global Equity asset class. In accordance with governmental accounting standards, this disclosure is limited to investments denominated in non-U.S. dollars. There may be additional foreign currency risk in investments that contain underlying securities or business operations exposed to a foreign currency. PERA's formal policy regarding foreign currency risk is to evaluate the risk as part of the fund's periodic asset/liability

study and to consider it in determining the total fund asset allocation. At December 31, 2017, PERA did not have a currency hedging program at the total fund level. However, at the manager level, hedging currency risk may be allowed and certain managers may actively manage currency exposure. PERA monitors currency risk at the total fund, asset class, and portfolio levels.

PERA's exposure to foreign currency risk as of December 31, 2017, is shown in the following table.

## FOREIGN CURRENCY RISK

Currency	Total	Global Equity	Private Equity	Real Estate	Income Receivable	Cash and Short-Term Investments	Corporate Bonds	Pending Trades	Pending Foreign Exchange Trades
Euro	\$3,164,574	\$2,818,372	\$332,973	\$2,471	\$9,480	\$3,117	\$—	\$2,947	(\$4,786)
Japanese yen	2,069,758	2,066,044	—	—	3,250	477	—	587	(600)
British pound sterling	1,853,795	1,763,324	85,699	—	3,789	961	—	25	(3)
Canadian dollar	776,670	773,956	—	—	1,698	1,016	—	—	—
Hong Kong dollar	730,537	730,344	—	—	12	206	—	(988)	963
Swiss franc	637,311	631,687	—	—	5,622	34	—	—	(32)
Australian dollar	440,205	441,024	—	—	604	177	—	(4,247)	2,647
South Korean won	383,566	381,226	—	—	2,148	189	—	12	(9)
Swedish krona	330,510	330,122	—	—	364	44	—	—	(20)
New Taiwan dollar	290,036	286,993	—	—	—	3,022	—	21	—
Indian rupee	275,416	274,870	—	—	—	546	—	—	—
Singapore dollar	178,903	177,886	—	—	607	444	—	—	(34)
Danish krone	173,717	171,221	—	—	2,496	50	—	—	(50)
South African rand	165,063	164,150	—	—	40	870	—	3	—
Brazilian real	118,240	116,023	—	—	565	238	159	853	402
Mexican peso	73,760	71,240	—	1,442	1	217	—	890	(30)
Malaysian ringgit	67,317	66,337	—	—	29	948	—	7	(4)
Thai baht	53,161	53,134	—	—	—	27	—	—	—
Indonesian rupiah	44,775	44,629	—	—	39	107	—	—	—
Norwegian krone	44,222	44,222	—	—	—	8	—	—	(8)
New Israeli shekel	35,544	35,515	—	—	9	26	—	—	(6)
Turkish lira	31,966	31,939	—	—	—	27	—	—	—
Chinese yuan renminbi (offshore)	26,777	26,484	—	—	—	293	—	—	—
Polish zloty	22,541	22,439	—	—	—	102	—	—	—
New Zealand dollar	17,214	17,121	—	—	—	93	—	—	—
Czech koruna	16,545	16,537	—	—	—	8	—	—	—
Philippine peso	15,487	15,474	—	—	—	13	—	—	—
United Arab Emirates dirham	11,193	11,190	—	—	—	3	—	—	—
Hungarian forint	10,911	10,911	—	—	—	—	—	—	—
Qatari riyal	6,736	6,666	—	—	—	70	—	—	—
Chilean peso	2,695	2,695	—	—	—	—	—	—	—
Russian ruble	1,772	1,772	—	—	—	—	—	—	—
Peruvian nuevo sol	139	139	—	—	—	—	—	—	—
<b>Total</b>	<b>\$12,071,056</b>	<b>\$11,605,686</b>	<b>\$418,672</b>	<b>\$3,913</b>	<b>\$30,753</b>	<b>\$13,333</b>	<b>\$159</b>	<b>\$110</b>	<b>(\$1,570)</b>

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

**Note 6—Derivative Instruments**

PERA reports derivative instruments at fair value. These derivative instruments involve, to varying degrees, elements of market risk to the extent of future market movements in excess of amounts recognized in the Statements of Fiduciary Net Position. For accounting purposes, derivative instruments are considered to be investments and not hedges.

The following table summarizes the derivative instruments outstanding as of December 31, 2017. These instruments are recorded in cash and short-term investments, investment receivables, and investments at fair value in the Statements of Fiduciary Net Position. The changes in fair value include all derivative instrument activity and are included in investment income in the Statements of Changes in Fiduciary Net Position. Investments in limited partnerships and commingled funds include derivative instruments that are not reported in the following disclosure.

**DERIVATIVE INSTRUMENTS—DEFINED BENEFIT PLANS**

Investment Derivatives	Changes in Fair Value	
	Classification	Amount
Foreign currency forwards	Investment income	(\$875)
Rights/warrants	Investment income	1,400
Fixed income futures	Investment income	24
<b>Total</b>		<b>\$549</b>

	Fair Value at December 31, 2017	
	Classification	Amount
Cash and short-term investments		(\$3)
Global equity		177
Investment receivables		22
<b>Total</b>		<b>\$196</b>

**DERIVATIVE INSTRUMENTS—DEFINED CONTRIBUTION AND DEFERRED COMPENSATION PLANS (SEPARATELY MANAGED ACCOUNTS)**

Investment Derivatives	Changes in Fair Value	
	Classification	Amount
Foreign currency forwards	Investment income	(\$17)
Rights/warrants	Investment income	62
<b>Total</b>		<b>\$45</b>

	Fair Value at December 31, 2017	
	Classification	Amount
Cash and short-term investments		\$—
Global equity		—
<b>Total</b>		<b>\$—</b>

**Foreign Currency Forward Contracts**

A foreign currency forward is a contractual agreement between two parties to pay or receive specific amounts of foreign currency at a future date in exchange for another currency at an agreed upon exchange rate. The settlement date for these contracts is three business days or more after the trade date. Forward commitments are not standardized and carry credit risk due to the possible nonperformance by one of the counterparties. The maximum potential loss is the aggregate face value in U.S. dollars at the time the contract was opened; however, the likelihood of such loss is remote. No losses related to counterparty default occurred in 2017. Foreign currency forward contracts are usually traded over-the-counter. These transactions are entered into in order to manage risks from exposure to foreign currency rate fluctuation and to facilitate foreign currency investment activity. Foreign currency forwards carry risk resulting from adverse fluctuations in foreign exchange rates. Recognition of realized gain or loss depends on whether the currency exchange rate has moved favorably or

unfavorably to the contract holder upon termination of the contract. Prior to termination of the contract, PERA records the unrealized currency translation gain or loss based on the applicable forward currency exchange rates which are determined by an external pricing service.

At December 31, 2017, PERA's defined benefit plans had outstanding foreign currency forward contracts to purchase currencies with a fair value of \$1,117 and outstanding contracts to sell currencies with a fair value of (\$1,120). PERA's defined contribution and deferred compensation plans had outstanding foreign currency forward contracts to purchase currency with a fair value of \$305 and outstanding contracts to sell currency with a fair value of (\$305).

Outstanding foreign currency forward contracts which have a fair value greater than or equal to \$1 or a fair value less than or equal to (\$1) are disclosed in detail on the next page.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

## OUTSTANDING FOREIGN CURRENCY FORWARD CONTRACTS—DEFINED BENEFIT PLANS

As of December 31, 2017

Objective <sup>1</sup>	Notional Amount Buy (Sell)	Effective Date	Maturity Date	Terms	Fair Value	Index Counterparty	Counterparty Credit Rating <sup>2</sup>
Facilitate foreign currency investment activity	969 BRL (293) USD	12/28/2017	1/3/2018	Exchange U.S. dollars for Brazilian real	(\$1)	The Northern Trust Company	A2 / AA-
Facilitate foreign currency investment activity	236 USD (26,684) JPY	12/27/2017	1/4/2018	Exchange Japanese yen for U.S. dollars	(1)	State Street Bank and Trust Company	Aa3 / AA
Facilitate foreign currency investment activity	444 USD (50,069) JPY	12/28/2017	1/5/2018	Exchange Japanese yen for U.S. dollars	(1)	Morgan Stanley and Company	A3 / A
<b>Total</b>					<b>(\$3)</b>		

<sup>1</sup> Outstanding currency transactions related to foreign currency investment activity are included in this disclosure according to how Northern Trust defines currency forward and currency spot transactions.

<sup>2</sup> Ratings are listed in order of Moody's and Fitch in the above schedule. If the counterparty legal entity does not have a public rating, the parent company rating is disclosed.

## Rights/Warrants

Rights provide the holder with the right, but not the obligation, to buy a company's common stock at a predetermined price, the subscription price. A right permits the investor to buy at a price that may be below the actual market price for that stock. A warrant is an option to buy an underlying equity security at a predetermined price for a finite period of time. For both rights and warrants, if the predetermined price is less than the actual market price for the equity security, each have intrinsic value. Both rights and warrants potentially have intrinsic value until their expiration date.

Investment in rights/warrants exposes PERA to limited market risk. In the event the market price of the company's common stock falls below the subscription or predetermined price, the amount of loss recognized is equal to the cost to acquire the investment. PERA records rights/warrants with global equity in the Statements of Fiduciary Net Position. As of December 31, 2017, PERA's defined benefit plans had outstanding rights/warrants with a total fair value of \$177.

## OUTSTANDING RIGHTS/WARRANTS—DEFINED BENEFIT PLANS

As of December 31, 2017

Security Type	Fair Value
Warrants	\$5
Rights	172
<b>Total</b>	<b>\$177</b>

## Fixed Income Futures

Fixed income futures represent contracts between two parties to purchase or sell fixed income securities at a future date for a specified price. Futures contracts trade on organized exchanges. Upon entering into a futures contract, PERA is required to pledge an amount of cash or securities (known as an initial margin deposit) equal to a percentage of the contract amount. Recognition of investment income, with a corresponding change to the amount of investment receivables or liabilities, occurred on a daily basis according to the fluctuation of value of the futures contract. Payments were received or made to settle the fluctuation of the contract's value on a periodic basis.

Investment in futures contracts exposes PERA to market risk and credit risk. In an event where market conditions change and no action is taken, the maximum amount of loss which could occur is equal to the notional market exposure of the contract. The possibility of such a loss is remote. Credit risk is minimized by a settlement process which uses central counterparty clearing, initial margin deposits, and periodic settlement payments. At December 31, 2017, PERA's defined benefit plans had 26 outstanding fixed income futures contracts with a total notional market exposure of \$3,225 and total investment receivables of \$22.

## FUTURES CONTRACTS OUTSTANDING—DEFINED BENEFIT PLANS

As of December 31, 2017

Contract Type	Year of Maturity	Notional Amount (Market Exposure)
Fixed income futures	2018	\$3,225

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

**Note 7—Commitments and Contingencies**

As of December 31, 2017, PERA had commitments for future investments in Private Equity of \$2,578,176, Real Estate of \$843,374, and the Opportunity Fund of \$687,352.

**Pending or Threatened Litigation**

PERA is involved in various lawsuits or threatened legal proceedings arising in the normal course of business. In the opinion of management, the ultimate resolution of these other matters will not have a material effect on the financial condition of PERA.

**Note 8—Voluntary Investment Program, Defined Contribution Retirement Plan, and Deferred Compensation Plan**

PERA administers the Voluntary Investment Program, the Defined Contribution Retirement Plan, and the Deferred Compensation Plan (collectively, Plans). The Voluntary Investment Program (PERAPlus 401(k) Plan) and Defined Contribution Retirement Plan (DC Plan) are both defined contribution plans. The Deferred Compensation Plan (PERAPlus 457 Plan) is a deferred compensation plan. The Board has the authority to establish and amend the Plans pursuant to C.R.S. § 24-51-1401, C.R.S. § 24-51-1501, and C.R.S. § 24-51-1601, respectively. The complete provisions of the PERAPlus 401(k) Plan and the DC Plan are incorporated into *PERA's 401(k) and Defined Contribution Plan and Trust Document*. The complete provisions of the PERAPlus 457 Plan are incorporated into *The PERA Deferred Compensation Plan Document*.

**All Plans**

The following investment, distribution, and fee provisions are the same under all three Plans.

- Participants have the choice of contributing to 18 different investment options. In addition, participants may also make transfers, at any time, among the following listed investment options:

- PERAdvantage Capital Preservation Fund
- PERAdvantage Fixed Income Fund
- PERAdvantage Real Return Fund
- PERAdvantage U.S. Large Cap Fund
- PERAdvantage International Stock Fund
- PERAdvantage U.S. Small and Mid-Cap Stock Fund
- PERAdvantage Socially Responsible Investment (SRI) Fund
- PERAdvantage Income Fund
- PERAdvantage 2020 Fund
- PERAdvantage 2025 Fund

- PERAdvantage 2030 Fund
- PERAdvantage 2035 Fund
- PERAdvantage 2040 Fund
- PERAdvantage 2045 Fund
- PERAdvantage 2050 Fund
- PERAdvantage 2055 Fund
- PERAdvantage 2060 Fund
- TD Ameritrade Self-Directed Brokerage Account
- The participant's entire account balance becomes available for distribution upon termination from all PERA-affiliated and/or PERAPlus 457-affiliated employers. All distributions are in accordance with the Plan documents and IRC requirements.
- Voya Institutional Plan Services, LLC, administers the recordkeeping for all participant transactions. The custodian is Northern Trust for all PERAdvantage investments except for the Great-West Stable Value Fund, an investment within the PERAdvantage Capital Preservation Fund, and the TD Ameritrade Self-Directed Brokerage Account.
- TD Ameritrade, Inc. provides brokerage services for the Self-Directed Brokerage Account. The TD Ameritrade Self-Directed Brokerage Account, which consists of cash, equities, fixed income, mutual funds, and exchange traded funds, is presented at fair value.
- The Great-West Stable Value Fund is offered through a group fixed and variable deferred annuity contract issued by Great-West Life & Annuity Insurance Company. As of December 31, 2017, the value of the variable deferred annuity contract including interest receivable and pending trade payable is \$422,934. Fair value as of December 31, 2017, was \$418,518.
- Cash balances represent both operating cash accounts and investment cash on deposit held by the custodians.
- Plan administration expenses are paid through a monthly administrative fee charged to participant accounts and an asset-based fee paid directly from each PERAdvantage fund and/or self-directed brokerage account. In addition, the underlying investment portfolio managers within each PERAdvantage fund charge an investment management fee, which is paid directly from investment proceeds.

**PERAPlus 401(k) Plan**

The PERAPlus 401(k) Plan was established January 1, 1985, and is an IRC § 401(k) plan that allows for voluntary participation to provide additional benefits at retirement for PERA members. All employees working for a PERA-affiliated employer may contribute to the PERAPlus 401(k) Plan. There were 409 employers eligible to participate in 2017 (see Note 1). The employer count is presented for purposes of complying with GASB 67 only. For all other purposes,

**NOTES TO THE FINANCIAL STATEMENTS***(Dollars in Thousands)*

the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

In 2017, participants could contribute the lesser of \$18,000 (actual dollars) or 100 percent of compensation less PERA member contributions. Catch-up contributions up to \$6,000 (actual dollars) in 2017 were allowed for participants who had attained age 50 before the close of the plan year, subject to the limitations of IRC § 414(v). Employer matching and discretionary contributions are allowable with total participant and employer contributions limited to \$54,000 (actual dollars) per participant in 2017.

Provisions of the PERAPlus 401(k) Plan permit in-service withdrawals by participants while employed with a PERA-affiliated employer through loans, hardship withdrawals, or by a trustee-to-trustee transfer to the PERA defined benefit plan to purchase service credit. The balance of outstanding loans as of December 31, 2017, is \$60,115 and is recorded as a benefit receivable on the Statements of Fiduciary Net Position. As of December 31, 2017, there were 68,891 participants with balances. Of the participants with balances, 24,796 made contributions within the last three months of the year, including 783 retirees. There were 13,112 terminated participants and 18,157 non-contributing retirees with balances. During 2017, the PERAPlus 401(k) Plan had a total of 2,286 terminated participants take full distributions of their accounts.

**DC Plan**

The DC Plan was established January 1, 2006, and is an IRC § 401(a) governmental profit-sharing plan. Its purpose is to offer a defined contribution alternative to the PERA defined benefit plan.

Participation is available to certain new employees of State agencies and departments, most community college employees, and the District Attorney within each Judicial District, and if authorized by the county and the District Attorney, the attorneys within that Judicial District. The eligible employees have the option to choose the PERA defined benefit plan or the DC Plan. There were 23 employers eligible to participate in 2017. The employer count is presented for purposes of complying with GASB 67 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

The Colorado General Assembly passed significant pension reform through SB 18-200: *Concerning Modifications To the Public Employees' Retirement Association Hybrid Defined Benefit Plan Necessary To Eliminate with a High Probability the Unfunded Liability of the Plan Within the Next Thirty Years*. The bill was signed into law by Governor Hickenlooper on June 4, 2018. SB 18-200 makes changes to eligibility provisions of the DC Plan administered by PERA. As these changes to eligibility provisions were not in effect at the end of 2017, a detailed summary of the changes required by SB 18-200 have been disclosed as a subsequent event in Note 12 on pages 99–100.

Between month 13 and month 72 of participation in the DC Plan, eligible participants may elect to terminate membership in the DC Plan and become a member of the PERA defined benefit plan.

Similarly, an eligible employee of the PERA defined benefit plan may elect, between month 13 and month 72 of membership, to terminate membership in the PERA defined benefit plan and become a participant of the DC Plan. Either election is irrevocable.

Participants in the DC Plan are required to contribute 8.00 percent and employers are required to contribute 10.15 percent of includable salary (for State Troopers and CBI agents, the participant and employer rates are 10.00 percent and 12.85 percent, respectively). In addition, employers contribute the 5.00 percent AED and 5.00 percent SAED to the State Division Trust Fund (see Note 4). DC Plan participants immediately vest in 50 percent of their employer contributions, together with accumulated investment earnings on the vested portion. For each full year of participation, vesting increases by 10 percent. Contribution requirements are established under C.R.S. § 24-51-1505.

Provisions of the DC Plan allow for the transfer of DC funds to the PERAPlus 401(k) Plan if a participant is still a PERA member but not active in the DC Plan. Additionally, the election to purchase service is available to those who are eligible and who are members of the PERA defined benefit plan with an existing DC Plan account. As of December 31, 2017, the DC Plan had 6,097 participants with balances. Of the participants with balances, 2,370 made contributions within the last three months of the year, including seven retirees. There were 3,151 terminated participants and 26 non-contributing retirees with balances. During the year, 391 participants took full distributions of their accounts.

**PERAPlus 457 Plan**

On July 1, 2009, PERA assumed the administrative and fiduciary responsibilities for the State of Colorado Deferred Compensation Plan previously administered under C.R.S. Part 1 of Article 52 of Title 24, as said part existed prior to its repeal in 2009.

The PERAPlus 457 Plan is an IRC § 457 plan that allows for voluntary participation to provide additional benefits at retirement. All employees working for a PERA employer affiliated with the PERAPlus 457 Plan may contribute to the PERAPlus 457 Plan. All employers that were affiliated with the State 457 Plan prior to July 1, 2009, including those that are not PERA-affiliated employers, remained affiliated with the PERAPlus 457 Plan and their employees remained eligible to contribute. In 2017, participants could defer the lesser of \$18,000 (actual dollars) or 100 percent of compensation less PERA member contributions. Catch-up deferrals, up to the greater of \$6,000 (actual dollars) for participants who had attained age 50 before the close of the plan year or the limits of the special section 457 plan catch-up, were allowed in 2017, subject to the limitations of IRC § 414(v) and § 457(b).

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

Provisions of the PERAPlus 457 Plan permit in-service withdrawals by participants while employed with a PERAPlus 457 Plan-affiliated employer through loans, unforeseen emergency withdrawals, de minimis distributions, or by a trustee-to-trustee transfer to the PERA defined benefit plan to purchase service. The balance of outstanding loans as of December 31, 2017, is \$11,872 and is recorded as a benefit receivable on the Statements of Fiduciary Net Position. As of December 31, 2017, there were 18,211 participants with balances. Of the participants with balances, 9,209 made contributions within the last three months of the year, including 247 retirees. There were 2,730 terminated participants and 4,048 non-contributing retirees with balances. During the year, the PERAPlus 457 Plan had a total of 767 terminated participants take full distributions of their accounts.

## Note 9—Health Care Trust Funds—Defined Benefit Health Care Plans

PERA offers two defined benefit OPEB health care plans to benefit recipients and retirees. The HCTF and the DPS HCTF were created under C.R.S. § 24-51-1201(1) and (2), respectively. The HCTF is a cost-sharing multiple-employer plan and the DPS HCTF is a single-employer plan. These funds provide a health care premium subsidy to eligible participating PERA benefit recipients and retirees who choose to enroll in one of the PERA health care plans, however, the subsidy is not available if only enrolled in the dental and/or vision plan(s). The health care premium subsidy is based upon the benefit structure under which the member retires and the member's years of service credit. For members who retire having service credit with employers in the DPS Division and one or more of the other four divisions, the premium subsidy is allocated between the two Health Care Trust Funds. The basis for the amount of the premium subsidy funded by each trust fund is the percentage of the member contribution account balance from each division as it relates to the total member contribution account balance from which the retirement benefit is paid.

### PERA Board Authority

Title 24, Article 51, Part 12 of the C.R.S., as amended, sets forth a framework that grants authority to the Board to contract, self-insure, and authorize disbursements necessary in order to carry out the purposes of the PERACare program, including the administration of the premium subsidies. PERA contracts with a national insurance carrier to administer claims for the self-insured health care plans, with a national prescription benefit manager to administer a pharmacy benefit for the self-insured plans, and with health insurance companies to provide fully insured health care plans providing services within Colorado.

### Plan Description and Benefit Provisions

C.R.S. § 24-51-1202 *et seq.* specifies the eligibility for enrollment in the health care plans offered by PERA and the amount of the premium subsidy. The law governing a benefit recipient's eligibility

for the subsidy and the amount of the subsidy differs slightly depending under which benefit structure the benefits are calculated. All benefit recipients under the PERA benefit structure and all retirees under the DPS benefit structure are eligible for a premium subsidy, if enrolled in a health care plan under PERACare. Upon the death of a DPS benefit structure retiree, no further subsidy is paid.

### Membership Eligibility

Enrollment in the PERACare health care program is voluntary and available to the following eligible individuals:

- Benefit recipients and their dependents.
- Guardians of children receiving PERA survivor benefits if the children are enrolled in the health care program.
- Surviving spouses of deceased retirees who chose single-life annuity options, if the surviving spouse was enrolled in the program when the retiree's death occurred.
- Divorced spouses of retirees who are not receiving PERA benefits, but were enrolled in the program when the divorce occurred.
- Members while receiving short-term disability program payments.
- Members whose employers have elected to provide coverage through the health care program and such members' dependents.

### Available Health Care Premium Subsidy

#### PERA Benefit Structure

The maximum service-based premium subsidy is \$230 (actual dollars) per month for benefit recipients who are under 65 years of age and who are not entitled to Medicare; the maximum service-based subsidy is \$115 (actual dollars) per month for benefit recipients who are 65 years of age or older or who are under 65 years of age and entitled to Medicare. The basis for the maximum service-based subsidy, in each case, is for benefit recipients with retirement benefits based on 20 or more years of service credit. There is a 5 percent reduction in the subsidy for each year less than 20. The benefit recipient pays the remaining portion of the premium to the extent the subsidy does not cover the entire amount.

For benefit recipients who have not participated in Social Security and who are not otherwise eligible for premium-free Medicare Part A for hospital-related services, C.R.S. § 24-51-1206(4) provides an additional subsidy. According to the statute, PERA cannot charge premiums to benefit recipients without Medicare Part A that are greater than premiums charged to benefit recipients with Part A for the same plan option, coverage level, and service credit. Currently, for each individual PERACare enrollee, the total premium for Medicare coverage is determined assuming plan participants have both Medicare Part A and Part B and the difference in premium cost is paid by the HCTF or the DPS HCTF on behalf of benefit recipients not covered by Medicare Part A.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

**DPS Benefit Structure**

The maximum service-based premium subsidy is \$230 (actual dollars) per month for retirees who are under 65 years of age and who are not entitled to Medicare; the maximum service-based subsidy is \$115 (actual dollars) per month for retirees who are 65 years of age or older or who are under 65 years of age and entitled to Medicare. The basis for the maximum subsidy, in each case, is for retirees with retirement benefits based on 20 or more years of service credit. There is a 5 percent reduction in the subsidy for each year less than 20. The retiree pays the remaining portion of the premium to the extent the subsidy does not cover the entire amount.

For retirees who have not participated in Social Security and who are not otherwise eligible for premium-free Medicare Part A for hospital-related services, the HCTF or the DPS HCTF pays an alternate service-based premium subsidy. Each individual retiree meeting these conditions receives the maximum \$230 (actual dollars) per month subsidy reduced appropriately for service less than 20 years, as described above. Retirees who do not have Medicare Part A pay the difference between the total premium and the monthly subsidy.

**Medicare Prescription Drugs**

The Medicare Prescription Drug, Improvement, and Modernization Act of 2003 established prescription drug coverage for Medicare beneficiaries under Medicare Part D. Beginning January 1, 2014, PERACare's prescription drug coverage for the self-insured Medicare supplement plans was moved to Employer Group Waiver Plan (EGWP) Medicare Part D prescription drug coverage. The EGWP provides three types of anticipated subsidies which the HCTF and DPS HCTF use to reduce the required premiums collected from the enrollees. Each fund pays for the full claims during the year and recoups the additional cost offsetting claims expense when the subsidies are received from the EGWP.

The subsidies provided by the EGWP include the following:

- A monthly direct subsidy based on the number of enrollees in the plan.
- A quarterly Coverage Gap Discount Program which is funded by pharmaceutical manufacturers and reimburses the funds a portion of the cost of certain drugs retirees have filled.
- An annual catastrophic coverage federal reinsurance which reimburses a portion of drug costs for retirees who reach a certain level of drug costs in a year.

The following amounts were recognized by the funds in 2017:

Subsidy	HCTF	DPS HCTF
Monthly direct subsidy	\$3,506	\$128
Quarterly Coverage Gap Discount	8,696	317
Annual federal reinsurance	15,020	547
<b>Total</b>	<b>\$27,222</b>	<b>\$992</b>

**Contributions**

Contribution requirements are established by statute under C.R.S. § 24-51-208. Colorado State law provisions may be amended from time to time by the Colorado General Assembly. PERA-affiliated employers must submit contributions for all PERA members equal to 1.02 percent of covered salaries. PERA-affiliated employers of the State Division, School Division, Local Government Division, and Judicial Division contribute to the HCTF. Affiliated employers of the DPS Division contribute to the DPS HCTF.

Listed below is the number of active participating employers for the two Health Care Trust Funds. New guidance under GASB 74 classifies a primary government and its component units as one employer.

Trust Fund	As of December 31, 2017 <sup>1</sup>
HCTF	408
DPS HCTF	1
<b>Total employers</b>	<b>409</b>

<sup>1</sup> This employer count is presented for purposes of complying with GASB 74 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

Employer contributions and investment earnings on the assets pay for the cost of the premium subsidies and the administrative costs incurred by the funds.

**Plan Data**

Benefit recipients and members of PERA consisted of the following as of December 31, 2017:

**MEMBERSHIP—HEALTH CARE TRUST FUNDS**

	HCTF	DPS HCTF	2017
Retirees and beneficiaries	111,436	7,044	<b>118,480</b>
Terminated employees eligible but not yet receiving benefits	25,977	1,596	<b>27,573</b>
Inactive members not eligible for benefits	219,329	10,919	<b>230,248</b>
Active members	191,778	15,991	<b>207,769</b>
<b>Total</b>	<b>548,520</b>	<b>35,550</b>	<b>584,070</b>

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

**PARTICIPATION IN THE HEALTH CARE PLANS FOR RETIREES AND SURVIVORS CURRENTLY RECEIVING RETIREMENT BENEFITS**

	HCTF	DPS HCTF	Total
<b>Enrolled in PERACare</b>			
Under age 65	12,470	526	12,996
Age 65 and older	44,004	3,290	47,294
	56,474	3,816	60,290
<b>Not enrolled in PERACare</b>			
Under age 65	14,848	604	15,452
Age 65 and older	40,114	2,624	42,738
	54,962	3,228	58,190
<b>Total retirees and survivors currently receiving benefits</b>	<b>111,436</b>	<b>7,044</b>	<b>118,480</b>

**Summary of HCTF and DPS HCTF**

PERA offers two general types of health plans: fully insured plans offered through a health care organization and self-insured plans administered by third-party vendors. The plans offered include HMO, PPO, Medicare Supplement, Medicare Advantage, and Medicare Cost plans.

Premiums collected and payments made are reported in two ways, depending on whether or not the funds bear any level of risk with regard to the health coverage. When there is no transfer of risk to the funds, the premiums collected are reported as a liability and the liability is relieved when the premiums are paid to the health insurance company that provides the fully insured health plan. When there is no health coverage risk, the only benefit payment reported is the subsidy benefit which is equal to the difference between the premiums collected from the enrollees and the full premium due to the health insurance company.

The health care plan that involves risk to the funds is the self-insured plan administered by Anthem Blue Cross Blue Shield (Anthem). When the health care plan bears risk, all claims paid are reported as benefit payments and premiums collected are reported as a reduction to benefit payments. PERA uses an outside consultant to determine the premiums required to cover anticipated health claims. The cost to the enrollee is reduced by the amount of the enrollee's calculated subsidy, if applicable. Implicit in this process is the risk that actual claims experience and the subsidies received from the EGWP could be different from the consultant's determination resulting in either a gain or a loss to the funds. In addition, other estimates and assumptions are made for these funds. It is possible that actual results could significantly differ from these estimates.

**Dental and Vision Plans**

Dental and vision plans are also available to benefit recipients. PERA offers fully insured and self-insured dental plans and self-insured vision plans. The funds provide no subsidy and the participants pay the full premiums for dental and vision coverage. For the fully insured dental plan, premiums collected are reported as a liability and the liability is relieved when the premiums are paid to the insurance company who provides the coverage. For this plan, the risk is borne by the insurance company contracted to provide the coverage. The claims paid for the self-insured dental and vision plans are recorded as benefit payments and the premiums collected are recorded as a reduction to benefit payments. PERA uses an outside consultant to determine the premiums required to cover anticipated claims. The risk to these plans is that actual claims experience could be different from the estimates resulting in either a gain or loss to the funds. As of December 31, 2017, there were 60,861 participants enrolled in the dental plans and 48,440 participants enrolled in the vision plans in both the HCTF and the DPS HCTF.

**PERA-Affiliated Employer Program Participation**

In addition, fully insured pre-Medicare health plans offered through Anthem and Kaiser Permanente are available to any PERA-affiliated employer who voluntarily elects to provide health care coverage through the health care plan for its employees who are PERA members. The program acts as a purchaser of private insurance to obtain economies of scale for the employers that elect to join in the joint purchasing arrangement. As of December 31, 2017, there were 17 employers in the program with 179 active members enrolled.

Fully insured dental and vision plans are also available to eligible employees of employers who have elected to provide health care coverage through PERA. As of December 31, 2017, there were 244 participants enrolled in the dental plans and 259 participants enrolled in the vision plans.

The insurance companies, who provide coverage through the program, set the rates for each employer group. There is no transfer of risk to the funds, PERA, or between the participating employers. The funds provide no subsidy and the insurance companies providing the benefits bear the risk for the plans. The participants and/or employers pay the full premiums for the coverage. PERA collects the premiums and remits them to the insurance companies who provide the coverage.

**NOTES TO THE FINANCIAL STATEMENTS**  
(*Dollars in Thousands*)

**Note 10—Net Pension Liability of the Division Trust Funds**

The components of the net pension liability (NPL) for participating employers for each Division Trust Fund as of December 31, 2017, are as follows:

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
Total pension liability	\$35,241,684	\$57,699,176	\$5,396,516	\$561,946	\$4,374,550
Plan fiduciary net position	15,223,702	25,362,730	4,283,086	329,862	3,478,040
<b>Net pension liability</b>	<b>\$20,017,982</b>	<b>\$32,336,446</b>	<b>\$1,113,430</b>	<b>\$232,084</b>	<b>\$896,510</b>
Plan fiduciary net position as a percentage of the total pension liability	43.20%	43.96%	79.37%	58.70%	79.51%

**Actuarial Methods and Assumptions**

Actuarial valuations involve estimates of the value of reported amounts and assumptions about the probability of events far into the future. Actuarially determined amounts are subject to continual revision as actual results are compared to past expectations and new estimates are made about the future. A Schedule of Net Pension Liability is included in the RSI, which follows the Notes to the Financial Statements. It presents multi-year trend information about whether the FNP is increasing or decreasing over time relative to the total pension liability (TPL). Calculations are based on the benefits provided under the terms of the substantive plan in effect at the time of each pension actuarial valuation and on the pattern of sharing of costs between employers of each Division Trust Fund and/or plan members to that point. Actuarial calculations reflect a long-term perspective.

The Colorado General Assembly passed significant pension reform through SB 18-200: *Concerning Modifications To the Public Employees' Retirement Association Hybrid Defined Benefit Plan Necessary to*

*Eliminate with a High Probability the Unfunded Liability of the Plan Within the Next Thirty Years.* The bill was signed into law by Governor Hickenlooper on June 4, 2018. SB 18-200 makes changes to certain benefit and contribution provisions of the defined benefit plans administered by PERA. In accordance with governmental accounting standards, the TPL was measured using the plan provisions in effect as of the measurement date, December 31, 2017. A detailed summary of the changes required by SB 18-200 have been disclosed as a subsequent event in Note 12 on pages 99–100.

The TPL for the Division Trust Funds was determined by actuarial valuations as of December 31, 2016, and generally accepted actuarial techniques were applied to roll forward the TPL to December 31, 2017 (measurement date). The December 31, 2016, actuarial valuations used the following actuarial cost method and key actuarial assumptions and other inputs:

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
Actuarial cost method	Entry age				
Price inflation	2.40%	2.40%	2.40%	2.40%	2.40%
Real wage growth	1.10%	1.10%	1.10%	1.10%	1.10%
Wage inflation	3.50%	3.50%	3.50%	3.50%	3.50%
Salary increases, including wage inflation	3.50%–9.17%	3.50%–9.70%	3.50%–10.45%	4.00%–5.00%	3.50%–9.70%
Long-term investment rate of return, net of pension plan investment expenses, including price inflation	7.25%	7.25%	7.25%	7.25%	7.25%
Discount rate <sup>1</sup>	5.26%	5.26%	7.25%	5.18%	7.25%
Post-retirement benefit increases:					
PERA benefit structure hired prior to 1/1/07 and DPS benefit structure	2.00% compounded annually				
PERA benefit structure hired after 12/31/06	Financed by the AIR <sup>2</sup>				

<sup>1</sup> The discount rates that were reflected in the roll-forward calculation of the TPL to the measurement date are shown on the schedule on page 94.

<sup>2</sup> Post-retirement benefit increases are provided by the AIR, accounted separately within each Division Trust Fund, and subject to moneys being available; therefore, liabilities related to increases for members of these benefit tiers can never exceed available assets.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

Healthy mortality assumptions for active members were based on the RP-2014 White Collar Employee Mortality Table, a table specifically developed for actively working people. To allow for an appropriate margin of improved mortality prospectively, the mortality rates incorporate a 70 percent factor applied to male rates and a 55 percent factor applied to female rates.

Healthy, post-retirement mortality assumptions for State and Local Government Divisions were based on the RP-2014 Healthy Annuitant Mortality Table, adjusted as follows:

- **Males:** Mortality improvement projected to 2018 using the MP-2015 projection scale, a 73 percent factor applied to rates for ages less than 80, a 108 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.
- **Females:** Mortality improvement projected to 2020 using the MP-2015 projection scale, a 78 percent factor applied to rates for ages less than 80, a 109 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.

Healthy, post-retirement mortality assumptions for School, Judicial, and DPS Divisions were based on the RP-2014 White Collar Healthy Annuitant Mortality Table, adjusted as follows:

- **Males:** Mortality improvement projected to 2018 using the MP-2015 projection scale, a 93 percent factor applied to rates for ages less than 80, a 113 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.
- **Females:** Mortality improvement projected to 2020 using the MP-2015 projection scale, a 68 percent factor applied to rates for ages less than 80, a 106 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.

The mortality assumption for disabled retirees was based on 90 percent of the RP-2014 Disabled Retiree Mortality Table.

The actuarial assumptions used in the December 31, 2016, valuations were based on the results of the 2016 experience analysis for the periods January 1, 2012, through December 31, 2015, as well as the October 28, 2016, actuarial assumptions workshop and were adopted by the Board during the November 18, 2016, Board meeting.

The long-term expected return on plan assets is reviewed as part of regular experience studies prepared every four or five years for PERA. Recently, this assumption has been reviewed more frequently. The most recent analyses were outlined in presentations to the Board on October 28, 2016.

Several factors were considered in evaluating the long-term rate of return assumption, including long-term historical data, estimates inherent in current market data, and a log-normal distribution analysis in which best-estimate ranges of expected future real rates of return (expected return, net of investment expense and inflation) were developed for each major asset class. These ranges were combined to produce the long-term expected rate of return by

weighting the expected future real rates of return by the target asset allocation percentage and then adding expected inflation. The capital market assumptions may cover a shorter investment horizon and may not be useful in setting the long-term rate of return for funding pension plans which covers a longer time frame. The assumption is intended to be a long-term assumption and is not expected to change absent a significant change in the asset allocation, a change in the inflation assumption, or a fundamental change in the market that alters expected returns in future years.

As of the most recent adoption of the long-term rate of return by the Board, the target asset allocation and best estimates of geometric real rates of return for each major asset class are summarized in the table as follows:

Asset Class	Target Allocation	30-Year Expected Geometric Real Rate of Return
U.S. Equity – Large Cap	21.20%	4.30%
U.S. Equity – Small Cap	7.42%	4.80%
Non-U.S. Equity – Developed	18.55%	5.20%
Non-U.S. Equity – Emerging	5.83%	5.40%
Core Fixed Income	19.32%	1.20%
High Yield	1.38%	4.30%
Non-U.S. Fixed Income – Developed	1.84%	0.60%
Emerging Market Debt	0.46%	3.90%
Core Real Estate	8.50%	4.90%
Opportunity Fund	6.00%	3.80%
Private Equity	8.50%	6.60%
Cash	1.00%	0.20%
<b>Total</b>	<b>100.00%</b>	

Note: In setting the long-term expected rate of return for the plan, projections employed to model future returns provide a range of expected long-term returns that, including expected inflation, ultimately support a long-term expected rate of return assumption of 7.25 percent.

#### Discount Rate/Single Equivalent Interest Rate

The projection of cash flows used to determine the discount rate was performed in accordance with GASB 67. The basis for the projection of the liabilities and the FNP was an actuarial valuation performed as of December 31, 2016, and the financial status of the funds as of the prior measurement date (December 31, 2016). In addition to the actuarial cost method and assumptions of the December 31, 2016, actuarial valuation presented earlier, the projection of cash flows applied the following methods and assumptions:

- Total covered payroll for the initial projection year consists of the covered payroll of the active membership present on the valuation date and the covered payroll of future plan members assumed to be hired during the year. In subsequent projection years, total covered payroll was assumed to increase annually at a rate of 3.50 percent.
- Employee contributions were assumed to be made at the member contribution rate as of the measurement date. Employee contributions for future plan members were used to reduce the estimated amount of total service costs for future plan members.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

- Employer contributions were assumed to be made at rates equal to the fixed statutory rates specified in law and effective as of the measurement date, including current and estimated future AED and SAED, until the actuarial value funding ratio reaches 103 percent, at which point, the AED and SAED will each drop 0.50 percent every year until they are zero. Additionally, estimated employer contributions included reductions for the funding of the AIR and retiree health care benefits. For future plan members, employer contributions were further reduced by the estimated amount of total service costs for future plan members not financed by their member contributions.
- Employer contributions and the amount of total service costs for future plan members were based upon a process used by the plan to estimate future ADCs assuming an analogous future plan member growth rate.
- The AIR balance was excluded from the initial FNP, as, per statute, AIR amounts cannot be used to pay benefits until transferred to either the retirement benefits reserve or the survivor benefits reserve, as appropriate. As the ad hoc post-retirement benefit increases financed by the AIR are defined to have a present value at the long-term expected rate of return on plan investments equal

to the amount transferred for their future payment, AIR transfers to the FNP and the subsequent AIR benefit payments have no impact on the single equivalent interest rate (SEIR) determination process when the timing of AIR cash flows is not a factor (i.e., the plan's FNP is not projected to be depleted). When AIR cash flow timing is a factor in the SEIR determination process (i.e., the plan's FNP is projected to be depleted), AIR transfers to the FNP and the subsequent AIR benefit payments were estimated and included in the projections.

- Benefit payments and contributions were assumed to be made at the end of the month.

Based on those methods and assumptions and the GASB 67 projection test methodology, the following table displays the discount rates used to measure the TPL for the prior measurement date (December 31, 2016) and the measurement date (December 31, 2017). In the determination of the discount rate applicable to the measurement date, this table also shows the crossover point where the division's FNP is projected to be depleted and the rates used to discount the projected benefit payments back to the measurement date for those periods:

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
<b>Discount rate (SEIR)</b>					
Prior measurement date	5.26%	5.26%	7.25%	5.18%	7.25%
Measurement date	4.72%	4.78%	7.25%	5.41%	7.25%
<b>Discount of projected benefit payments</b>					
Long-term expected rate of return	7.25%	7.25%	7.25%	7.25%	7.25%
Period rate was applied	Through 2038	Through 2041	All periods	Through 2042	All periods
Municipal bond index rate <sup>1, 2</sup>	3.43%	3.43%	N/A	3.43%	N/A
Period rate was applied	On and after 2038	On and after 2041	N/A	On and after 2042	N/A

<sup>1</sup> The municipal bond index rate is the average of the Bond Buyer General Obligation 20-year Municipal Bond Index Rates during the month of December published at the end of each week by The Bond Buyer.

<sup>2</sup> As of the prior measurement date, the municipal bond index rate was 3.86 percent.

The results of the GASB 67 projection test methodology and development of the discount rate for each fund do not necessarily indicate the fund's ability to make benefit payments in the future.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

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

The following presents the NPL for participating employers for each plan using the current discount rate, as well as what the plan's NPL would be if it were calculated using a discount rate that is one percentage point lower or one percentage point higher than the current rate:

<b>Trust Fund</b>	<b>1.0 Percent Decrease in Discount Rate</b>	<b>Net Pension Liability</b>
State Division	3.72%	\$24,903,807
School Division	3.78%	40,846,431
Local Government Division	6.25%	1,773,333
Judicial Division	4.41%	298,430
DPS Division	6.25%	1,410,777

<b>Trust Fund</b>	<b>Current Discount Rate</b>	<b>Net Pension Liability</b>
State Division	4.72%	\$20,017,982
School Division	4.78%	32,336,446
Local Government Division	7.25%	1,113,430
Judicial Division	5.41%	232,084
DPS Division	7.25%	896,510

<b>Trust Fund</b>	<b>1.0 Percent Increase in Discount Rate</b>	<b>Net Pension Liability</b>
State Division	5.72%	\$16,007,019
School Division	5.78%	25,401,780
Local Government Division	8.25%	563,306
Judicial Division	6.41%	175,676
DPS Division	8.25%	470,853

As shown, if there is a significant deviation, over a long period, in the actual rate of return compared to the assumed discount rate, the measurement of the NPL could be materially under- or over-reported as of December 31, 2017.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

**Note 11—Net OPEB Liability of the Health Care Trust Funds**

The components of the NOL for participating employers for each Health Care Trust Fund as of December 31, 2017, are as follows:

	HCTF	DPS HCTF
Total OPEB liability	\$1,575,822	\$73,267
Plan fiduciary net position	276,222	22,308
<b>Net OPEB liability</b>	<b>\$1,299,600</b>	<b>\$50,959</b>
Plan fiduciary net position as a percentage of the total OPEB liability	17.53%	30.45%

**Actuarial Methods and Assumptions**

Actuarial valuations involve estimates of the value of reported amounts and assumptions about the probability of events far into the future. Actuarially determined amounts are subject to continual revision as actual results are compared to past expectations and new estimates are made about the future. A Schedule of Net OPEB Liability is included in the RSI, which follows the Notes to the

Financial Statements. It presents multi-year trend information about whether the FNP is increasing or decreasing over time relative to the TOL. Calculations are based on the benefits provided under the terms of the substantive plan in effect at the time of each actuarial valuation and on the pattern of sharing of costs between employers of each fund to that point. Actuarial calculations reflect a long-term perspective. In accordance with governmental accounting standards, the TOL is measured using the plan provisions in effect at the measurement date, December 31, 2017.

The TOL for the Health Care Trust Funds was determined by actuarial valuations as of December 31, 2016, and generally accepted actuarial techniques were applied to roll forward the TOL to December 31, 2017 (measurement date). The December 31, 2016, actuarial valuations used the following actuarial cost method and key actuarial assumptions and other inputs:

	HCTF	DPS HCTF
Actuarial cost method		
Price inflation	Entry age	Entry age
Real wage growth	2.40%	2.40%
Wage inflation	1.10%	1.10%
Salary increases, including wage inflation	3.50%	3.50%
Long-term investment rate of return, net of OPEB plan investment expenses, including price inflation	3.50% in aggregate	3.50% in aggregate
Discount rate	7.25%	7.25%
Health care cost trend rates	7.25%	7.25%
PERA benefit structure:		
Service-based premium subsidy	0.00%	0.00%
PERACare Medicare plans	5.00%	5.00%
Medicare Part A premiums	3.00% for 2017, gradually rising to 4.25% in 2023	3.00% for 2017, gradually rising to 4.25% in 2023
DPS benefit structure:		
Service-based premium subsidy	0.00%	0.00%
PERACare Medicare plans	N/A	N/A
Medicare Part A premiums	N/A	N/A

Health care cost trend rates reflect the change in per capita health costs over time due to factors such as medical inflation, utilization, plan design, and technology improvements. For the PERA benefit structure, health care cost trend rates are needed to project the future costs associated with providing benefits to those PERACare enrollees not eligible for premium-free Medicare Part A.

Health care cost trend rates for the PERA benefit structure are based on published annual health care inflation surveys in conjunction with actual plan experience (if credible), building block models and heuristics developed by health plan actuaries and administrators, and projected trends for the Federal Hospital Insurance Trust Fund (Medicare Part A premiums) provided by the Centers for Medicare & Medicaid Services. Effective December 31, 2016, the health care cost

trend rates for Medicare Part A premiums were revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.

The PERA benefit structure health care cost trend rates that were used to measure the TOL are summarized in the table below:

Year	PERACare Medicare Plans	Medicare Part A Premiums
2017	5.00%	3.00%
2018	5.00%	3.25%
2019	5.00%	3.50%
2020	5.00%	3.75%
2021	5.00%	4.00%
2022	5.00%	4.00%
2023	5.00%	4.25%
2024+	5.00%	4.25%

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

Mortality assumptions used in Note 10 for the determination of the TPL for each the Division Trust Funds as shown below are applied, as applicable, in the determination of the TOL for the Health Care Trust Funds. Affiliated employers of the State, School, Local Government, and Judicial Divisions participate in the HCTF. Affiliated employers of the DPS Division participate in the DPS HCTF.

Healthy mortality assumptions for active members were based on the RP-2014 White Collar Employee Mortality Table, a table specifically developed for actively working people. To allow for an appropriate margin of improved mortality prospectively, the mortality rates incorporate a 70 percent factor applied to male rates and a 55 percent factor applied to female rates.

Healthy, post-retirement mortality assumptions for State and Local Government Divisions were based on the RP-2014 Healthy Annuitant Mortality Table, adjusted as follows:

- Males: Mortality improvement projected to 2018 using the MP-2015 projection scale, a 73 percent factor applied to rates for ages less than 80, a 108 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.
- Females: Mortality improvement projected to 2020 using the MP-2015 projection scale, a 78 percent factor applied to rates for ages less than 80, a 109 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.

Healthy, post-retirement mortality assumptions for School, Judicial, and DPS Divisions were based on the RP-2014 White Collar Healthy Annuitant Mortality Table, adjusted as follows:

- Males: Mortality improvement projected to 2018 using the MP-2015 projection scale, a 93 percent factor applied to rates for ages less than 80, a 113 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.
- Females: Mortality improvement projected to 2020 using the MP-2015 projection scale, a 68 percent factor applied to rates for ages less than 80, a 106 percent factor applied to rates for ages 80 and above, and further adjustments for credibility.

The mortality assumption for disabled retirees was based on 90 percent of the RP-2014 Disabled Retiree Mortality Table.

The following economic and demographic assumptions were specifically developed for, and used in, the measurement of the obligations for the HCTF and DPS HCTF:

- The assumed rates of PERACare participation were revised to reflect more closely actual experience.
- Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits were updated to reflect the change in costs for the 2017 plan year.

- The percentages of PERACare enrollees who will attain age 65 and older ages and are assumed to not qualify for premium-free Medicare Part A coverage were revised to more closely reflect actual experience.
- The percentage of disabled PERACare enrollees who are assumed to not qualify for premium-free Medicare Part A coverage were revised to reflect more closely actual experience.
- Assumed election rates for the PERACare coverage options that would be available to future PERACare enrollees who will qualify for the "No Part A Subsidy" when they retire were revised to more closely reflect actual experience.
- Assumed election rates for the PERACare coverage options that will be available to those current PERACare enrollees, who qualify for the "No Part A Subsidy" but have not reached age 65, were revised to more closely reflect actual experience.
- The health care cost trend rates for Medicare Part A premiums were revised to reflect the then-current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
- The rates of PERACare coverage election for spouses of eligible inactive members and future retirees were revised to more closely reflect actual experience.
- The assumed age differences between future retirees and their participating spouses were revised to reflect more closely actual experience.

The actuarial assumptions used in the December 31, 2016, valuations were based on the results of the 2016 experience analysis for the periods January 1, 2012, through December 31, 2015, as well as, the October 28, 2016, actuarial assumptions workshop and were adopted by the Board during the November 18, 2016, Board meeting. In addition, certain actuarial assumptions pertaining to per capita health care costs and their related trend rates are analyzed and updated annually by the Board's actuary, as needed.

The long-term expected return on plan assets is reviewed as part of regular experience studies prepared every four or five years for PERA. Recently, this assumption has been reviewed more frequently. The most recent analyses were outlined in presentations to the Board on October 28, 2016. Several factors were considered in evaluating the long-term rate of return assumption, including long-term historical data, estimates inherent in current market data, and a log-normal distribution analysis in which best-estimate ranges of expected future real rates of return (expected return, net of investment expense and inflation) were developed for each major asset class. These ranges were combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and then adding expected inflation. The capital market assumptions may cover a shorter investment horizon and may not be useful in setting the long-term rate of return for funding OPEB plans which covers a longer time frame. The assumption is intended to be a long-term assumption and is not expected to

## NOTES TO THE FINANCIAL STATEMENTS

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change absent a significant change in the asset allocation, a change in the inflation assumption, or a fundamental change in the market that alters expected returns in future years.

As of the most recent adoption of the long-term rate of return by the Board, the target asset allocation and best estimates of geometric real rates of return for each major asset class are summarized in the table as follows:

Asset Class	Target Allocation	30-Year Expected Geometric Real Rate of Return
U.S. Equity—Large Cap	21.20%	4.30%
U.S. Equity—Small Cap	7.42%	4.80%
Non-U.S. Equity—Developed	18.55%	5.20%
Non-U.S. Equity—Emerging	5.83%	5.40%
Core Fixed Income	19.32%	1.20%
High Yield	1.38%	4.30%
Non-U.S. Fixed Income—Developed	1.84%	0.60%
Emerging Market Debt	0.46%	3.90%
Core Real Estate	8.50%	4.90%
Opportunity Fund	6.00%	3.80%
Private Equity	8.50%	6.60%
Cash	1.00%	0.20%
<b>Total</b>	<b>100.00%</b>	

Note: In setting the long-term expected rate of return for the plan, projections employed to model future returns provide a range of expected long-term returns that, including expected inflation, ultimately support a long-term expected rate of return assumption of 7.25 percent.

### Sensitivity of the Net OPEB Liability to Changes in the Health Care Cost Trend Rates

The following presents the NOL using the current health care cost trend rates applicable to the PERA benefit structure, as well as what the fund's NOL would be if it were calculated using health care cost trend rates that are one percentage point lower or one percentage point higher than the current rates:

	1.0 Percent Decrease in Trend Rates	Current Trend Rates	1.0 Percent Increase in Trend Rates
PERACare Medicare trend rate	4.00%	5.00%	6.00%
Initial Medicare Part A trend rate	2.00%	3.00%	4.00%
Ultimate Medicare Part A trend rate	3.25%	4.25%	5.25%
HCTF net OPEB liability	\$1,263,843	\$1,299,600	\$1,342,667
DPS HCTF net OPEB liability	50,897	50,959	51,042

### Discount Rate/Single Equivalent Interest Rate

The projection of cash flows used to determine the discount rate was performed in accordance with GASB 74. The basis for the projections of the liabilities and the FNP was an actuarial valuation performed as of December 31, 2016 and the financial status of the fund as of the prior measurement date (December 31, 2016). In addition to the actuarial cost method and assumptions of the December 31, 2016, actuarial valuation presented earlier, the projection of cash flows applied the following methods and assumptions:

- Updated health care cost trend rates for Medicare Part A premiums as of the December 31, 2017, measurement date.

- Total covered payroll for the initial projection year consists of the covered payroll of the active membership present on the valuation date and the covered payroll of future plan members assumed to be hired during the year. In subsequent projection years, total covered payroll was assumed to increase annually at a rate of 3.50 percent.
- Employer contributions were assumed to be made at rates equal to the fixed statutory rates specified in law and effective as of the measurement date. For future plan members, employer contributions were reduced by the estimated amount of total service costs for future plan members.
- Employer contributions and the amount of total service costs for future plan members were based upon a process used by the plan to estimate future ADCs assuming an analogous future plan member growth rate.
- Transfers of a portion of purchase service agreements intended to cover the costs associated with OPEB benefits were estimated and included in the projections.
- Benefit payments and contributions were assumed to be made at the end of the month.

Based on those methods and assumptions and the GASB 74 projection test methodology, the FNP for the HCTF and DPS HCTF were projected to be available to make all projected future benefit payments of current plan members and were not projected to reach a depletion date. Therefore, the long-term expected rate of return on plan investments was applied to all periods of projected benefit payments to determine the TOL for each fund. The discount rate determination does not use a municipal bond index rate. The discount rate used to measure the TOL for these funds as of the measurement date (December 31, 2017) was 7.25 percent.

The results of the GASB 74 projection test methodology and development of the discount rate for each fund do not necessarily indicate the fund's ability to make benefit payments in the future.

### Sensitivity of the Net OPEB Liability to Changes in the Discount Rate

The following presents the NOL for participating employers for each fund using the current discount rate, as well as what the fund's NOL would be if it were calculated using a discount rate that is one percentage point lower or one percentage point higher than the current rate:

1.0 Percent Decrease in Discount Rate	Net OPEB Liability
HCTF	\$1,461,159
DPS HCTF	58,073
Current Discount Rate	Net OPEB Liability
HCTF	\$1,299,600
DPS HCTF	50,959
1.0 Percent Increase in Discount Rate	Net OPEB Liability
HCTF	\$1,161,705
DPS HCTF	44,878

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As shown, if there is a significant deviation, over a long period, in the actual rate of return compared to the assumed discount rate, the measurement of the NOL could be materially under- or over-reported as of December 31, 2017.

## Note 12—Subsequent Events

### Legislation Impacting Future Years

During the 2018 legislative session, the Colorado General Assembly passed significant pension reform through SB 18-200: *Concerning Modifications To the Public Employees' Retirement Association Hybrid Defined Benefit Plan Necessary to Eliminate with a High Probability the Unfunded Liability of the Plan Within the Next Thirty Years*. The bill was signed into law by Governor Hickenlooper on June 4, 2018. SB 18-200 makes changes to the plans administered by PERA with the goal of eliminating the UAAL of the Division Trust Funds and thereby reach a 100 percent funded ratio for each division within the next 30 years. A summary of the bill's main provisions is as follows:

#### Benefit Changes

- Increase the number of years used in the HAS calculation from three to five years for members, except judges, who do not have five years of service credit on December 31, 2019, and for new members hired on or after January 1, 2020.
- Increase the number of years used in the HAS calculation for the Judicial Division from one to three years for members who do not have five years of service credit on December 31, 2019, and for new members hired on or after January 1, 2020.
- Redefine PERA-includable salary for all members to include payouts of unused sick leave.
- Redefine PERA-includable salary for members hired on or after July 1, 2019, to include contributions to IRC Section 125 and 132 plans.
- Apply the State Trooper contribution rate, retirement age, and benefits to other safety officers, including sheriff deputies and corrections officers hired on or after January 1, 2020.
- For members, other than State Troopers, hired on or after January 1, 2020, age and service for full service retirement is met at:
  - Any age with 35 years.
  - Age 64 with 30 years.
  - Age 65 with 5 years.
- For members, other than State Troopers, hired on or after January 1, 2020, age and service for reduced service retirement is met at:
  - Age 55 with 25 years.
  - Age 60 with 5 years.

- For State Troopers hired on or after January 1, 2020, age and service for full service retirement is met at:
  - Any age with 35 years.
  - Age 55 with 25 years.
  - Age 65 with 5 years.

- For State Troopers hired on or after January 1, 2020, age and service for reduced service retirement is met at:

- Age 55 with 20 years.

- Temporary suspension of AI for years 2018 and 2019.

- Sets the AI cap at 1.5 percent and extends the AI waiting period from one to three years.

#### Contribution Changes

- Incrementally increases the member contribution percentage a total of 2.00 percent as follows:
  - 0.75 percent on July 1, 2019.
  - 0.75 percent on July 1, 2020.
  - 0.50 percent on July 1, 2021.
- Increase employer contributions 0.25 percent on July 1, 2019, for all divisions except for the Local Government Division.
- PERA will receive an annual direct distribution from the State in the amount of \$225 million (in actual dollars). The distribution will occur on July 1, 2018, and on July 1 each year thereafter until there are no unfunded actuarial accrued liabilities in the trust fund of any division that receives such distribution. PERA shall allocate the distribution to the trust funds as it would an employer contribution in a manner that is proportionate to the annual payroll of each division except there shall be no allocation to the Local Government Division.
- Beginning January 1, 2021, and every year thereafter, employer contribution rates for the State and Local Government Divisions will be adjusted to include a defined contribution supplement. The defined contribution supplement for these two divisions will be the employer contribution amount paid to defined contribution plan participant accounts that would have otherwise gone to the defined benefit trusts to pay down the unfunded liability plus any defined benefit investment earnings thereon, expressed as a percentage of salary on which employer contributions have been made.

#### Other Provisions

- Beginning July 1, 2020, and then each year thereafter, member contributions, employer contributions, the direct distribution from the State, and the AI will be adjusted based on certain statutory parameters to keep PERA on path to full funding in 30 years.

## NOTES TO THE FINANCIAL STATEMENTS

(Dollars in Thousands)

- Expand PERAChoice for new members hired on or after January 1, 2019, in the Local Government Division and to new members hired on or after January 1, 2019, who are classified college and university employees in the State Division.
- Increase the cost to disaffiliate for Local Government Division employers by setting the discount rate to equal the long-term assumed rate of return assumption minus 200 basis points.
- Expand the existing Fire and Police Pension Reform Commission to include oversight of PERA and creates a new Subcommittee exclusively focused on PERA.
- PERA may share private equity and real estate investment information in an executive session of the legislative members of the Pension Review Commission unless confidentiality provisions of contracts prohibit such disclosure.

Governmental accounting standards require the net pension liabilities for financial reporting purposes be measured using the plan provisions in effect as of the pension plan's year-end. Additionally, governmental accounting standards require that the passage of SB 18-200 into law be treated as a nonrecognized subsequent event as these statutory changes to plan provisions did not exist as of the December 31, 2017, measurement date. The collective net pension liabilities calculated using the plan provisions in effect at December 31, 2017, for the five Division Trust Funds and required disclosures can be found in Note 10. For comparative purposes, the following schedule presents the net pension liabilities and associated discount rates found in Note 10, as well as estimates of what the net pension liabilities and associated discount rates would have been had SB 18-200 become law on December 31, 2017. This pro forma information was prepared using the FNP of each of the Division Trust Funds as of December 31, 2017. Future net pension liabilities reported could be materially different based on changes in investment markets, actuarial assumptions, plan experience and other factors.

Trust Fund	Discount Rate (Found in Note 10)	Collective Net Pension Liability (Found in Note 10)	Estimated Discount Rate Calculated Using Plan Provisions Required by SB 18-200 (Pro forma)	Estimated Collective Net Pension Liability Using Plan Provisions Required by SB 18-200 (Pro forma)
State Division	4.72%	\$20,017,982	7.25%	\$9,492,389 <sup>1</sup>
School Division	4.78%	32,336,446	7.25%	14,609,326 <sup>2</sup>
Local Government Division	7.25%	1,113,430	7.25%	787,548
Judicial Division	5.41%	232,084	7.25%	99,572 <sup>3</sup>
DPS Division	7.25%	896,510	7.25%	649,523
<b>Total<sup>4</sup></b>		<b>\$54,596,452</b>		<b>\$25,638,358</b>

<sup>1</sup> Recognizing that the changes in contribution and benefit provisions also affect the determination of the discount rate used to calculate the collective NPL, approximately \$8,932,894 of the difference between Note 10 and pro forma amount is attributable to the use of a 7.25 percent discount rate.

<sup>2</sup> Recognizing that the changes in contribution and benefit provisions also affect the determination of the discount rate used to calculate the collective NPL, approximately \$15,094,855 of the difference between Note 10 and pro forma amount is attributable to the use of a 7.25 percent discount rate.

<sup>3</sup> Recognizing that the changes in contribution and benefit provisions also affect the determination of the discount rate used to calculate the collective NPL, approximately \$98,065 of the difference between Note 10 and pro forma amount is attributable to the use of a 7.25 percent discount rate.

<sup>4</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS**  
*(Dollars in Thousands)*

**SCHEDULE OF CHANGES IN NET PENSION LIABILITY<sup>1</sup>—STATE DIVISION**

For the Years Ended December 31

	2017	2016	2015	2014
<b>Total pension liability</b>				
Service cost	<b>\$518,360</b>	\$317,466	\$309,351	\$285,311
Interest	<b>1,640,426</b>	1,741,390	1,700,903	1,663,542
Changes of benefit terms	—	—	—	—
Difference between expected and actual experience	<b>416,731</b>	176,889	237,147	(1,069)
Changes of assumptions or other inputs	<b>2,286,877</b>	7,313,068	(192,776)	—
Benefit payments, refunds, and disability premiums	<b>(1,615,021)</b>	(1,546,071)	(1,483,517)	(1,415,754)
<b>Net change in total pension liability</b>	<b>3,247,373</b>	8,002,742	571,108	532,030
 Total pension liability – beginning	<b>31,994,311</b>	23,991,569	23,420,461	22,888,431
<b>Total pension liability – ending (a)</b>	<b>\$35,241,684</b>	<b>\$31,994,311</b>	<b>\$23,991,569</b>	<b>\$23,420,461</b>
 Plan fiduciary net position				
Contributions – employer	<b>\$563,977</b>	\$521,804	\$484,005	\$444,372
Contributions – active member (includes purchased service)	<b>256,420</b>	247,533	244,926	234,056
Net investment income	<b>2,391,683</b>	947,981	210,337	780,762
Benefit payments, refunds, and disability premiums	<b>(1,615,021)</b>	(1,546,071)	(1,483,517)	(1,415,754)
Administrative expense	<b>(11,745)</b>	(11,271)	(10,779)	(10,067)
Other additions and deductions	<b>12,208</b>	5,668	1,617	118
<b>Net change in plan fiduciary net position</b>	<b>1,597,522</b>	165,644	(553,411)	33,487
 Plan fiduciary net position – beginning	<b>13,626,180</b>	13,460,536	14,013,947	13,980,460
<b>Plan fiduciary net position – ending (b)</b>	<b>\$15,223,702</b>	<b>\$13,626,180</b>	<b>\$13,460,536</b>	<b>\$14,013,947</b>
 Net pension liability – ending (a)-(b)	<b>\$20,017,982</b>	<b>\$18,368,131</b>	<b>\$10,531,033</b>	<b>\$9,406,514</b>

<sup>1</sup> Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

*The accompanying notes are an integral part of the Required Supplementary Information.*

**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS**  
*(Dollars in Thousands)*

**SCHEDULE OF CHANGES IN NET PENSION LIABILITY<sup>1</sup>—SCHOOL DIVISION**

For the Years Ended December 31

	2017	2016	2015	2014
<b>Total pension liability</b>				
Service cost	\$954,368	\$567,247	\$548,358	\$511,059
Interest	2,690,433	2,722,256	2,652,731	2,582,865
Changes of benefit terms	—	—	—	—
Difference between expected and actual experience	564,155	346,658	278,464	(1,387)
Changes of assumptions or other inputs	3,547,294	13,572,334	(298,005)	—
Benefit payments, refunds, and disability premiums	(2,411,987)	(2,300,644)	(2,208,452)	(2,113,547)
<b>Net change in total pension liability</b>	<b>5,344,263</b>	<b>14,907,851</b>	<b>973,096</b>	<b>978,990</b>
 Total pension liability – beginning	 52,354,913	 37,447,062	 36,473,966	 35,494,976
<b>Total pension liability – ending (a)</b>	<b>\$57,699,176</b>	<b>\$52,354,913</b>	<b>\$37,447,062</b>	<b>\$36,473,966</b>
 <b>Plan fiduciary net position</b>				
Contributions – employer	\$857,740	\$812,740	\$754,182	\$686,323
Contributions – active member (includes purchased service)	399,053	386,481	372,378	356,520
Net investment income	3,982,275	1,569,026	344,000	1,274,862
Benefit payments, refunds, and disability premiums	(2,411,987)	(2,300,644)	(2,208,452)	(2,113,547)
Administrative expense	(23,019)	(21,991)	(20,865)	(19,290)
Other additions and deductions	(22,378)	(17,334)	(9,082)	(4,264)
<b>Net change in plan fiduciary net position</b>	<b>2,781,684</b>	<b>428,278</b>	<b>(767,839)</b>	<b>180,604</b>
 Plan fiduciary net position – beginning	 22,581,046	 22,152,768	 22,920,607	 22,740,003
<b>Plan fiduciary net position – ending (b)</b>	<b>\$25,362,730</b>	<b>\$22,581,046</b>	<b>\$22,152,768</b>	<b>\$22,920,607</b>
 <b>Net pension liability – ending (a)-(b)</b>	 <b>\$32,336,446</b>	 <b>\$29,773,867</b>	 <b>\$15,294,294</b>	 <b>\$13,553,359</b>

<sup>1</sup> Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

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**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS**  
*(Dollars in Thousands)*

**SCHEDULE OF CHANGES IN NET PENSION LIABILITY<sup>1</sup>—LOCAL GOVERNMENT DIVISION**

For the Years Ended December 31

	2017	2016	2015	2014
<b>Total pension liability</b>				
Service cost	\$75,417	\$65,250	\$63,005	\$58,676
Interest	360,995	346,944	338,616	329,156
Changes of benefit terms	(110)	—	—	—
Difference between expected and actual experience	125,585	42,105	14,930	(322)
Changes of assumptions or other inputs	—	179,802	(36,449)	—
Benefit payments, refunds, and disability premiums	(289,218)	(272,344)	(265,789)	(256,972)
<b>Net change in total pension liability</b>	<b>272,669</b>	<b>361,757</b>	<b>114,313</b>	<b>130,538</b>
 Total pension liability – beginning	 5,123,847	 4,762,090	 4,647,777	 4,517,239
<b>Total pension liability – ending (a)</b>	<b>\$5,396,516</b>	<b>\$5,123,847</b>	<b>\$4,762,090</b>	<b>\$4,647,777</b>
 <b>Plan fiduciary net position</b>				
Contributions – employer	\$78,291	\$75,132	\$70,415	\$68,719
Contributions – employer disaffiliation	1,063	—	—	186,006
Contributions – active member (includes purchased service)	56,797	52,451	51,986	49,290
Net investment income	669,011	261,276	56,328	200,394
Benefit payments, refunds, and disability premiums	(289,218)	(272,344)	(265,789)	(256,972)
Administrative expense	(2,541)	(2,395)	(2,253)	(2,091)
Other additions and deductions	(3,823)	(1,123)	(1,646)	(2,190)
<b>Net change in plan fiduciary net position</b>	<b>509,580</b>	<b>112,997</b>	<b>(90,959)</b>	<b>243,156</b>
 Plan fiduciary net position – beginning	 3,773,506	 3,660,509	 3,751,468	 3,508,312
<b>Plan fiduciary net position – ending (b)</b>	<b>\$4,283,086</b>	<b>\$3,773,506</b>	<b>\$3,660,509</b>	<b>\$3,751,468</b>
 <b>Net pension liability – ending (a)-(b)</b>	 <b>\$1,113,430</b>	 <b>\$1,350,341</b>	 <b>\$1,101,581</b>	 <b>\$896,309</b>

<sup>1</sup> Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

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**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS**  
*(Dollars in Thousands)*

**SCHEDULE OF CHANGES IN NET PENSION LIABILITY<sup>1</sup>—JUDICIAL DIVISION**

For the Years Ended December 31

	2017	2016	2015	2014
<b>Total pension liability</b>				
Service cost	\$14,364	\$12,639	\$10,813	\$9,024
Interest	27,480	25,774	25,005	24,820
Changes of benefit terms	—	—	—	—
Difference between expected and actual experience	16,644	22,804	7,289	(5)
Changes of assumptions or other inputs	(14,394)	43,576	21,485	21,294
Benefit payments, refunds, and disability premiums	(25,298)	(22,888)	(21,200)	(19,903)
<b>Net change in total pension liability</b>	<b>18,796</b>	<b>81,905</b>	<b>43,392</b>	<b>35,230</b>
 Total pension liability – beginning	 543,150	 461,245	 417,853	 382,623
<b>Total pension liability – ending (a)</b>	<b>\$561,946</b>	<b>\$543,150</b>	<b>\$461,245</b>	<b>\$417,853</b>
 <b>Plan fiduciary net position</b>				
Contributions – employer	\$8,080	\$8,024	\$7,702	\$7,070
Contributions – active member (includes purchased service)	4,863	4,037	4,197	4,296
Net investment income	51,173	19,783	4,149	15,299
Benefit payments, refunds, and disability premiums	(25,298)	(22,888)	(21,200)	(19,903)
Administrative expense	(86)	(81)	(77)	(72)
Other additions and deductions	2,226	2,678	3,081	156
<b>Net change in plan fiduciary net position</b>	<b>40,958</b>	<b>11,553</b>	<b>(2,148)</b>	<b>6,846</b>
 Plan fiduciary net position – beginning	 288,904	 277,351	 279,499	 272,653
<b>Plan fiduciary net position – ending (b)</b>	<b>\$329,862</b>	<b>\$288,904</b>	<b>\$277,351</b>	<b>\$279,499</b>
 <b>Net pension liability – ending (a)-(b)</b>	 <b>\$232,084</b>	 <b>\$254,246</b>	 <b>\$183,894</b>	 <b>\$138,354</b>

<sup>1</sup> Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

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**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS**  
*(Dollars in Thousands)*

**SCHEDULE OF CHANGES IN NET PENSION LIABILITY<sup>1</sup>—DPS DIVISION**

For the Years Ended December 31

	2017	2016	2015	2014
<b>Total pension liability</b>				
Service cost	\$91,986	\$85,988	\$82,079	\$76,564
Interest	295,838	283,862	281,752	274,862
Changes of benefit terms	—	—	—	—
Difference between expected and actual experience	47,121	(2,839)	45,767	(174)
Changes of assumptions or other inputs	—	205,645	(113,772)	—
Benefit payments, refunds, and disability premiums	(281,844)	(272,071)	(263,323)	(255,434)
<b>Net change in total pension liability</b>	<b>153,101</b>	<b>300,585</b>	<b>32,503</b>	<b>95,818</b>
 Total pension liability – beginning	 4,221,449	 3,920,864	 3,888,361	 3,792,543
<b>Total pension liability – ending (a)</b>	<b>\$4,374,550</b>	<b>\$4,221,449</b>	<b>\$3,920,864</b>	<b>\$3,888,361</b>
 <b>Plan fiduciary net position</b>				
Contributions – employer	\$27,578	\$17,071	\$8,494	\$18,478
Contributions – active member (includes purchased service)	56,820	54,852	53,558	49,409
Net investment income	548,585	218,415	49,172	182,823
Benefit payments, refunds, and disability premiums	(281,844)	(272,071)	(263,323)	(255,434)
Administrative expense	(2,857)	(2,754)	(2,599)	(2,377)
Other additions and deductions	3,781	3,135	(1,764)	(1,547)
<b>Net change in plan fiduciary net position</b>	<b>352,063</b>	<b>18,648</b>	<b>(156,462)</b>	<b>(8,648)</b>
 Plan fiduciary net position – beginning	 3,125,977	 3,107,329	 3,263,791	 3,272,439
<b>Plan fiduciary net position – ending (b)</b>	<b>\$3,478,040</b>	<b>\$3,125,977</b>	<b>\$3,107,329</b>	<b>\$3,263,791</b>
 <b>Net pension liability – ending (a)-(b)</b>	 <b>\$896,510</b>	 <b>\$1,095,472</b>	 <b>\$813,535</b>	 <b>\$624,570</b>

<sup>1</sup> Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

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**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS**  
(*Dollars in Thousands*)

**SCHEDULE OF NET PENSION LIABILITY<sup>1</sup>**

For the Years Ended December 31

State Division	2017	2016	2015	2014	2013
Total pension liability	\$35,241,684	\$31,994,311	\$23,991,569	\$23,420,461	\$22,888,431
Plan fiduciary net position	15,223,702	13,626,180	13,460,536	14,013,947	13,980,460
<b>Net pension liability</b>	<b>\$20,017,982</b>	<b>\$18,368,131</b>	<b>\$10,531,033</b>	<b>\$9,406,514</b>	<b>\$8,907,971</b>
Plan fiduciary net position as a percentage of the total pension liability	43.20%	42.59%	56.11%	59.84%	61.08%
Covered payroll	\$2,774,207	\$2,710,651	\$2,641,867	\$2,564,670	\$2,474,965
Net pension liability as a percentage of covered payroll	721.57%	677.63%	398.62%	366.77%	359.92%
School Division	2017	2016	2015	2014	2013
Total pension liability	\$57,699,176	\$52,354,913	\$37,447,062	\$36,473,966	\$35,494,976
Plan fiduciary net position	25,362,730	22,581,046	22,152,768	22,920,607	22,740,003
<b>Net pension liability</b>	<b>\$32,336,446</b>	<b>\$29,773,867</b>	<b>\$15,294,294</b>	<b>\$13,553,359</b>	<b>\$12,754,973</b>
Plan fiduciary net position as a percentage of the total pension liability	43.96%	43.13%	59.16%	62.84%	64.07%
Covered payroll	\$4,471,357	\$4,349,320	\$4,235,290	\$4,063,236	\$3,938,650
Net pension liability as a percentage of covered payroll	723.19%	684.56%	361.12%	333.56%	323.84%
Local Government Division	2017	2016	2015	2014	2013
Total pension liability	\$5,396,516	\$5,123,847	\$4,762,090	\$4,647,777	\$4,517,239
Plan fiduciary net position	4,283,086	3,773,506	3,660,509	3,751,468	3,508,312
<b>Net pension liability</b>	<b>\$1,113,430</b>	<b>\$1,350,341</b>	<b>\$1,101,581</b>	<b>\$896,309</b>	<b>\$1,008,927</b>
Plan fiduciary net position as a percentage of the total pension liability	79.37%	73.65%	76.87%	80.72%	77.66%
Covered payroll	\$632,768	\$608,223	\$561,518	\$540,468	\$529,003
Net pension liability as a percentage of covered payroll	175.96%	222.01%	196.18%	165.84%	190.72%
Judicial Division	2017	2016	2015	2014	2013
Total pension liability	\$561,946	\$543,150	\$461,245	\$417,853	\$382,623
Plan fiduciary net position	329,862	288,904	277,351	279,499	272,653
<b>Net pension liability</b>	<b>\$232,084</b>	<b>\$254,246</b>	<b>\$183,894</b>	<b>\$138,354</b>	<b>\$109,970</b>
Plan fiduciary net position as a percentage of the total pension liability	58.70%	53.19%	60.13%	66.89%	71.26%
Covered payroll	\$48,948	\$48,700	\$46,870	\$42,977	\$39,942
Net pension liability as a percentage of covered payroll	474.14%	522.07%	392.35%	321.93%	275.32%
DPS Division	2017	2016	2015	2014	2013
Total pension liability	\$4,374,550	\$4,221,449	\$3,920,864	\$3,888,361	\$3,792,543
Plan fiduciary net position	3,478,040	3,125,977	3,107,329	3,263,791	3,272,439
<b>Net pension liability</b>	<b>\$896,510</b>	<b>\$1,095,472</b>	<b>\$813,535</b>	<b>\$624,570</b>	<b>\$520,104</b>
Plan fiduciary net position as a percentage of the total pension liability	79.51%	74.05%	79.25%	83.94%	86.29%
Covered payroll	\$658,198	\$642,177	\$621,115	\$584,319	\$547,660
Net pension liability as a percentage of covered payroll	136.21%	170.59%	130.98%	106.89%	94.97%

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**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS**  
*(Dollars in Thousands)*

**SCHEDULE OF EMPLOYER CONTRIBUTIONS**

For the Years Ended December 31

<b>State Division</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>	<b>2014</b>	<b>2013</b>
Actuarially determined contribution rate (a)	22.71%	22.31%	22.35%	20.45%	20.01%
Covered payroll (b)	\$2,774,207	\$2,710,651	\$2,641,867	\$2,564,670	\$2,474,965
Annual Increase Reserve contribution (c)	14,355	12,838	11,400	9,984	N/A
Actuarially determined contribution (a) x (b) + (c)	644,377	617,584	601,857	534,459	495,241
Contributions in relation to the actuarially determined contribution	563,977	521,804	484,005	444,372	393,218
<b>Annual contribution deficiency</b>	<b>\$80,400</b>	<b>\$95,780</b>	<b>\$117,852</b>	<b>\$90,087</b>	<b>\$102,023</b>
Actual contributions as a percentage of covered payroll	20.33%	19.25%	18.32%	17.33%	15.89%
	<b>2012</b>	<b>2011</b>	<b>2010</b>	<b>2009</b>	<b>2008</b>
Actuarially determined contribution rate (a)	16.52%	13.63%	18.93%	17.91%	18.45%
Covered payroll (b)	\$2,384,934	\$2,393,791	\$2,392,080	\$2,384,137	\$2,371,639
Annual Increase Reserve contribution (c)	N/A	N/A	N/A	N/A	N/A
Actuarially determined contribution (a) x (b) + (c)	393,991	326,274	452,821	426,999	437,567
Contributions in relation to the actuarially determined contribution	328,055	277,122	282,640	293,234	267,533
<b>Annual contribution deficiency</b>	<b>\$65,936</b>	<b>\$49,152</b>	<b>\$170,181</b>	<b>\$133,765</b>	<b>\$170,034</b>
Actual contributions as a percentage of covered payroll	13.76%	11.58%	11.82%	12.30%	11.28%
<b>School Division</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>	<b>2014</b>	<b>2013</b>
Actuarially determined contribution rate (a)	22.54%	22.36%	21.94%	19.65%	19.79%
Covered payroll (b)	\$4,471,357	\$4,349,320	\$4,235,290	\$4,063,236	\$3,938,650
Annual Increase Reserve contribution (c)	19,903	17,868	15,648	13,280	N/A
Actuarially determined contribution (a) x (b) + (c)	1,027,747	990,376	944,871	811,706	779,459
Contributions in relation to the actuarially determined contribution	857,740	812,740	754,182	686,323	613,738
<b>Annual contribution deficiency</b>	<b>\$170,007</b>	<b>\$177,636</b>	<b>\$190,689</b>	<b>\$125,383</b>	<b>\$165,721</b>
Actual contributions as a percentage of covered payroll	19.18%	18.69%	17.81%	16.89%	15.58%
	<b>2012</b>	<b>2011</b>	<b>2010</b>	<b>2009</b>	<b>2008</b>
Actuarially determined contribution rate (a)	17.60%	15.73%	18.75%	16.56%	17.18%
Covered payroll (b)	\$3,819,066	\$3,821,603	\$3,900,662	\$3,922,175	\$3,804,927
Annual Increase Reserve contribution (c)	N/A	N/A	N/A	N/A	N/A
Actuarially determined contribution (a) x (b) + (c)	672,156	601,138	731,374	649,512	653,686
Contributions in relation to the actuarially determined contribution	564,444	534,230	512,391	474,872	426,786
<b>Annual contribution deficiency</b>	<b>\$107,712</b>	<b>\$66,908</b>	<b>\$218,983</b>	<b>\$174,640</b>	<b>\$226,900</b>
Actual contributions as a percentage of covered payroll	14.78%	13.98%	13.14%	12.11%	11.22%

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**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS**  
*(Dollars in Thousands)*

**SCHEDULE OF EMPLOYER CONTRIBUTIONS**

For the Years Ended December 31

Local Government Division	2017	2016	2015	2014	2013
Actuarially determined contribution rate (a)	11.92%	11.98%	13.62%	11.78%	10.62%
Covered payroll (b)	\$632,768	\$608,223	\$561,518	\$540,468	\$529,003
Annual Increase Reserve contribution (c)	3,390	2,969	2,522	2,180	N/A
Actuarially determined contribution (a) x (b) + (c)	78,816	75,834	79,001	65,847	56,180
Contributions in relation to the actuarially determined contribution	79,354 <sup>1</sup>	75,132	70,415	254,725 <sup>2</sup>	65,329
<b>Annual contribution deficiency (excess)</b>	<b>(\$538)</b>	<b>\$702</b>	<b>\$8,586</b>	<b>(\$188,878)</b>	<b>(\$9,149)</b>
Actual contributions as a percentage of covered payroll	12.54%	12.35%	12.54%	47.13%	12.35%
	2012	2011	2010	2009	2008
Actuarially determined contribution rate (a)	9.79%	8.98%	12.31%	11.14%	11.95%
Covered payroll (b)	\$523,668	\$718,169	\$705,265	\$705,097	\$718,902
Annual Increase Reserve contribution (c)	N/A	N/A	N/A	N/A	N/A
Actuarially determined contribution (a) x (b) + (c)	51,267	64,492	86,818	78,548	85,909
Contributions in relation to the actuarially determined contribution	83,816	89,536	87,731	82,986	78,291
<b>Annual contribution deficiency (excess)</b>	<b>(\$32,549)</b>	<b>(\$25,044)</b>	<b>(\$913)</b>	<b>(\$4,438)</b>	<b>\$7,618</b>
Actual contributions as a percentage of covered payroll	16.01%	12.47%	12.44%	11.77%	10.89%

<sup>1</sup> Contributions include the disaffiliation payment of \$1,063 for Cunningham Fire Protection District. See Note 1, “2017 Changes in Plan Provisions Since 2016” in the Notes to the RSI—Division Trust Funds for more information.

<sup>2</sup> Contributions include the disaffiliation payment of \$186,006 for Memorial Health System. See Note 2, “2014 Changes in Assumptions or Other Inputs since 2013” in the Notes to the RSI—Division Trust Funds for more information on the lawsuit resolution for Memorial Health System.

Judicial Division	2017	2016	2015	2014	2013
Actuarially determined contribution rate (a)	22.54%	22.07%	21.45%	20.07%	21.53%
Covered payroll (b)	\$48,948	\$48,700	\$46,870	\$42,977	\$39,942
Annual Increase Reserve contribution (c)	191	164	141	116	N/A
Actuarially determined contribution (a) x (b) + (c)	11,224	10,912	10,195	8,741	8,599
Contributions in relation to the actuarially determined contribution	8,080	8,024	7,702	7,070	6,494
<b>Annual contribution deficiency</b>	<b>\$3,144</b>	<b>\$2,888</b>	<b>\$2,493</b>	<b>\$1,671</b>	<b>\$2,105</b>
Actual contributions as a percentage of covered payroll	16.51%	16.48%	16.43%	16.45%	16.26%
	2012	2011	2010	2009	2008
Actuarially determined contribution rate (a)	18.28%	16.30%	18.63%	17.08%	17.66%
Covered payroll (b)	\$39,045	\$39,033	\$37,412	\$37,583	\$35,937
Annual Increase Reserve contribution (c)	N/A	N/A	N/A	N/A	N/A
Actuarially determined contribution (a) x (b) + (c)	7,137	6,362	6,970	6,419	6,346
Contributions in relation to the actuarially determined contribution	5,840	5,356	5,605	5,749	5,078
<b>Annual contribution deficiency</b>	<b>\$1,297</b>	<b>\$1,006</b>	<b>\$1,365</b>	<b>\$670</b>	<b>\$1,268</b>
Actual contributions as a percentage of covered payroll	14.96%	13.72%	14.98%	15.30%	14.13%

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**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS**  
*(Dollars in Thousands)*

**SCHEDULE OF EMPLOYER CONTRIBUTIONS**

For the Years Ended December 31

DPS Division <sup>1</sup>	2017	2016	2015	2014	2013
Actuarially determined contribution rate (a)	10.28%	10.46%	11.06%	9.67%	11.53%
Covered payroll (b)	\$658,198	\$642,177	\$621,115	\$584,319	\$547,660
Annual Increase Reserve contribution (c)	4,100	3,685	3,186	2,633	N/A
Actuarially determined contribution (a) x (b) + (c)	71,763	70,857	71,881	59,137	63,145
Contributions in relation to the actuarially determined contribution	27,578	17,071	8,494	18,478	23,104
<b>Annual contribution deficiency</b>	<b>\$44,185</b>	<b>\$53,786</b>	<b>\$63,387</b>	<b>\$40,659</b>	<b>\$40,041</b>
Actual contributions as a percentage of covered payroll	4.19%	2.66%	1.37%	3.16%	4.22%
	2012	2011	2010		
Actuarially determined contribution rate (a)	9.60%	11.85%	14.61%		
Covered payroll (b)	\$510,872	\$491,646	\$470,774		
Annual Increase Reserve contribution (c)	N/A	N/A	N/A		
Actuarially determined contribution (a) x (b) + (c)	49,044	58,260	68,780		
Contributions in relation to the actuarially determined contribution	13,145	11,722	5,733		
<b>Annual contribution deficiency</b>	<b>\$35,899</b>	<b>\$46,538</b>	<b>\$63,047</b>		
Actual contributions as a percentage of covered payroll	2.57%	2.38%	1.22%		

<sup>1</sup> The DPS Division Trust Fund was established on January 1, 2010, and received the net assets of the Denver Public Schools Retirement System.

*The accompanying notes are an integral part of the Required Supplementary Information.*

**SCHEDULE OF INVESTMENT RETURNS<sup>1</sup>**

For the Years Ended December 31

	2017	2016	2015	2014
Annual money-weighted rate of return, net of investment expenses	18.1%	7.3%	1.6%	5.8%

<sup>1</sup> Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

*The accompanying notes are an integral part of the Required Supplementary Information.*

## NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

### Note 1—Significant Changes in Plan Provisions Affecting Trends in Actuarial Information

#### 2017 Changes in Plan Provisions Since 2016

- The Cunningham Fire Protection District (CFPD) disaffiliated from the Local Government Division on December 2, 2017. For the purpose of the December 31, 2017, measurement date, liabilities were determined assuming no additional benefit accrals for the disaffiliated membership of the CFPD that had not refunded their PERA member contribution accounts. The total disaffiliation payment of \$1,159 was allocated to the Local Government Division Trust Fund and the Health Care Trust Fund (HCTF) in the amount of \$1,063 and \$96, respectively.
- Pursuant to House Bill (HB) 17-1265, the Amortization Equalization Disbursement (AED) and Supplemental Amortization Equalization Disbursement (SAED) contribution rates are adjusted for employers in the Judicial Division as follows:
  - For the calendar year beginning in 2019, C.R.S. § 24-51-411(4.5) increases the AED payment to 3.40 percent of PERA-includable salary and requires the AED payment to increase by 0.4 percent at the start of each of the following four calendar years through 2023 at which time the AED payment will be 5.00 percent of PERA-includable salary.
  - For the calendar year beginning in 2019, C.R.S. § 24-51-411(7.5) increases the SAED payment to 3.40 percent of PERA-includable salary and requires the SAED payment to increase by 0.4 percent at the start of each of the following four calendar years through 2023 at which time the SAED payment will be 5.00 percent of PERA-includable salary.
- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the pension certificates of participation (PCOPs) issued in 1997 and 2008 and refinanced thereafter.

#### 2016 Changes in Plan Provisions Since 2015

- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

#### 2015 Changes in Plan Provisions Since 2014

- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.
- As required under Colorado Revised Statutes § 24-51-401(1.7)(e), PERA calculated and provided to the Colorado General Assembly an adjustment to the DPS Division's employer contribution rate to assure the equalization of the School Division's and the DPS Division's ratios of unfunded actuarial accrued liability (UAAL) to payroll as of December 31, 2039. Subsequently, the Colorado

General Assembly passed HB 15-1391, reducing the employer contribution rate of the DPS Division from 13.75 percent to 10.15 percent, effective January 1, 2015.

#### 2014 Changes in Plan Provisions Since 2013

- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

#### 2013 Changes in Plan Provisions Since 2012

- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

#### 2012 Changes in Plan Provisions Since 2011

- The valuation reflects the disaffiliation of Memorial Health System (Memorial), formerly the largest employer of the Local Government Division, as of October 1, 2012. For the purposes of the December 31, 2012, actuarial valuation, liabilities were determined assuming no additional benefit accrals for the disaffiliated membership of Memorial that had not refunded their PERA member contribution accounts. Additionally, no additional incoming dollars were assumed added to the Local Government Division Trust Fund, as there was ongoing litigation regarding the potential dollars owed to the Local Government Division Trust Fund due to the disaffiliation.
- Pursuant to Senate Bill (SB) 11-076, there was a short-term contribution "swap" between employers and active members in the State and Judicial Divisions covering the period July 1, 2011, through June 30, 2012. Active member contributions for the period were increased by 2.5 percent of pensionable payroll and employer contributions were reduced by that amount.
- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

#### 2011 Changes in Plan Provisions Since 2010

- Pursuant to SB 10-146, there was a short-term contribution "swap" between employers and active members in the State and Judicial Divisions covering the period July 1, 2010, through June 30, 2011. The enactment of SB 11-076 extended the contribution swap an additional year, from July 1, 2011, through June 30, 2012. Active member contributions for both periods were increased by 2.5 percent of pensionable payroll and employer contributions were reduced by that amount.
- Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008 and refinanced thereafter.

## NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(*Dollars in Thousands*)

### 2010 Changes in Plan Provisions Since 2009

- The valuation reflects the addition of the DPS benefit structure as a result of the merger of DPSRS into PERA as a separate division, effective January 1, 2010. Major plan provisions adopted as part of the merger legislation (SB 09-282) include:
  - Transfers from the DPS Division to other Divisions may build upon a DPS benefit structure benefit within those Divisions.
  - Hourly and part-time employees of Denver Public Schools become members of the DPS Division as of January 1, 2010, with no past service credit.
  - Actual employer contributions to the DPS Division are reduced by an amount equal to the principal payments plus interest necessary each year to finance the PCOPs issued in 1997 and 2008. Colorado statutes call for a “true-up” in 2015, and every five years following, with the expressed purpose of adjusting the total DPS contribution rate to ensure equalization of the ratio of UAAL over payroll between the DPS and School Divisions at the end of the 30-year period beginning January 1, 2010.
- Pursuant to SB 10-146, there was a short-term contribution “swap” between employers and active members in the State and Judicial Divisions covering the period July 1, 2010, through June 30, 2011. Active member contributions for this period were increased by 2.5 percent of pensionable payroll and employer contributions were reduced by that amount.

### 2009 Changes in Plan Provisions Since 2008

- The following changes were made to the plan provisions as part of SB 10-001:
  - For the State Division, the AED continues to increase by 0.4 percent per year to a total rate of 5.0 percent by 2017. In addition, the SAED continues to increase by 0.5 percent per year to a total rate of 5.0 percent by 2017. However, if the funding ratio reaches 103 percent, the AED and SAED will be reduced by 0.5 percent of pay each.
  - For the School Division, the AED will continue to increase by 0.4 percent per year from 2013 through 2015 and by 0.3 percent in 2016 for a total rate of 4.5 percent. In addition, the SAED will continue to increase by 0.5 percent per year to a total rate of 5.5 percent by 2018. Also, the 0.4 percent increase in the statutory employer contribution rate in 2013 was eliminated. However, if the funding ratio reaches 103 percent, the AED and SAED will be reduced by 0.5 percent of pay each.
  - For the Local Government and Judicial Divisions, the AED is frozen at the 2010 level of 2.20 percent. In addition, the SAED is frozen at the 2010 level of 1.50 percent. However, if the funding ratio reaches 103 percent, the AED and SAED will be reduced by 0.5 percent of pay each.

- For benefit recipients of the PERA benefit structure based upon a membership date before January 1, 2007, or for benefit recipients of the DPS benefit structure, future post-retirement benefit increases (AI) were reduced to an amount equal to 2 percent (the lesser of that or the annual Consumer Price Index for Urban Wage Earners and Clerical Workers [CPI-W] increase for 2010). However, if the investment return for the prior year is negative, then the AI is an amount equal to the annual CPI-W increase with a cap of 2 percent. The 2 percent cap may be adjusted based upon the year-end funded status, with increases mandated when the funded status reaches 103 percent and decreases mandated when the funded status subsequently falls below 90 percent. The cap will not be reduced below 2 percent. In addition, the AI is first paid on the July 1st that is at least 12 months after retirement for those members who retire on or after January 1, 2011. Members not eligible to retire as of January 1, 2011, who retire with a reduced service retirement allowance must reach age 60 or the age and service requirements for unreduced service retirement to be eligible for the AI.

- Effective January 1, 2011, other than in the Judicial Division, for all active members who are not eligible for retirement on January 1, 2011, the annual salary increase cap in determination of Highest Average Salary was lowered from 15 percent to 8 percent for PERA benefit structure members and for DPS benefit structure members, a change from the average of salaries of the highest 36 months of earned service to the PERA benefit structure method with an annual salary increase cap of 8 percent.
- Effective January 1, 2011, a new requirement was added that PERA benefit structure members must have five years of earned service credit in order to receive a 50 percent match on a refund.
- Effective January 1, 2011, the reduction factors for a reduced service retirement benefit for members not eligible to retire as of January 1, 2011, were changed to an actuarial equivalent basis.
- Effective January 1, 2011, a modified Rule of 85 for service retirement eligibility was implemented for members with less than 5 years of service credit as of January 1, 2011 (this rule does not apply to State Troopers).
- Effective January 1, 2011, a modified Rule of 88 with a minimum age of 58 for service retirement eligibility was implemented for members hired on or after January 1, 2011, but before January 1, 2017 (this rule does not apply to State Troopers).
- Effective January 1, 2011, a modified Rule of 90 with a minimum age of 60 for service retirement eligibility was implemented for members hired on or after January 1, 2017 (this rule does not apply to State Troopers and to participants whose last 10 years of service were in the School or DPS Divisions).

### 2008 Changes in Plan Provisions Since 2007

- The Board approved a reduction to the interest rate credited on member contribution accounts from 5 percent to 3 percent.

## NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(*Dollars in Thousands*)

### Note 2—Significant Changes in Assumptions or Other Inputs Affecting Trends in Actuarial Information

#### 2017 Changes in Assumptions or Other Inputs Since 2016

- The single equivalent interest rate (SEIR) for the State Division was lowered from 5.26 percent to 4.72 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the fiduciary net position (FNP), and the resulting application of the municipal bond index rate.
- The SEIR for the School Division was lowered from 5.26 percent to 4.78 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate.
- The SEIR for the Judicial Division was increased from 5.18 percent to 5.41 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate.
- The municipal bond index rate used in the determination of the SEIR for the State, School, and Judicial Divisions changed from 3.86 percent on the prior measurement date to 3.43 percent on the measurement date.

#### 2016 Changes in Assumptions or Other Inputs Since 2015

- The investment return assumption was lowered from 7.50 percent to 7.25 percent.
- The price inflation assumption was lowered from 2.80 percent to 2.40 percent.
- The wage inflation assumption was lowered from 3.90 percent to 3.50 percent.
- The post-retirement mortality assumption for healthy lives for the State and Local Government Divisions was changed to the RP-2014 Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 73 percent factor applied to ages below 80 and a 108 percent factor applied to age 80 and above, projected to 2018, for males, and a 78 percent factor applied to ages below 80 and a 109 percent factor applied to age 80 and above, projected to 2020, for females.
- The post-retirement mortality assumption for healthy lives for the School, Judicial, and DPS Divisions was changed to the RP-2014 White Collar Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 93 percent factor applied to ages below 80 and a 113 percent factor applied to age 80 and above, projected to 2018, for males, and a 68 percent factor applied to ages below 80 and a 106 percent factor applied to age 80 and above, projected to 2020, for females.
- For disabled retirees, the mortality assumption was changed to reflect 90 percent of RP-2014 Disabled Retiree Mortality Table.

- The mortality assumption for active members was changed to RP-2014 White Collar Employee Mortality Table, a table specifically developed for actively working people. To allow for an appropriate margin of improved mortality prospectively, the mortality rates incorporate a 70 percent factor applied to male rates and a 55 percent factor applied to female rates.
- The rates of retirement, withdrawal, and disability were revised to reflect more closely actual experience.
- The estimated administrative expense as a percentage of covered payroll was increased from 0.35 percent to 0.40 percent.
- The SEIR for the State and School Divisions was lowered from 7.50 percent to 5.26 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate of 3.86 percent on the measurement date.
- The SEIR for the Local Government Division was lowered from 7.50 percent to 7.25 percent, reflecting the change in the long-term expected rate of return.
- The SEIR for the Judicial Division was lowered from 5.73 percent to 5.18 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate from 3.57 percent on the prior measurement date to 3.86 percent on the measurement date.
- The SEIR for the DPS Division was lowered from 7.50 percent to 7.25 percent, reflecting the change in the long-term expected rate of return.

#### 2015 Changes in Assumptions or Other Inputs Since 2014

- The SEIR for the Judicial Division was lowered from 6.14 percent to 5.73 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate from 3.70 percent on the prior measurement date to 3.57 percent on the measurement date.
- The following programming changes were made:
  - Valuation of the full survivor benefit without any reduction for possible remarriage.
  - Reflection of the employer match on separation benefits for all eligible years.
  - Reflection of one year of service eligibility for survivor annuity benefit.
  - Refinement of the 18-month AI timing.
  - Refinements to directly value certain and life, modified cash refund and pop-up benefit forms.

## NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS

(Dollars in Thousands)

- The following methodology changes were made:
  - Recognition of merit salary increases in the first projection year.
  - Elimination of the assumption that 35 percent of future disabled members elect to receive a refund.
  - Removal of the negative value adjustment for liabilities associated with refunds of future terminating members.
  - Adjustments to the timing of the normal cost and UAAL payment calculations to reflect contributions throughout the year.

### **2014 Changes in Assumptions or Other Inputs Since 2013**

- The SEIR for the Judicial Division was lowered from 6.66 percent to 6.14 percent to reflect the changes to the projection's valuation basis, a projected year of depletion of the FNP, and the resulting application of the municipal bond index rate from 4.73 percent on the prior measurement date to 3.70 percent on the measurement date.
- In 2012, a lawsuit was initiated to determine the amount owed to PERA by Memorial and the City of Colorado Springs (City) for Memorial's departure from PERA. In September 2014, PERA and the City agreed to resolve the lawsuit. The agreement provided for the City to pay PERA \$190,000 for the liabilities associated with the retirement and health care benefits already earned by 7,666 Memorial employees for the work that they performed before Memorial ceased to be a PERA employer. On October 3, 2014, PERA received a disaffiliation payment from the City, which was allocated to the Local Government Division Trust Fund and the HCTF in the amount of \$186,006 and \$3,994, respectively.

### **2013 Changes in Assumptions or Other Inputs Since 2012**

- The investment return assumption was lowered from 8.00 percent to 7.50 percent.
- The price inflation assumption was lowered from 3.50 percent to 2.80 percent.
- The wage inflation assumption was lowered from 4.25 percent to 3.90 percent.

### **2012 Changes in Assumptions or Other Inputs Since 2011**

- The price inflation assumption was lowered from 3.75 percent to 3.50 percent.
- The wage inflation assumption was lowered from 4.50 percent to 4.25 percent.
- The rates of retirement, withdrawal, mortality and disability were revised to more closely reflect actual experience.
- The post-retirement mortality tables used were changed to the RP-2000 Combined Mortality tables projected with Scale AA to 2020, set back one year for males and two years for females.

- The investment return assumption was changed to be only net of investment expenses to better represent the investment consultant's assumptions and predictions and also to better align with recent changes in GASB accounting and reporting requirements. An ongoing estimated administrative expense of 0.35 percent of pensionable payroll was added to the normal cost beginning with the December 31, 2012, actuarial valuation.

- To reflect the short-term contribution "swap" between employers and active members covering the period July 1, 2010, through June 30, 2012, the actuarially determined contribution (ADC) has been adjusted in the State and Judicial Divisions.

### **2011 Changes in Assumptions or Other Inputs Since 2010**

- To reflect the short-term contribution "swap" between employers and active members covering the period July 1, 2010, through June 30, 2012, the ADC has been adjusted in the State and Judicial Division.

### **2010 Changes in Assumptions or Other Inputs Since 2009**

- Assumptions were supplemented to provide for the valuation of the DPS benefit structure added as a result of the merger of DPSRS into PERA as a separate division, effective January 1, 2010.
- To reflect the short-term contribution "swap" between employers and active members covering the period July 1, 2010, through June 30, 2012, the ADC has been adjusted in the State and Judicial Division.

### **2009 Changes in Assumptions or Other Inputs Since 2008**

- The investment return assumption was lowered from 8.50 percent to 8.00 percent.
- The withdrawal rates, pre-retirement mortality rates, disability rates and retirement rates were revised to more closely reflect the actual experience of PERA.
- The post-retirement mortality tables used for service retirements and dependents of deceased pensioners were changed to the 1994 Group Annuity Mortality Table set back three years for males and set back two years for females.
- The deferral period for deferred vested members was revised to more closely reflect the actual experience of PERA.

### **2008 Changes in Assumptions or Other Inputs Since 2007**

- The assumed interest rate credited on member contribution accounts was reduced from 5 percent to 3 percent, reflecting the change to the Board approved rate.

**NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—DIVISION TRUST FUNDS**  
*(Dollars in Thousands)***Note 3—Methods and Assumptions Used in Calculations of ADC**

The ADC rates, as a percentage of covered payroll, used to determine the ADC amounts in the Schedule of Employer Contributions are calculated as of December 31, two years prior to the end of the year in which ADC amounts are reported. The following actuarial methods and assumptions (from the December 31, 2015, actuarial valuation) were used to determine contribution rates reported in that schedule for the year ending December 31, 2017:

Actuarial cost method	Entry age
Amortization method	Level percentage of payroll
Amortization period	30 years, closed, layered
Equivalent single amortization period	29 years
Asset valuation method	4-year smoothed market
Price inflation	2.80 percent
Real wage growth	1.10 percent
Wage inflation	3.90 percent
Salary increases, including wage inflation	3.90 to 10.85 percent
Long-term investment rate of return, net of pension plan investment expense, including price inflation	7.50 percent
Future post-retirement benefit increases	
PERA benefit structure hired prior to 1/1/07 and DPS benefit structure	2.00 percent
PERA benefit structure hired after 12/31/06	0.00 percent, as financed by the AIR

## REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

### SCHEDULE OF CHANGES IN NET OPEB LIABILITY<sup>1</sup>—HEALTH CARE TRUST FUND

For the Year Ended December 31

	2017
<b>Total OPEB liability</b>	
Service cost	\$20,036
Interest	108,625
Changes of benefit terms	5
Difference between expected and actual experience	7,354
Changes of assumptions or other inputs	—
Benefit payments	(116,960) <sup>2</sup>
<b>Net change in total OPEB liability</b>	<b>19,060</b>
<b>Total OPEB liability – beginning</b>	<b>1,556,762</b>
<b>Total OPEB liability – ending (a)</b>	<b>\$1,575,822</b>
<b>Plan fiduciary net position</b>	
Contributions – employer	\$83,077
Contributions – employer disaffiliation	96
Other additions (includes purchased service transfers)	9,760
Net investment income	44,990
Benefit payments	(102,665)
Administrative expense	(19,162)
Other deductions	(102)
<b>Net change in plan fiduciary net position</b>	<b>15,994</b>
<b>Plan fiduciary net position – beginning</b>	<b>260,228</b>
<b>Plan fiduciary net position – ending (b)</b>	<b>\$276,222</b>
<b>Net OPEB liability – ending (a)-(b)</b>	<b>\$1,299,600</b>

<sup>1</sup> Information is not available prior to 2017. In future reports, additional years will be added until 10 years of historical data are presented.

<sup>2</sup> Includes administrative and other health care claims processing fees reported as administrative expenses, other additions and other deductions in the Statements of Changes in Fiduciary Net Position.

*The accompanying notes are an integral part of the Required Supplementary Information.*

**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS**  
*(Dollars in Thousands)*

**SCHEDULE OF CHANGES IN NET OPEB LIABILITY<sup>1</sup>—DPS HEALTH CARE TRUST FUND**

For the Year Ended December 31

	2017
<b>Total OPEB liability</b>	
Service cost	\$1,591
Interest	5,057
Changes of benefit terms	—
Difference between expected and actual experience	(35)
Changes of assumptions or other inputs	—
Benefit payments	(6,191) <sup>2</sup>
<b>Net change in total OPEB liability</b>	<b>422</b>
 Total OPEB liability – beginning	 72,845
<b>Total OPEB liability – ending (a)</b>	<b>\$73,267</b>
 Plan fiduciary net position	
Contributions – employer	\$6,930
Other additions (includes purchased service transfers)	242
Net investment income	3,305
Benefit payments	(5,694)
Administrative expense	(808)
Other deductions	(4)
<b>Net change in plan fiduciary net position</b>	<b>3,971</b>
 Plan fiduciary net position – beginning	 18,337
<b>Plan fiduciary net position – ending (b)</b>	<b>\$22,308</b>
 Net OPEB liability – ending (a)-(b)	 <b>\$50,959</b>

<sup>1</sup> Information is not available prior to 2017. In future reports, additional years will be added until 10 years of historical data are presented.

<sup>2</sup> Includes administrative and other health care claims processing fees reported as administrative expenses, other additions, and other deductions in the Statements of Changes in Fiduciary Net Position.

*The accompanying notes are an integral part of the Required Supplementary Information.*

**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS**  
(*Dollars in Thousands*)

**SCHEDULE OF NET OPEB LIABILITY<sup>1</sup>**

For the Years Ended December 31

Health Care Trust Fund	2017	2016
Total OPEB liability	\$1,575,822	\$1,556,762
Plan fiduciary net position	276,222	260,228
<b>Net OPEB liability</b>	<b>\$1,299,600</b>	<b>\$1,296,534</b>

Plan fiduciary net position as a percentage of the total OPEB liability	17.53%	16.72%
Covered payroll	\$7,927,280	\$7,716,894
Net OPEB liability as a percentage of covered payroll	16.39%	16.80%

DPS Health Care Trust Fund	2017	2016
Total OPEB liability	\$73,267	\$72,845
Plan fiduciary net position	22,308	18,337
<b>Net OPEB liability</b>	<b>\$50,959</b>	<b>\$54,508</b>

Plan fiduciary net position as a percentage of the total OPEB liability	30.45%	25.17%
Covered payroll	\$658,198	\$642,177
Net OPEB liability as a percentage of covered payroll	7.74%	8.49%

<sup>1</sup> Information is not available prior to 2016. In future reports, additional years will be added until 10 years of historical data are presented.

*The accompanying notes are an integral part of the Required Supplementary Information.*

**SCHEDULE OF EMPLOYER CONTRIBUTIONS**

For the Years Ended December 31

Health Care Trust Fund	2017	2016	2015	2014	2013
Actuarially determined contribution rate (a)	1.08%	1.09%	1.15%	1.32%	1.24%
Covered payroll (b)	\$7,927,280	\$7,716,894	\$7,485,545	\$7,211,351	\$6,982,560
Retiree drug subsidy (c)	—	—	—	—	15,731
Actuarially determined contribution (a) x (b) + (c)	85,615	84,114	86,084	95,190	102,315
Contributions in relation to the actuarially determined contribution	83,173 <sup>1</sup>	80,825	78,463	79,625 <sup>2</sup>	88,515
<b>Annual contribution deficiency</b>	<b>\$2,442</b>	<b>\$3,289</b>	<b>\$7,621</b>	<b>\$15,565</b>	<b>\$13,800</b>
Actual contributions as a percentage of covered payroll	1.05%	1.05%	1.05%	1.10%	1.27%
	2012	2011	2010	2009	2008
Actuarially determined contribution rate (a)	1.18%	1.28%	1.12%	1.12%	1.11%
Covered payroll (b)	\$6,766,713	\$6,972,596	\$7,035,419	\$7,048,992	\$6,931,405
Retiree drug subsidy (c)	14,198	14,151	14,169	13,633	13,743
Actuarially determined contribution (a) x (b) + (c)	94,045	103,400	92,966	92,582	90,682
Contributions in relation to the actuarially determined contribution	86,751	87,600	88,216	87,706	86,342
<b>Annual contribution deficiency</b>	<b>\$7,294</b>	<b>\$15,800</b>	<b>\$4,750</b>	<b>\$4,876</b>	<b>\$4,340</b>
Actual contributions as a percentage of covered payroll	1.28%	1.26%	1.25%	1.24%	1.25%

<sup>1</sup> Contributions include the disaffiliation payment of \$96 for Cunningham Fire Protection District. See Note 1, "2017 Changes in Plan Provisions Since 2016" in the Notes to the RSI-Division Trust Funds for more information.

<sup>2</sup> Contributions include the disaffiliation payment of \$3,994 for Memorial Health Systems. See Note 2, "2014 Changes in Assumptions or Other Inputs since 2013" in the Notes to the RSI-Division Trust Funds for more information on the lawsuit resolution for Memorial Health Systems.

*The accompanying notes are an integral part of the Required Supplementary Information.*

**REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS**  
(*Dollars in Thousands*)

**SCHEDULE OF EMPLOYER CONTRIBUTIONS**

For the Years Ended December 31

DPS Health Care Trust Fund <sup>1</sup>	2017	2016	2015	2014	2013
Actuarially determined contribution rate (a)	0.68%	0.75%	0.81%	0.87%	0.86%
Covered payroll (b)	\$658,198	\$642,177	\$621,115	\$584,319	\$547,660
Retiree drug subsidy (c)	—	—	—	—	563
Actuarially determined contribution (a) x (b) + (c)	4,476	4,816	5,031	5,084	5,273
Contributions in relation to the actuarially determined contribution	6,930	6,723	6,371	6,003	6,121
<b>Annual contribution deficiency (excess)</b>	<b>(\$2,454)</b>	<b>(\$1,907)</b>	<b>(\$1,340)</b>	<b>(\$919)</b>	<b>(\$848)</b>
Actual contributions as a percentage of covered payroll	1.05%	1.05%	1.03%	1.03%	1.12%
	2012	2011	2010		
Actuarially determined contribution rate (a)	0.92%	0.92%	0.95% <sup>2</sup>		
Covered payroll (b)	\$510,872	\$491,646	\$470,774		
Retiree drug subsidy (c)	488	499	537		
Actuarially determined contribution (a) x (b) + (c)	5,188	5,022	5,002		
Contributions in relation to the actuarially determined contribution	5,731	5,528	5,298		
<b>Annual contribution deficiency (excess)</b>	<b>(\$543)</b>	<b>(\$506)</b>	<b>(\$296)</b>		
Actual contributions as a percentage of covered payroll	1.12%	1.12%	1.13%		

<sup>1</sup> The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

<sup>2</sup> The actuarially determined contribution rate of 0.9484 percent has been rounded to two decimal places for presentation purposes.

*The accompanying notes are an integral part of the Required Supplementary Information.*

**SCHEDULE OF INVESTMENT RETURNS<sup>1</sup>**

For the Years Ended December 31

	2017	2016	2015	2014
Annual money-weighted rate of return, net of investment expenses	18.1%	7.3%	1.6%	5.8%

<sup>1</sup> Information is not available prior to 2014. In future reports, additional years will be added until 10 years of historical data are presented.

*The accompanying notes are an integral part of the Required Supplementary Information.*

## NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS

(*Dollars in Thousands*)

### Note 1—Significant Changes in Plan Provisions Affecting Trends in Actuarial Information

#### 2017 Changes in Plan Provisions Since 2016

- The Cunningham Fire Protection District (CFPD) disaffiliated from the Local Government Division, thereby ending participation in the Health Care Trust Fund (HCTF) on December 2, 2017. For the purpose of disclosure as of the December 31, 2017, measurement date, liabilities were determined assuming no additional service accruals impacting possible future premium subsidies for the disaffiliated membership of the CFPD that had not refunded their PERA member contribution accounts. The total disaffiliation payment of \$1,159 was allocated to the Local Government Division Trust Fund and the HCTF in the amount of \$1,063 and \$96, respectively.

#### 2016 Changes in Plan Provisions Since 2015

- There were no changes made to plan provisions.

#### 2015 Changes in Plan Provisions Since 2014

- There were no changes made to plan provisions.

#### 2014 Changes in Plan Provisions Since 2013

- There were no changes made to plan provisions.

#### 2013 Changes in Plan Provisions Since 2012

- There were no changes made to plan provisions.

#### 2012 Changes in Plan Provisions Since 2011

- The Memorial Health System (Memorial), disaffiliated from the Local Government Division, hence ending participation in the HCTF, on October 1, 2012. For the purpose of disclosure as of the December 31, 2012, measurement date, liabilities were determined assuming no additional service accruals impacting possible future premium subsidies for the disaffiliated membership of Memorial that had not refunded their PERA member contribution accounts. Additionally, no additional incoming dollars were assumed added to the HCTF as of December 31, 2012, as there was ongoing litigation regarding the potential dollars owed to the Local Government Division Trust Fund and the HCTF due to the disaffiliation.

#### 2011 Changes in Plan Provisions Since 2010

- There were no changes made to plan provisions.

#### 2010 Changes in Plan Provisions Since 2009

- The Denver Public Schools Retirement System (DPSRS) merged into PERA, effective January 1, 2010, as a separate division, the Denver Public Schools (DPS) Division. Also effective January 1, 2010, the liabilities and assets of the Denver Public Schools Retiree Health Benefit Trust were transferred into the newly created DPS HCTF. The valuation reflects the addition of the DPS benefit structure as a result of the merger. Hence, transfers from the DPS Division to the other PERA divisions covered by the HCTF may build upon a DPS benefit structure benefit within the HCTF and transfers from the other PERA divisions to the DPS Division covered by the DPS HCTF may build upon a PERA benefit structure benefit within the DPS HCTF.

### 2009 Changes in Plan Provisions Since 2008

- The following changes were made to the plan provisions as part of Senate Bill 10-001:
  - Effective January 1, 2011, a modified Rule of 85 for service retirement eligibility was implemented for members with less than 5 years of service credit as of January 1, 2011 (this rule does not apply to State Troopers).
  - Effective January 1, 2011, a modified Rule of 88 with a minimum age of 58 for service retirement eligibility was implemented for members hired on or after January 1, 2011 but before January 1, 2017 (this rule does not apply to State Troopers).
  - Effective January 1, 2011, a modified Rule of 90 with a minimum age of 60 for service retirement eligibility was implemented for members hired on or after January 1, 2017 (this rule does not apply to State Troopers).

#### 2008 Changes in Plan Provisions Since 2007

- There were no changes made to plan provisions.

### Note 2—Significant Changes in Assumptions or Other Inputs Affecting Trends in Actuarial Information

#### 2017 Changes in Assumptions or Other Inputs Since 2016

- There were no changes made to the actuarial methods or assumptions.

#### 2016 Changes in Assumptions or Other Inputs Since 2015

- The following methodology change was made:
  - The Entry Age Normal actuarial cost method allocation basis has been changed from a level dollar amount to a level percentage of pay.
- The following changes were made to the actuarial assumptions:
  - The investment rate of return assumption decreased from 7.50 percent to 7.25 percent.
  - The price inflation assumption decreased from 2.80 percent to 2.40 percent.
  - The wage inflation assumption decreased from 3.90 percent to 3.50 percent.
  - The mortality assumption for active members was changed to RP-2014 White Collar Employee Mortality Table, a table specifically developed for actively working people. To allow for an appropriate margin of improved mortality prospectively, the mortality rates incorporate a 70 percent factor applied to male rates and a 55 percent factor applied to female rates.
  - The post-retirement mortality assumption for healthy lives for the State and Local Government Divisions was changed to the RP-2014 Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 73 percent factor applied to ages below 80 and a 108 percent factor applied to age 80 and above, projected to 2018, for males, and a 78 percent factor

## NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

applied to ages below 80 and a 109 percent factor applied to age 80 and above, projected to 2020, for females.

- The post-retirement mortality assumption for healthy lives for the School, Judicial, and DPS Divisions was changed to the RP-2014 White Collar Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 93 percent factor applied to ages below 80 and a 113 percent factor applied to age 80 and above, projected to 2018, for males, and a 68 percent factor applied to ages below 80 and a 106 percent factor applied to age 80 and above, projected to 2020, for females.
- For disabled retirees, the mortality assumption was changed to reflect 90 percent of RP-2014 Disabled Retiree Mortality Table.
- The assumed rates of withdrawal, retirement, and disability have been adjusted to more closely reflect experience.
- The assumed rates of PERACare participation have been revised to reflect more closely actual experience.
- Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2017 plan year.
- The percentage of PERACare enrollees who will attain age 65 and older ages and are assumed to not qualify for premium-free Medicare Part A coverage have been revised to reflect more closely actual experience.
- The percentage of disabled PERACare enrollees who are assumed to not qualify for premium-free Medicare Part A coverage has been revised to reflect more closely actual experience.
- The health care cost trend rates for Medicare Part A premiums have been revised to reflect the then-current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
- Assumed election rates for the PERACare coverage options that would be available to future PERACare enrollees who will qualify for the "No Part A Subsidy" when they retire have been revised to more closely reflect actual experience.
- Assumed election rates for the PERACare coverage options that will be available to those current PERACare enrollees, who qualify for the "No Part A Subsidy" but have not reached age 65, have been revised to more closely reflect actual experience.
- The rates of PERACare coverage election for spouses of eligible inactive members and future retirees was revised to reflect more closely actual experience.
- The assumed age differences between future retirees and their participating spouses have been revised to reflect more closely actual experience.

### 2015 Changes in Assumptions or Other Inputs Since 2014

- The following methodology changes were made:
  - Rates of morbidity to model the growth in assumed claims as a PERACare enrollee ages have been added to the process used to project per capita health care costs of those PERACare enrollees under the PERA benefit structure who have attained age 65 and older and are not eligible for premium-free Medicare Part A benefits.
  - Adjustments were made to the timing of the normal cost and unfunded actuarial accrued liability (UAAL) payment calculations to reflect contributions throughout the year.
- The following changes were made to the actuarial assumptions:
  - The percentage of PERACare enrollees who will attain age 65 and older ages and are assumed to not qualify for premium-free Medicare Part A coverage have been revised to more closely reflect actual experience.
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2016 plan year.
  - The health care cost trend rates for Medicare Part A premiums have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.

### 2014 Changes in Assumptions or Other Inputs Since 2013

- The following change was made to the actuarial assumptions:
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2015 plan year.
- The following other change was made:
  - In 2012, a lawsuit was initiated to determine the amount owed to PERA by Memorial and the City of Colorado Springs (City) for Memorial's disaffiliation from PERA. In September 2014, PERA and the City agreed to resolve the lawsuit. The agreement provided for the City to pay PERA \$190,000 for the liabilities associated with the retirement and health care benefits already earned by 7,666 Memorial employees for the work that they performed before Memorial ceased to be a PERA employer. On October 3, 2014, PERA received a disaffiliation payment from the City, which was allocated to the Local Government Division Trust Fund and the HCTF in the amount of \$186,006 and \$3,994, respectively.

**NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS**  
(*Dollars in Thousands*)**2013 Changes in Assumptions or Other Inputs Since 2012**

- The following changes were made to the actuarial assumptions:
  - The investment rate of return assumption decreased from 8.00 percent to 7.50 percent per annum.
  - The price inflation assumption decreased from 3.50 percent to 2.80 percent per annum.
  - The wage inflation assumption decreased from 4.25 percent to 3.90 percent per annum.
  - Effective January 1, 2014, PERACare no longer participates in the Centers for Medicare & Medicaid Services' (CMS) Retiree Drug Subsidy (RDS) program. PERACare enrollees participating in the self-insured Medicare supplement plans and the Medicare HMO plan offered by Rocky Mountain Health Plans now receive their prescription drug benefits through a Medicare Prescription Drug Plan. The liability associated with the RDS has been eliminated.
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2014 plan year.
  - The health care cost trend rates for Medicare Part A premiums have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
  - The utilization rates for the No Part A subsidy of both retirees and their spouses have been revised.

**2012 Changes in Assumptions or Other Inputs Since 2011**

- The following changes were made to the actuarial assumptions:
  - The price inflation assumption decreased from 3.75 percent to 3.50 percent.
  - The wage inflation assumption decreased from 4.50 percent to 4.25 percent.
  - The post-retirement mortality assumption for healthy lives changed to the RP-2000 Combined Mortality Table rates projected with Scale AA to 2020 (set back one year for males and two years for females).
  - The active member mortality assumption was revised to match the post-retirement mortality table. However, the percentages of the post-retirement mortality tables reflected on active member lives were changed to 55 percent for males and 40 percent for females.
  - The RP-2000 Disability Mortality Table was retained. The setback applied to the male disability mortality rates remains unchanged at two years, however, the setback applied to the female mortality rates changed from five years to two years.

- The rates of withdrawal were revised to more closely reflect actual experience.
- The rates of early, reduced retirement for all divisions decreased and the rates for unreduced retirements increased to more closely reflect actual experience.
- The rates of disability from active service decreased slightly to more closely reflect actual experience.
- The investment return assumption was changed to be only net of investment expenses to better represent the investment consultant's assumptions and predictions and also to better align with recent changes in GASB accounting and reporting requirements.
- The rates of participation in PERACare for current and future participants of all divisions and DPS Division deferred vested members have been revised to more closely reflect actual experience.
- The percentage of PERACare enrollees who will attain age 65 and older ages and are assumed to not qualify for premium-free Medicare Part A coverage have been revised to more closely reflect actual experience.
- The average age difference between covered male and female spouses has been updated to reflect actual experience.
- Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2013 plan year.
- The initial per capita payments estimated to be made by CMS under the RDS program have been updated based upon the most recent attestation of actuarial equivalence.
- The health care cost trend rates for Medicare Part A premiums and RDS payments have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
- The last year in which the prescription drug benefit provided to those members eligible for Medicare Part D is deemed to be actuarially equivalent has been increased to 2023.

**2011 Changes in Assumptions or Other Inputs Since 2010**

- The following changes were made to the actuarial assumptions:
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2012 plan year.

**NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS**  
(*Dollars in Thousands*)

- The initial per capita payments estimated to be made by CMS under the RDS have been updated based upon the most recent attestation of actuarial equivalence.
- The health care cost trend rates for Medicare Part A premiums and RDS payments have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
- The last year in which the prescription drug benefit provided to those members eligible for Medicare Part D is deemed to be actuarially equivalent has been increased to 2019.

**2010 Changes in Assumptions or Other Inputs Since 2009**

- The following changes were made to the actuarial assumptions:
  - Assumptions were supplemented to provide for the valuation of the DPS benefit structure added as a result of the merger of the DPSRS into PERA, effective January 1, 2010.
  - DPS HCTF was created on January 1, 2010, to provide health care subsidies for DPS retirees participating in PERACare.
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2011 plan year.
  - PERACare funding rates are used to determine the health care costs for participants enrolled in the self-insured plans who are expected to attain age 65 and older ages and not eligible for premium-free Medicare Part A.
  - The starting per capita payments estimated to be made by the CMS under the RDS have been updated based upon the most recent attestation of actuarial equivalence.
  - The health care cost trend rates for Medicare Part A premiums and RDS payments have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
  - The percentage of PERACare enrollees who are projected to be age 65 and older, and estimated to not be eligible for premium-free Medicare Part A has been revised to reflect plan experience.
  - The last year in which the prescription drug benefit provided to those members eligible for Medicare Part D is deemed to be actuarially equivalent has been increased to 2018.
  - Liabilities for those members represented under both the PERA benefit structure and the DPS benefit structure have been allocated based upon member contribution account balances.

**2009 Changes in Assumptions or Other Inputs Since 2008**

- The following changes were made to the actuarial assumptions:
  - The investment rate of return decreased from 8.50 percent to 8.00 percent per annum.
  - The withdrawal rates, retirement rates, pre-retirement mortality rates, and disability rates for all divisions have been revised to more closely reflect the actual experience of PERA.
  - The post-retirement mortality tables used for service retirements and dependents of deceased pensioners have been changed to the 1994 Group Annuity Mortality Table set back three years for males and set back two years for females.
  - The deferral period for deferred vested members was revised to reflect more closely the actual experience of PERA.
  - The rates of participation in PERACare for current members, future members, deferred vested members, and spouses have been revised to more closely reflect the actual experience of PERA.
  - Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2010 plan year.
  - The starting per capita payments estimated to be made by CMS under the RDS Program have been updated based upon the most recent attestation of actuarial equivalence.
  - The health care cost trend rates have been revised to reflect the expectation of future increases in rates of inflation applicable to Medicare Part A premiums.
  - The last year in which the prescription drug benefit provided to those members eligible for Medicare Part D is deemed to be actuarially equivalent has been reduced to 2017.

**2008 Changes in Assumptions or Other Inputs Since 2007**

- The following changes were made to the actuarial assumptions:
  - Initial per capita health care costs for those PERA enrollees who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits, and who participate in the Kaiser Permanente, Rocky Mountain Health Plans, and Secure Horizons plans, have been updated to reflect their change in costs for the 2009 plan year.
  - The starting per capita payments estimated to be made by CMS under the RDS have been updated based upon the most recent attestation of actuarial equivalence.
  - The assumed level of spousal participation was updated to better match plan experience.

**NOTES TO THE REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)—HEALTH CARE TRUST FUNDS**  
*(Dollars in Thousands)*

- The year in which the prescription drug benefit provided to those members eligible for Medicare Part D ceases to be actuarially equivalent, by failing the net test component of the Actuarial Equivalency Attestation, was extended to 2018 based upon the most recent attestation of actuarial equivalence.
- The premium payable to CMS for Medicare Part A coverage was updated to reflect the change in cost for 2009.

**Note 3—Methods and Assumptions Used in Calculations of ADC**

The ADC rates, as a percentage of covered payroll, used to determine the ADC amounts in the Schedule of Employer Contributions are calculated as of December 31, two years prior to the end of the year in which ADC amounts are reported. The following actuarial methods and assumptions (from the December 31, 2015, actuarial valuation) were used to determine contribution rates reported in that schedule for the year ending December 31, 2017:

Actuarial cost method	Entry age
Amortization method	Level percentage of payroll
Amortization period	Open 30-year period
Asset valuation method	4-year smoothed market
Price inflation	2.80 percent
Real wage growth	1.10 percent
Wage inflation	3.90 percent
Salary increases, including wage inflation	3.90 in aggregate
Long-term investment rate of return, net of pension plan investment expense, including price inflation	7.50 percent
Health care inflation factors	
PERA benefit structure:	
Service-based premium subsidy	0.00 percent
Medicare Part A premiums	2.75 percent initial 4.25 percent ultimate
Carrier premiums	5.00 percent
DPS benefit structure:	
Service-based premium subsidy	0.00 percent
Medicare Part A premiums	N/A
Carrier premiums	N/A

## SUPPLEMENTARY SCHEDULES

(Dollars in Thousands)

## SCHEDULE OF ADMINISTRATIVE EXPENSES

For the Years Ended December 31

	2017	2016
<b>Personnel Services</b>		
Salaries	\$31,996	\$30,402
Employee benefits	11,864	10,705
<b>Total personnel services</b>	<b>43,860</b>	<b>41,107</b>
<b>Professional Services</b>		
Actuarial contracts	490	555
Audits	259	205
Investment services	2,760	2,278
Legal and legislative counsel	2,577	3,235
Computer services and consulting	1,202	1,241
Management consulting	1,481	1,446
Health care consulting	322	349
Other	1,007	1,033
<b>Total professional services</b>	<b>10,098</b>	<b>10,342</b>
<b>Miscellaneous</b>		
Equipment rental and services	1,685	1,648
Memberships	370	390
Publications and subscriptions	62	65
Travel and local expense	731	790
Auto expense	19	17
Telephone	232	210
Postage	1,732	1,535
Insurance	520	458
Printing	593	504
Office supplies	657	763
Building rent, supplies, and utilities	982	958
<b>Total miscellaneous</b>	<b>7,583</b>	<b>7,338</b>
<b>Direct Expense</b>		
Life Insurance Reserve	353	928
Health Care Trust Fund	16,693	16,726
DPS Health Care Trust Fund	651	657
Voluntary Investment Program	1,432	1,443
Defined Contribution Retirement Plan	366	361
Deferred Compensation Plan	600	600
<b>Total direct expense</b>	<b>20,095</b>	<b>20,715</b>
Depreciation expense	340	473
Tenant and other expense	992	991
Internal investment manager expense	(17,648)	(16,955)
<b>Total administrative expense</b>	<b>\$65,320</b>	<b>\$64,011</b>
<b>Allocation of Administrative Expense</b>		
State Division Trust Fund	\$11,745	\$11,271
School Division Trust Fund	23,019	21,991
Local Government Division Trust Fund	2,541	2,395
Judicial Division Trust Fund	86	81
DPS Division Trust Fund	2,857	2,754
Voluntary Investment Program	2,877	2,814
Defined Contribution Retirement Plan	739	726
Deferred Compensation Plan	993	963
Health Care Trust Fund	19,162	19,166
DPS Health Care Trust Fund	808	818
Life Insurance Reserve	493	1,032
<b>Total administrative expense</b>	<b>\$65,320</b>	<b>\$64,011</b>

Note: The ratio of administrative expenses to fiduciary net position for the Division Trust Funds is eight basis points (0.08 percent) for 2017 and nine basis points (0.09 percent) for 2016.  
 See accompanying *Independent Auditors' Report*.

**SUPPLEMENTARY SCHEDULES**

(Dollars in Thousands)

**SCHEDULE OF OTHER ADDITIONS**

For the Years Ended December 31

	State Division Trust Fund	School Division Trust Fund	Local Govt. Division Trust Fund	Judicial Division Trust Fund	DPS Division Trust Fund	Voluntary Investment Program	Defined Contribution Retirement Plan	Deferred Compensation Plan	HCTF	DPS HCTF	Life Insurance Reserve	TOTAL 2017	2016
Administrative fee income	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$2,469	\$158	\$—	\$2,627	\$2,601
Revenue sharing	—	—	—	—	—	140	10	54	—	—	—	204	163
Participant loan interest	—	—	—	—	—	2,018	—	451	—	—	—	2,469	2,494
Interfund transfers at retirement	15,772	—	—	2,378	3,857	—	—	—	—	—	—	22,007	14,671
Purchase service transfer to health care	—	—	—	—	—	—	—	—	7,259	84	—	7,343	6,838
Settlement income	47	78	13	1	11	—	—	—	2	—	—	152	148
Miscellaneous	41	28	1	—	2	49	29	5	30	—	—	185	205
Total other additions	<b>\$15,860</b>	<b>\$106</b>	<b>\$14</b>	<b>\$2,379</b>	<b>\$3,870</b>	<b>\$2,207</b>	<b>\$39</b>	<b>\$510</b>	<b>\$9,760</b>	<b>\$242</b>	<b>\$—</b>	<b>\$34,987</b>	<b>\$27,120</b>

**SCHEDULE OF OTHER DEDUCTIONS**

For the Years Ended December 31

	State Division Trust Fund	School Division Trust Fund	Local Govt. Division Trust Fund	Judicial Division Trust Fund	DPS Division Trust Fund	Voluntary Investment Program	Defined Contribution Retirement Plan	Deferred Compensation Plan	HCTF	DPS HCTF	Life Insurance Reserve	TOTAL 2017	2016
Interfund transfers at retirement	\$—	\$19,374	\$2,633	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$—	\$22,007	\$14,671
Purchase service transfer to health care	2,859	3,047	1,200	153	84	—	—	—	—	—	—	7,343	6,838
Miscellaneous	793	63	4	—	5	1,411	116	698	102	4	—	3,196	2,747
Total other deductions	<b>\$3,652</b>	<b>\$22,484</b>	<b>\$3,837</b>	<b>\$153</b>	<b>\$89</b>	<b>\$1,411</b>	<b>\$116</b>	<b>\$698</b>	<b>\$102</b>	<b>\$4</b>	<b>\$—</b>	<b>\$32,546</b>	<b>\$24,256</b>

See accompanying Independent Auditors' Report.

**SUPPLEMENTARY SCHEDULES**

(*Dollars in Thousands*)

**SCHEDULE OF INVESTMENT EXPENSES**

For the Years Ended December 31

	2017	2016
<b>External Manager Expenses</b>		
Fixed income	\$4,806	\$4,488
Global equity	31,800	30,694
Private equity	54,878	50,760
Real estate	43,911	46,104
Opportunity fund	15,836	9,353
Cash and short-term investments	427	512
<b>Total external manager expenses</b>	<b>151,658</b>	<b>141,911</b>
 Internal manager expenses		
	17,648	16,955
Other investment expenses and custody fees	3,495	2,934
 Defined contribution and deferred compensation plan investment expenses	 5,445	 4,545
<b>Total investment expenses</b>	<b>\$178,246</b>	<b>\$166,345</b>

**SCHEDULE OF PAYMENTS TO CONSULTANTS**

For the Years Ended December 31

	2017	2016
<b>Professional Contracts</b>		
Actuarial	\$490	\$555
Audits	259	205
Legal and legislative counsel	2,577	3,235
Computer services and consulting	1,202	1,241
Management consulting	1,481	1,446
Health care consulting	322	349
Other	1,007	1,033
<b>Total payments to consultants<sup>1</sup></b>	<b>\$7,338</b>	<b>\$8,064</b>

<sup>1</sup> Excludes investment advisers.

See accompanying *Independent Auditors' Report*.



# INVESTMENT SECTION



## COLORADO PERA REPORT ON INVESTMENT ACTIVITY

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds

### State Law

State law gives complete responsibility for the investment of Colorado PERA's funds to the PERA Board of Trustees (Board), with some stipulations including:

- The aggregate amount of moneys invested in corporate stocks or corporate bonds, notes, or debentures, which are convertible into corporate stock or in investment trust shares cannot exceed 65 percent of the then book value of the fund.
- No investment of the fund in common or preferred stock, or both, of any single corporation can exceed 5 percent of the then book value of the fund.
- The fund cannot acquire more than 12 percent of the outstanding stock or bonds of any single corporation.
- The origination of mortgages or deeds of trust on real residential property is prohibited.

Additionally, Colorado Revised Statutes (C.R.S.) § 24-54.8-202 imposes targeted divestment from companies that have economic prohibitions against Israel. C.R.S. § 24-54.8-101 imposed targeted divestment from companies with active operations in Sudan. In October 2017, the United States Secretary of State issued a report that confirmed the Government of Sudan's positive actions during 2017 and lifted all sanctions against the Government of Sudan. This lifting of sanctions triggered the repeal clause in the Colorado divestment legislation, and therefore the Sudan divestment statute was repealed by operation of law.

### Colorado PERA Board's Statutory Fiduciary Responsibility

By State law, the management of PERA's retirement fund is vested in the Board who is held to the standard of conduct of fiduciaries in discharging their responsibilities. According to C.R.S. § 24-51-207(2), the Board, as fiduciaries, must carry out their functions solely in the interest of PERA members and benefit recipients and for the exclusive purpose of providing benefits.

### Goal

The function of PERA is to provide present and future retirement or survivor benefits for its members. The investment function is managed in a manner to promote long-term financial security for our membership while maintaining the stability of the fund.

### Overview of Investment Policy

PERA's investment policy outlines the investment philosophy and guidelines within which the fund's investments will be managed, and includes the following:

- Strategic asset allocation is the most significant factor influencing long-term investment performance and asset volatility.
- The fund's liabilities are long-term and the investment strategy will therefore be long-term in nature.
- The asset allocation policy will be periodically re-examined to ensure its appropriateness to the then-prevailing liability considerations.
- As a long-term investor, PERA will invest across a wide spectrum of investments in a prudent manner.
- Active management may be expected to add value over passive investment alternatives under appropriate conditions.

The Board determines the strategic asset allocation policy for the fund. In 2014, the Board commissioned an asset/liability study prepared by Aon Hewitt Investment Consulting, Inc. (Aon Hewitt). The objective of the study was to determine the optimal strategic asset allocation policy that would ultimately allow PERA to meet its benefit obligations, while also ensuring that PERA incurs appropriate levels of risk. On March 20, 2015, the Board voted to change the strategic asset allocation policy of the fund effective July 1, 2015. This strategic asset allocation contains a long-term target allocation and specific ranges within which each asset class may operate. Because the long-term target allocation will be achieved over time, an initial interim target allocation was approved as of July 1, 2015. This interim target allocation was revised as of July 1, 2016. It was reviewed again and retained without changes on June 23, 2017. PERA staff and Aon Hewitt are responsible for annually recommending interim policy targets to the Board until the long-term target allocation is achieved.

### ASSET ALLOCATION TARGETS AND RANGES<sup>1</sup>

	Interim Asset Allocation Target During 2017	Long-Term Asset Allocation	Target Range During 2017
Global Equity	53.5%	53.0%	47.0% – 59.0%
Fixed Income	23.5%	23.0%	18.0% – 28.0%
Private Equity	8.5%	8.5%	5.0% – 12.0%
Real Estate	8.5%	8.5%	5.0% – 12.0%
Opportunity Fund	5.0%	6.0%	0.0% – 9.0%
Cash and Short-Term Investments	1.0%	1.0%	0.0% – 3.0%

<sup>1</sup> See Note 5 of the Financial Section for detailed disclosures about each asset class.

**COLORADO PERA REPORT ON INVESTMENT ACTIVITY**

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds

The asset/liability study considered expected investment returns, risks, and correlations of returns. The characteristics of the fund's liabilities were analyzed in conjunction with expected investment risks and returns. The targeted strategic asset allocation is designed to provide appropriate diversification and to balance the expected total rate of return with the volatility of expected returns. The asset allocation targets are adhered to through the implementation of a rebalancing policy. Investments are managed and monitored in a manner which seeks to balance return and risk within the asset/liability framework. The Chief Investment Officer is authorized to execute investment transactions on behalf of the Board. Assets are managed both internally and externally. In making investment decisions, the Board and staff utilize external experts in various fields including risk and performance analysis, portfolio construction, and other important investment functions and issues.

**Basis of Presentation**

Aon Hewitt, the Board's Investment Performance consultant, provides the investment returns for the fund based on data made available by the fund's custodian, The Northern Trust Company (Northern Trust). Performance calculations were prepared using time-weighted rates of return and are net-of-fees unless otherwise indicated. Returns for periods longer than one year are annualized.

**Corporate Governance****General Policy**

Although PERA is not subject to the Employee Retirement Income Security Act of 1974 (ERISA), the Board complies with the position taken by the U.S. Department of Labor (DOL) in February 1988. The DOL has stated that the right to vote shares of stock owned by a pension plan is, in itself, an asset of the plan, and therefore the fiduciary's responsibility to manage the assets includes proxy voting. PERA regularly works with various member organizations and federal oversight committees to promote and support national standards of corporate governance that protect long-term investor interests.

**Colorado PERA Board's Shareholder Responsibility Committee**

To assist the Board in carrying out its fiduciary responsibilities in voting proxies, the Board established a Shareholder Responsibility Committee. PERA's General Counsel serves as an adviser to the Committee. The Board and the Shareholder Responsibility Committee have delegated to its staff in the Corporate Governance and Legal Services Division the authority to execute and vote all proxies according to PERA's Proxy Voting Policy. Proxy issues are reviewed by staff on a case-by-case basis and then voted according to guidelines established by PERA's Proxy Voting Policy. PERA retains proxy advisers to assist in the proxy voting process.

**Proxy Voting Policy**

PERA's Proxy Voting Policy sets forth directives on a broad range of issues. The voting of proxy ballots for all domestic and non-U.S. stocks is accomplished by PERA's Corporate Governance and Legal Services Department. PERA regularly reviews and revises the Proxy Voting Policy to keep it up to date with established corporate governance standards. PERA's Proxy Voting Policy can be viewed on PERA's website at [www.copera.org](http://www.copera.org).

*(The Colorado PERA Report on Investment Activity was prepared by internal staff.)*

**INVESTMENT BROKERS/ADVISERS (INTERNALLY MANAGED ASSETS)**

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds

Amherst Pierpont Securities LLC	MarketAxess Corp.
Aon Hewitt Investment Consulting, Inc.	Mitsubishi UFJ Securities (USA), Inc.
Baird (Robert W.) & Co., Incorporated	Mizuho Securities USA, Inc.
Bank of America Merrill Lynch	Morgan Stanley & Co. Inc.
Barclays Capital Inc.	National Bank of Canada
BNP Paribas Securities Corp.	Nomura Securities International, Inc.
Calyon Securities (USA), Inc.	RBC Capital Markets Corporation
Cantor Fitzgerald & Co.	RBS Securities, Inc.
Citigroup Global Markets Inc.	Sanford C. Bernstein & Co., LLC
Credit Suisse Securities (USA) LLC	Sidoti & Company, LLC
CRT Capital Group LLC	Stifel, Nicolaus & Company Incorporated
Deutsche Bank Securities Inc.	Susquehanna International Group, LLC
Goldman Sachs & Co.	The Bank of NewYork Mellon Corp.
HSBC Securities (USA) Inc.	The Northern Trust Company
J.P. Morgan Securities, Inc.	Themis Trading LLC
Jefferies & Co., Inc.	U.S. Bancorp
Liquidnet, Inc.	UBS Securities, LLC
Loop Capital Markets LLC	Wells Fargo Securities, LLC

Note: A list of investment managers is available upon request.

**SCHEDULE OF COMMISSIONS<sup>1</sup>**

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds

For the Year Ended December 31, 2017

(Dollars in Thousands)

Asset Class	Internally Managed Investments		Externally Managed Investments		Total Commissions
	Commissions	Percentage of Asset Class	Commissions	Percentage of Asset Class	
Global Equity	\$1,811	74%	\$4,581	26%	\$6,392
Fixed Income <sup>2</sup>	14,155	76%	3,228	24%	17,383
<b>Total commissions</b>	<b>\$15,966</b>		<b>\$7,809</b>		<b>\$23,775</b>

<sup>1</sup> Does not include commingled funds or commissions within Private Equity, Real Estate, and the Opportunity Fund.<sup>2</sup> Fixed Income commissions are estimated.

## SCHEDULE OF INVESTMENT EXPENSES

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds  
 For the Year Ended December 31, 2017  
*(Dollars in Thousands)*

Total investment expenses for internal and external management of PERA's \$48.9 billion (actual dollars) investment portfolio were \$172,801 representing about 35 basis points. By judiciously combining internal and external management of PERA's investment portfolio, PERA is able to invest at a relatively low cost.

	Investment Expense <sup>1</sup>
Global Equity	\$31,800
Fixed Income	4,806
Private Equity	54,878
Real Estate	43,911
Opportunity Fund	15,836
Cash and Short-Term Investments	427
<b>Total External Manager Expenses</b>	<b>151,658</b>
Internal Manager Expenses	17,648
Other Investment Expenses and Custody Fees	3,495
<b>Total Investment Expenses</b>	<b>\$172,801</b>

<sup>1</sup> See the Investment Summary on page 133 for information about fair value of investments.

## SCHEDULE OF INVESTMENT INCOME AND EXPENSE BY ASSET CLASS

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds  
 For the Year Ended December 31, 2017  
*(Dollars in Thousands)*

Asset Class	Net Appreciation in Fair Value <sup>1</sup>	Interest and Dividends	Net Operating Income <sup>2</sup>	Investment Expenses <sup>3</sup>	Net Securities Lending Income	Net Investment Income
Global Equity	\$5,667,072	\$530,887	\$—	(\$42,336)	\$7,944	\$6,163,567
Fixed Income	120,887	300,254	—	(8,742)	1,006	413,405
Private Equity	625,519	—	45,057	(57,882)	—	612,694
Real Estate	229,975	—	194,558	(45,980)	—	378,553
Opportunity Fund	106,479	—	32,482	(17,396)	—	121,565
Cash and Short-Term Investments	—	4,944	—	(465)	—	4,479
<b>Total</b>	<b>\$6,749,932</b>	<b>\$836,085</b>	<b>\$272,097</b>	<b>(\$172,801)</b>	<b>\$8,950</b>	<b>\$7,694,263</b>

<sup>1</sup> Global Equity and Fixed Income include realized gain/(loss) recognized on securities sold during 2017, current year unrealized gain/(loss) and unrealized translation gain/(loss) and class action revenue. Private Equity, Real Estate, and Opportunity Fund include current year realized and unrealized gain/(loss), paid carried interest, and adjustments to accrued carried interest as reported by the General Partner.

<sup>2</sup> Private Equity, Real Estate, and Opportunity Fund include investment income and expenses as reported by the General Partner.

<sup>3</sup> Includes external and internal investment management, custody, and other investment expenses.

## SCHEDULE OF ALTERNATIVE INVESTMENT CONTRIBUTIONS, DISTRIBUTIONS, AND PAID CARRIED INTEREST

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds  
 For the Year Ended December 31, 2017  
*(Dollars in Thousands)*

Asset Class	Contributions <sup>1</sup>	Distributions <sup>2</sup>	Paid Carried Interest <sup>3</sup>
Private Equity	\$769,604	\$1,149,651	\$87,396
Real Estate	262,058	350,464	9,413
Opportunity Fund	223,204	161,522	3,574
<b>Total</b>	<b>\$1,254,866</b>	<b>\$1,661,637</b>	<b>\$100,383</b>

<sup>1</sup> Represents money sent to external entities for the purpose of funding alternative investments and/or fees during the current fiscal year.

<sup>2</sup> Represents money or shares of companies received from external entities during the current fiscal year, generally due to PERA receiving its proportionate share of an investment's exited value.

<sup>3</sup> Represents the share of profits paid to external entities due to investment returns surpassing agreed-upon thresholds. Amounts will vary, potentially significantly, from year to year depending on the timing of sales of the underlying investments and the magnitude of the gains.

## INVESTMENT SUMMARY

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds  
(Dollars in Thousands)

	Fair Value Per Financial Statement December 31, 2017	Reallocation of Investment Amounts <sup>1</sup>	Non-Investment Amounts <sup>2</sup>	Fair Value Per Investment Portfolio December 31, 2017	Interim Asset Allocation Target During 2017 <sup>3</sup>	Actual Asset Allocation (Percent of Fair Value)		
						12/31/17	12/31/16	12/31/15
Global Equity	\$28,083,121	\$142,265	\$—	\$28,225,386	53.5%	57.7%	55.9%	55.5%
Fixed Income	10,465,666	244,768	—	10,710,434	23.5%	21.9%	22.7%	24.7%
Private Equity	3,895,311	8,199	—	3,903,510	8.5%	8.0%	8.4%	8.2%
Real Estate	4,219,505	(16,448)	—	4,203,057	8.5%	8.6%	9.0%	8.6%
Opportunity Fund	1,669,635	—	—	1,669,635	5.0%	3.4%	2.6%	2.2%
Cash and Short-Term Investments								
Operating Cash	207	—	(207)	—				
Cash and Short-Term Investments	599,425	(361,634)	—	237,791	1.0%	0.4%	1.4%	0.8%
Net securities lending collateral and obligations	1,042	(1,042)	—	—				
Net investment settlements and income and other liabilities <sup>4</sup>	(120,535)	(16,108)	136,643	—				
Benefit and interfund receivables and capital assets <sup>5</sup>	181,639	—	(181,639)	—				
<b>Total</b>	<b>\$48,995,016</b>	<b>\$—</b>	<b>(\$45,203)</b>	<b>\$48,949,813</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

<sup>1</sup> Investment receivables, payables, accruals, securities lending collateral, securities lending obligations and cash and short-term investments have been reallocated back to the investment portfolios that hold them.

<sup>2</sup> Non-investment amounts are not included in the determination of actual investment asset allocation.

<sup>3</sup> See page 129 for more information about the strategic asset allocation policy of the fund.

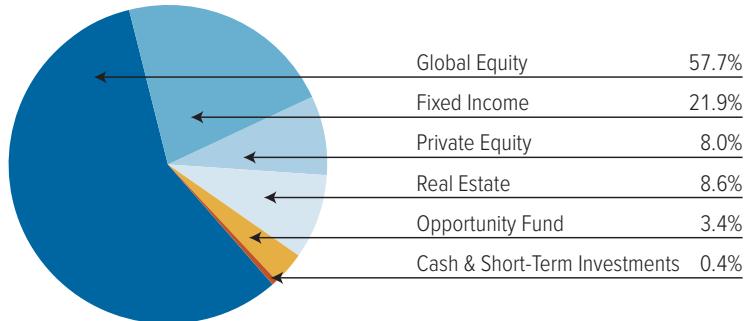
<sup>4</sup> Includes non-investment payables of \$136,643.

<sup>5</sup> Includes benefit receivables of \$167,037, interfund receivables of \$422, and capital assets of \$14,180.

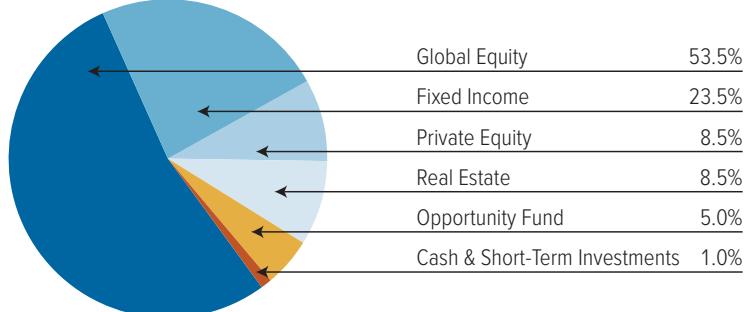
## Asset Allocation at Fair Value

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds  
As of December 31, 2017

Asset Allocation at Fair Value



Interim Target Allocation



## SCHEDULE OF INVESTMENT RESULTS

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds  
As of December 31, 2017

Aon Hewitt provides the investment returns for the fund based on data made available by Northern Trust. Listed below are the annualized one-, three-, five-, and ten-year net-of-fees time-weighted rates of return for each asset class and their respective benchmarks.

	2017	3-Year	5-Year	10-Year
<b>PERA Total Portfolio</b>	<b>18.1%</b>	8.8%	9.5%	6.0%
Total Fund Policy Benchmark <sup>1</sup>	<b>16.0%</b>	7.8%	9.0%	5.9%
Median Plan (BNY Mellon Performance and Risk Analytics <sup>3</sup> and Investment Metrics' Median Public Fund Universe)	<b>15.6%</b>	7.4%	8.6%	5.5%
<b>Global Equity</b>	<b>26.3%</b>	10.6%	11.9%	6.3%
Global Equity Custom Benchmark <sup>1</sup>	<b>23.9%</b>	9.5%	11.0%	5.8%
<b>Fixed Income</b>	<b>4.2%</b>	2.8%	2.5%	4.7%
Fixed Income Custom Benchmark <sup>1</sup>	<b>4.1%</b>	2.8%	2.5%	4.4%
<b>Private Equity</b>	<b>17.8%</b>	11.8%	12.7%	8.2%
Private Equity Custom Benchmark <sup>2</sup>	<b>17.5%</b>	10.7%	16.3%	10.5%
<b>Real Estate</b>	<b>9.8%</b>	12.3%	12.9%	4.8%
Real Estate Custom Benchmark <sup>3</sup>	<b>7.2%</b>	9.9%	10.9%	5.0%
<b>Opportunity Fund</b>	<b>8.4%</b>	5.1%	3.5%	3.4%
Opportunity Fund Benchmark <sup>4</sup>	<b>8.8%</b>	4.9%	4.5%	2.8%
<b>Cash and Short-Term Investments</b>	<b>1.1%</b>	0.5%	0.3%	0.5%
ICE BofAML U.S. 3-Month Treasury Bill Index	<b>0.9%</b>	0.4%	0.3%	0.4%

Note: Performance calculations were prepared using net-of-fees time-weighted rates of return.

<sup>1</sup> The PERA Board adopted benchmarks beginning April 1, 2004, for each of the various asset classes. The adopted benchmarks have changed over time and, accordingly, the benchmark returns presented represent a blend, as follows:

- The Total Fund Policy Benchmark—A combination of 53.5 percent of the Global Equity Custom Benchmark; 23.5 percent of the Fixed Income Custom Benchmark; 8.5 percent of the Private Equity Custom Benchmark; 8.5 percent of the Real Estate Custom Benchmark; 5.0 percent of the Opportunity Fund Benchmark; and 1.0 percent of the ICE BofAML U.S. 3-Month Treasury Bill Index. Beginning July 2015 and prior to July 2016, a combination of 55.0 percent of the Global Equity Custom Benchmark; 24.0 percent of the Fixed Income Custom Benchmark; 7.5 percent of the Real Estate Custom Benchmark; 7.5 percent of the Private Equity Custom Benchmark, 5.0 percent of the Opportunity Fund Benchmark; and 1.0 percent of the ICE BofAML U.S. 3-Month Treasury Bill Index. Beginning January 2012 and prior to July 2015, a combination of 56.0 percent of the Global Equity Custom Benchmark; 25.0 percent of the Fixed Income Custom Benchmark; 7.0 percent of the Real Estate Custom Benchmark; 7.0 percent of the Private Equity Custom Benchmark, and 5.0 percent of the Opportunity Fund Benchmark. Beginning January 2011 and prior to January 2012, a combination of 56.0 percent of the Global Equity Custom Benchmark; 25.0 percent of the Fixed Income Custom Benchmark; 7.0 percent of the Real Estate Custom Benchmark; 7.0 percent of the Private Equity Custom Benchmark, and 5.0 percent of the Public Markets Benchmark. Beginning January 2009 and prior to January 2011, a combination of 58.0 percent of the Global Equity Custom Benchmark; 25.0 percent of the Fixed Income Custom Benchmark; 7.0 percent of the Real Estate Custom Benchmark; 7.0 percent of the Private Equity Custom Benchmark, and 3.0 percent of the Public Markets Benchmark. For 2008, a combination of 43.0 percent of the Dow Jones Wilshire 5000 Stock Index; 15.0 percent of the MSCI ACWI ex-U.S. Index; 25.0 percent of the Bloomberg Barclays Capital U.S. Universal Bond Index; 7.0 percent of the Real Estate Custom Benchmark; 7.0 percent of the Private Equity Custom Benchmark, and 3.0 percent of the Public Markets Benchmark.
- Global Equity Custom Benchmark—The MSCI ACWI IMI. Prior to February 1, 2013, 52.0 percent DJ U.S. Total Stock Market Index and 48.0 percent MSCI ACWI ex-U.S. Index. Prior to October 1, 2012, 58.0 percent DJ U.S. Total Stock Market Index and 42.0 percent MSCI ACWI ex-U.S. Index. Prior to April 2012, 64.0 percent DJ U.S. Total Stock Market Index and 36.0 percent MSCI ACWI ex-U.S. Index. Prior to October 1, 2011, 69.0 percent DJ U.S. Total Stock Market Index and 31.0 percent MSCI ACWI ex-U.S. Index. Prior to April 1, 2011, 74.1 percent DJ U.S. Total Stock Market Index (replaced the DJ Wilshire 5000 in 2009) and 25.9 percent MSCI ACWI ex-U.S. Index.
- Fixed Income Custom Benchmark—The Bloomberg Barclays U.S. Universal Bond Index. Beginning July 1, 2010 and prior to July 1, 2015, 98.0 percent of the Bloomberg Barclays Capital U.S. Universal Bond Index and 2.0 percent of the Bloomberg Barclays Capital U.S. Long Government/Credit Index. Prior to July 1, 2010, Bloomberg Barclays Capital U.S. Universal Bond Index.

<sup>2</sup> The Burgiss Time Weighted Rate of Return Benchmark. Prior to January 1, 2015, the DJ U.S. Total Stock Market Index plus 250 basis points annually. Prior to January 1, 2012, DJ U.S. Total Stock Market Index (replaced the DJ Wilshire 5000 in 2009) plus 300 basis points annually.

<sup>3</sup> NCREIF Open End Diversified Core Equity Index (NFI-ODCE) plus 50 basis points annually. Prior to January 1, 2012, the NFI-ODCE plus 100 basis points annually.

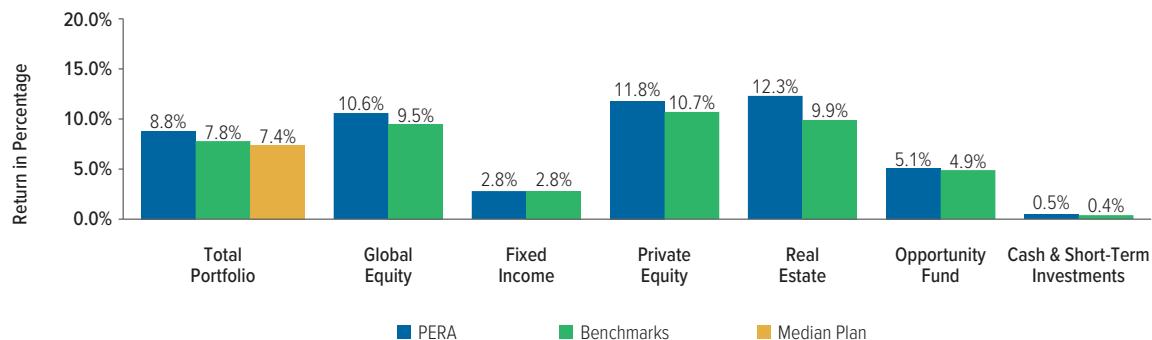
<sup>4</sup> A market value weighted aggregate of the benchmarks of the individual strategies included in the Opportunity Fund. Prior to January 2012, a combination of 69.1 percent of the Global Equity Custom Benchmark and 30.9 percent of the Fixed Income Custom Benchmark. Beginning January 1, 2008 and prior to January 2011, a combination of 51.8 percent DJ U.S. Total Stock Market Index (replaced the DJ Wilshire 5000 in 2009), 18.1 percent MSCI ACWI ex-U.S. Index, and 30.1 percent Fixed Income Custom Benchmark.

## SCHEDULE OF INVESTMENT RESULTS

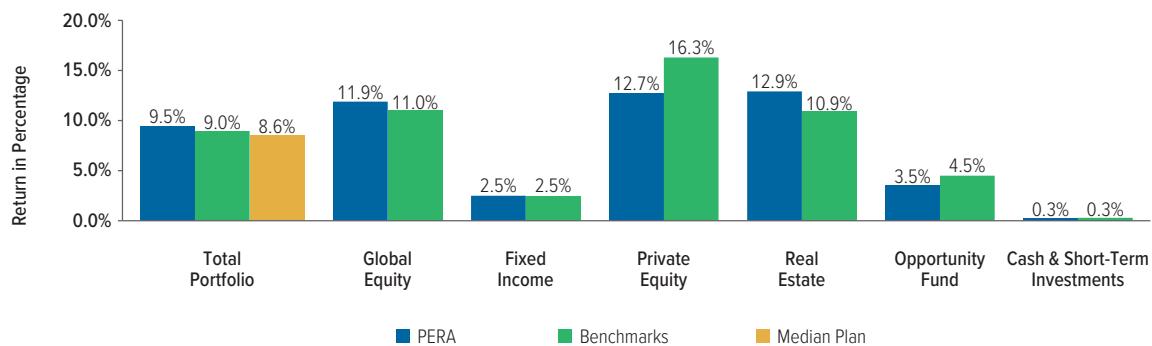
Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds  
As of December 31, 2017

Listed below are the three-, five-, and ten-year net-of-fees time-weighted rates of return for the total fund and each asset class and their respective benchmarks.

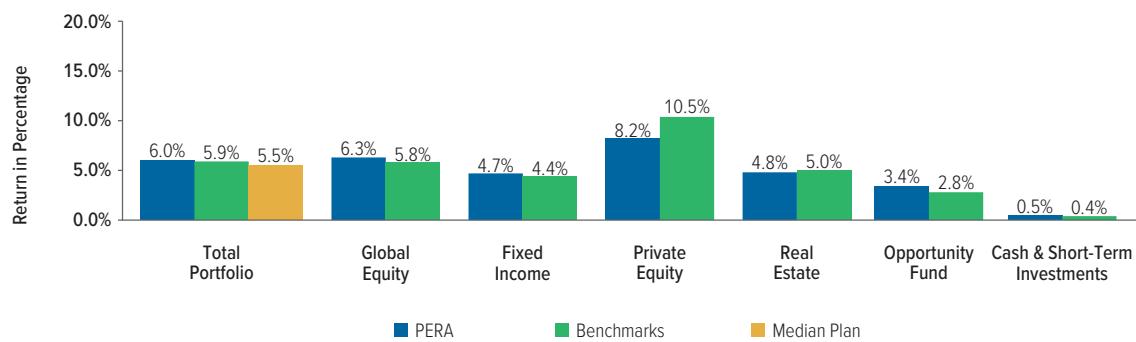
Three-Year Net-of-Fees Time-Weighted Rates of Return



Five-Year Net-of-Fees Time-Weighted Rates of Return



Ten-Year Net-of-Fees Time-Weighted Rates of Return



## FUND PERFORMANCE EVALUATION

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds  
(Performance returns are net-of-fees unless otherwise indicated)

### Evaluation

Aon Hewitt and Northern Trust are retained by PERA to evaluate fund performance. Aon Hewitt is also used for the Real Estate portfolio performance evaluation and industry comparisons. In their analysis, Aon Hewitt and Northern Trust include all investments within the portfolio, including cash and accrued income. They also compute the annual rates of return. In order to provide fund returns inclusive of all asset classes, performance calculations are prepared using time-weighted rates of return and are annualized for periods greater than one year.

### Asset Allocation

PERA's long-term strategic asset allocation policy sets forth specific portfolio targets. Interim asset allocation targets effective at the end of 2017, approved by the Board in 2016, are as follows: Global Equity 53.5 percent, Fixed Income 23.5 percent, Private Equity 8.5 percent, Real Estate 8.5 percent, Opportunity Fund 5.0 percent, and Cash 1.0 percent.

### Total Portfolio Results

For the year ended December 31, 2017, PERA's total fund returned 18.1 percent, outperforming the policy benchmark's return of 16.0 percent. PERA adopted a policy benchmark, which is a passive representation of the asset allocation policy, as of April 1, 2004. The total fund has outperformed the policy benchmark on the one-, three-, five-, and ten-year time periods.

For the year ended December 31, 2017, the total fund returned 18.1 percent, compared to the BNY Mellon Performance and Risk Analytics' and Investment Metrics' Median Public Fund Universe return of 15.6 percent. As of December 31, 2017, the BNY Mellon Performance and Risk Analytics' and Investment Metrics' Median Public Fund Universe measure was comprised of 106 public pension funds with assets of approximately \$2.1 trillion. The total fund has performed better than the BNY Mellon Performance and Risk Analytics' and Investment Metrics' Median Public Fund Universe over the one-, three-, five-, and ten-year time periods.

For the year ended December 31, 2017, the total fund returned 18.1 percent, compared to a hypothetical portfolio consisting of 60 percent global equities<sup>1</sup> and 40 percent fixed income<sup>2</sup>, which returned 15.6 percent. The total fund has performed better than this hypothetical portfolio on the one-, three-, five- and ten-year time periods (8.8 percent versus 6.9 percent, 9.5 percent versus 7.7 percent, and 6.0 percent versus 5.5 percent, for the three-, five-, and ten-year time periods, respectively).

### Global Equity

Global equities had a remarkable year, not only by posting strong returns, but also by demonstrating unusually low volatility. Strong corporate earnings growth, record-low market volatility, synchronized

global economic expansion, favorable U.S. macroeconomic attributes including a weaker U.S. dollar, higher commodity prices, and moderate inflation, were the themes propelling equities throughout 2017. Equities seemed to shrug off political turmoil such as the failure of U.S. healthcare reform and the tense geopolitical environment, and instead focused on other themes that drove global equity strength, such as the success of U.S. tax reform. One of the most widely cited drivers of this strength was the universal upswing in global economic growth across regional economies during 2017. Looking at the equity markets around the world, stocks of emerging market countries led the global rally of 2017, as these markets benefited the most from the global economic boom. In terms of styles and sectors, growth stocks, led by the technology sector, outperformed value stocks, while large cap stocks outperformed small cap stocks. Investors also held strong in their belief that the best investments in 2017 were the stocks with strong balance sheets and secular growth, a somewhat defensive posture, and an unexpected switch from the focus on cyclical in 2016.

In 2017, PERA's Global Equity portfolio returned 26.3 percent, outperforming its custom benchmark's return of 23.9 percent. The Global Equity portfolio has outperformed its custom benchmark over the one-, three-, five-, and ten-year periods.

### Fixed Income

In 2017, the major themes in the fixed income markets were strong and synchronized global growth, substantial liquidity, and subdued inflation. Fixed income markets moved in a similar pattern throughout the year with the yield curve flattening, credit spreads tightening and volatility declining to multi-year lows. The flattening of the yield curve was the result of higher short term interest rates as the Federal Reserve (Fed) raised the federal funds target rate three times while long term interest rates were little changed. In the second half, as expected, the Fed announced it would begin to reduce its balance sheet by slowly trimming reinvestment of principal and interest payments received from its portfolio of fixed income securities. The Fed's effort to reduce liquidity was offset by further balance sheet expansion by global central banks continuing to stimulate growth and inflation in their respective local economies. Inflation remained low due to modest wage growth and disruptors in the economy driving down prices in the communications and retail sectors. During the year, credit spreads tightened by 30 basis points, the yield curve flattened by 100 basis points, and volatility ended the year 20 percent lower than it started. Consistent with strong equity markets, the more risky segments of fixed income led returns for the year as high yield and emerging markets returned 7.5 percent and 8.2 percent, respectively.

During 2017, PERA's Fixed Income portfolio outperformed its custom benchmark, returning 4.2 percent versus its custom benchmark's return of 4.1 percent. The portfolio has performed in line with its custom benchmark over the three- and five-year time periods and outperformed its custom benchmark over the one- and ten-year time periods.

<sup>1</sup> MSCI ACWI IMI.

<sup>2</sup> Bloomberg Barclays U.S. Universal Bond Index.

**FUND PERFORMANCE EVALUATION**

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds  
(Performance returns are net-of-fees unless otherwise indicated)

**Private Equity**

Private equity (PE) investment activity in 2017 declined relative to prior years, but remained above historical averages due to the large amount of capital on the sidelines and a relatively positive outlook on the economy. Competition from financial and corporate strategic acquirers, as well as strong public markets, contributed to higher company valuations. Initial public offering (IPO) and merger and acquisition PE exit activity remained strong on a historical basis, but decreased in number and volume from 2016 totals. In addition to potential synergies gained through buy-and-build strategies, PE managers emphasized high-conviction/value-creation strategies as a way to drive growth and further compensate for a rich pricing environment. A continued focus on strong balance sheets and thoughtful capital structures was employed by PE managers to build strong company portfolios that can maneuver through market cycles.

PE fundraising continued its strong run during 2017 as investor demand for exposure to the asset class remained robust. Buyout strategies took the greatest proportion of PE capital, accounting for over half of all capital raised during the year and an increase from prior years. Energy-related strategies saw a rebound in fundraising from 2016 and gained momentum as 2017 came to a close. Late 2017 tax reform is expected to have an impact across PE, most notably as it applies to corporate tax rates, carried interest, and interest deductibility. The PE industry is in the early phases of implementing these new policies and it remains to be determined what longer-term effects may be.

Venture capital activity increased year-over-year and continues to be robust. A healthy venture-backed IPO market as well as the emergence of disruptive technologies, such as artificial intelligence and cryptocurrencies, spurred increased venture activity in 2017.

PERA's Private Equity portfolio returned 17.8 percent in 2017 compared with its custom benchmark's return of 17.5 percent. The portfolio outperformed its custom benchmark over the one- and three-year time frames, but underperformed its custom benchmark over the five- and ten-year time frames. The portfolio's since inception net internal rate of return as of December 31, 2017, was 10.5 percent compared to its custom benchmark's since inception internal rate of return of 10.2 percent.

**Real Estate**

Real estate transaction volume in 2017 remained strong as investors continue to target real estate. Debt financing remained generally widely available, particularly for core investments, and interest rates remained generally low. The stable financial markets and steady real estate fundamentals should generally lead to rising property values.

Although investors are likely to be more discerning in their selection process, the U.S. remains one of the most attractive commercial real estate markets. The industrial sector continues to experience one of the longest expansions on record as it benefits from the impact of e-commerce. The multifamily sector has experienced some weakness

in pricing, although the long term outlook for this sector remains strong. The office sector appears to have plateaued after a period of cyclical expansion and retail continues to struggle to find its footing, despite growth in consumer spending. It remains unclear what the long-term impact e-commerce will have on physical retail structures.

In 2017, the Real Estate portfolio had a total return of 9.8 percent, compared to its custom benchmark's return of 7.2 percent. The Real Estate portfolio outperformed its custom benchmark over the one-, three-, and five-year periods and underperformed its custom benchmark over the ten-year period.

**Opportunity Fund**

Global equity and credit markets continued to climb higher in 2017, continuing the multi-year trend of positive sentiment towards growth-oriented assets driven by steadily rising corporate earnings, tight credit spreads, low unemployment, relatively low interest rates, muted inflation, and the lowest volatility on record. The prospect of synchronized global growth for the first time in many years, and a business-friendly tax overhaul in the U.S., fueled strong rallies in all major asset classes. While this macro environment was supportive of strong gains in most institutional investment portfolios, momentum-driven markets posed a number of challenges for generating benchmark exceeding returns in diversified, multi-asset class portfolios with an emphasis on tactical opportunities, relative-value trades and value-oriented strategies.

Most alternative investment strategies had positive returns during the year, but trailed public market performance. New regulatory initiatives continued to dampen liquidity in private credit markets, which created opportunities for alternative sources of capital to fill the gap and earn a premium return over traditional fixed income investments. Although there was little stress in the broader markets, opportunistic investment managers found pockets of distressed and special situations, most notably in retail, telecommunications, energy, and European non-performing loans. Hedge funds generally demonstrated positive performance in 2017, with equity long-short funds posting the highest returns, while relative value and credit strategies produced mid-single digit returns, albeit with exceptionally low volatility. Global macro investments performed poorly on a comparative basis, with the exception being those funds with an emerging markets focus, and a recent divergence in rates and monetary policy guidance created a more favorable outlook for macro strategies. Overall, timberland valuations experienced modest movement, supported by growing demand from new housing development and supply disruptions due to isolated weather events.

In 2017, PERA's Opportunity Fund portfolio returned 8.4 percent compared to its custom benchmark's return of 8.8 percent. The Opportunity Fund has outperformed its custom benchmark over the three- and ten-year periods, and underperformed its custom benchmark over the one- and five-year periods.

## INVESTMENT SECTION SCHEDULES

Does Not Include the Two Defined Contribution Pension and Deferred Compensation Trust Funds  
(*Dollars in Thousands*)

### PROFILE OF INVESTMENTS IN COLORADO

As of December 31, 2017

	Fair Value
Public Equity <sup>1</sup>	\$147,940
Bonds	
Bonds and notes <sup>1</sup>	48,758
Colorado Housing Finance Authority	6,633
Total Bonds	55,391
Real Estate	60,272
Private Equity	
Partnership investments <sup>2</sup>	166,172
Future commitments to Colorado-based general partnerships or funds	69,391
Total Private Equity	235,563
Opportunity Fund	16,032
<b>Total</b>	<b>\$515,198</b>

<sup>1</sup> Companies headquartered in Colorado.

<sup>2</sup> Private equity partnership investments domiciled in Colorado.

### LARGEST EQUITY HOLDINGS BY FAIR VALUE<sup>1</sup>

As of December 31, 2017

	Shares	Fair Value
Apple Inc.	3,235,051	\$547,468
Microsoft Corp.	5,360,301	458,520
Amazon.com, Inc.	345,555	404,116
Alphabet Inc.	335,029	352,920
JP Morgan Chase & Co.	2,383,681	254,911
Facebook Inc.	1,317,490	232,484
Visa Inc.	1,981,239	225,901
Honeywell Intl. Inc.	1,391,088	213,337
Chevron Corp.	1,517,747	190,007
Comcast Corp.	4,419,470	177,000

<sup>1</sup> Does not include commingled funds.

Note: A complete list of holdings is available upon request.

### LARGEST FIXED INCOME HOLDINGS BY FAIR VALUE<sup>1</sup>

As of December 31, 2017

	Par Value	Income Rate	Maturity Date	Fair Value
US Treasury Notes	\$168,000	2.750%	2/15/24	\$172,410
US Treasury Bonds	165,000	2.375%	5/15/27	164,529
US Treasury Notes	165,000	1.625%	7/31/19	164,394
US Treasury Notes	134,000	1.625%	8/31/19	133,456
US Treasury Notes	125,000	1.375%	2/29/20	123,589
US Treasury Notes	120,000	1.875%	10/31/22	118,256
US Treasury Notes	125,000	1.625%	5/15/26	117,734
US Treasury Notes	115,000	1.250%	7/31/23	108,985
GNMA Pool #MA4585	107,760	3.000%	7/20/47	108,843
US Treasury Notes	105,000	1.375%	1/31/20	103,888

<sup>1</sup> Does not include commingled funds.

Note: A complete list of holdings is available upon request.

## VOLUNTARY INVESTMENT PROGRAM, DEFINED CONTRIBUTION RETIREMENT PLAN, AND DEFERRED COMPENSATION PLAN (PLANS) REPORT ON INVESTMENT ACTIVITY

(Dollars in Thousands)

### Overview

PERA established the Voluntary Investment Program (PERAPPlus 401(k) Plan) on January 1, 1985, under Section 401(k) of the Internal Revenue Code (IRC). The Defined Contribution Retirement Plan (DC Plan) was established January 1, 2006, as an IRC § 401(a) governmental profit-sharing plan. On July 1, 2009, PERA assumed the administrative and fiduciary responsibility for the State of Colorado Deferred Compensation Plan, now known as the PERAPPlus 457 Plan. PERA publishes an Annual Report for the PERAPPlus 401(k), the DC Plan, and the PERAPPlus 457 Plan and distributes it to all plan participants.

The PERAPPlus 401(k) Plan includes voluntary contributions made by employees of PERA-affiliated employers in the State, School, Local Government, Judicial, and Denver Public Schools Division Trust Funds. These contributions are entirely separate from those that members make to the defined benefit plan each month. On December 31, 2017, the PERAPPlus 401(k) Plan had a fiduciary net position (FNP) of \$3,275,171 and 68,891 accounts, representing increases of 15.74 percent in the FNP and 0.20 percent in the number of accounts from December 31, 2016.

The DC Plan offers a defined contribution alternative to the PERA defined benefit plan for certain new employees of State agencies and departments, most community colleges, and the District Attorney within each Judicial District, and if authorized by the county and the District Attorney, the attorneys within each Judicial District. On December 31, 2017, the DC Plan had a FNP of \$211,089 and 6,097 accounts, representing increases of 26.09 percent in the FNP and 5.83 percent in the number of accounts from December 31, 2016. See Note 12 in the Financial Section for information on changes to future eligibility.

The PERAPPlus 457 Plan includes voluntary contributions made by employees working for a PERA-affiliated employer that have also affiliated with the PERAPPlus 457 Plan. The employees of some employers that had affiliated with the State of Colorado Deferred Compensation Plan prior to July 1, 2009, and were not affiliated with PERA, remain eligible to contribute. On December 31, 2017, the PERAPPlus 457 Plan had a FNP of \$865,599 and 18,211 accounts, representing increases of 15.15 percent in the FNP and 1.62 percent in the number of accounts from December 31, 2016.

### PERAPPLUS 401(K) PLAN YEAR-END STATISTICS

Year	Fiduciary Net Position	Number of Accounts	Actively Contributing Participants <sup>1</sup>
2008	\$1,303,807	72,353	36,646
2009	1,674,861	75,819	36,270
2010	1,902,325	73,860	33,740
2011	1,891,347	71,620	28,859
2012	2,105,675	69,559	26,406
2013	2,509,750	68,691	26,022
2014	2,682,000	68,270	25,481
2015	2,644,099	68,791	25,726
2016	2,829,663	68,752	25,263
2017	3,275,171	68,891	24,796

<sup>1</sup> Defined as contributing within the last three months of the year.

### DC PLAN YEAR-END STATISTICS

Year	Fiduciary Net Position	Number of Accounts	Actively Contributing Participants <sup>1</sup>
2008	\$4,996	864	532
2009	37,475	3,039	1,716
2010	53,384	3,479	1,850
2011	63,597	4,029	2,080
2012	83,267	4,362	2,099
2013	113,500	4,719	2,216
2014	131,466	5,046	2,261
2015	141,026	5,403	2,357
2016	167,406	5,761	2,373
2017	211,089	6,097	2,370

<sup>1</sup> Defined as contributing within the last three months of the year.

### PERAPPLUS 457 PLAN YEAR-END STATISTICS

Year	Fiduciary Net Position	Number of Accounts	Actively Contributing Participants <sup>1</sup>
2009	\$393,352	18,007	9,057
2010	458,881	18,215	9,916
2011	483,965	17,821	10,004
2012	544,518	17,469	9,469
2013	643,602	17,462	9,469
2014	689,451	17,738	9,551
2015	691,676	17,814	9,323
2016	751,682	17,921	9,107
2017	865,599	18,211	9,209

<sup>1</sup> Defined as contributing within the last three months of the year.

**VOLUNTARY INVESTMENT PROGRAM, DEFINED CONTRIBUTION RETIREMENT PLAN, AND DEFERRED COMPENSATION PLAN  
(PLANS) REPORT ON INVESTMENT ACTIVITY**  
(Dollars in Thousands)

## Outline of Investment Policies

### Objectives

The Board is responsible for approving an appropriate range of investments that addresses the needs of the participants in the Plans. The objectives of selecting the investment options under each Plan are to:

- Provide a wide range of investment opportunities in various asset classes so as to allow for diversification and to cover a wide risk/return spectrum.
- Maximize returns within reasonable and prudent levels of risk.
- Provide returns comparable to returns for similar investment options.
- Control administrative and management costs to the plan and participants.

### Responsibilities

The Investment Advisory Committee (IAC), a committee of internal management staff, monitors and evaluates the investment asset classes and the underlying portfolio asset mix and allocation range for each investment option. The IAC also monitors and evaluates the portfolio managers and other service providers. RVK, Inc. serves as consultant to the IAC and the Benefits Committee.

Recommendations of the IAC are presented to PERA's Executive Director and Chief Investment Officer. Upon their concurrence, the recommendations are presented to the Board for consideration if required by the investment policy.

The Board is responsible for:

- The oversight of the Plans and portfolio composition.
- Approving changes to the plan documents.
- Approving the investment policies and amendments thereto.
- Accepting or rejecting the IAC's recommendations with regard to policies, objectives, specific investment options, and service providers.

## PERAdvantage Investment Options

The PERAdvantage investments provide diversification within each of the six primary funds, one additional specialized fund, and ten target retirement date funds. The PERAdvantage investments simplify choices, increase diversification, and help participants identify investments based on how the fund invests the money rather than name familiarity. In addition, the Plans also provide a self-directed brokerage account for participants to select their own investments.

Participants invest assets in one or more of the following investments:

### Primary Investment Options

#### *PERAdvantage Capital Preservation Fund*

The fund seeks to provide consistent investment income with a stable net asset value primarily by investing in a portfolio of high-quality, medium-term fixed income securities. This fund invests in securities issued by the U.S. Government or one of its agencies, including agency mortgage bonds, as well as high-grade corporate bonds. Since the underlying fixed income investments fluctuate in market value with changes in the market, the portfolio is paired with one or more insurance contracts offered by high-quality insurance companies to provide a more stable return and to offer participants the ability to withdraw or transfer their funds subject to plan rules without any market value risk or other penalty for premature withdrawal. The fund is managed by GW Capital Management, LLC.

#### *PERAdvantage Fixed Income Fund*

The fund seeks to generate income, preserve capital, and provide long-term capital appreciation by investing in a diversified portfolio of fixed-income instruments of varying maturities. The fund objective is to combine actively managed core and passive core styles. The fund is managed by BlackRock (targeted at 50 percent of the portfolio) and Wells Fargo Asset Management (targeted at 50 percent of the portfolio).

#### *PERAdvantage Real Return Fund*

The fund seeks to provide broad exposure to real assets and U.S. Treasury Inflation Protected Securities (TIPS) and to produce a return over a full market cycle that exceeds the rate of inflation. The fund invests in U.S. TIPS, Real Estate Investment Trusts (REITs), global commodity and natural resource stocks, and commodities. State Street Global Advisors manages the fund.

#### *PERAdvantage U.S. Large Cap Stock Fund*

The fund seeks to provide long-term capital appreciation and dividend income primarily by investing in the common stock of companies located in the United States with large market capitalizations similar to those found in the Russell 1000™ Index. The fund combines active and passive management styles. The fund is 100 percent managed by PERA. See "2017 Changes" on the next page.

**VOLUNTARY INVESTMENT PROGRAM, DEFINED CONTRIBUTION RETIREMENT PLAN, AND DEFERRED COMPENSATION PLAN (PLANS) REPORT ON INVESTMENT ACTIVITY**  
*(Dollars in Thousands)****PERAdvantage International Stock Fund***

The fund seeks to provide long-term capital appreciation and dividend income primarily by investing in the common stock of companies located outside the United States. The fund invests in a wide array of non-U.S. stocks similar to those found in the MSCI All Countries World Index (ACWI) ex-U.S. Index. The fund combines growth and value investment styles, and active and passive management styles. The fund is managed by Harding Loevner (targeted at 35 percent of the portfolio), Dodge & Cox (targeted at 35 percent of the portfolio), and BlackRock (targeted at 30 percent of the portfolio).

***PERAdvantage U.S. Small and Mid Cap Stock Fund***

The fund seeks to provide long-term capital appreciation and dividend income primarily by investing in the common stock of companies located in the United States with small and mid-market capitalizations similar to the securities included in the Russell 2500™ Index. The fund combines growth and value investment styles and active and passive management styles. The fund is managed by TimesSquare Capital Management (targeted at 35 percent of the portfolio), Dimensional Fund Advisors (targeted at 35 percent of the portfolio), and BlackRock (targeted at 30 percent of the portfolio).

**Additional Investment Options*****PERAdvantage Target Retirement Date Funds***

There are ten funds with varying asset mixes and risk levels based on expected retirement date. Each of the funds is invested in the corresponding BlackRock LifePath® Index Target Retirement Date Fund. These funds use passive management strategies and become more conservative as the retirement date approaches. BlackRock manages the funds.

***PERAdvantage Socially Responsible Investment (SRI) Fund***

The fund seeks to invest in a portfolio of developed market stocks screened on environmental, social, and governance (ESG) factors, and U.S. government fixed income securities. The equity portion seeks to replicate the return of the MSCI World ESG Index. The fixed income portion invests in U.S. Government securities, and may invest a significant portion or all of its assets in mortgage-backed securities. The fund is managed by Northern Trust Investments (targeted at 60 percent of the portfolio), and J.P. Morgan Asset Management (targeted at 40 percent of the portfolio).

***TD Ameritrade Self-Directed Brokerage Account***

This account allows selection from numerous mutual funds and other types of securities, such as stocks and bonds, for an additional fee. Investment in the self-directed brokerage account is offered through TD Ameritrade, a Division of TD Ameritrade, Inc.

**2017 Changes**

Effective December 11, 2017, the portions of the PERAdvantage U.S. Large Cap Stock Fund managed by LSV Asset Management (targeted at 15 percent of the portfolio) and Winslow Capital Management (targeted at 15 percent of the portfolio) were reallocated to PERA managed portfolios.

**Loans**

Participants in the PERAPLus 401(k) and PERAPLus 457 Plans may access their funds through loans as allowed under plan policy and the Internal Revenue Service. The DC Plan prohibits participant loans.

**Administrative Fees**

Plan administrative fees pay for recordkeeping, custodial services, consulting, and internal PERA administrative expenses.

The administrative fee consists of a flat \$1.00 per month per participant per plan and an asset-based fee of up to 0.07 percent on each underlying PERAdvantage portfolio. Investments with revenue sharing reduce the asset-based administrative fee by the amount of such revenue sharing.

*(The Colorado PERA Report on Investment Activity was prepared by internal staff.)*

## VOLUNTARY INVESTMENT PROGRAM, DEFINED CONTRIBUTION RETIREMENT PLAN, AND DEFERRED COMPENSATION PLAN (PLANS) SCHEDULE OF INVESTMENT RESULTS

Fund/Benchmark	2017	3-Year	5-Year
<b>PERAdvantage Capital Preservation Fund</b>	1.9%	1.9%	1.9%
Hueler Stable Value Index (Equal Wtd Avg)	2.0%	1.8%	1.8%
<b>PERAdvantage Fixed Income Fund</b>	3.7%	2.2%	2.0%
Bloomberg Barclays U.S. Aggregate Bond Index	3.5%	2.2%	2.1%
<b>PERAdvantage Real Return Fund</b>	6.8%	2.1%	0.0%
70% SSgA Real Asset Strategy <sup>1</sup> /30% Bloomberg Barclays U.S. TIPS Index	6.9%	2.2%	0.2%
<b>PERAdvantage U.S. Large Cap Stock Fund</b>	22.8%	10.9%	15.6%
Russell 1000™ Index	21.7%	11.2%	15.7%
<b>PERAdvantage International Stock Fund</b>	27.4%	8.5%	8.3%
MSCI ACWI Ex-US Index	27.2%	7.8%	6.8%
<b>PERAdvantage U.S. Small and Mid Cap Stock Fund</b>	15.9%	8.9%	13.6%
Russell 2500™ Index	16.8%	10.1%	14.3%
<b>PERAdvantage SRI Fund</b>	13.4%	6.1%	7.5%
SRI Fund Custom Index <sup>2</sup>	13.2%	5.9%	7.4%
<b>PERAdvantage Income Fund</b>	9.9%	4.8%	5.2%
BlackRock LifePath® Retirement Index	10.0%	4.9%	5.3%
<b>PERAdvantage 2020 Fund</b>	11.6%	5.4%	6.3%
BlackRock LifePath® 2020 Index	11.6%	5.5%	6.5%
<b>PERAdvantage 2025 Fund</b>	13.7%	6.2%	7.2%
BlackRock LifePath® 2025 Index	13.7%	6.3%	7.4%
<b>PERAdvantage 2030 Fund</b>	15.6%	6.9%	8.1%
BlackRock LifePath® 2030 Index	15.6%	7.0%	8.2%
<b>PERAdvantage 2035 Fund</b>	17.5%	7.6%	8.8%
BlackRock LifePath® 2035 Index	17.5%	7.6%	9.0%
<b>PERAdvantage 2040 Fund</b>	19.2%	8.2%	9.5%
BlackRock LifePath® 2040 Index	19.1%	8.2%	9.6%
<b>PERAdvantage 2045 Fund</b>	20.3%	8.6%	10.0%
BlackRock LifePath® 2045 Index	20.2%	8.5%	10.2%
<b>PERAdvantage 2050 Fund</b>	20.7%	8.7%	10.4%
BlackRock LifePath® 2050 Index	20.6%	8.7%	10.5%
<b>PERAdvantage 2055 Fund</b>	20.6%	8.7%	10.6%
BlackRock LifePath® 2055 Index	20.6%	8.7%	10.7%
<b>PERAdvantage 2060 Fund</b>	20.6%	8.6%	N/A
BlackRock LifePath® 2060 Index	20.6%	8.7%	N/A

Note: Performance is net of management and administrative fees. Performance is calculated using time-weighted net asset values. All performance is calculated by RVK, Inc.

<sup>1</sup> Index consists of 25 percent Bloomberg Barclays U.S. TIPS Index; 15 percent Dow Jones U.S. Select REIT Index; 25 percent Bloomberg Roll Select Commodity Index; 25 percent S&P Global LargeMidCap Commodity and Resources Index; and 10 percent S&P Global Infrastructure Index.

<sup>2</sup> The SRI Fund Custom Index consists of 60 percent MSCI World ESG Index (Net) and 40 percent Bloomberg Barclays U.S. Government Bond Index.

## VOLUNTARY INVESTMENT PROGRAM INVESTMENT SUMMARY

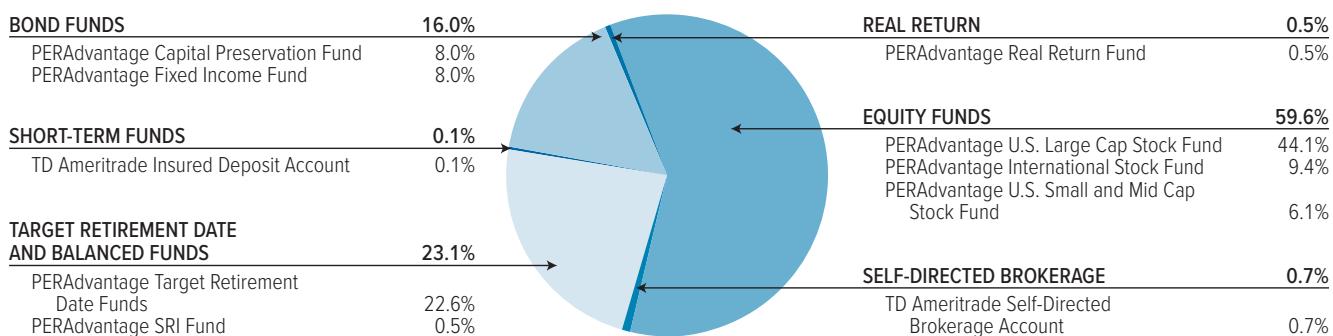
(Dollars in Thousands)

	Fair Value December 31, 2017	Percent of Total Fair Value 2017
PERAdvantage Capital Preservation Fund <sup>1</sup>	\$255,628	8.0%
PERAdvantage Fixed Income Fund	256,734	8.0%
PERAdvantage Real Return Fund	15,170	0.5%
PERAdvantage U.S. Large Cap Stock Fund	1,410,292	44.1%
PERAdvantage International Stock Fund	301,767	9.4%
PERAdvantage U.S. Small and Mid Cap Stock Fund	194,046	6.1%
PERAdvantage SRI Fund	16,137	0.5%
PERAdvantage Income Fund	128,745	4.0%
PERAdvantage 2020 Fund	119,040	3.7%
PERAdvantage 2025 Fund	127,560	4.0%
PERAdvantage 2030 Fund	105,649	3.3%
PERAdvantage 2035 Fund	91,685	2.9%
PERAdvantage 2040 Fund	58,882	1.9%
PERAdvantage 2045 Fund	38,977	1.2%
PERAdvantage 2050 Fund	27,797	0.9%
PERAdvantage 2055 Fund	17,779	0.6%
PERAdvantage 2060 Fund	3,726	0.1%
TD Ameritrade Insured Deposit Account	3,666	0.1%
TD Ameritrade Self-Directed Brokerage Account	23,659	0.7%

<sup>1</sup> The Stable Value Fund in the PERAdvantage Capital Preservation Fund is reported at contract value.

## Asset Allocation for Voluntary Investment Program (PERAPplus 401(k) Plan)

As of December 31, 2017



## DEFINED CONTRIBUTION RETIREMENT PLAN INVESTMENT SUMMARY

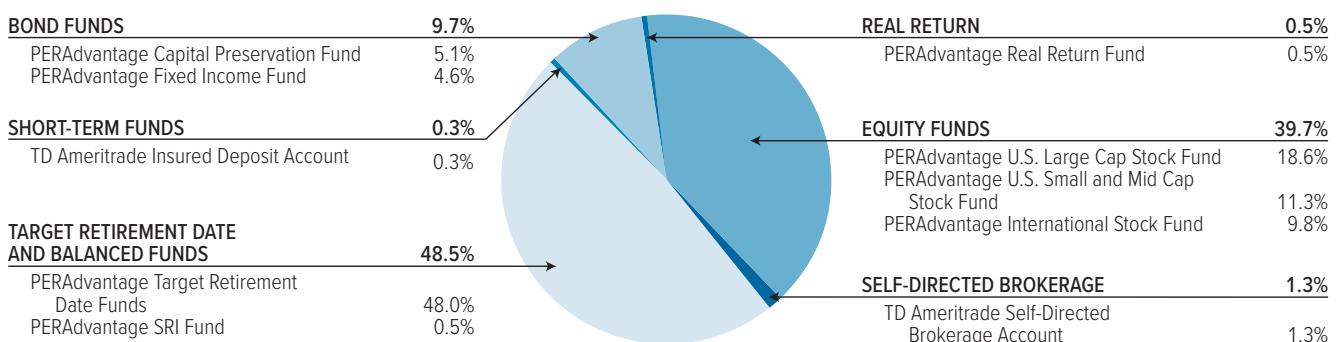
(Dollars in Thousands)

	Fair Value December 31, 2017	Percent of Total Fair Value 2017
PERAdvantage Capital Preservation Fund <sup>1</sup>	\$10,469	5.1%
PERAdvantage Fixed Income Fund	9,364	4.6%
PERAdvantage Real Return Fund	958	0.5%
PERAdvantage U.S. Large Cap Stock Fund	38,112	18.6%
PERAdvantage International Stock Fund	20,000	9.8%
PERAdvantage U.S. Small and Mid Cap Stock Fund	23,117	11.3%
PERAdvantage SRI Fund	950	0.5%
PERAdvantage Income Fund	6,718	3.3%
PERAdvantage 2020 Fund	6,830	3.3%
PERAdvantage 2025 Fund	7,548	3.7%
PERAdvantage 2030 Fund	10,280	5.0%
PERAdvantage 2035 Fund	10,316	5.0%
PERAdvantage 2040 Fund	12,981	6.4%
PERAdvantage 2045 Fund	19,673	9.6%
PERAdvantage 2050 Fund	15,274	7.5%
PERAdvantage 2055 Fund	7,288	3.6%
PERAdvantage 2060 Fund	1,180	0.6%
TD Ameritrade Insured Deposit Account	625	0.3%
TD Ameritrade Self-Directed Brokerage Account	2,740	1.3%

<sup>1</sup> The Stable Value Fund in the PERAdvantage Capital Preservation Fund is reported at contract value.

## Asset Allocation for Defined Contribution Retirement Plan (DC Plan)

As of December 31, 2017



## DEFERRED COMPENSATION PLAN INVESTMENT SUMMARY

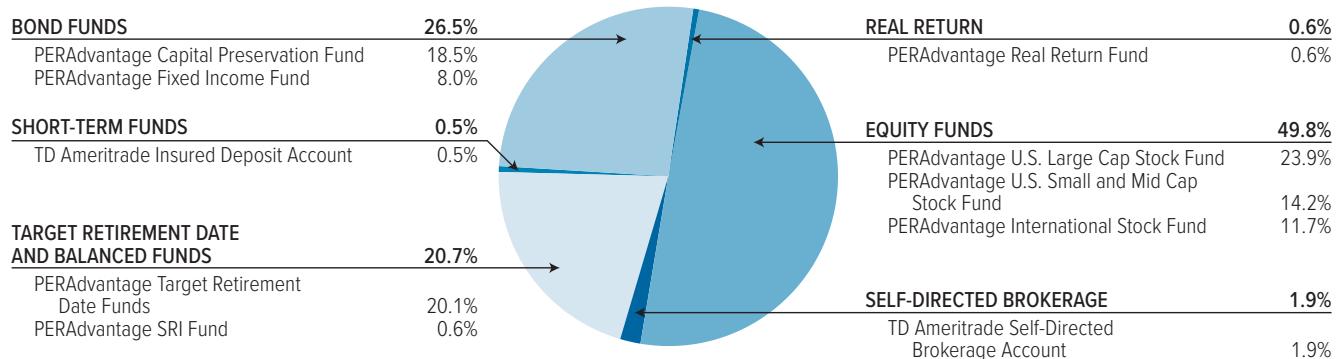
(Dollars in Thousands)

	Fair Value December 31, 2017	Percent of Total Fair Value 2017
PERAdvantage Capital Preservation Fund <sup>1</sup>	\$156,837	18.5%
PERAdvantage Fixed Income Fund	67,403	8.0%
PERAdvantage Real Return Fund	4,863	0.6%
PERAdvantage U.S. Large Cap Stock Fund	202,739	23.9%
PERAdvantage International Stock Fund	99,324	11.7%
PERAdvantage U.S. Small and Mid Cap Stock Fund	120,184	14.2%
PERAdvantage SRI Fund	5,244	0.6%
PERAdvantage Income Fund	28,661	3.4%
PERAdvantage 2020 Fund	27,055	3.2%
PERAdvantage 2025 Fund	33,512	4.0%
PERAdvantage 2030 Fund	24,084	2.8%
PERAdvantage 2035 Fund	22,069	2.6%
PERAdvantage 2040 Fund	14,865	1.8%
PERAdvantage 2045 Fund	8,555	1.0%
PERAdvantage 2050 Fund	5,047	0.6%
PERAdvantage 2055 Fund	4,074	0.5%
PERAdvantage 2060 Fund	1,595	0.2%
TD Ameritrade Insured Deposit Account	4,237	0.5%
TD Ameritrade Self-Directed Brokerage Account	16,129	1.9%

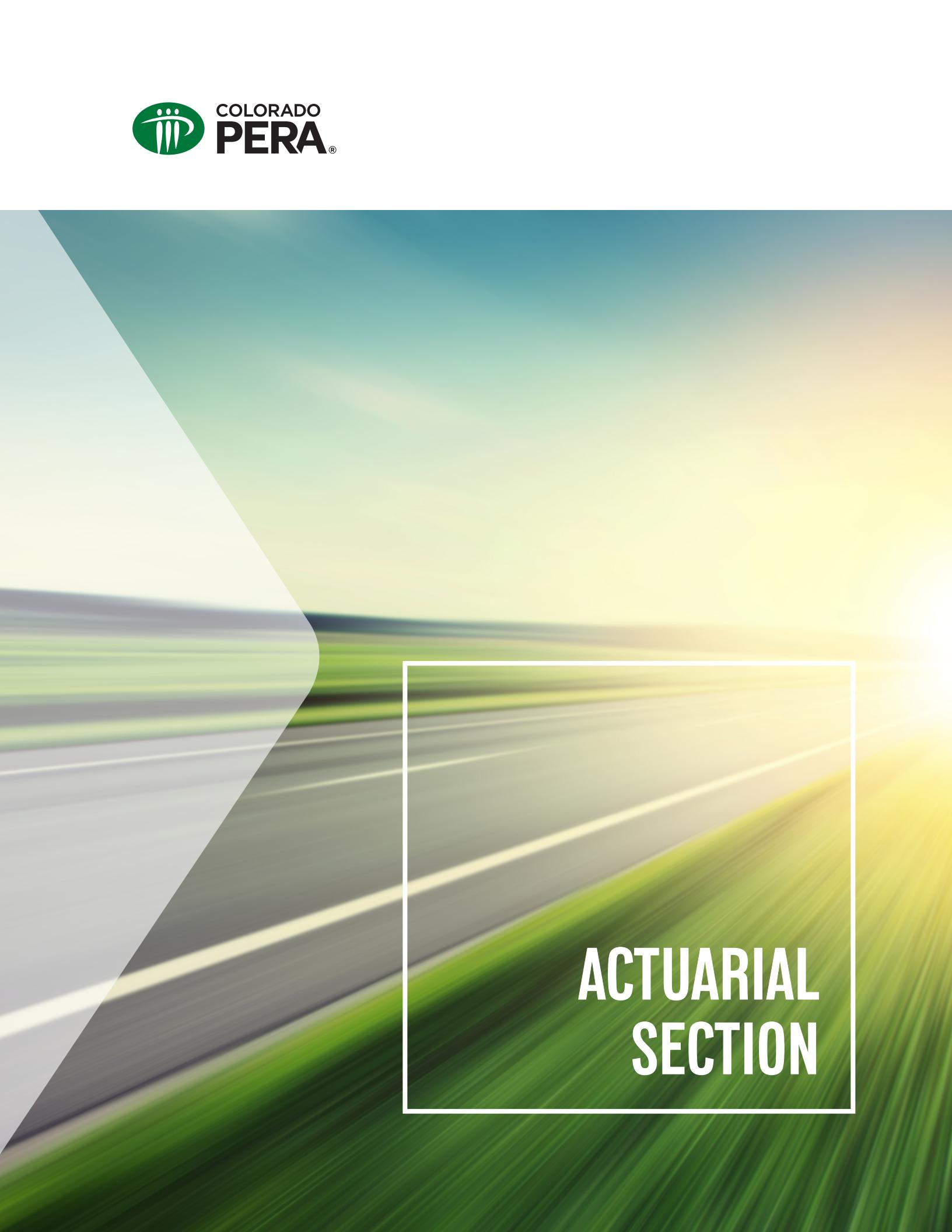
<sup>1</sup> The Stable Value Fund in the PERAdvantage Capital Preservation Fund is reported at contract value.

## Asset Allocation for Deferred Compensation Plan (PERAPlus 457 Plan)

As of December 31, 2017





The background of the image is a photograph of a road with motion blur, creating a sense of speed. The road is grey with a white dashed line, and the surrounding area is green grass. A large, white, curved shape is positioned on the left side of the image, partially obscuring the road. In the bottom right corner, there is a white rectangular box with a thin black border. Inside this box, the words "ACTUARIAL SECTION" are written in a large, bold, white, sans-serif font.

**ACTUARIAL  
SECTION**





June 19, 2018

Board of Trustees  
Public Employees' Retirement Association of Colorado  
1301 Pennsylvania Street  
Denver, CO 80203-2386

**RE: ACTUARIAL CERTIFICATION OF PERA DIVISION AND HEALTH CARE TRUST FUNDS**

Dear Members of the Board:

Per the "Colorado PERA Defined Benefit Pension Plan Funding Policy", adopted by the Board of Trustees on March 20, 2015 and revised on January 19, 2018 and the "Colorado PERA Defined Benefit OPEB Plan Funding Policy", adopted by the Board of Trustees on January 19, 2018, the main funding objectives of the Public Employees' Retirement Association of Colorado (Colorado PERA) are:

- Preservation of the defined benefit plan structure,
- Demonstration of transparency and accountability,
- Achievement of a funded ratio greater than or equal to 110%,
- Balance of contribution rate stability and intergenerational equity,
- Reduction of Unfunded Actuarial Accrued Liabilities, and
- Recognition of beneficial elements of pooled risk.

With these goals in mind, an annual actuarial valuation is performed as a measure of the progress towards them. The most recent valuations are based on the plan provisions and actuarial assumptions and methods in effect on December 31, 2017. The valuation reflects the changes to Contribution Structures, Benefit Provisions, and the Defined Contribution (DC) PERAChoice Program impacting the Division Trust Funds resulting from Senate Bill (SB) 18-200 that was enacted on June 4, 2018. In completing the valuation of the five defined benefit pension plans, referred to as the Division Trust Funds, and the two defined benefit Other Post-employment Benefit plans, referred to as the Health Care Trust Funds (HCTFs), Cavanaugh Macdonald Consulting, LLC (CMC) relied on membership and financial data provided by Colorado PERA. We have reviewed this data for reasonableness, and made some general edit checks to impute certain information that may not have been provided with the original employee data. We have not audited this data, but we have reconciled the data used in the prior year's valuation with this current valuation data.

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This valuation reflects the following changes from the prior valuation including:

- The Cunningham Fire Protection District (CFPD) disaffiliated from the Local Government Division Trust Fund (Local Government Division) and the Health Care Trust Fund (HCTF) as of December 2, 2017. For the purpose of measuring obligations as of December 31, 2017, liabilities were determined assuming no additional service accruals pertaining to retirement benefits or impacting possible future premium subsidies for the disaffiliated membership of the CFPD that had not refunded their PERA member contribution accounts. The total disaffiliation payment of \$1,159,030 was received by PERA as of March 14, 2018, and was allocated to the Local Government Division and the HCTF in the amount of \$1,063,119 and \$95,911, respectively. These amounts are appropriately recognized in each Plan's assets as of December 31, 2017.
- The new Defined Benefit OPEB Funding Policy was adopted by the Board of Trustees on January 19, 2018. In addition, a revision of the Defined Benefit Pension Funding Policy was adopted by the Board of Trustees on January 19, 2018.
- SB 18-200 was enacted on June 4, 2018. The changes to the main plan provisions are as follows:
  - ***Changes to Contribution Structures***
    - Increase member contributions by 2.00%, phased in over a three-year period
      - Additional 0.75%, effective July 1, 2019
      - Additional 0.75%, effective July 1, 2020
      - Additional 0.50%, effective July 1, 2021
    - Increase employer contribution by 0.25% effective July 1, 2019 for State, School, Judicial and DPS Divisions only
    - Initiates an annual Direct Distribution from the state treasury of \$225 million, effective July 1, 2018 to be proportioned between the State, School, Judicial and DPS Divisions only
    - Redefines PERA-includable payroll to include:
      - Contributions to federal tax-advantaged plans for new members, effective July 1, 2019, and
      - Compensation for unused sick leave converted to cash payments applicable to all members, effective immediately
    - Initiates Automatic Adjustment Provisions for employer and member contributions, Annual Increases on benefits, and the Direct Distribution with the intent to keep PERA on the path to full funding, effective July 1, 2019 with first adjustment not prior to July 1, 2020
  - ***Changes to Benefit Provisions***
    - Modifies Annual Increase (AI) structure, effective upon enactment
      - Lowers AI cap from 2.00%, per annum to 1.50%, per annum
      - Extends the initial AI payment waiting period from one to three years for members retiring from active service
      - Suspends AI payments for years 2018 and 2019 for current retirees
      - Automatic adjustment provisions may impact AI cap in future

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- Increases number of years used in the Highest Average Salary (HAS) calculation for new hires and non-vested members as of January 1, 2020
  - State, School, Local Government and DPS Divisions: From three to five years
  - Judicial Division: From one to three years
- Extends full service retirement eligibilities for new hires (non-State Troopers), effective January 1, 2020
  - Any age with 35 years
  - Age 64 with 30 years
  - Age 65 with 5 years
- Extends reduced service retirement eligibilities for new hires (non-State Troopers), effective January 1, 2020
  - Age 55 with 25 years
  - Age 60 with 5 years
- Extends full service retirement eligibilities for State Trooper new hires, effective January 1, 2020
  - Any age with 35 years
  - Age 55 with 25 years
  - Age 65 with 5 years
- Extends reduced service retirement eligibilities for State Trooper new hires, effective January 1, 2020
  - Age 55 with 20 years
  - Age 60 with 5 years
- Applies the State Trooper contribution rates and benefit provisions for new hires in the following positions, effective January 1, 2020
  - State Division: Corrections Officers
  - Local Government Division: County Sheriffs, Undersheriffs, Deputy Sheriffs, Noncertified deputy sheriffs and detention officers
- ***Changes to Defined Contribution (DC) PERAChoice Program Impacting the Division Trust Funds***
  - Expands PERAChoice to new hires as of January 1, 2019, applicable to:
    - Certain members of the State Division
      - Classified college and university employees
    - All members of the Local Government Division
  - Requires an actuarially determined payment of a DC Supplement from division employers with PERAChoice based on employees who choose to participate in the DC Plan, effective January 1, 2021.

In our opinion, the assumptions are individually reasonable, taking into account the experience of the Division Trust Funds and the HCTFs and reasonable expectations, internally consistent, and, in combination, offer our best estimate of anticipated experience affecting the Division Trust Funds and the HCTFs.

Future actuarial results may differ significantly from the current results due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of

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the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Additionally, retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

CMC provided the following information and/or schedules for the December 31, 2017, CAFR:

**FINANCIAL SECTION**

- Yearly Contribution Deficiency – Division Trust Funds and HCTFs
- Average Monthly Benefit By Division – for 2017 considering entire retiree population and those retiring in 2017 with 4-year Historical Results in each category – Division Trust Funds Only
- Required Discount Rate Sensitivity Information for the Division Trust Funds and HCTFs providing the Net Pension Liability and the Net OPEB Liability at a discount rate that is one percentage point lower and one percentage point higher than the discount rate at Measurement Date.
- Required Health Care Cost Trend Rate Sensitivity Information for the HCTFs at health care cost trend rates that are one percentage point lower and one percentage point higher than the health care cost trend rates applied at Measurement Date.
- Membership Data – Division Trust Funds and HCTFs
- Participation Data – HCTFs Only
- Estimated Collective Net Pension Liability – considering changes in plan provisions pursuant to SB 18-200 – Division Trust Funds Only
- Required Supplementary Information – Schedule of Changes in Net Pension Liability – Division Trust Funds
- Required Supplementary Information – Schedule of the Net Pension Liability – Division Trust Funds
- Required Supplementary Information – Schedule of Employer Contributions – Division Trust Funds
- Notes to Required Supplementary Information – Division Trust Funds
- Required Supplementary Information – Schedule of Changes in Net OPEB Liability – HCTFs
- Required Supplementary Information – Schedule of the Net OPEB Liability – HCTFs
- Required Supplementary Information – Schedule of Employer Contributions – HCTFs
- Notes to Required Supplementary Information – HCTFs

**ACTUARIAL SECTION**

- Schedule of Retirees and Beneficiaries Added to and Removed from the Benefit Payroll – Division Trust Funds and HCTFs
- Member – Retiree Comparison – Division Trust Funds Only
- Solvency Test – Division Trust Funds and HCTFs
- Schedule of Funding Progress – Division Trust Funds and HCTFs
- Analysis of Financial Experience – Division Trust Funds and HCTFs
- Schedule of Gains and Losses in Accrued Liabilities and Reconciliation of Unfunded Actuarial Accrued Liabilities – Division Trust Funds Only

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- Schedule of Computed Employer Contribution Rates for the 2019 Fiscal Year – Division Trust Funds and HCTFs
- Actuarial Statistics – Division Trust Funds and HCTFs
- Actuarially Determined Contributions (ADCs) – Division Trust Funds and HCTFs
- Alternative ADCs using 25-year, 20-year and 15-year amortization periods – Division Trust Funds Only
- Funded Ratios – Division Trust Funds and HCTFs
- Funded Ratio, Unfunded Actuarial Accrued Liability and ADC using 5.75%, 6.75%, 7.25%, 7.75% and 8.75% investment return assumptions – Division Trust Funds and HCTFs
- Schedule of Active Member Actuarial Valuation Data – Division Trust Funds and HCTFs

**STATISTICAL SECTION (DIVISION TRUST FUNDS ONLY)**

- Member and Benefit Recipient Statistics
- Breakdown of Membership by Tiers
- PERA Benefit Payments
  - Benefit Payments by Benefit Range
  - Benefit Payments by Benefit Range including RBA amounts
  - Benefit Payments by Decile
- Schedule of Average Retirement Benefits Payable by Year of Retirement
  - For all retirees
  - For members who retired during the year
- Schedule of Retirees and Survivors by Types of Benefits
- Schedule of Average Benefit Payments

In aggregate, the Division Trust Funds have a funded ratio of 61% based on the Actuarial Value of Assets and 65% based on the Market Value of Assets. For the HCTFs combined, the funded ratios are 17% on an Actuarial Value of Assets basis and 18% on a Market Value of Assets basis.

The results indicate that the combined employer and member statutory contribution rates, along with the annual \$225 million direct distribution from the state treasury, are sufficient to fund the normal cost for all members, each division's unfunded accrued liability, the Annual Increase Reserve (AIR) Funds, and provide additional contributions to help finance both Health Care Trust Funds.

It should be noted that the results of the December 31, 2017 funding valuation, combined with financial projections of all Division Trust Funds reflecting anticipated growth in active membership and a lower cost benefit structure for new members, indicate that the goal of funding 100% of the actuarial accrued liability under the PERA revised benefit structure created by SB 18-200, is achievable within a projection period of 30 years. The projected periods are as follows:

Division Trust Fund	Years Until 100% Funded
State Division	27 Years
School Division	30 Years
Local Government Division	15 Years
Judicial Division	15 Years
Denver Public Schools (DPS) Division	17 Years

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The employer contribution rate, combined with anticipated future employee growth and service purchase transfers, is sufficient to eventually finance the HCTF's and DPS HCTF's benefits.

Actuarial computations presented in the December 31, 2017 actuarial valuation report are for purposes of determining the actuarially determined contribution rates and evaluating the funding of the Division Trust Funds and HCTFs. Determinations for purposes other than meeting these requirements may be significantly different from the results shown in the December 31, 2017 actuarial valuation.

We also prepared actuarial computations as of December 31, 2017 for purposes of fulfilling financial accounting requirements for PERA under Governmental Accounting Standards Board (GASB) Statement No. 67 and Statement No. 74. The actuarial assumptions used in the funding report were also used for GASB 67 and GASB 74 reporting, with the exception of the discount rate used to determine the Total Pension Liability for the State, School and Judicial Divisions. In addition, the entry age normal actuarial cost method, which is required to be used under GASB 67 and GASB 74, is also used in the funding valuation report. The actuarial assumptions used in both the funding and the GASB 67 and GASB 74 accounting reports meet the parameters set by Actuarial Standards of Practice (ASOPs), as issued by the Actuarial Standards Board, and generally accepted accounting principles (GAAP) applicable in the United States of America as promulgated by the Governmental Accounting Standards Board.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this information is complete and accurate and that the valuation was performed in accordance with standards of practice and by qualified actuaries as prescribed by the American Academy of Actuaries and the Actuarial Standards Board. The undersigned are members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. All of the consultants listed below have experience in performing valuations for large statewide public retirement systems.

Sincerely,

A handwritten signature in blue ink that appears to read "Edward A. Macdonald".

Edward A. Macdonald, ASA, FCA, MAAA  
President

A handwritten signature in blue ink that appears to read "Edward J. Koebel".

Edward J. Koebel, EA, FCA, MAAA  
Principal and Consulting Actuary

A handwritten signature in blue ink that appears to read "Alisa Bennett".

Alisa Bennett, FSA, EA, FCA, MAAA  
Principal and Consulting Actuary

A handwritten signature in blue ink that appears to read "Jeffrey Gann".

Jeffrey Gann, FSA, EA, MAAA  
Senior Actuary

## DIVISION TRUST FUNDS—PENSION

### Introduction

The standard promulgated by the Governmental Accounting Standards Board (GASB) Statement No. 67, results in the preparation of two actuarial valuations—one for funding purposes and one for accounting and financial reporting purposes. Unless otherwise noted, this Division Trust Funds subsection reports on the actuarial valuation performed for funding purposes, but also includes information on specific differences between the two actuarial valuations. This subsection covers information on PERA's five defined benefit pension plans, which includes the State Division, School Division, Local Government Division, and Judicial Division Trust Funds all of which are cost-sharing multiple-employer plans and the Denver Public Schools (DPS) Division Trust Fund which is a single-employer plan.

The Colorado PERA Board of Trustees (Board) is responsible for maintaining a pension funding policy applicable to these plans. The current pension funding policy was initially adopted by the Board on March 20, 2015, effective for the December 31, 2014, funding actuarial valuation and later amended on January 19, 2018. The pension funding policy requires the calculation of an actuarially determined contribution (ADC) for each of the five Division Trust Funds for the purpose of assessing the adequacy of the statutory contribution rates of each Division Trust Fund. The ADC is determined in accordance with pension plan provisions in effect as of the date of the actuary's Letter of Certification and, as such, include the changes to plan provisions, to the extent applicable, required by Senate Bill (SB) 18-200: *Concerning Modifications To the Public Employees' Retirement Association Hybrid Defined Benefit Plan Necessary To Eliminate with a High Probability the Unfunded Liability of the Plan Within the Next Thirty Years*. This bill was signed into law by Governor Hickenlooper on June 4, 2018. The plan provisions in effect on December 31, 2017, are summarized in Note 1 in the Financial Section. The changes to plan provisions required by SB 18-200 are summarized on pages 159-160.

### Actuarial Methods and Assumptions

#### Actuarial Methods

The Board is responsible for the actuarial methods and assumptions used in the actuarial valuations in accordance with Colorado Revised Statutes (C.R.S.) § 24-51-204(5). The Board retains an external actuary, currently Cavanaugh Macdonald Consulting, LLC (CMC), to perform annual actuarial valuations and sustainability projections as well as periodic experience studies to review the actuarial assumptions versus actual plan experience. Through formal action, the Board updates, replaces, or adopts new methods and assumptions as deemed necessary. In addition to annual actuarial valuations and periodic assumption reviews, the Board established the practice of conducting actuarial audits every three to five years; the last one was performed by Milliman in 2014.

The ultimate cost that a defined benefit retirement plan, such as PERA, incurs is equal to the benefits paid plus expenses. Contributions to the plan and investment earnings on plan assets pay for the ultimate cost.

Using the plan's schedule of benefits, the member data, and the carefully selected actuarial assumptions, the plan's actuary annually estimates the cost of the benefits to be paid. Following the Actuarial Standards of Practice (ASOPs) and the Board-adopted pension funding policy, the actuary allocates these costs and determines a systematic manner to fund future plan benefits.

#### Entry Age Normal Cost Method

For PERA (as well as most public sector plans), one important funding policy objective is to fund the plan in a manner that keeps contribution rates approximately level from generation to generation. The funding method best designed to keep annual costs level as a percent of covered payroll is the Entry Age Normal (EAN) cost method. It is for this reason that the EAN cost method was selected by the Board to be used in the actuarial valuations. Under the EAN cost method, early and service retirement, termination (including the possibility of refunds), disability, and death benefits are projected for all active members. Cost factors, which are developed to produce level annual costs in each year from the age at hire (entry age) to the assumed retirement age, are applied to the projected benefits to determine the normal cost. The normal cost is the portion of the total plan cost allocated to the current year. Normal cost is determined only for active members currently accruing benefits. Those in receipt of benefits, terminated or beyond assumed retirement age have no allocated normal cost. The actuarial accrued liability (AAL) for active members is the portion of the total plan cost allocated to prior years. The total AAL for the plan includes the AAL for active members and the present value of the expected benefit payments to members currently receiving benefits and inactive members entitled to future benefits. The excess of the total AAL over the actuarial value of plan assets is the unfunded actuarial accrued liability (UAAL).

The effect of differences between the actuarial assumptions and the actual experience of the plan is calculated each year when the annual actuarial valuation is performed. These differences produce actuarial gains or losses that result in an adjustment of the UAAL.

#### Amortization Method

Under the pension funding policy, an ADC is determined by adding the normal cost and the cost to amortize, over defined, closed periods, any existing UAAL or new UAAL, including the impact of any experience actuarial gains and losses, actuarial assumption changes, and changes in plan provisions. Implementing a layered amortization approach requires each amortized item to be tracked over the closed period defined for that category.

## DIVISION TRUST FUNDS—PENSION

The legacy UAAL as of December 31, 2014, is being recognized over a closed 30-year period from that date. All gains, losses, and changes in actuarial methods and assumptions on and after January 1, 2015, are being recognized each year and amortized separately over closed 30-year periods. The impact of any changes in plan provisions will be recognized over a closed period relating to the demographics of the group affected and/or the duration of the enhancement provided, not to exceed 25 years. If any future actuarial valuation indicates a division has a negative UAAL, the ADC shall be set equal to the normal cost until such time as the funded ratio equals or exceeds 120 percent. At that time, the ADC shall be equal to the normal cost less an amount equal to 15 year amortization of the portion of the negative UAAL above the 120 percent funded ratio.

Once determined, the ADC is then expressed as a level percentage of assumed future covered payroll and compared, as a benchmark, against the current statutory employer contribution rate for each division.

### **Asset Valuation Method**

In 1992, the Board adopted a method for valuing assets that determines a smoothed market value of assets. The smoothed market value of assets recognizes the differences between actual and expected investment experience for each year in equal amounts over a four-year period. The smoothed market value of assets excludes the Annual Increase Reserve (AIR). Note, the term “market value” is used in the Board’s pension funding policy regarding the description of the determination of the asset valuation method used for funding purposes. The term “market value” is used consistently throughout the Actuarial Section, which has the identical meaning of the term “fair value” as is used in other sections of this *Comprehensive Annual Financial Report (CAFR)*.

### **Actuarial Assumptions**

The determination of the AAL includes recognition of a number of economic and non-economic assumptions in addition to the applied actuarial methods described above. Unless otherwise noted, it can be assumed that the economic and demographic actuarial assumptions applied to the actuarial valuation for funding purposes also were applied to the actuarial valuation for accounting and financial reporting purposes.

### **Economic Assumptions**

Periodically, the Board participates in an actuarial assumptions workshop to ensure understanding and to provide for the retention or adoption of all economic assumptions under the guidance provided by ASOP No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, as prescribed by the Actuarial Standards Board. The most recent workshop took place on October 28, 2016. Presentations were given to the Board by the retained actuary, CMC, which included a detailed description of the results of the 2016 experience analysis, review of long-term historical data, the 2016 survey of capital market assumptions by Horizon Actuarial Services, LLC, and a log-normal distribution analysis. The Board’s investment consultant, Aon Hewitt Investment Consulting, Inc. (Aon Hewitt),

and other actuarial and investment experts also provided their economic and market outlooks. In addition, the Board reviewed a variety of current and projected economic and financial information prior to the meeting.

As a result of the October 28, 2016, actuarial assumptions workshop and the November 18, 2016, Board meeting, the following economic assumptions were adopted, effective for the December 31, 2016, actuarial valuation:

- Investment rate of return assumption of 7.25 percent per year, compounded annually, net of investment expenses.
- Price inflation assumption of 2.40 percent per year.
- Real rate of investment return assumption of 4.85 percent per year, net of investment expenses.
- Wage inflation assumption of 3.50 percent per year.

Exhibits A, B, C, D, and E show sample pay increase assumptions for individual members effective with the December 31, 2016, actuarial valuation.

Annually, the Board reviews the rate at which interest is credited to member accounts. The Board originally adopted the general policy regarding the annual review during 2006, with slight revisions to the policy details since adoption. In November 2017, the Board voted to continue the annual interest rate at 3.00 percent for interest earned during 2018.

### **Non-Economic Assumptions**

ASOP No. 35, *Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations*, is followed for the selection and adoption of appropriate demographic assumptions. As a result of the 2016 experience analysis and the October 28, 2016, actuarial assumptions workshop, revised demographic assumptions including withdrawal rates, retirement rates for early reduced and unreduced retirement, disability rates, and pre- and post-retirement and disability mortality rates, for all divisions, were adopted as of November 18, 2016, to more closely reflect PERA’s actual experience. The revised demographic assumptions became effective for the December 31, 2016, actuarial valuation.

Beginning in 1986, PERA has used a select and ultimate approach, for all members except State Troopers and members of the Judicial Division, in applying rates of withdrawal or termination when estimating the number of members who will leave service prior to retirement. This approach recognizes the fact that regardless of age, a significant number of members leave PERA-covered employment within the first five years of service. Based on the results of the 2016 experience analysis, the first year withdrawal assumption was decreased and the rates for the remaining years within the five-year select period were increased for the State Division and the School and DPS Divisions. The rates of withdrawal for each year within the select period were increased for the Local Government Division. Since more than five years has passed since the merger of the Denver Public School Retirement System (DPSRS) into PERA,

## DIVISION TRUST FUNDS—PENSION

the application of a select period was discontinued for the members in the DPS benefit structure. The ultimate withdrawal rates were increased for the State, School and DPS, and Local Government Divisions as well as for the DPS benefit structure, but decreased for the Judicial Division and State Troopers. The revised withdrawal assumptions became effective for the December 31, 2016, actuarial valuation.

The results of the 2016 experience analysis supported the current assumption for the refund of member accounts; that 35 percent of the vested members who terminate will elect to withdraw their accounts while the remaining 65 percent will elect to leave their accounts in the plan to be eligible for a benefit at their retirement date. This assumption was last revised and adopted in 2009, for all non-Judicial Division members in both the PERA and DPS benefit structures. As a result, the actuary did not recommend adjustments to this assumption for these members. The same assumption for members of the Judicial Division also was retained, which assumes that 100 percent of vested members who terminate elect to leave their contributions in the plan in order to be eligible for a benefit at their retirement date.

As a result of the 2016 experience analysis, minor changes were made to the reduced early retirement rates applicable to all members. In addition, based on CMC recommendations, the Board adopted minor increases in all the rates of unreduced retirement and an extension of the certain retirement age from age 70 to age 75 for all members except State Troopers. The revised reduced and unreduced retirement assumptions became effective for the December 31, 2016, actuarial valuation.

Based on the results of the 2016 experience analysis, the rates of disability from active service were decreased at most ages for the State, School and DPS, and Judicial Divisions, State Troopers, and the DPS benefit structure and slightly increased for the Local Government Division. The revised disability assumptions became effective for the December 31, 2016, actuarial valuation.

The probabilities of withdrawal from service (rates for the ultimate period) and disability are shown for sample ages in Exhibits A, B, C, D, and E. Exhibit F shows the select rates of withdrawal applicable to certain members in the first four years of employment (rates for the select period, if applicable). The probabilities of age and service retirements are shown in Exhibits G and H.

As a result of the 2016 experience analysis, CMC recommended a change to more recently published mortality tables, adjusted to reflect PERA's experience and to provide a reasonable margin for improved mortality in the future. Therefore, effective with the December 31, 2016, actuarial valuation, healthy mortality assumptions for pre-retirement were based on the RP-2014 White Collar Employee Mortality Table, a table specifically developed for pre-retirement mortality for actively working people. To allow for an appropriate margin of improved mortality prospectively, the mortality rates incorporate a 70 percent factor applied to male rates and a 55 percent factor applied to female rates.

Based on the results of the 2016 experience analysis, which showed greater longevity for benefit recipients in the School, DPS, and Judicial Divisions than in the State and Local Government Divisions, CMC recommended that PERA use two different base mortality tables for healthy post-retirement mortality. Effective with the December 31, 2016, actuarial valuation, the following tables were adopted:

- For the State and Local Government Divisions: The RP-2014 Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 73 percent factor applied to ages below 80 and a 108 percent factor applied to age 80 and above, projected to 2018, for males, and a 78 percent factor applied to ages below 80 and a 109 percent factor applied to age 80 and above, projected to 2020, for females.
- For the School, DPS, and Judicial Divisions: The RP-2014 White Collar Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 93 percent factor applied to ages below 80 and a 113 percent factor applied to age 80 and above, projected to 2018, for males, and a 68 percent factor applied to ages below 80 and a 106 percent factor applied to age 80 and above, projected to 2020, for females.

The results of the 2016 experience analysis indicated that assumptions regarding mortality after disability retirement also should be updated. Effective for the December 31, 2016, actuarial valuation, the RP-2014 Disabled Retiree Mortality Table was implemented with a 90 percent factor applied to both male and female mortality rates.

The recently revised pre- and post-retirement and disability retirement mortality assumptions appropriately reflect PERA's recent and anticipated plan experience and are used to estimate the value of expected future benefit payments. Exhibits A, B, C, D, and E list the healthy pre-retirement mortality rates at sample ages and Exhibit I lists all the healthy post-retirement mortality rates and values at sample ages.

The element of the normal cost for each division, referred to as the administrative expense load, was first adopted by the Board effective for the December 31, 2012, actuarial valuation, resulting from a CMC recommendation from the 2012 experience analysis. Based on the results of the 2016 experience analysis, the estimated administrative expense as a percentage of covered payroll was increased from 0.35 percent to 0.40 percent, effective with the December 31, 2016, actuarial valuation.

### ***Annual Increase Assumptions***

Regardless of benefit structure, effective for years 2018 and 2019 the annual increase (AI) rate awarded by the Board is assumed to be 0.00 percent. Effective for 2020 and thereafter, the maximum AI rate that may be awarded by the Board is assumed to be 1.50 percent. Pursuant to C.R.S. § 24-51-413, regarding automatic adjustment provisions, the maximum AI rate may be adjusted as necessary in future years, but cannot be reduced below 0.50 percent or increased above 2.00 percent. In addition, the assumed waiting period to meet

## DIVISION TRUST FUNDS—PENSION

the eligibility for AI payments was extended from 12 months to 36 months, effective with enactment of SB 18-200 (June 4, 2018). These AI assumptions were effective for the December 31, 2017, actuarial valuation in recognition of changes made to the AI provisions pursuant to SB 18-200.

For PERA benefit structure members with a membership date prior to January 1, 2007, and DPS benefit structure members, it is assumed that effective for 2020 and thereafter, the maximum AI rate that may be awarded by the Board is 1.50 percent per year after payments begin and eligibility requirements for payment of the AI have been met. This maximum AI rate is subject to the required adjustments as defined in C.R.S. § 24-51-413.

For members in the PERA benefit structure with a membership date after December 31, 2006, an AIR was established for each Division Trust Fund to provide AIs, to the extent affordable, once benefits become payable for these members. From the employer statutory contributions submitted for these members, an amount equal to one percent of covered payroll and a certain percentage of reinstatement of service purchase dollars are transferred into the AIR to fund the current and future increases related to the AIR provisions. Pursuant to C.R.S. § 24-51-1009(4), and effective for the year 2020 and thereafter, the maximum AI rate that may be awarded by the Board equals the lesser of 1.50 percent or the average of the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) for each of the months during the prior calendar year. The total amount of increases paid in any year cannot exceed 10.00 percent of the total funds available in the AIR in the division from which they retire or decease. This maximum AI rate is subject to the required adjustments as defined in C.R.S. § 24-51-413. Therefore, the actuarial assumption applied to these members assumes that benefits do not increase with respect to the annual assessment of actuarial liability associated with the Division Trust Funds, since they receive AIs only to the extent affordable in accordance with C.R.S. § 24-51-1009. This assumption was adopted as of the December 31, 2007, actuarial valuation in recognition of AI provisions enacted in 2006.

Held within the trust and accounted for separately for each division, the dollars within each AIR are excluded from the Division Trust Fund assets for purposes of the annual funding actuarial valuation. The AIR is subject to a separate annual actuarial calculation to determine the extent of the payment, if any, of AIs each year to eligible individuals.

### **Actuarial Studies**

Accumulated investment income is a significant contributor to the success of a defined benefit plan, often providing between 50 to 80 percent of the total inflows over the life of a plan. The financial market's major decline in 2008 prompted the Board to pursue additional actuarial studies over the last few years to evaluate the appropriateness of PERA's investment return assumption in concert with other pertinent economic assumptions. Following their adopted

governance procedures and practices, the Board performs periodic asset/liability modeling studies, actuarial audits, and actuarial experience analyses approximately every three to five years.

At the March 21, 2014, Board meeting, the Board approved an asset/liability modeling study to be conducted by Aon Hewitt. Based on the study, the Board adopted a new Asset Allocation policy on March 20, 2015, as described in Note 5 in the Financial Section.

In 2016, the Board requested an experience analysis covering plan experience for the four-year period from 2012 through 2015, to provide an updated view of all economic and demographic assumptions. CMC completed the experience analysis in October 2016, for purposes of discussion at the actuarial assumption workshop held October 28, 2016. Based on CMC's plan experience analysis and presentations from CMC and other experts, the Board adopted updated economic and demographic assumptions at the November 18, 2016, Board meeting to be effective for the December 31, 2016, actuarial valuation.

In 2014, the Board engaged Milliman, an independent actuarial firm, to conduct an actuarial audit. The primary focus of the audit was to ensure independence, accuracy, and conformity with the accepted ASOPs with regard to results of the annual actuarial valuation and the appropriateness of the actuarial assumptions used to calculate those results. Milliman's findings were favorable toward CMC's work product concluding, overall, the calculations were reasonable. During the replication of the December 31, 2013, actuarial valuation, Milliman was able to come within a 1 percent margin of CMC's calculated AALs and closely matched each division's normal cost rates applying the same methods as used by CMC. Milliman determined that the data used by CMC were reasonable, were able to closely match benefit and valuation asset amounts, and determined that the actuarial methods and assumptions applied were in conformity with the ASOPs. Milliman found no grounds on which to suggest a revision of the previous year's actuarial valuation, but recommended a few changes in methodologies to be considered for future actuarial valuations as listed below.

- Apply mid-year timing of contributions used in normal cost rate calculation.
- Make a technical change in the amortization calculation.
- Make slight adjustments to certain liability calculations.
- Include merit increases in first year compensation amounts.
- Add further disclosure of assumptions and methods in the actuarial valuation report.

CMC evaluated each of Milliman's recommendations as well as internally reviewed all programming and actuarial procedures. The assessment resulted in the adoption of revised procedures reflecting Milliman's suggestions as well as some additional procedural and/or programming refinements. All of the changes were first incorporated into the December 31, 2014, valuation results and have continued to be applied in subsequent valuations.

## DIVISION TRUST FUNDS—PENSION

Milliman found no grounds on which to suggest a revision of the 2012 experience study, which encompassed plan experience from 2008 through 2011, but recommended a few changes in methodologies to be considered for future experience studies.

- Increase margin for mortality assumption.
- Modify assumed timing of AI for active members.

Pursuant to C.R.S. § 24-51-1010, passed into law in 2006, prior to any increase in benefits, the Legislature is responsible for contracting an actuary or actuarial firm to conduct an actuarial assessment of the impact of such increase. One element of SB 18-200 is the extension of plan provisions for State Troopers to certain other safety officers. This revision will be recognized, as appropriate, in future funding actuarial valuations and currently is recognized in the actuarial projections performed in parallel with the December 31, 2017, funding actuarial valuation. A brief description and estimated impact, is provided below:

- Effective January 1, 2020, the State Troopers contribution structure and benefit provisions are extended to corrections officers (State Division) and county sheriffs, undersheriffs, deputy sheriffs, noncertified deputy sheriffs, and detention officers (Local Government Division) hired on or after January 1, 2020. These changes were included in the actuarial analysis for SB 18-200, performed by the Board's actuaries, CMC, to ensure there would be no projected adverse impact to the State or Local Government Division Trust Funds. Based on CMC's analysis, these changes are deemed to have no anticipated adverse impact to the State and Local Government Divisions as the higher employer and member contribution levels adequately cover the projected normal cost (or accrual cost) for the new members.

### Changes Since Last Actuarial Valuation

#### *Changes in Actuarial Methods*

There are no actuarial method changes reflected in the December 31, 2017, actuarial valuation since the last actuarial valuation as of December 31, 2016.

#### *Changes in Actuarial Assumptions*

There are no changes in economic and demographic actuarial assumptions incorporated into the actuarial valuation as of December 31, 2017, since the last actuarial valuation as of December 31, 2016.

#### *Changes in Plan Provisions*

The following changes to contribution and benefit provisions for the five Division Trust Funds have been recognized since the last actuarial valuation as of December 31, 2016. However, only a few of these changes, particularly those impacting the amount and timing of the AI, directly affect the results of the December 31, 2017, actuarial valuation. The remainder of the changes listed below will impact future actuarial valuations commensurate with the effective dates as shown.

Following the 2018 legislative session, Governor Hickenlooper signed into law SB 18-200, which includes the following reforms:

#### *Changes to Contribution Provisions*

- Incrementally increases the member contribution percentage a total of 2.00 percent as follows:
  - 0.75 percent on July 1, 2019.
  - 0.75 percent on July 1, 2020.
  - 0.50 percent on July 1, 2021.
- Increase employer contributions 0.25 percent on July 1, 2019, for all divisions except for the Local Government Division.
- PERA will receive an annual direct distribution from the State in the amount of \$225 million (in actual dollars). The distribution will occur on July 1, 2018, and on July 1 each year thereafter until there are no unfunded actuarial accrued liabilities in the trust fund of any division that receives such distribution. PERA shall allocate the distribution to the trust funds as it would an employer contribution in a manner that is proportionate to the annual payroll of each division except there shall be no allocation to the Local Government Division.
- Beginning January 1, 2021, and every year thereafter, employer contribution rates for the State and Local Government Divisions will be adjusted to include a defined contribution supplement. The defined contribution supplement for these two divisions will be the employer contribution amount paid to defined contribution plan participant accounts that would have otherwise gone to the defined benefit trusts to pay down the unfunded liability plus any defined benefit investment earnings thereon, expressed as a percentage of salary on which employer contributions have been made.

#### *Changes to Benefit Provisions*

- Increase the number of years used in the HAS calculation from three to five years for members, except judges, who do not have five years of service credit on December 31, 2019, and for new members hired on or after January 1, 2020.
- Increase the number of years used in the HAS calculation for the Judicial Division from one to three years for members who do not have five years of service credit on December 31, 2019, and for new members hired on or after January 1, 2020.
- Redefine PERA-includable salary for all members to include payouts of unused sick leave.
- Redefine PERA-includable salary for members hired on or after July 1, 2019, to include contributions to IRC Section 125 and 132 plans.
- Apply the State Trooper contribution rate, retirement age, and benefits to other safety officers, including sheriff deputies and corrections officers hired on or after January 1, 2020.

**DIVISION TRUST FUNDS—PENSION**

- For members, other than State Troopers, hired on or after January 1, 2020, age and service for full service retirement is met at:
  - Any age with 35 years.
  - Age 64 with 30 years.
  - Age 65 with 5 years.
- For members, other than State Troopers, hired on or after January 1, 2020, age and service for reduced service retirement is met at:
  - Age 55 with 25 years.
  - Age 60 with 5 years.
- For State Troopers hired on or after January 1, 2020, age and service for full service retirement is met at:
  - Any age with 35 years.
  - Age 55 with 25 years.
  - Age 65 with 5 years.
- For State Troopers hired on or after January 1, 2020, age and service for reduced service retirement is met at:
  - Age 55 with 20 years.
- Temporary suspension of AI for years 2018 and 2019.
- Sets the AI cap at 1.5 percent and extends the AI waiting period from one to three years.

***Other Changes***

- Beginning July 1, 2020, and then each year thereafter, member contributions, employer contributions, the direct distribution from the State, and the AI will be adjusted based on certain statutory parameters to keep PERA on path to full funding in 30 years.
- Expand PERAChoice for new members hired on or after January 1, 2019, in the Local Government Division and to new members hired on or after January 1, 2019, who are classified college and university employees in the State Division.
- Increase the cost to disaffiliate for Local Government Division employers by setting the discount rate to equal the long-term assumed rate of return assumption minus 200 basis points.

***Significant Events******(Dollars in thousands)***

The significant events during 2017, recognized in the actuarial valuation as of December 31, 2017, include:

- The enactment of pension reforms pursuant to SB 18-200, as detailed above.
- The Cunningham Fire Protection District (CFPD) disaffiliated from the Local Government Division on December 2, 2017. For the purpose of the December 31, 2017, actuarial valuation, liabilities were determined assuming no additional benefit accrals for the disaffiliated membership of the CFPD that had not refunded

their PERA member contribution accounts. This resulted in an actuarial gain of \$110. The total disaffiliation payment of \$1,159 was allocated to the Local Government Division Trust Fund and the HCTF in the amount of \$1,063 and \$96, respectively.

**Differences in Actuarial Valuation Methods and Assumptions**

- The actuarial valuation for funding purposes was performed as of December 31, 2017. The actuarial valuation for accounting and financial reporting purposes was performed as of December 31, 2016, and the total pension liability (TPL) was rolled forward to the measurement date as of December 31, 2017.
- Census data used for the actuarial valuation for funding purposes reflects membership data as of December 31, 2017, and the census data used for the actuarial valuation for accounting and financial reporting purposes reflects membership data as of December 31, 2016. Therefore, all summaries and schedules, regarding actuarial valuation results for funding purposes, shown in the Actuarial Section, reflect census data as of December 31, 2017.
- The actuarial valuation for funding purposes for the State Division used a discount rate of 7.25 percent as of the December 31, 2017, and December 31, 2016, valuation dates. The actuarial valuation for accounting and financial reporting purposes for the State Division reflected a discount rate of 4.72 percent and 5.26 percent as of the December 31, 2017, and December 31, 2016, measurement dates, respectively.
- The actuarial valuation for funding purposes for the School Division used a discount rate of 7.25 percent as of the December 31, 2017, and December 31, 2016, valuation dates. The actuarial valuation for accounting and financial reporting purposes for the School Division reflected a discount rate of 4.78 percent and 5.26 percent as of the December 31, 2017, and December 31, 2016, measurement dates, respectively.
- The actuarial valuation for funding purposes for the Judicial Division used a discount rate of 7.25 percent as of the December 31, 2017, and December 31, 2016, valuation dates. The actuarial valuation for accounting and financial reporting purposes for the Judicial Division reflected a discount rate of 5.41 percent and 5.18 percent as of the December 31, 2017, and December 31, 2016, measurement dates, respectively.
- The actuarial valuation for funding purposes applies an asset valuation method that recognizes a four-year smoothed market value of assets for purposes of determining the UAAL. The actuarial valuation for accounting and financial reporting purposes applies the fair value of assets to determine the net pension liability.
- The actuarial valuation for funding purposes does not apply an AI assumption for members of the PERA benefit structure hired on or after January 1, 2007, in the determination of the AAL. Therefore, the ADC established by the funding valuation does not consider future increases for this member group and the assets attributable to the AIR are not included in the actuarial value of

## DIVISION TRUST FUNDS—PENSION

assets. A separate annual actuarial valuation is performed on the AIR to determine the applicable AI payable to eligible members after benefit commencement. AIR plan provisions are deemed substantively automatic, ad hoc cost-of-living adjustments.

Liabilities associated with the AIR statutorily can never exceed available assets. As a result, the actuarial valuation for accounting and financial reporting purposes includes the balance of the AIR both in the plan assets, at fair value, and in the TPL of the applicable division.

- The actuarial valuation for funding purposes as of December 31, 2017, reflects the revised plan provisions for all divisions pursuant to SB 18-200 as described above. The actuarial valuation for accounting and financial reporting purposes does not reflect these changes to plan provisions as this legislation was passed into law after the December 31, 2017, measurement date.

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## Actuarial Assumptions: Exhibits A–I

## Exhibit A: Separations from Employment Before Retirement and Individual Pay Increase Assumptions—State Division

Sample Ages	Percent of Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Member		
	Ultimate Withdrawal <sup>1</sup>		Death <sup>2</sup>		Disability		Merit and Seniority	Inflation and Productivity	Total Increase (Next Year)
	Male	Female	Male	Female	Male	Female			
<b>State Members (Other Than State Troopers)</b>									
20	30.00%	20.00%	0.020%	0.008%	0.01%	0.01%	5.67%	3.50%	9.17%
25	10.00%	14.50%	0.024%	0.008%	0.01%	0.01%	3.75%	3.50%	7.25%
30	7.00%	10.00%	0.022%	0.010%	0.01%	0.01%	2.80%	3.50%	6.30%
35	6.00%	7.50%	0.026%	0.013%	0.03%	0.03%	2.05%	3.50%	5.55%
40	5.00%	6.75%	0.031%	0.018%	0.05%	0.05%	1.50%	3.50%	5.00%
45	4.25%	5.50%	0.048%	0.031%	0.09%	0.09%	0.85%	3.50%	4.35%
50	4.25%	5.25%	0.083%	0.051%	0.20%	0.20%	0.50%	3.50%	4.00%
55	4.25%	5.25%	0.137%	0.078%	0.27%	0.27%	0.10%	3.50%	3.60%
60	4.25%	5.25%	0.230%	0.113%	0.30%	0.30%	0.00%	3.50%	3.50%
65	4.25%	5.25%	0.406%	0.172%	0.30%	0.30%	0.00%	3.50%	3.50%
70	4.25%	5.25%	0.720%	0.299%	0.30%	0.30%	0.00%	3.50%	3.50%
<b>State Troopers</b>									
20	8.00%	8.00%	0.020%	0.008%	0.01%	0.01%	5.50%	3.50%	9.00%
25	6.00%	6.00%	0.024%	0.008%	0.02%	0.02%	3.75%	3.50%	7.25%
30	4.00%	4.00%	0.022%	0.010%	0.04%	0.04%	2.80%	3.50%	6.30%
35	3.75%	3.75%	0.026%	0.013%	0.06%	0.06%	2.05%	3.50%	5.55%
40	3.00%	3.00%	0.031%	0.018%	0.10%	0.10%	1.50%	3.50%	5.00%
45	3.00%	3.00%	0.048%	0.031%	0.25%	0.25%	1.20%	3.50%	4.70%
50	3.00%	3.00%	0.083%	0.051%	0.30%	0.30%	0.80%	3.50%	4.30%
55	3.00%	3.00%	0.137%	0.078%	0.30%	0.30%	0.40%	3.50%	3.90%
60	3.00%	3.00%	0.230%	0.113%	0.30%	0.30%	0.00%	3.50%	3.50%
65	3.00%	3.00%	0.406%	0.172%	0.30%	0.30%	0.00%	3.50%	3.50%
70	3.00%	3.00%	0.720%	0.299%	0.30%	0.30%	0.00%	3.50%	3.50%

<sup>1</sup> There are no select withdrawal assumptions for State Troopers.

<sup>2</sup> Rates are shown for active members. Separate post-retirement and disability mortality tables are used for retirees.

## Exhibit B: Separations from Employment Before Retirement and Individual Pay Increase Assumptions—School Division and Denver Public Schools (DPS) Division—PERA Benefit Structure

Sample Ages	Percent of Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Member		
	Ultimate Withdrawal		Death <sup>1</sup>		Disability		Merit and Seniority	Inflation and Productivity	Total Increase (Next Year)
	Male	Female	Male	Female	Male	Female			
<b>School Division and Denver Public Schools (DPS) Division—PERA Benefit Structure</b>									
20	20.00%	14.50%	0.020%	0.008%	0.01%	0.01%	6.20%	3.50%	9.70%
25	10.00%	12.00%	0.024%	0.008%	0.01%	0.01%	4.10%	3.50%	7.60%
30	6.50%	8.00%	0.022%	0.010%	0.01%	0.01%	2.95%	3.50%	6.45%
35	5.25%	6.50%	0.026%	0.013%	0.02%	0.02%	2.50%	3.50%	6.00%
40	4.25%	5.00%	0.031%	0.018%	0.04%	0.04%	1.95%	3.50%	5.45%
45	4.00%	5.00%	0.048%	0.031%	0.06%	0.06%	1.35%	3.50%	4.85%
50	4.00%	5.00%	0.083%	0.051%	0.09%	0.09%	0.80%	3.50%	4.30%
55	4.00%	5.00%	0.137%	0.078%	0.15%	0.15%	0.35%	3.50%	3.85%
60	4.00%	5.00%	0.230%	0.113%	0.21%	0.21%	0.00%	3.50%	3.50%
65	4.00%	5.00%	0.406%	0.172%	0.21%	0.21%	0.00%	3.50%	3.50%
70	4.00%	5.00%	0.720%	0.299%	0.21%	0.21%	0.00%	3.50%	3.50%

<sup>1</sup> Rates are shown for active members. Separate post-retirement and disability mortality tables are used for retirees.

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## Exhibit C: Separations from Employment Before Retirement and Individual Pay Increase Assumptions—Local Government Division

Sample Ages	Percent of Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Member		
	Ultimate Withdrawal		Death <sup>1</sup>		Disability		Merit and Seniority	Inflation and Productivity	Total Increase (Next Year)
	Male	Female	Male	Female	Male	Female			
20	13.00%	16.00%	0.020%	0.008%	0.01%	0.01%	6.95%	3.50%	10.45%
25	12.00%	16.00%	0.024%	0.008%	0.01%	0.01%	4.30%	3.50%	7.80%
30	8.00%	11.00%	0.022%	0.010%	0.01%	0.01%	2.64%	3.50%	6.14%
35	6.00%	9.00%	0.026%	0.013%	0.03%	0.03%	1.72%	3.50%	5.22%
40	5.25%	6.50%	0.031%	0.018%	0.04%	0.04%	1.23%	3.50%	4.73%
45	4.50%	6.50%	0.048%	0.031%	0.11%	0.11%	0.99%	3.50%	4.49%
50	4.50%	6.00%	0.083%	0.051%	0.15%	0.15%	0.79%	3.50%	4.29%
55	4.50%	6.00%	0.137%	0.078%	0.17%	0.17%	0.60%	3.50%	4.10%
60	4.50%	6.00%	0.230%	0.113%	0.25%	0.25%	0.25%	3.50%	3.75%
65	4.50%	6.00%	0.406%	0.172%	0.25%	0.25%	0.00%	3.50%	3.50%
70	4.50%	6.00%	0.720%	0.299%	0.25%	0.25%	0.00%	3.50%	3.50%

<sup>1</sup> Rates are shown for active members. Separate post-retirement and disability mortality tables are used for retirees.

## Exhibit D: Separations from Employment Before Retirement and Individual Pay Increase Assumptions—Judicial Division

Sample Ages	Percent of Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Member		
	Withdrawal <sup>1</sup>		Death <sup>2</sup>		Disability		Merit and Seniority <sup>3</sup>	Inflation and Productivity	Total Increase (Next Year)
	Male	Female	Male	Female	Male	Female			
30	1.65%	1.65%	0.022%	0.010%	0.01%	0.01%	1.50%	3.50%	5.00%
35	1.65%	1.65%	0.026%	0.013%	0.02%	0.02%	1.50%	3.50%	5.00%
40	1.65%	1.65%	0.031%	0.018%	0.04%	0.04%	0.67%	3.50%	4.17%
45	1.65%	1.65%	0.048%	0.031%	0.08%	0.08%	0.50%	3.50%	4.00%
50	1.65%	1.65%	0.083%	0.051%	0.10%	0.10%	0.50%	3.50%	4.00%
55	1.65%	1.65%	0.137%	0.078%	0.20%	0.20%	0.50%	3.50%	4.00%
60	1.65%	1.65%	0.230%	0.113%	0.30%	0.30%	0.50%	3.50%	4.00%
65	1.65%	1.65%	0.406%	0.172%	0.30%	0.30%	0.50%	3.50%	4.00%
70	1.65%	1.65%	0.720%	0.299%	0.30%	0.30%	0.50%	3.50%	4.00%

<sup>1</sup> There are no select withdrawal assumptions for members in the Judicial Division.

<sup>2</sup> Rates are shown for active members. Separate post-retirement and disability mortality tables are used for retirees.

<sup>3</sup> Pay raises are subject to legislative approval. Percentages shown are based on prior experience.

## Exhibit E: Separations from Employment Before Retirement and Individual Pay Increase Assumptions—All Division Trust Funds—DPS Benefit Structure

Sample Ages	Percent of Members Separating Within the Next Year						Pay Increase Assumptions for an Individual Member		
	Withdrawal <sup>1</sup>		Death <sup>2</sup>		Disability		Merit and Seniority	Inflation and Productivity	Total Increase (Next Year)
	Male	Female	Male	Female	Male	Female			
20	8.00%	10.00%	0.020%	0.008%	0.01%	0.01%	3.50%	3.50%	7.00%
25	8.00%	10.00%	0.024%	0.008%	0.01%	0.01%	3.50%	3.50%	7.00%
30	7.00%	9.00%	0.022%	0.010%	0.01%	0.01%	3.20%	3.50%	6.70%
35	7.00%	8.00%	0.026%	0.013%	0.02%	0.02%	2.76%	3.50%	6.26%
40	5.75%	6.50%	0.031%	0.018%	0.05%	0.05%	2.12%	3.50%	5.62%
45	5.00%	4.50%	0.048%	0.031%	0.09%	0.09%	1.34%	3.50%	4.84%
50	4.50%	4.50%	0.083%	0.051%	0.20%	0.20%	0.80%	3.50%	4.30%
55	4.25%	4.50%	0.137%	0.078%	0.24%	0.24%	0.42%	3.50%	3.92%
60	4.25%	4.50%	0.230%	0.113%	0.38%	0.38%	0.20%	3.50%	3.70%
65	4.25%	4.50%	0.406%	0.172%	0.40%	0.40%	0.00%	3.50%	3.50%
70	4.25%	4.50%	0.720%	0.299%	0.40%	0.40%	0.00%	3.50%	3.50%

<sup>1</sup> There are no select withdrawal assumptions for members in the DPS benefit structure.

<sup>2</sup> Rates are shown for active members. Separate post-retirement and disability mortality tables are used for retirees.

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## Exhibit F: Select Rates of Separation Assumptions—State Division, School and DPS Divisions, and Local Government Division

Percent of Members With Less Than Five Years of Service Withdrawing from Employment Next Year<sup>1</sup>

Completed Years of Service	State Division		School and DPS Divisions <sup>2</sup>		Local Government Division	
	Male	Female	Male	Female	Male	Female
0	41.5%	41.5%	37.0%	34.0%	41.0%	39.0%
1	20.5%	21.5%	21.0%	20.0%	24.0%	23.0%
2	14.5%	16.0%	16.0%	15.0%	17.0%	18.0%
3	11.5%	13.0%	12.0%	12.0%	12.0%	14.0%
4	9.5%	11.5%	11.0%	11.0%	10.0%	11.0%

<sup>1</sup> There are no select withdrawal assumptions for State Troopers or Judicial Division members.<sup>2</sup> Rates shown are for PERA benefit structure members in the School or DPS Divisions. Effective December 31, 2016, a select withdrawal period is no longer applied to members in the DPS benefit structure.

## Exhibit G: Percent of Members Eligible for Reduced Retirement Benefits Retiring Next Year

Retirement Ages	State Division		State Troopers	School and DPS Divisions <sup>1</sup>		Local Government Division		Judicial Division	DPS Benefit Structure <sup>2</sup>
	Male	Female		Male	Female	Male	Female		
50	9.5%	10.0%	10.0%	8.0%	8.0%	8.0%	9.0%	6.0%	8.0% 5.0%
51	9.5%	10.0%	10.0%	8.0%	8.0%	8.0%	9.0%	6.0%	8.0% 5.0%
52	9.5%	10.0%	10.0%	8.0%	8.0%	8.0%	9.0%	6.0%	8.0% 5.0%
53	9.5%	10.0%	10.0%	8.0%	8.0%	8.0%	9.0%	6.0%	8.0% 10.0%
54	9.5%	10.0%	10.0%	10.0%	10.0%	8.0%	9.0%	6.0%	11.0% 10.0%
55	9.5%	10.0%	5.0%	10.0%	10.0%	8.0%	12.0%	6.0%	11.0% 10.0%
56	9.5%	10.0%	5.0%	10.0%	11.0%	8.0%	12.0%	6.0%	11.0% 10.0%
57	9.5%	10.0%	5.0%	10.0%	11.0%	8.0%	12.0%	6.0%	11.0% 10.0%
58	9.5%	10.0%	5.0%	10.0%	11.0%	8.0%	12.0%	6.0%	11.0% 10.0%
59	9.5%	10.0%	5.0%	10.0%	11.0%	10.0%	11.5%	6.0%	15.0% 12.0%
60	9.5%	10.0%	10.0%	10.0%	11.0%	11.0%	11.5%	8.0%	15.0% 15.0%
61	9.5%	10.0%	10.0%	12.0%	11.0%	11.0%	11.5%	8.0%	17.0% 15.0%
62	9.5%	10.0%	10.0%	12.0%	11.0%	11.0%	11.5%	8.0%	17.0% 15.0%
63	9.5%	10.0%	10.0%	12.0%	11.0%	11.0%	11.5%	8.0%	17.0% 15.0%
64	9.5%	10.0%	10.0%	12.0%	11.0%	11.0%	11.5%	8.0%	17.0% 15.0%
65 and over	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0% 0.0%

<sup>1</sup> Rates shown are for PERA benefit structure members in the School or DPS Divisions.<sup>2</sup> Rates shown are for DPS benefit structure members in any division.

## DIVISION TRUST FUNDS—PENSION

## Exhibit H: Percent of Members Eligible for Unreduced Retirement Benefits Retiring Next Year

Retirement Ages	State Division		State Troopers <sup>1</sup>	School and DPS Divisions <sup>2</sup>		Local Government Division		Judicial Division	DPS Benefit Structure <sup>3</sup>	
	Male	Female		Male	Female	Male	Female		Male	Female
50	60%	55%	40%	55%	60%	60%	60%	6%	40%	40%
51	50%	40%	32%	48%	54%	46%	52%	6%	40%	40%
52	42%	36%	32%	46%	48%	30%	40%	6%	35%	30%
53	38%	34%	32%	42%	42%	25%	40%	6%	35%	30%
54	32%	26%	32%	40%	40%	22%	40%	6%	30%	30%
55	25%	25%	32%	28%	29%	22%	28%	6%	30%	30%
56	20%	24%	32%	25%	25%	25%	30%	6%	20%	25%
57	20%	20%	32%	25%	25%	22%	21%	6%	24%	25%
58	18%	18%	32%	22%	22%	20%	21%	6%	22%	20%
59	20%	18%	32%	22%	22%	20%	21%	6%	25%	24%
60	20%	21%	32%	25%	25%	22%	21%	8%	22%	30%
61	18%	18%	32%	25%	24%	22%	20%	8%	20%	28%
62	22%	19%	32%	24%	27%	24%	27%	8%	25%	30%
63	20%	19%	32%	24%	24%	25%	22%	8%	40%	30%
64	20%	19%	32%	24%	24%	25%	22%	8%	20%	30%
65	24%	22%	100%	27%	26%	25%	25%	15%	30%	35%
66	26%	26%	100%	28%	28%	30%	25%	15%	30%	35%
67	25%	24%	100%	25%	25%	20%	30%	15%	30%	32%
68	22%	25%	100%	24%	22%	25%	20%	15%	30%	30%
69	22%	24%	100%	24%	22%	25%	20%	15%	30%	30%
70	25%	25%	100%	22%	25%	25%	24%	40%	30%	30%
71	25%	25%	100%	22%	23%	25%	24%	40%	30%	30%
72	25%	25%	100%	22%	23%	25%	24%	40%	30%	30%
73	25%	25%	100%	22%	23%	25%	24%	40%	30%	30%
74	25%	25%	100%	22%	23%	25%	24%	40%	30%	30%
75 and over	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

<sup>1</sup> For State Troopers prior to age 50, it is assumed that 40 percent of the eligible members will retire at each age from age 45 through age 49.

<sup>2</sup> Rates shown are for PERA benefit structure members in the School or DPS Divisions.

<sup>3</sup> Rates shown are for DPS benefit structure members in any division.

## DIVISION TRUST FUNDS—PENSION

Exhibit I: Rates of Post-Retirement Mortality and Single Life Retirement Values<sup>1</sup>

(In Actual Dollars)

## MORTALITY ASSUMPTIONS—STATE AND LOCAL GOVERNMENT DIVISIONS

Sample Attained Ages	Percent of Retirees Deceasing Within the Next Year		Present Value of \$1 Monthly for Life		Present Value of \$1 Monthly Increasing 1.5% Annually		Future Life Expectancy in Years	
	Male	Female	Male	Female	Male	Female	Male	Female
40	0.031%	0.018%	\$159.33	\$161.37	\$192.94	\$196.28	43.92	46.29
45	0.048%	0.031%	154.77	157.53	185.60	189.85	39.00	41.34
50	0.297%	0.198%	148.50	152.23	176.16	181.54	34.11	36.41
55	0.458%	0.277%	142.13	146.36	166.58	172.46	29.67	31.80
60	0.635%	0.393%	134.41	138.72	155.40	161.27	25.40	27.26
65	0.831%	0.595%	124.54	128.88	141.80	147.59	21.22	22.84
70	1.185%	0.965%	111.83	116.53	125.19	131.28	17.14	18.59
75	1.830%	1.627%	95.82	101.49	105.35	112.36	13.21	14.58
80	3.824%	3.123%	76.84	84.09	82.99	91.48	9.59	10.92
85	7.940%	6.061%	59.12	66.51	62.84	71.17	6.77	7.89

## MORTALITY ASSUMPTIONS—SCHOOL, DPS, AND JUDICIAL DIVISIONS

Sample Attained Ages	Percent of Retirees Deceasing Within the Next Year		Present Value of \$1 Monthly for Life		Present Value of \$1 Monthly Increasing 1.5% Annually		Future Life Expectancy in Years	
	Male	Female	Male	Female	Male	Female	Male	Female
40	0.031%	0.018%	\$159.92	\$162.72	\$193.89	\$198.58	44.51	48.05
45	0.048%	0.031%	155.60	159.46	186.85	192.89	39.58	43.10
50	0.257%	0.130%	149.69	154.97	177.81	185.55	34.70	38.18
55	0.397%	0.181%	143.43	149.57	168.31	177.00	30.19	33.44
60	0.544%	0.257%	135.67	142.39	157.03	166.24	25.83	28.76
65	0.728%	0.422%	125.61	132.99	143.16	152.94	21.55	24.18
70	1.117%	0.690%	112.71	120.96	126.31	136.81	17.38	19.74
75	1.849%	1.191%	96.88	105.82	106.65	117.57	13.44	15.50
80	3.630%	2.537%	78.48	87.79	84.85	95.78	9.84	11.59
85	7.332%	5.320%	60.30	69.46	64.12	74.49	6.91	8.34

<sup>1</sup> Rates are shown for healthy members. Separate disability mortality tables are used for disabled retirees.

## DIVISION TRUST FUNDS—PENSION

### Summary of Funding Progress

The PERA funding objective is to pay long-term benefit promises through contributions that remain approximately level from year to year as a percent of covered payroll earned by PERA members. The information in this section provides an overview of funding progress:

- The solvency test shows the degree to which existing liabilities are funded, including prior history.
- A schedule of funding progress shows the UAAL as a percentage of annual covered payroll, including prior history.
- Schedules detailing actuarial gains and losses, by source, including prior history and a reconciliation of UAAL considering the total of all five Division Trust Funds, over the past five years.
- The scheduled contribution requirements based on the December 31, 2017, actuarial valuation for the period ending December 31, 2019.

Consideration of the plans' current funded ratio, the unfunded liabilities in relation to annual covered payroll, historic trends, including significant gains and losses, and the schedule of future contributions should provide sufficient information to appropriately measure funding progress.

### Solvency Test

The solvency test is one means of checking PERA's funding progress. In this test, the plan's actuarial value of assets are compared with: (A) member contributions (with interest) on deposit, (B) the liabilities for future benefits to persons who have retired, died or become disabled, and to those who have terminated service with the right to a future benefit, and (C) the liabilities for service already rendered by active members. In a system that has been following the discipline of level contribution rate financing, the liabilities for member contributions on deposit (liability A) and the liabilities for future benefits to present retirees (liability B) are fully covered by present valuation assets, except in certain circumstances.

The actuarial valuation of December 31, 2017, shows that plan assets fully cover liability A. In addition, the remainder of plan assets covers a portion of the liabilities for future benefits to persons who have retired or terminated service with the right to a future benefit (liability B). Generally, if the system continues to use level contribution rate financing, the funded portion of liability B and C will increase over time.

## DIVISION TRUST FUNDS—PENSION

## SOLVENCY TEST

(Dollars in Thousands)

Valuation Date	Aggregate Accrued Liabilities			Actuarial Value of Plan Assets	Portion of Actuarial Accrued Liabilities Covered by Valuation Assets		
	Active Member Contributions (A) <sup>1</sup>	Retirees, Beneficiaries, and Inactive Members (B)	Employer-Financed Portion of Active Members (C)		Liability (A)	Liability (B)	Liability (C)
<b>State Division</b>							
12/31/2008	\$2,566,620	\$12,999,235	\$4,932,813	\$13,914,371	100.0%	87.3%	0.0%
12/31/2009	2,568,287	12,660,958	4,747,972	13,382,736	100.0%	85.4%	0.0%
12/31/2010	2,569,046	13,149,658	4,637,472	12,791,946	100.0%	77.7%	0.0%
12/31/2011	2,629,640	13,710,393	4,486,510	12,010,045	100.0%	68.4%	0.0%
12/31/2012	2,668,942	14,191,469	4,331,084	12,538,675	100.0%	69.5%	0.0%
12/31/2013	2,675,469	15,296,368	4,871,888	13,129,460	100.0%	68.3%	0.0%
12/31/2014	2,688,514	15,846,200	4,873,607	13,523,488	100.0%	68.4%	0.0%
12/31/2015	2,685,014	16,470,370	4,930,287	13,882,820	100.0%	68.0%	0.0%
12/31/2016	2,678,312	17,933,227	5,058,377	14,026,332	100.0%	63.3%	0.0%
12/31/2017	2,668,406	17,395,423	4,718,256	14,256,410	100.0%	66.6%	0.0%
<b>School Division</b>							
12/31/2008	\$3,695,995	\$19,416,006	\$7,888,201	\$21,733,329	100.0%	92.9%	0.0%
12/31/2009	3,769,100	18,830,712	7,813,003	21,054,910	100.0%	91.8%	0.0%
12/31/2010	3,779,760	19,658,749	7,901,245	20,321,736	100.0%	84.1%	0.0%
12/31/2011	3,783,336	20,666,021	7,536,842	19,266,110	100.0%	74.9%	0.0%
12/31/2012	3,823,348	21,466,078	7,329,607	20,266,574	100.0%	76.6%	0.0%
12/31/2013	3,881,145	23,301,641	8,254,526	21,369,380	100.0%	75.1%	0.0%
12/31/2014	3,915,705	24,247,868	8,222,959	22,143,356	100.0%	75.2%	0.0%
12/31/2015	4,003,251	25,133,168	8,540,734	22,871,661	100.0%	75.1%	0.0%
12/31/2016	4,108,961	27,922,423	9,321,584	23,263,344	100.0%	68.6%	0.0%
12/31/2017	4,212,088	26,937,539	8,896,588	23,780,045	100.0%	72.6%	0.0%
<b>Local Government Division</b>							
12/31/2008	\$675,174	\$1,949,108	\$1,213,801	\$2,933,296	100.0%	100.0%	25.5%
12/31/2009	678,519	1,963,925	1,208,377	2,932,628	100.0%	100.0%	24.0%
12/31/2010	657,847	2,180,451	1,167,268	2,926,045	100.0%	100.0%	7.5%
12/31/2011	666,794	2,330,543	1,162,678	2,882,691	100.0%	95.1%	0.0%
12/31/2012	528,029	2,750,956	878,636	3,098,721	100.0%	93.4%	0.0%
12/31/2013	533,003	2,991,177	978,102	3,291,298	100.0%	92.2%	0.0%
12/31/2014	534,695	3,114,436	961,836	3,629,400	100.0%	99.4%	0.0%
12/31/2015	533,262	3,275,093	972,343	3,777,161	100.0%	99.0%	0.0%
12/31/2016	545,507	3,573,344	1,094,201	3,879,197	100.0%	93.3%	0.0%
12/31/2017	544,525	3,482,526	1,018,881	4,009,413	100.0%	99.5%	0.0%
<b>Judicial Division</b>							
12/31/2008	\$54,593	\$160,475	\$72,990	\$230,967	100.0%	100.0%	21.8%
12/31/2009	52,754	165,904	77,038	228,714	100.0%	100.0%	13.1%
12/31/2010	53,742	171,904	78,193	227,814	100.0%	100.0%	2.8%
12/31/2011	54,688	186,420	78,329	221,515	100.0%	89.5%	0.0%
12/31/2012	57,762	193,774	75,361	238,807	100.0%	93.4%	0.0%
12/31/2013	59,348	208,236	84,014	256,800	100.0%	94.8%	0.0%
12/31/2014	60,973	214,541	95,739	270,866	100.0%	97.8%	0.0%
12/31/2015	60,118	232,303	109,545	286,891	100.0%	97.6%	0.0%
12/31/2016	58,119	273,416	115,582	297,888	100.0%	87.7%	0.0%
12/31/2017	54,973	277,542	95,593	310,085	100.0%	91.9%	0.0%
<b>DPS Division<sup>2</sup></b>							
12/31/2010	\$317,442	\$2,370,217	\$645,155	\$2,961,720	100.0%	100.0%	42.5%
12/31/2011	333,550	2,435,504	673,473	2,804,706	100.0%	100.0%	5.3%
12/31/2012	348,739	2,479,706	667,104	2,936,695	100.0%	100.0%	16.2%
12/31/2013	364,126	2,672,260	749,486	3,075,895	100.0%	100.0%	5.3%
12/31/2014	379,240	2,665,352	771,501	3,151,456	100.0%	100.0%	13.9%
12/31/2015	394,306	2,732,879	778,055	3,207,327	100.0%	100.0%	10.3%
12/31/2016	402,849	2,999,767	843,814	3,220,935	100.0%	93.9%	0.0%
12/31/2017	419,239	2,867,254	802,033	3,257,770	100.0%	99.0%	0.0%

Please see page 169 for footnote references.

## DIVISION TRUST FUNDS—PENSION

## SOLVENCY TEST (CONTINUED)

(Dollars in Thousands)

Valuation Date	Aggregate Accrued Liabilities			Actuarial Value of Plan Assets	Portion of Actuarial Accrued Liabilities Covered by Valuation Assets		
	Active Member Contributions (A) <sup>1</sup>	Retirees, Beneficiaries, and Inactive Members (B)	Employer-Financed Portion of Active Members (C)		Liability (A)	Liability (B)	Liability (C)
<b>All Division Trust Funds<sup>3, 4</sup></b>							
12/31/2008	\$6,992,382	\$34,524,824	\$14,107,805	\$38,811,963	100.0%	92.2%	0.0%
12/31/2009	7,068,660	33,621,499	13,846,390	37,598,988	100.0%	90.8%	0.0%
12/31/2010	7,377,837	37,530,979	14,429,333	39,229,261	100.0%	84.9%	0.0%
12/31/2011	7,468,008	39,328,881	13,937,832	37,185,067	100.0%	75.6%	0.0%
12/31/2012	7,426,820	41,081,983	13,281,792	39,079,472	100.0%	77.0%	0.0%
12/31/2013	7,513,091	44,469,682	14,938,016	41,122,833	100.0%	75.6%	0.0%
12/31/2014	7,579,127	46,088,397	14,925,642	42,718,566	100.0%	76.2%	0.0%
12/31/2015	7,675,951	47,843,813	15,330,964	44,025,860	100.0%	76.0%	0.0%
12/31/2016	7,793,748	52,702,177	16,433,558	44,687,696	100.0%	70.0%	0.0%
12/31/2017	<b>7,899,231</b>	<b>50,960,284</b>	<b>15,531,351</b>	<b>45,613,723</b>	<b>100.0%</b>	<b>74.0%</b>	<b>0.0%</b>

<sup>1</sup> Includes accrued interest on member contributions.<sup>2</sup> The DPS Division Trust Fund was established on January 1, 2010, and received the net assets of the DPSRS.<sup>3</sup> Results prior to December 31, 2010, do not include the DPS Division.<sup>4</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

## DIVISION TRUST FUNDS—PENSION

**Unfunded Actuarial Accrued Liability**

UAALs are the difference between actuarially calculated liabilities for service already rendered and the valuation assets of the retirement fund. It is common for unfunded liabilities to exist in a defined benefit retirement plan.

In 2016, the ratio of PERA's valuation assets to accrued liabilities was 58.1 percent and increased to 61.3 percent by the end of 2017.

The following factors resulted in higher liabilities (or losses) to PERA during 2017:

- Lower investment returns than assumed in 2014, 2015, and 2016.
- More members retired at earlier ages than expected.
- More service and disability retirements were experienced than expected.
- Fewer members terminated PERA-covered employment and withdrew their accounts than expected.
- More survivor benefits were granted than anticipated.
- New PERA members had some service resulting in accrued liabilities.
- Actual payroll contributions were less than the determined ADC.

The following factors resulted in lower liabilities (or gains) during 2017:

- Higher investment return than assumed in 2017.
- Member pay increases were lower than expected.
- Retirees experienced shorter lifespans than expected.

Since 2000, PERA's funded ratio has declined from a high of 105.2 percent to the current funded status of 61.3 percent at the end of 2017. In response to the declining funded ratio, legislation was enacted in 2004 and 2006, with the specific purpose of strengthening PERA's future funded status. Among other cost-saving measures, the Amortization Equalization Disbursement (AED) and the Supplemental Amortization Equalization Disbursement (SAED) were created and implemented. The 2008 global financial crisis further necessitated major pension reform. The enactment of SB 10-001 in 2010 significantly affected benefit and eligibility provisions, the payment structure of AIs, and employer funding mechanisms with the intent to return PERA to a 100 percent funded ratio within the next 30 years.

Between 2010 and 2015, PERA's funded status was negatively affected primarily by the recognition of adverse economic experience and by the adoption of more conservative economic and demographic assumptions to better reflect anticipated future behaviors, longevity, and economic conditions. For the year-ended December 31, 2016, actuarial results showed significant decreases to PERA's funded status primarily due to the adoption of new mortality tables reflecting the expectation of increased longevity of the membership and a more conservative assumed investment rate of return of 7.25 percent. To address PERA's risk profile and funded status, the Board brought forth to the membership, employers, and the General Assembly, the need to consider additional reforms for the 2018 Legislative Session. The Colorado General Assembly passed significant pension reform through SB 18-200 which changes plan provisions with the goal of eliminating the UAAL as described previously.

Liabilities for members are based on service rendered toward their retirement benefits payable in the future. UAALs exist because liabilities for such service by members exceed assets currently on hand for such future benefits. The Solvency Test shows that benefits to all PERA retirees are funded at 74.0 percent.

Since inflation decreases the dollar's value, it is important to examine more than basic actuarial metrics and data when assessing the plan's financial status. The ratio of UAAL dollars divided by member covered payroll can provide a meaningful index. The lower the ratio, the greater is the strength of the system. Observation of this relative index over a period of years will give an indication of the financial strength of the system. The significant increase in this ratio for the periods 2008 through 2011 was primarily a result of the four-year smoothing of the large investment loss from 2008. The increase in this ratio for 2013 was predominantly attributable to the increase in liability due to the reduction in the investment rate of return assumption as well as the changes in the underlying economic assumptions effective for the December 31, 2013, actuarial valuation. The decrease in this ratio for 2014 and 2015 mainly is attributable to investment gains on the actuarial value of assets, reflecting the strong investment performance in 2012 and 2013, and changes to certain actuarial methods incorporated into the 2014 actuarial valuation as a result of the 2014 actuarial audit. This ratio again increased in 2016, which mainly was attributable to an increase in liability due to the reduction in the investment rate of return assumption and changes in the underlying economic assumptions as well as the adoption of revised mortality tables, effective for the December 31, 2016, actuarial valuation. The decrease in this ratio in 2017 is mainly attributable to the reforms enacted pursuant to SB 18-200 and the investment gains on the actuarial value of assets reflecting the strong investment performance during 2017.

## DIVISION TRUST FUNDS—PENSION

## SCHEDULE OF FUNDING PROGRESS

(Dollars in Thousands)

(A) Valuation Date	(B) Actuarial Value of Plan Assets	(C) Actuarial Accrued Liabilities	(D) Unfunded Actuarial Accrued Liabilities (UAAL) (C) – (B)	(E) Funded Ratio (B)/(C)	(F) Annual Covered Payroll	(G) UAAL As a % of Covered Payroll (D)/(F)
<b>State Division</b>						
12/31/2008	\$13,914,371	\$20,498,668	\$6,584,297	67.9%	\$2,371,639	277.6%
12/31/2009	13,382,736	19,977,217	6,594,481	67.0%	2,384,137	276.6%
12/31/2010	12,791,946	20,356,176	7,564,230	62.8%	2,392,080	316.2%
12/31/2011	12,010,045	20,826,543	8,816,498	57.7%	2,393,791	368.3%
12/31/2012	12,538,675	21,191,495	8,652,820	59.2%	2,384,934	362.8%
12/31/2013	13,129,460	22,843,725	9,714,265	57.5%	2,474,965	392.5%
12/31/2014	13,523,488	23,408,321	9,884,833	57.8%	2,564,670	385.4%
12/31/2015	13,882,820	24,085,671	10,202,851	57.6%	2,641,867	386.2%
12/31/2016	14,026,332	25,669,916	11,643,584	54.6%	2,710,651	429.5%
12/31/2017	<b>14,256,410</b>	<b>24,782,085</b>	<b>10,525,675</b>	<b>57.5%</b>	<b>2,774,207</b>	<b>379.4%</b>
<b>School Division</b>						
12/31/2008	\$21,733,329	\$31,000,202	\$9,266,873	70.1%	\$3,804,927	243.5%
12/31/2009	21,054,910	30,412,815	9,357,905	69.2%	3,922,175	238.6%
12/31/2010	20,321,736	31,339,754	11,018,018	64.8%	3,900,662	282.5%
12/31/2011	19,266,110	31,986,199	12,720,089	60.2%	3,821,603	332.8%
12/31/2012	20,266,574	32,619,033	12,352,459	62.1%	3,819,066	323.4%
12/31/2013	21,369,380	35,437,312	14,067,932	60.3%	3,938,650	357.2%
12/31/2014	22,143,356	36,386,532	14,243,176	60.9%	4,063,236	350.5%
12/31/2015	22,871,661	37,677,153	14,805,492	60.7%	4,235,290	349.6%
12/31/2016	23,263,344	41,352,968	18,089,624	56.3%	4,349,320	415.9%
12/31/2017	<b>23,780,045</b>	<b>40,046,215</b>	<b>16,266,170</b>	<b>59.4%</b>	<b>4,471,357</b>	<b>363.8%</b>
<b>Local Government Division</b>						
12/31/2008	\$2,933,296	\$3,838,083	\$904,787	76.4%	\$718,902	125.9%
12/31/2009	2,932,628	3,850,821	918,193	76.2%	705,097	130.2%
12/31/2010	2,926,045	4,005,566	1,079,521	73.0%	705,265	153.1%
12/31/2011	2,882,691	4,160,015	1,277,324	69.3%	718,169	177.9%
12/31/2012	3,098,721	4,157,621	1,058,900	74.5%	523,668	202.2%
12/31/2013	3,291,298	4,502,282	1,210,984	73.1%	529,003	228.9%
12/31/2014	3,629,400	4,610,967	981,567	78.7%	540,468	181.6%
12/31/2015	3,777,161	4,780,698	1,003,537	79.0%	561,518	178.7%
12/31/2016	3,879,197	5,213,052	1,333,855	74.4%	608,223	219.3%
12/31/2017	<b>4,009,413</b>	<b>5,045,932</b>	<b>1,036,519</b>	<b>79.5%</b>	<b>632,768</b>	<b>163.8%</b>
<b>Judicial Division</b>						
12/31/2008	\$230,967	\$288,058	\$57,091	80.2%	\$35,937	158.9%
12/31/2009	228,714	295,696	66,982	77.3%	37,583	178.2%
12/31/2010	227,814	303,839	76,025	75.0%	37,412	203.2%
12/31/2011	221,515	319,437	97,922	69.3%	39,033	250.9%
12/31/2012	238,807	326,897	88,090	73.1%	39,045	225.6%
12/31/2013	256,800	351,598	94,798	73.0%	39,942	237.3%
12/31/2014	270,866	371,253	100,387	73.0%	42,977	233.6%
12/31/2015	286,891	401,966	115,075	71.4%	46,870	245.5%
12/31/2016	297,888	447,117	149,229	66.6%	48,700	306.4%
12/31/2017	<b>310,085</b>	<b>428,108</b>	<b>118,023</b>	<b>72.4%</b>	<b>48,948</b>	<b>241.1%</b>

Please see page 172 for footnote references.

## DIVISION TRUST FUNDS—PENSION

## SCHEDULE OF FUNDING PROGRESS (CONTINUED)

(Dollars in Thousands)

(A) Valuation Date	(B) Actuarial Value of Plan Assets	(C) Actuarial Accrued Liabilities	(D) Unfunded Actuarial Accrued Liabilities (UAAL) (C) – (B)	(E) Funded Ratio (B)/(C)	(F) Annual Covered Payroll	(G) UAAL As a % of Covered Payroll (D)/(F)
<b>DPS Division<sup>1</sup></b>						
12/31/2010	\$2,961,720	\$3,332,814	\$371,094	88.9%	\$470,774	78.8%
12/31/2011	2,804,706	3,442,527	637,821	81.5%	491,646	129.7%
12/31/2012	2,936,695	3,495,549	558,854	84.0%	510,872	109.4%
12/31/2013	3,075,895	3,785,872	709,977	81.2%	547,660	129.6%
12/31/2014	3,151,456	3,816,093	664,637	82.6%	584,319	113.7%
12/31/2015	3,207,327	3,905,240	697,913	82.1%	621,115	112.4%
12/31/2016	3,220,935	4,246,430	1,025,495	75.9%	642,177	159.7%
<b>12/31/2017</b>	<b>3,257,770</b>	<b>4,088,526</b>	<b>830,756</b>	<b>79.7%</b>	<b>658,198</b>	<b>126.2%</b>
<b>All Division Trust Funds<sup>2, 3</sup></b>						
12/31/2008	\$38,811,963	\$55,625,011	\$16,813,048	69.8%	\$6,931,405	242.6%
12/31/2009	37,598,988	54,536,549	16,937,561	68.9%	7,048,992	240.3%
12/31/2010	39,229,261	59,338,149	20,108,888	66.1%	7,506,193	267.9%
12/31/2011	37,185,067	60,734,721	23,549,654	61.2%	7,464,242	315.5%
12/31/2012	39,079,472	61,790,595	22,711,123	63.2%	7,277,585	312.1%
12/31/2013	41,122,833	66,920,789	25,797,956	61.5%	7,530,220	342.6%
12/31/2014	42,718,566	68,593,166	25,874,600	62.3%	7,795,670	331.9%
12/31/2015	44,025,860	70,850,728	26,824,868	62.1%	8,106,660	330.9%
12/31/2016	44,687,696	76,929,483	32,241,787	58.1%	8,359,071	385.7%
<b>12/31/2017</b>	<b>45,613,723</b>	<b>74,390,866</b>	<b>28,777,143</b>	<b>61.3%</b>	<b>8,585,478</b>	<b>335.2%</b>

<sup>1</sup> The DPS Division Trust Fund was established on January 1, 2010, and received the net assets of DPSRS.<sup>2</sup> Results prior to December 31, 2010, do not include the DPS Division.<sup>3</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Note: A history of contributions by Division Trust Fund, the ADC compared to the actual employer contributions paid, including the deficiency (or excess), for each of the last ten years, is shown in the Schedule of Employer Contributions, found on pages 107–109 in the Required Supplementary Information (RSI) in the Financial Section.

## DIVISION TRUST FUNDS—PENSION

## Actuarial Gains and Losses

## ANALYSIS OF FINANCIAL EXPERIENCE

(Dollars in Millions)

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
<b>Amounts</b>					
From differences between assumed and actual experience on liabilities					
Age and service retirements <sup>1</sup>	\$73.2	\$111.8	\$8.3	\$2.0	\$16.1
Disability retirements <sup>2</sup>	11.5	7.9	1.5	(0.1)	2.1
Deaths <sup>3</sup>	(6.0)	5.2	(8.1)	(0.5)	(11.6)
Withdrawals <sup>4</sup>	78.9	162.8	17.5	0.4	(8.4)
New members <sup>5</sup>	82.3	98.6	15.5	1.4	40.5
Pay increases <sup>6</sup>	(46.6)	(117.7)	(21.4)	(4.2)	(24.4)
Other <sup>7</sup>	32.3	45.6	8.1	0.9	(25.7)
Subtotal	225.6	314.2	21.4	(0.1)	(11.4)
From differences between assumed and actual experience on assets					
	(50.7)	(94.6)	(17.6)	(1.4)	(11.2)
From changes in plan assumptions and methods					
	—	—	—	—	—
From changes in plan provisions					
	(1,592.7)	(2,632.3)	(325.9)	(34.4)	(247.0)
<b>Total actuarial (gains)/losses on 2017 activities</b>	<b>(\$1,417.8)</b>	<b>(\$2,412.7)</b>	<b>(\$322.1)</b>	<b>(\$35.9)</b>	<b>(\$269.6)</b>
<b>Total actuarial (gains)/losses on 2016 activities</b>	<b>\$1,165.1</b>	<b>\$2,850.3</b>	<b>\$322.2</b>	<b>\$32.0</b>	<b>\$267.3</b>

<sup>1</sup> Age and service retirements: If members retire at older ages than assumed, there is a gain. If members retire at younger ages than assumed, there is a loss.<sup>2</sup> Disability retirements: If disability claims are lower than assumed, there is a gain. If disability claims are higher than assumed, there is a loss.<sup>3</sup> Deaths: If survivor claims are lower than assumed, there is a gain. If survivor claims are higher than assumed, there is a loss. If retirees die sooner than assumed, there is a gain. If retirees live longer than assumed, there is a loss.<sup>4</sup> Withdrawal from employment: If more members terminate and more liabilities are released by withdrawals than assumed, there is a gain. If fewer liabilities are released by terminations than assumed, there is a loss.<sup>5</sup> New members: If new members entering the plan have prior service, there is a loss.<sup>6</sup> Pay increases: If there are smaller salary increases than assumed, there is a gain. If greater salary increases occur than assumed, there is a loss.<sup>7</sup> Other: Miscellaneous gains and losses result from changes in the actuary's valuation software, data adjustments, timing of financial transactions, etc.

## DIVISION TRUST FUNDS—PENSION

The table below identifies the components that contributed to the growth in the underfunded status of the Division Trust Funds for the period 2013 to 2017.

## SCHEDULE OF GAINS AND LOSSES IN ACCRUED LIABILITIES AND RECONCILIATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITIES

(Dollars in Millions)

Type of Activity	2013	2014	2015	2016	2017	\$ (Gain) or Loss for Years Ended December 31
						2013–2017
UAAL beginning of year	\$22,711.2	\$25,798.0	\$25,874.6	\$26,824.9	\$32,241.8	\$22,711.2
Experience (gains) and losses						
Age and service retirements	32.7	180.4	132.1	139.0	211.4	695.6
Disability retirements	24.2	23.9	22.7	22.3	22.9	116.0
Deaths	70.4	67.1	68.5	79.9	(21.0)	264.9
Withdrawal from employment	122.4	204.1	172.7	205.9	251.2	956.3
New members	215.3	176.0	149.9	213.0	238.3	992.5
Pay increases	(230.2)	(52.6)	(64.4)	(275.0)	(214.3)	(836.5)
Investment income	(1,139.1)	(579.1)	(418.0)	236.3	(175.5)	(2,075.4) <sup>1</sup>
Other	(11.4)	(52.0)	(35.7)	68.2	61.2	30.3
Experience (gain)/loss during year	(915.7)	(32.2)	27.8	689.6	374.2	143.7
Non-recurring items						
Change in plan assumptions and methods	3,140.3 <sup>2</sup>	(636.9)	—	3,947.3 <sup>3</sup>	—	6,450.7
Change in plan provisions	—	—	—	—	(4,832.3) <sup>4</sup>	(4,832.3)
Non-recurring items	3,140.3	(636.9)	—	3,947.3	(4,832.3)	1,618.4
Contribution deficiency	301.7	55.3	380.9	249.6	195.2	1,182.7 <sup>5</sup>
Expected change in UAAL	560.5	690.4	541.6	530.4	798.2	3,121.1 <sup>6</sup>
<b>Total (gain)/loss for year</b>	<b>3,086.8</b>	<b>76.6</b>	<b>950.3</b>	<b>5,416.9</b>	<b>(3,464.7)</b>	<b>6,065.9</b>
UAAL end of year	<b>\$25,798.0</b>	<b>\$25,874.6</b>	<b>\$26,824.9</b>	<b>\$32,241.8</b>	<b>\$28,777.1</b>	<b>\$28,777.1</b>

The previous schedule shows where gains and losses occurred over the five-year period compared to what was expected or assumed.

These include the following significant gains and losses:

<sup>1</sup> \$2.1 billion cumulative gain due to the higher than assumed investment returns.

<sup>2</sup> \$3.1 billion loss, in 2013, primarily due to the reduction of the long-term expected investment rate of return assumption from 8.00 percent to 7.50 percent.

<sup>3</sup> \$3.9 billion loss, in 2016, primarily due to the reduction of the long-term expected investment rate of return assumption from 7.50 percent to 7.25 percent and the adoption of revised mortality tables to recognize extended member longevity.

<sup>4</sup> \$4.8 billion gain, in 2017, primarily due to the changes in pension plan provisions enacted pursuant to SB 18-200.

<sup>5</sup> \$1.2 billion cumulative loss resulting from contribution deficiencies; occurring when actual contributions flowing into the plans are less than the determined ADC (previous to 2014, GASB's annual required contribution).

<sup>6</sup> \$3.1 billion cumulative loss indicating the five-year difference between each prior year's UAAL and the expected current year UAAL considering the normal cost earned, less the required employer contributions all of which is adjusted for interest.

## DIVISION TRUST FUNDS—PENSION

## Actuarial Valuation Results

Contribution rates for the year ending December 31, 2019, are derived from the results of the December 31, 2017, annual actuarial valuation and are determined in advance for purposes of budgeting and consideration of any necessary legislative action.

## SCHEDULE OF COMPUTED EMPLOYER CONTRIBUTION RATES FOR THE 2019 FISCAL YEAR

	State Division	Expressed as a percentage of Covered Payroll			DPS Division
	School Division	Local Government Division	Judicial Division		
<b>Contributions</b>					
Service retirement benefits	7.10%	8.33%	6.63%	14.38%	8.33%
Disability retirement benefits	0.37%	0.24%	0.27%	0.73%	0.31%
Survivor benefits	0.15%	0.13%	0.15%	0.46%	0.12%
Termination withdrawals	1.65%	1.89%	1.64%	0.96%	1.93%
Refunds	1.05%	1.01%	1.13%	0.10% <sup>1</sup>	1.60%
Administrative expense load	0.40%	0.40%	0.40%	0.40%	0.40%
Total normal cost	10.72%	12.00%	10.22%	17.03%	12.69%
Less member contributions <sup>2</sup>	(8.43%) <sup>3</sup>	(8.38%)	(8.38%)	(8.38%)	(8.38%)
<b>Employer normal cost</b>	<b>2.29%</b>	<b>3.62%</b>	<b>1.84%</b>	<b>8.65%</b>	<b>4.31%</b>
Percentage available to amortize unfunded actuarial accrued liabilities	16.51%	15.18%	10.28%	10.51%	0.32%
Amortization period <sup>4</sup>	33 years	38 years	22 years	33 years	Infinite
Total employer contribution rate for actuarially funded benefits <sup>5</sup>	10.35% <sup>3</sup>	10.28%	10.00%	13.79%	10.28%
Amortization Equalization Disbursement	5.00%	4.50%	2.20%	3.40%	4.50%
Supplemental Amortization Equalization Disbursement	5.00%	5.50%	1.50%	3.40%	5.50%
Less Health Care Trust Fund	(1.02%)	(1.02%)	(1.02%)	(1.02%)	(1.02%)
Less Annual Increase Reserve	(0.53%)	(0.46%)	(0.56%)	(0.41%)	(0.63%)
Less PCOP credit	—	—	—	—	(14.00%) <sup>6</sup>
<b>Employer contribution rate for defined benefit plan</b>	<b>18.80%</b>	<b>18.80%</b>	<b>12.12%</b>	<b>19.16%</b>	<b>4.63%</b>

<sup>1</sup> Assumes no judge will elect a refund of contributions made for the 17th through the 20th year of service.

<sup>2</sup> Includes 50 percent of the phased-in amount of 0.75 percent additional member contribution effective July 1, 2019.

<sup>3</sup> Weighted average of more than one statutory rate.

<sup>4</sup> For the State, School, Judicial, and DPS Divisions, the amortization period shown considers the \$225 million direct distribution from the State.

<sup>5</sup> For the State, School, Judicial, and DPS Divisions, the rate shown includes 50 percent of the 0.25 percent additional employer contribution effective July 1, 2019, but does not reflect the direct distribution of \$225 million from the state treasury.

<sup>6</sup> An offset to the DPS Division rate is provided for under C.R.S. § 24-51-412. See Note 4 in the Financial Section.

## DIVISION TRUST FUNDS—PENSION

The AED and SAED are set to increase in future years for the Judicial Division, as shown below. With the passage of SB 10-001, the AED and the SAED can be adjusted based on the year-end funded status within a particular Division Trust Fund. If a particular Division Trust Fund reaches a funded status of 103 percent, a decrease in the AED and SAED is mandated and if it subsequently falls below a funded status of 90 percent, an increase is mandated. For the Local Government and Judicial Divisions, if the funded ratio reaches 90 percent and subsequently falls below 90 percent, an increase in the AED and SAED is mandated. Increases cannot exceed the maximum allowable limitations shown below.

## FUTURE AED AND SAED RATES

Trust Fund	2018 Rates		Future Annual Increases in Rates Prescribed by Colorado Revised Statutes.		Maximum Allowable Limitations	
	AED	SAED	AED	SAED	AED	SAED
State Division	5.00%	5.00%	N/A	N/A	5.00%	5.00%
School Division	4.50%	5.50%	N/A	N/A	4.50%	5.50%
Local Government Division	2.20%	1.50%	N/A	N/A	5.00%	5.00%
Judicial Division	2.20%	1.50%	Yes <sup>1</sup>	Yes <sup>2</sup>	5.00%	5.00%
DPS Division <sup>3</sup>	4.50%	5.50%	N/A	N/A	4.50%	5.50%

<sup>1</sup> For the calendar year beginning in 2019, C.R.S. § 24-51-411(4.5) increases the AED payment to 3.40 percent of PERA-includable salary and requires the AED payment to increase by 0.4 percent at the start of each of the following four calendar years through 2023 at which time the AED payment will be 5.00 percent of PERA-includable salary.

<sup>2</sup> For the calendar year beginning in 2019, C.R.S. § 24-51-411(7.5) increases the SAED payment to 3.40 percent of PERA-includable salary and requires the SAED payment to increase by 0.4 percent at the start of each of the following four calendar years through 2023 at which time the SAED payment will be 5.00 percent of PERA-includable salary.

<sup>3</sup> DPS Division employers are permitted to reduce the AED and SAED by the PCOP offset, as specified in C.R.S. § 24-51-412 *et seq.*

Note: A history of contributions by Division Trust Fund, the ADC compared to the actual employer contributions paid, including the deficiency (or excess), for each of the last ten years, is shown in the Schedule of Employer Contributions, found on pages 107–109, in the RSI in the Financial Section.

## DIVISION TRUST FUNDS—PENSION

*Annual Actuarial Valuation Statistics*

As of December 31, 2017, the Funded Ratio, the UAAL, the ADC for 2019 as a percentage of covered payroll, and the amortization period considering current funding and future increases prescribed by Colorado statute, for each Division Trust Fund, are shown in the following table. The results in this table are based on the actuarial valuation for funding purposes, which does not consider the impact of reduced benefits for those hired in the future as provided for in Colorado law.

**ACTUARIAL STATISTICS***(Dollars in Thousands)*

Trust Fund	Funded Ratio	UAAL	ADC <sup>1</sup>	Amortization Period Considering Future AED and SAED Increases
State Division	57.5%	\$10,525,675	23.28%	33 Years
School Division	59.4%	16,266,170	23.59%	38 Years
Local Government Division	79.5%	1,036,519	10.75%	22 Years
Judicial Division	72.4%	118,023	21.90%	24 Years
DPS Division	79.7%	830,756	11.14%	Infinite
<b>All Division Trust Funds<sup>2</sup></b>		<b>\$28,777,143</b>		

<sup>1</sup> Determined considering the 30-year target amortization period defined in the pension funding policy for purposes of funding benchmarks and RSI reporting as shown in the Financial Section.

<sup>2</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Pursuant to the pension funding policy, for reporting purposes, alternative ADCs also are determined by applying the layered amortization methodology as previously described. Under the target and alternative calculations, the legacy UAAL as of December 31, 2014, was amortized using a 30-year period, but the alternative ADCs use a 25-year closed period, a 20-year closed period, and a 15-year closed period, in lieu of the 30-year period, for amortization of any “new” UAAL recognized on and after January 1, 2015. The 2019 target and alternative ADCs, by division, are displayed below:

Trust Fund	Target ADC 30-Year <sup>1</sup>	Alternative ADCs		
		25-Year <sup>2</sup>	20-Year <sup>2</sup>	15-Year <sup>2</sup>
State Division	23.28%	23.60%	24.11%	24.99%
School Division	23.59%	24.08%	24.84%	26.17%
Local Government Division	10.75%	11.08%	11.59%	12.48%
Judicial Division	21.90%	22.42%	23.24%	24.68%
DPS Division	11.14%	11.35%	11.67%	12.22%

<sup>1</sup> Refers to the amortization period used to amortize the legacy UAAL as of December 31, 2014, and any “new” UAAL recognized on and after January 1, 2015.

<sup>2</sup> Refers to the amortization period used to amortize any “new” UAAL recognized on and after January 1, 2015.

**Funded Ratio***(Dollars in Thousands)*

The funded ratio for the plan is determined by dividing the actuarial value of assets by the AAL. The actuarial value of assets is not the current market value but a market-related value, which recognizes the differences between actual and expected investment experience for each year in equal amounts over a four-year period. The actuarial value of the assets as of December 31, 2017, was \$45,613,752 compared to a market value of assets of \$48,341,276, and to the AAL of \$74,390,866. The funded ratio for each of the funds, based on the actuarial value of assets, at December 31 for each of the last five years is shown below.

Trust Fund	2013	2014	2015	2016	2017
State Division	57.5%	57.8%	57.6%	54.6%	57.5%
School Division	60.3%	60.9%	60.7%	56.3%	59.4%
Local Government Division	73.1%	78.7%	79.0%	74.4%	79.5%
Judicial Division	73.0%	73.0%	71.4%	66.6%	72.4%
DPS Division	81.2%	82.6%	82.1%	75.9%	79.7%
<b>All Division Trust Funds<sup>1</sup></b>	<b>61.5%</b>	<b>62.3%</b>	<b>62.1%</b>	<b>58.1%</b>	<b>61.3%</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

## DIVISION TRUST FUNDS—PENSION

The Board's pension funding policy states that the targeted actuarial funded ratio is greater than or equal to 110 percent on a combined Division Trust Fund basis. The funded ratios listed on the previous page give an indication of progress made toward achieving the stated objective. A larger funded ratio indicates that a plan is better funded. As an example, for every \$1.00 of the actuarially determined benefits earned for the School Division Trust Fund as of December 31, 2017, approximately \$0.59 of assets are available for payment based on the actuarial value of assets. These benefits earned will be payable over the life span of members after their retirement and therefore, it is not imperative that the AAL equal the actuarial value of assets at any given moment in time.

At December 31, 2017, and December 31, 2016, PERA had the following funded status for all of its Division Trust Funds.

## FUNDDED STATUS FOR THE DIVISION TRUST FUNDS

(Dollars in Thousands)

	Market Value of Assets <sup>1</sup>		Actuarial Value of Assets <sup>2</sup>	
	12/31/2016	12/31/2017	12/31/2016	12/31/2017
<b>State Division Trust Fund</b>				
Actuarial accrued liability <sup>3</sup>	\$25,669,916	\$24,782,085	\$25,669,916	\$24,782,085
Assets held to pay those liabilities	13,538,772	15,105,378	14,026,332	14,256,410
<b>Unfunded actuarial accrued liability</b>	<b>\$12,131,144</b>	<b>\$9,676,707</b>	<b>\$11,643,584</b>	<b>\$10,525,675</b>
Funded ratio	52.7%	61.0%	54.6%	57.5%
<b>School Division Trust Fund</b>				
Actuarial accrued liability <sup>3</sup>	\$41,352,968	\$40,046,215	\$41,352,968	\$40,046,215
Assets held to pay those liabilities	22,465,388	25,204,920	23,263,344	23,780,045
<b>Unfunded actuarial accrued liability</b>	<b>\$18,887,580</b>	<b>\$14,841,295</b>	<b>\$18,089,624</b>	<b>\$16,266,170</b>
Funded ratio	54.3%	62.9%	56.3%	59.4%
<b>Local Government Division Trust Fund</b>				
Actuarial accrued liability <sup>3</sup>	\$5,213,052	\$5,045,932	\$5,213,052	\$5,045,932
Assets held to pay those liabilities	3,748,369	4,249,852	3,879,197	4,009,413
<b>Unfunded actuarial accrued liability</b>	<b>\$1,464,683</b>	<b>\$796,080</b>	<b>\$1,333,855</b>	<b>\$1,036,519</b>
Funded ratio	71.9%	84.2%	74.4%	79.5%
<b>Judicial Division Trust Fund</b>				
Actuarial accrued liability <sup>3</sup>	\$447,117	\$428,108	\$447,117	\$428,108
Assets held to pay those liabilities	287,888	328,459	297,888	310,085
<b>Unfunded actuarial accrued liability</b>	<b>\$159,229</b>	<b>\$99,649</b>	<b>\$149,229</b>	<b>\$118,023</b>
Funded ratio	64.4%	76.7%	66.6%	72.4%
<b>DPS Division Trust Fund</b>				
Actuarial accrued liability <sup>3</sup>	\$4,246,430	\$4,088,526	\$4,246,430	\$4,088,526
Assets held to pay those liabilities	3,108,233	3,452,667	3,220,935	3,257,770
<b>Unfunded actuarial accrued liability</b>	<b>\$1,138,197</b>	<b>\$635,859</b>	<b>\$1,025,495</b>	<b>\$830,756</b>
Funded ratio	73.2%	84.4%	75.9%	79.7%
<b>All Division Trust Funds<sup>4</sup></b>				
Actuarial accrued liability <sup>3</sup>	\$76,929,483	\$74,390,866	\$76,929,483	\$74,390,866
Assets held to pay those liabilities <sup>5</sup>	43,148,650	48,341,276	44,687,696	45,613,723
<b>Unfunded actuarial accrued liability</b>	<b>\$33,780,833</b>	<b>\$26,049,590</b>	<b>\$32,241,787</b>	<b>\$28,777,143</b>
Funded ratio	56.1%	65.0%	58.1%	61.3%

<sup>1</sup> The market value of assets is the fair value of the investments.

<sup>2</sup> The actuarial value of assets is calculated by spreading any market gains or losses above or below the assumed rate of return over four years.

<sup>3</sup> Based upon an assumed rate of return on investments of 7.25 percent and an assumed rate of 7.25 percent to discount the liabilities to be paid in the future to a value as of December 31, 2016, and December 31, 2017.

<sup>4</sup> The data in this table is aggregated for information purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

<sup>5</sup> In aggregate, the market value of the assets as of December 31, 2017, is \$2,727,524 greater than the actuarial value of assets calculated by the actuaries, as they are recognizing the gains and losses in value over four years, rather than only in the year they occurred. The remaining gains and (losses) to be smoothed for 2015 are (\$639,410), for 2016 are (\$48,321), and for 2017 are \$3,415,255.

## DIVISION TRUST FUNDS—PENSION

*Sensitivity of Actuarial Valuation to Changes in Assumed Investment Rate of Return and Discount Rate*

The most important long-term driver of a pension plan is investment income. The investment return assumption and the discount rate for liabilities should be based on an estimated long-term investment yield for the plan, considering the nature and mix of current and expected plan investments and the basis used to determine the actuarial value of assets.

To understand the importance of the investment rate of return, which is used to discount the actuarial liabilities of PERA, a one and one-half, and one-half percent fluctuation in the investment rate of return and discount rate would change the funded ratio, UAAL, and ADC (for contributions for the fiscal year ended December 31, 2019) as shown on the tables below and on the next page.

**INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 5.75 PERCENT***(Dollars in Thousands)*

Trust Fund	Actuarial Value of Assets			Market Value of Assets UAAL
	Funded Ratio	UAAL	ADC	
State Division	48.9%	\$14,883,638	31.80%	\$14,034,670
School Division	50.0%	23,751,227	33.53%	22,326,352
Local Government Division	66.8%	1,992,430	20.60%	1,751,990
Judicial Division	62.3%	187,831	33.03%	169,457
DPS Division	67.4%	1,573,968	20.32%	1,379,071
<b>All Division Trust Funds<sup>1</sup></b>		<b>\$42,389,094</b>		<b>\$39,661,540</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 6.75 PERCENT***(Dollars in Thousands)*

Trust Fund	Actuarial Value of Assets			Market Value of Assets UAAL
	Funded Ratio	UAAL	ADC	
State Division	54.7%	\$11,815,543	25.83%	\$10,966,575
School Division	56.3%	18,454,121	26.50%	17,029,246
Local Government Division	75.2%	1,321,107	13.81%	1,080,667
Judicial Division	69.0%	139,284	25.40%	120,910
DPS Division	75.7%	1,046,400	13.86%	851,502
<b>All Division Trust Funds<sup>1</sup></b>		<b>\$32,776,455</b>		<b>\$30,048,900</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**CURRENT INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 7.25 PERCENT***(Dollars in Thousands)*

Trust Fund	Actuarial Value of Assets			Market Value of Assets UAAL
	Funded Ratio	UAAL	ADC	
State Division	57.5%	\$10,525,675	23.28%	\$9,676,707
School Division	59.4%	16,266,170	23.59%	14,841,295
Local Government Division	79.5%	1,036,519	10.75%	796,080
Judicial Division	72.4%	118,023	21.90%	99,649
DPS Division	79.7%	830,756	11.14%	635,859
<b>All Division Trust Funds<sup>1</sup></b>		<b>\$28,777,143</b>		<b>\$26,049,590</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

## DIVISION TRUST FUNDS—PENSION

**INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 7.75 PERCENT***(Dollars in Thousands)*

Trust Fund	Actuarial Value of Assets			Market Value of Assets UAAL
	Funded Ratio	UAAL	ADC	
State Division	60.6%	\$9,256,610	20.58%	\$8,407,641
School Division	62.8%	14,069,918	20.41%	12,645,044
Local Government Division	84.0%	765,488	7.68%	525,049
Judicial Division	76.1%	97,635	18.50%	79,261
DPS Division	84.2%	612,068	8.30%	417,170
<b>All Division Trust Funds<sup>1</sup></b>		<b>\$24,801,719</b>		<b>\$22,074,165</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 8.75 PERCENT***(Dollars in Thousands)*

Trust Fund	Actuarial Value of Assets			Market Value of Assets UAAL
	Funded Ratio	UAAL	ADC	
State Division	66.7%	\$7,104,145	15.85%	\$6,255,177
School Division	69.6%	10,409,762	14.98%	8,984,887
Local Government Division	93.0%	301,606	2.02%	61,166
Judicial Division	83.4%	61,757	12.14%	43,383
DPS Division	92.8%	250,943	3.36%	56,045
<b>All Division Trust Funds<sup>1</sup></b>		<b>\$18,128,213</b>		<b>\$15,400,658</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Note: The time-weighted, net-of-fees annualized rate of return for the pooled investment assets was 9.5 percent for the past five years and 6.0 percent for the past 10 years. The 35-year annualized gross-of-fees rate of return for the pooled investment assets was 9.5 percent.

## DIVISION TRUST FUNDS—PENSION

## Plan Data

## SCHEDULE OF RETIREES, BENEFICIARIES, AND SURVIVORS ADDED TO AND REMOVED FROM THE BENEFIT PAYROLL

(In Actual Dollars)

Valuation Date	No. <sup>1</sup>	Added to Payroll Annual Benefits	No. <sup>1</sup>	Removed from Payroll Annual Benefits	No. <sup>1</sup>	Payroll—End of Year Annual Benefits	Average Annual Benefits	Increase in Average Benefits
<b>State Division<sup>2</sup></b>								
12/31/2008					30,514	\$1,020,023,424	\$33,428	—
12/31/2009	1,550	\$58,001,148	734	\$16,212,468	31,330	1,095,394,056	34,963	4.6%
12/31/2010	1,705	63,012,492	668	15,870,416	32,367	1,142,735,232	35,306	1.0%
12/31/2011	1,477	52,575,840	767	18,206,208	33,077	1,198,047,252	36,220	2.6%
12/31/2012	1,753	60,313,800	835	17,053,956	33,995	1,259,715,132	37,056	2.3%
12/31/2013	1,472	49,314,648	621	15,343,872	34,846	1,316,530,332	37,781	2.0%
12/31/2014	1,688	70,625,718	728	17,912,280	35,806	1,369,243,770	38,241	1.2%
12/31/2015	1,862	92,808,306	803	20,891,508	36,865	1,441,160,568	39,093	2.2%
12/31/2016	1,953	90,963,480	805	22,828,296	38,013	1,509,295,752	39,705	1.6%
12/31/2017	2,029	96,524,376	810	23,794,584	39,232	1,582,025,544	40,325	1.6%
<b>School Division<sup>2</sup></b>								
12/31/2008					45,754	\$1,487,330,100	\$32,507	—
12/31/2009	2,432	\$75,857,232	727	\$14,333,928	47,459	1,599,048,372	33,693	3.6%
12/31/2010	3,002	94,587,504	717	15,977,299	49,744	1,677,950,928	33,732	0.1%
12/31/2011	2,783	83,582,412	809	17,059,212	51,718	1,776,539,052	34,350	1.8%
12/31/2012	3,044	87,700,656	985	18,719,640	53,777	1,876,340,508	34,891	1.6%
12/31/2013	2,744	79,704,816	713	17,081,472	55,808	1,974,615,348	35,382	1.4%
12/31/2014	3,016	111,392,724	843	19,419,540	57,981	2,066,588,532	35,643	0.7%
12/31/2015	2,990	130,162,524	1,027	23,409,984	59,944	2,173,341,072	36,256	1.7%
12/31/2016	3,023	123,292,224	1,027	25,461,636	61,940	2,271,171,660	36,667	1.1%
12/31/2017	3,249	130,564,260	1,026	26,635,332	64,163	2,375,100,588	37,017	1.0%
<b>Local Government Division<sup>2</sup></b>								
12/31/2008					4,373	\$139,012,452	\$31,789	—
12/31/2009	373	\$12,911,052	75	\$1,444,056	4,671	154,915,224	33,165	4.3%
12/31/2010	463	18,211,380	82	1,560,317	5,052	171,596,184	33,966	2.4%
12/31/2011	332	11,254,980	88	1,645,992	5,296	184,500,768	34,838	2.6%
12/31/2012	687	23,576,376	105	1,892,688	5,878	209,260,764	35,601	2.2%
12/31/2013	345	10,330,380	76	1,456,248	6,147	221,838,300	36,089	1.4%
12/31/2014	392	13,412,585	93	2,018,928	6,446	233,231,957	36,182	0.3%
12/31/2015	408	18,760,927	97	2,215,488	6,757	249,777,396	36,966	2.2%
12/31/2016	388	15,843,636	100	2,491,764	7,045	263,129,268	37,350	1.0%
12/31/2017	420	18,329,400	114	2,916,156	7,351	278,542,512	37,892	1.5%
<b>Judicial Division<sup>2</sup></b>								
12/31/2008					281	\$13,659,096	\$48,609	—
12/31/2009	19	\$1,376,436	9	\$189,624	291	15,290,100	52,543	8.1%
12/31/2010	10	876,804	8	234,040	293	15,935,640	54,388	3.5%
12/31/2011	21	1,224,480	3	103,752	311	17,320,980	55,694	2.4%
12/31/2012	19	1,089,288	11	337,308	319	18,331,992	57,467	3.2%
12/31/2013	9	740,508	6	156,468	322	19,219,128	59,687	3.9%
12/31/2014	16	1,068,823	8	368,520	330	19,919,431	60,362	1.1%
12/31/2015	20	2,111,405	6	323,940	344	21,706,896	63,101	4.5%
12/31/2016	28	2,406,072	12	287,580	360	23,825,388	66,182	4.9%
12/31/2017	24	2,554,728	9	398,184	375	25,981,932	69,285	4.7%
<b>DPS Division<sup>2,3</sup></b>								
12/31/2010	6,199	\$216,886,500	—	\$—	6,199	\$216,886,500	\$34,987	—
12/31/2011	252	7,977,360	155	4,143,396	6,296	224,954,832	35,730	2.1%
12/31/2012	274	8,333,292	168	3,949,860	6,402	232,858,044	36,373	1.8%
12/31/2013	284	9,255,936	135	3,704,628	6,551	242,733,072	37,053	1.9%
12/31/2014	306	12,537,532	171	5,065,860	6,686	250,204,744	37,422	1.0%
12/31/2015	295	14,799,992	178	5,884,980	6,803	259,119,756	38,089	1.8%
12/31/2016	322	14,412,348	190	5,854,992	6,935	267,677,112	38,598	1.3%
12/31/2017	283	13,847,400	181	6,388,008	7,037	275,136,504	39,099	1.3%

Please see page 182 for footnote references.

## DIVISION TRUST FUNDS—PENSION

## SCHEDULE OF RETIREES, BENEFICIARIES, AND SURVIVORS ADDED TO AND REMOVED FROM THE BENEFIT PAYROLL (CONTINUED)

(In Actual Dollars)

Valuation Date	No. <sup>1</sup>	Added to Payroll Annual Benefits	No. <sup>1</sup>	Removed from Payroll Annual Benefits	No. <sup>1</sup>	Payroll—End of Year Annual Benefits	Average Annual Benefits	Increase in Average Benefits
<b>All Division Trust Funds<sup>2, 4</sup></b>								
12/31/2008					80,922	\$2,660,025,072	\$32,871	—
12/31/2009	4,374	\$148,145,868	1,545	\$32,180,076	83,751	2,864,647,752	34,204	4.1%
12/31/2010	11,379 <sup>5</sup>	393,574,680	1,475	33,642,072	93,655 <sup>5</sup>	3,225,104,484	34,436	0.7%
12/31/2011	4,865	156,615,072	1,822	41,158,560	96,698	3,401,362,884	35,175	2.1%
12/31/2012	5,777	181,013,412	2,104	41,953,452	100,371	3,596,506,440	35,832	1.9%
12/31/2013	4,854	149,346,288	1,551	37,742,688	103,674	3,774,936,180	36,412	1.6%
12/31/2014	5,418	209,037,382	1,843	44,785,128	107,249	3,939,188,434	36,729	0.9%
12/31/2015	5,575	258,643,154	2,111	52,725,900	110,713	4,145,105,688	37,440	1.9%
12/31/2016	5,714	246,917,760	2,134	56,924,268	114,293	4,335,099,180	37,930	1.3%
<b>12/31/2017</b>	<b>6,005</b>	<b>261,820,164</b>	<b>2,140</b>	<b>60,132,264</b>	<b>118,158</b>	<b>4,536,787,080</b>	<b>38,396</b>	<b>1.2%</b>

<sup>1</sup> The number does not include deferred survivors.<sup>2</sup> Amounts derived on an accrual basis.<sup>3</sup> The DPS Division Trust Fund was established on January 1, 2010, and received the net assets of DPSRS.<sup>4</sup> Data prior to December 31, 2010, does not include the DPS Division.<sup>5</sup> Includes the addition of 6,199 beneficiaries due to the DPSRS merger.

The number of persons receiving monthly retirement benefits has grown steadily in relation to membership. This trend will likely continue for many years into the future. The retirement benefit disbursements shown in the right-hand column include cost-of-living increases paid in years since 1970. Prior to 1981, figures are for years ended June 30.

MEMBER-RETIREE COMPARISON—ALL DIVISION TRUST FUNDS<sup>1</sup>

(In Actual Dollars)

Year	Number of Retiree Accounts on 12/31	Number of Member Accounts on 12/31 <sup>2</sup>	Retiree Accounts as % of Members on 12/31	Total Benefits Paid— Year Ended 12/31
1940	93	3,715	2.5%	\$72,588
1945	171	5,585	3.1%	137,442
1950	280	11,853	2.4%	237,866
1955	747	21,185	3.5%	745,679
1960	1,775	33,068	5.4%	2,055,139
1965	3,631	49,701	7.3%	5,486,225
1970	6,308	65,586	9.6%	13,115,234
1975	11,650	84,781	13.7%	32,820,433
1980	17,301	96,473	17.9%	71,289,456
1985	24,842	101,409	24.5%	192,456,029
1990	32,955	115,350	28.6%	350,398,094
1995	41,909	203,102	20.6%	639,501,796
2000	53,015	248,104	21.4%	1,093,779,068
2005	69,416	306,139	22.7%	1,973,240,491
2010	91,412	378,264	24.2%	3,161,773,781
2015	108,426	436,465	24.8%	4,073,789,897
2016	111,975	451,760	24.8%	4,260,156,437
<b>2017</b>	<b>115,801</b>	<b>465,590</b>	<b>24.9%</b>	<b>4,458,990,801</b>

<sup>1</sup> Amounts derived on a cash basis. Data prior to 2010 does not include the DPS Division.<sup>2</sup> Includes inactive member accounts.

## DIVISION TRUST FUNDS—PENSION

## SCHEDULE OF MEMBERS IN ACTUARIAL VALUATION

By Attained Age and Years of Service as of December 31, 2017

(In Actual Dollars)

## State Division

For State Division members (excluding State Troopers) the average age was 45.6 years, the average service was 8.7 years, and the average expected remaining service life was 8.4 years. For State Troopers the average age was 41.7 years, the average service was 12.4 years, and the average expected remaining service life was 10.6 years.

Attained Age	Years of Service to Valuation Date							Total No.	Annual Valuation Payroll
	0–4	5–9	10–14	15–19	20–24	25–29	30+		
Up to 20	193	—	—	—	—	—	—	193	\$1,145,981
20–24	1,668	3	—	—	—	—	—	1,671	37,049,929
25–29	4,153	316	4	—	—	—	—	4,473	159,416,191
30–34	4,231	1,544	335	3	—	—	—	6,113	264,272,324
35–39	3,339	1,703	1,209	267	10	—	—	6,528	319,903,478
40–44	2,452	1,387	1,304	951	211	9	—	6,314	339,596,585
45–49	3,761	1,623	1,317	1,134	805	285	11	8,936	476,649,154
50–54	1,835	1,136	1,144	1,046	806	624	187	6,778	391,910,508
55–59	1,492	1,088	1,245	1,047	749	552	299	6,472	359,064,578
60	265	210	255	204	124	93	69	1,220	68,300,037
61	267	197	221	177	136	89	52	1,139	62,260,776
62	219	184	198	155	98	100	63	1,017	55,887,013
63	178	187	183	137	91	66	47	889	48,610,774
64	167	140	171	154	78	52	54	816	43,250,279
65	158	146	137	121	73	47	42	724	37,103,067
66	138	92	96	74	50	48	32	530	26,571,386
67	109	84	74	68	41	36	29	441	21,686,908
68	86	61	56	49	25	21	21	319	15,466,589
69	78	47	55	41	16	12	20	269	12,396,622
70+	239	160	137	117	53	53	85	844	33,665,024
<b>Total</b>	<b>25,028</b>	<b>10,308</b>	<b>8,141</b>	<b>5,745</b>	<b>3,366</b>	<b>2,087</b>	<b>1,011</b>	<b>55,686</b>	<b>\$2,774,207,203</b>

## School Division

For School Division members the average age was 44.6 years, the average service was 8.4 years, and the average expected remaining service life was 8.8 years.

Attained Age	Years of Service to Valuation Date							Total No.	Annual Valuation Payroll
	0–4	5–9	10–14	15–19	20–24	25–29	30+		
Up to 20	778	—	—	—	—	—	—	778	\$4,499,779
20–24	4,257	38	—	—	—	—	—	4,295	73,891,248
25–29	9,874	1,169	42	—	—	—	—	11,085	326,539,038
30–34	7,455	4,102	873	25	—	—	—	12,455	425,597,661
35–39	6,867	3,425	3,781	731	11	—	—	14,815	558,921,110
40–44	6,430	2,940	3,193	3,047	408	16	—	16,034	646,296,777
45–49	8,107	3,127	3,017	2,764	2,138	420	16	19,589	768,809,851
50–54	4,238	2,475	2,806	2,469	1,713	1,440	211	15,352	652,565,833
55–59	3,427	2,084	2,597	2,628	1,637	1,055	510	13,938	549,059,117
60	581	345	461	456	250	155	75	2,323	84,227,167
61	537	283	377	405	257	161	77	2,097	78,742,379
62	497	296	297	328	215	114	73	1,820	63,878,994
63	408	203	254	298	169	116	64	1,512	53,803,660
64	380	212	206	236	152	104	50	1,340	45,295,630
65	325	185	188	169	118	82	42	1,109	35,656,009
66	278	151	134	112	71	59	38	843	25,576,929
67	278	111	89	92	55	41	19	685	18,418,349
68	262	90	79	77	40	28	15	591	15,088,142
69	192	86	62	54	37	19	19	469	11,365,758
70+	880	402	267	131	75	51	54	1,860	33,123,416
<b>Total</b>	<b>56,051</b>	<b>21,724</b>	<b>18,723</b>	<b>14,022</b>	<b>7,346</b>	<b>3,861</b>	<b>1,263</b>	<b>122,990</b>	<b>\$4,471,356,847</b>

## DIVISION TRUST FUNDS—PENSION

## SCHEDULE OF MEMBERS IN ACTUARIAL VALUATION (CONTINUED)

By Attained Age and Years of Service as of December 31, 2017

(In Actual Dollars)

## Local Government Division

For Local Government Division members the average age was 44.0 years, the average service was 7.6 years, and the average expected remaining service life was 7.8 years.

Attained Age	Years of Service to Valuation Date						No.	Total	Annual Valuation Payroll
	0–4	5–9	10–14	15–19	20–24	25–29			
Up to 20	526	—	—	—	—	—	526	\$2,421,654	
20–24	629	6	—	—	—	—	635	10,956,799	
25–29	985	84	8	—	—	—	1,077	38,169,657	
30–34	928	254	81	5	—	—	1,268	58,694,620	
35–39	818	289	231	62	3	—	1,403	73,563,931	
40–44	803	274	305	144	56	1	1,583	86,068,998	
45–49	557	248	348	200	117	42	6	1,518	94,108,331
50–54	470	234	290	187	159	74	38	1,452	90,246,735
55–59	392	246	304	230	150	105	66	1,493	89,166,045
60	68	37	57	46	30	14	8	260	16,423,584
61	66	42	45	30	21	19	12	235	13,706,580
62	64	37	39	23	30	11	10	214	11,449,508
63	51	29	35	24	15	5	8	167	9,250,111
64	64	21	32	27	13	13	5	175	9,432,863
65	55	28	32	20	10	14	5	164	8,218,994
66	52	27	26	13	7	6	5	136	7,079,418
67	34	9	15	8	5	4	1	76	2,926,171
68	31	14	22	6	1	3	1	78	3,015,541
69	22	12	13	7	2	3	—	59	2,130,803
70+	135	42	37	18	10	3	6	251	5,737,994
Total	6,750	1,933	1,920	1,050	629	317	171	12,770	\$632,768,337

## Judicial Division

For Judicial Division members the average age was 55.4 years, the average service was 13.2 years, and the average expected remaining service life was 10.4 years.

Attained Age	Years of Service to Valuation Date						No.	Total	Annual Valuation Payroll
	0–4	5–9	10–14	15–19	20–24	25–29			
Up to 20	—	—	—	—	—	—	—	—	\$—
20–24	—	—	—	—	—	—	—	—	—
25–29	—	—	—	—	—	—	—	—	—
30–34	1	2	—	—	—	—	—	3	193,210
35–39	8	3	1	—	—	—	—	12	1,310,404
40–44	21	3	3	1	1	—	—	29	3,850,549
45–49	8	12	10	2	1	1	—	34	5,033,332
50–54	12	15	24	10	6	1	—	68	10,443,601
55–59	11	15	12	11	9	14	4	76	11,653,197
60	2	2	3	3	1	2	—	13	1,932,906
61	—	—	3	1	3	2	—	9	1,421,927
62	4	3	—	2	1	—	1	11	1,664,217
63	—	1	2	2	3	—	1	9	1,291,430
64	—	3	4	1	—	2	1	11	1,680,950
65	—	4	4	4	1	4	1	18	2,644,956
66	—	—	2	1	1	1	1	6	917,758
67	2	1	1	2	1	—	1	8	1,140,386
68	—	2	2	—	—	2	1	7	1,094,892
69	—	1	2	1	—	1	1	6	828,474
70+	1	1	2	2	3	1	2	12	1,845,418
Total	70	68	75	43	31	31	14	332	\$48,947,607

## DIVISION TRUST FUNDS—PENSION

## SCHEDULE OF MEMBERS IN ACTUARIAL VALUATION (CONTINUED)

By Attained Age and Years of Service as of December 31, 2017

(In Actual Dollars)

## DPS Division

For DPS Division members the average age was 40.5 years, the average service was 6.1 years, and the average expected remaining service life was 9.6 years.

Attained Age	Years of Service to Valuation Date							Total No.	Annual Valuation Payroll
	0–4	5–9	10–14	15–19	20–24	25–29	30+		
Up to 20	64	—	—	—	—	—	—	64	\$573,921
20–24	808	7	—	—	—	—	—	815	16,478,340
25–29	2,268	219	—	—	—	—	—	2,487	84,497,898
30–34	1,790	855	77	2	—	—	—	2,724	114,008,401
35–39	1,572	765	301	34	2	—	—	2,674	112,778,220
40–44	729	493	306	191	29	1	—	1,749	82,767,856
45–49	570	493	223	244	92	15	1	1,638	79,541,334
50–54	367	339	180	191	99	78	7	1,261	60,892,323
55–59	342	299	166	148	106	61	38	1,160	51,872,718
60	55	60	17	30	15	11	11	199	8,720,716
61	46	74	14	20	14	6	9	183	7,154,177
62	50	53	20	27	11	9	7	177	7,765,240
63	33	51	18	24	13	5	5	149	6,371,012
64	38	38	24	18	14	8	8	148	6,024,986
65	29	34	13	18	10	5	5	114	5,010,808
66	35	19	7	6	3	4	3	77	2,773,777
67	27	25	6	7	4	2	—	71	2,405,947
68	25	24	1	7	4	1	1	63	2,210,083
69	16	19	8	1	2	1	3	50	1,623,986
70+	75	77	7	9	6	4	10	188	4,726,563
Total	8,939	3,944	1,388	977	424	211	108	15,991	\$658,198,306

## DIVISION TRUST FUNDS—PENSION

## SCHEDULE OF ACTIVE MEMBER ACTUARIAL VALUATION DATA

As of December 31

(In Actual Dollars)

Year	Number of Participating Employers <sup>1</sup>	Number of Active Members	Annual Payroll for Active Members	Average Annual Pay for Active Members	% Increase (Decrease) in Average Annual Pay
<b>State Division</b>					
2008	69	54,441	\$2,371,638,806	\$43,563	—
2009	70	54,333	2,384,136,844	43,880	0.73%
2010	70	54,977	2,392,080,128	43,511	(0.84%)
2011	70	54,956	2,393,791,402	43,558	0.11%
2012	70	54,804	2,384,933,961	43,518	(0.09%)
2013	70	55,354	2,474,965,482	44,712	2.74%
2014	32	55,300	2,564,669,718	46,377	3.72%
2015	32	55,291	2,641,866,650	47,781	3.03%
2016	32	55,725	2,710,650,565	48,643	1.80%
2017	32	55,686	2,774,207,203	49,819	2.42%
<b>School Division</b>					
2008	197	118,547	\$3,804,926,777	\$32,096	—
2009	196	119,390	3,922,175,230	32,852	2.36%
2010	271 <sup>2</sup>	116,486	3,900,661,576	33,486	1.93%
2011	275 <sup>2</sup>	114,820	3,821,603,410	33,283	(0.61%)
2012	281 <sup>2</sup>	115,294	3,819,065,598	33,125	(0.47%)
2013	294 <sup>2</sup>	117,727	3,938,649,818	33,456	1.00%
2014	224	119,618	4,063,235,757	33,968	1.53%
2015	227	120,239	4,235,290,282	35,224	3.70%
2016	229	121,945	4,349,319,783	35,666	1.25%
2017	234	122,990	4,471,356,847	36,355	1.93%
<b>Local Government Division</b>					
2008	141	17,379	\$718,901,763	\$41,366	—
2009	139	16,166	705,097,035	43,616	5.44%
2010	142	16,144	705,265,331	43,686	0.16%
2011	145	16,065	718,169,015	44,704	2.33%
2012	143	12,097	523,668,446	43,289	(3.17%)
2013	146	11,954	529,003,436	44,253	2.23%
2014	141	12,084	540,468,037	44,726	1.07%
2015	140	12,176	561,518,205	46,117	3.11%
2016	141	12,736	608,222,609	47,756	3.55%
2017	140	12,770	632,768,337	49,551	3.76%
<b>Judicial Division</b>					
2008	6	317	\$35,937,094	\$113,366	—
2009	6	317	37,582,661	118,557	4.58%
2010	6	317	37,412,139	118,019	(0.45%)
2011	6	329	39,033,369	118,642	0.53%
2012	6	329	39,045,008	118,678	0.03%
2013	6	332	39,941,730	120,306	1.37%
2014	2	334	42,976,979	128,674	6.96%
2015	2	334	46,869,730	140,329	9.06%
2016	2	335	48,699,531	145,372	3.59%
2017	2	332	48,947,607	147,433	1.42%

Please see page 187 for footnote references.

## DIVISION TRUST FUNDS—PENSION

## SCHEDULE OF ACTIVE MEMBER ACTUARIAL VALUATION DATA (CONTINUED)

As of December 31

(In Actual Dollars)

Year	Number of Participating Employers <sup>1</sup>	Number of Active Members	Annual Payroll for Active Members	Average Annual Pay for Active Members	% Increase (Decrease) in Average Annual Pay
<b>DPS Division<sup>3</sup></b>					
2010	28 <sup>2</sup>	13,171	\$470,773,746	\$35,743	—
2011	27 <sup>2</sup>	13,571	491,646,251	36,228	1.36%
2012	29 <sup>2</sup>	13,911	510,872,366	36,724	1.37%
2013	31 <sup>2</sup>	14,816	547,659,912	36,964	0.65%
2014	1	15,414	584,319,269	37,908	2.55%
2015	1	15,929	621,114,573	38,993	2.86%
2016	1	15,950	642,177,158	40,262	3.25%
2017	1	<b>15,991</b>	<b>658,198,306</b>	<b>41,161</b>	<b>2.23%</b>
<b>All Division Trust Funds<sup>4</sup></b>					
2008	413	190,684	\$6,931,404,440	\$36,350	—
2009	411	190,206	7,048,991,770	37,060	1.95%
2010	517 <sup>2</sup>	201,095	7,506,192,920	37,327	0.72%
2011	523 <sup>2</sup>	199,741	7,464,243,447	37,370	0.12%
2012	529 <sup>2</sup>	196,435	7,277,585,379	37,048	(0.86%)
2013	547 <sup>2</sup>	200,183	7,530,220,378	37,617	1.54%
2014	400	202,750	7,795,669,760	38,450	2.21%
2015	402	203,969	8,106,659,440	39,745	3.37%
2016	405	206,691	8,359,069,646	40,442	1.75%
2017	<b>409</b>	<b>207,769</b>	<b>8,585,478,300</b>	<b>41,322</b>	<b>2.18%</b>

<sup>1</sup> Prior to 2014, employer counts were based on separate units of government. Effective in 2014, GASB 67 classifies a primary government and its component units as one employer. Employer counts for the years 2014 and beyond are presented for purposes of complying with GASB 67 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

<sup>2</sup> Includes charter schools operating within the School and DPS Divisions.

<sup>3</sup> The DPS Division Trust Fund was established on January 1, 2010, and received the net assets of DPSRS.

<sup>4</sup> Data prior to 2010 does not include the DPS Division.

## HEALTH CARE TRUST FUNDS—OPEB

### Introduction

Implementation of GASB Statement No. 74 results in the preparation of two actuarial valuations—one for funding purposes and one for accounting and financial reporting purposes. Unless otherwise noted, this Health Care Trust Funds subsection reports on the actuarial valuation performed for funding purposes, but also includes information on specific differences between the two actuarial valuations. This subsection includes information on PERA's two defined benefit Other Postemployment Benefit (OPEB) plans. The Health Care Trust Fund (HCTF) is a cost-sharing multiple-employer plan and the Denver Public Schools Health Care Trust Fund (DPS HCTF) is a single-employer plan.

The HCTF and the DPS HCTF provide a subsidy for PERACare, PERA's health benefits program. Participation in the HCTF and the DPS HCTF is voluntary pursuant to C.R.S. § 24-51-1201. Employer contributions and investment earnings on the assets of the plans pay for the costs.

The HCTF and the DPS HCTF provide a health care premium subsidy based upon the benefit structure under which a member retires and the member's years of service credit. There is an allocation of the premium subsidy between the trust funds for members who retire with service credit in the DPS Division and one or more of the other divisions, as set forth in C.R.S. § 24-51-1206.5. The basis for the allocation of the premium subsidy is the percentage of the member contribution balance from each division as it relates to the total member contribution account balance.

The Board is responsible for maintaining a funding policy applicable to PERA's OPEB funds. The OPEB funding policy was last revised and adopted by the Board on January 19, 2018, effective for the December 31, 2017, funding actuarial valuation. The OPEB funding policy requires the calculation of an ADC for each of the two Health Care Trust Funds for the purpose of assessing the adequacy of the statutory contribution rate of each HCTF. The ADC is determined in accordance with the OPEB plan provisions, as described in Note 9 in the Financial Section.

The Board has the authority to contract, self-insure, and authorize disbursements necessary in order to carry out the purposes of the PERACare program including the administration of the health care subsidies.

### Actuarial Methods and Assumptions

#### Actuarial Methods

The Board is responsible for the actuarial methods and assumptions used in the OPEB actuarial valuations in accordance with C.R.S. § 24-51-204(5). The Board retains an external actuary, currently CMC, to perform annual actuarial valuations and sustainability projections as well as periodic experience studies to review the actuarial assumptions versus actual plan experience. Through formal action, the Board updates, replaces, or adopts new methods and assumptions applicable to OPEB plans as deemed necessary.

In general, the AALs of the HCTF and the DPS HCTF consist of the following two types of benefits:

- A service-based, monthly premium subsidy.
- A subsidy for members not eligible for premium-free Medicare Part A coverage.

The plan's actuary determines the costs relating to the subsidies provided by the HCTF and the DPS HCTF. Currently, all participating employers are statutorily required to contribute 1.02 percent of covered payroll to fund these benefits.

The actuary followed ASOP No. 6, *Measuring Retiree Group Benefit Obligations*, for purposes of recommending appropriate OPEB-specific assumptions. Although many of the economic and demographic assumptions used to determine pension liabilities apply in the determination of OPEB liabilities, additional assumptions typically are required. All actuarial methods and assumptions necessary to assess OPEB liabilities, in addition to those already provided on previous pages, are described and/or listed below.

#### Entry Age Normal Cost Method

The EAN cost method used for the determination of the pension liabilities also applies to the calculation of the OPEB liabilities. Consistent with the determination of normal cost of the pension plans, the calculation of the normal cost of the OPEB plans is based upon compensation.

#### Amortization Method

Under the OPEB funding policy, an ADC is determined by adding the normal cost and the cost to amortize, over defined, closed periods, any existing UAAL or new UAAL, including the impact of any experience actuarial gains and losses, actuarial assumption changes, and changes in plan provisions. Implementing a layered amortization approach requires each amortized item to be tracked over the closed period defined for that category.

The legacy UAAL as of December 31, 2017, will be recognized over a closed 30-year period from that date. All gains, losses, and changes in actuarial methods and assumptions on and after January 1, 2018, will be recognized each year and amortized separately over closed 30-year periods. The impact of any changes in plan provisions will be recognized over a closed period relating to the demographics of the group affected and/or the duration of the enhancement provided, not to exceed 25 years. If any future actuarial valuation indicates a fund has a negative UAAL, the ADC shall be set equal to the normal cost until such time as the funded ratio equals or exceeds 120 percent. At that time, the ADC shall be equal to the normal cost less an amount equal to the 15-year amortization of the portion of the negative UAAL above the 120 percent funded ratio.

Once determined, the ADC is then expressed as a level percentage of assumed future covered payroll and compared, as a benchmark, against the current statutory employer contribution rate.

## HEALTH CARE TRUST FUNDS—OPEB

### Asset Valuation Method

The Board adopted a method for valuing assets that determines a smoothed market value of assets. The smoothed value of assets recognizes the differences between actual and expected investment experience for each year in equal amounts over a four-year period. Note, the term "market value" is used in the Board's OPEB funding policy regarding the description of the determination of the asset valuation method used for funding purposes. The term "market value" is used consistently throughout the Actuarial Section and has the identical meaning of the term "fair value" as is used in the other sections of this CAFR.

### Actuarial Assumptions

The determination of the AAL includes recognition of a number of economic and non-economic assumptions in addition to the applied actuarial methods described above. Unless otherwise noted, it can be assumed that the economic and demographic actuarial assumptions applied to the actuarial valuation for funding purposes also were applied to the actuarial valuation for accounting and financial reporting purposes.

### Economic Assumptions

The economic assumptions for price inflation, investment rate of return, and wage inflation used in the determination of the pension liabilities also apply to the OPEB plans. In addition to these economic assumptions, initial per capita health care costs, morbidity rates, and health care cost trend rates are needed to project the future costs associated with providing benefits to those PERACare enrollees under the PERA benefit structure who are not eligible for premium-free Medicare Part A.

Exhibit J contains the assumptions used in determining the additional liability for PERACare enrollees under the PERA benefit structure who are age 65 or older and who are not eligible for premium-free Medicare Part A. Shown are the monthly costs/premiums assumed for 2018, which are subject to the morbidity rates and health care cost trend rates. The morbidity rates were first adopted for use for the December 31, 2015, actuarial valuation, and the health care cost trend rates are reviewed and updated annually. All cost/premiums and morbidity and trend assumptions are displayed in the adjacent tables.

Exhibit K contains the dollar subsidy amounts used in determining the additional liability for PERACare enrollees under the DPS benefit structure who are age 65 or older and who are not eligible for premium-free Medicare Part A.

Effective January 1, 2014, PERACare enrollees participating in the self-insured Medicare supplement plans and the Medicare HMO plan offered by Rocky Mountain Health Plans receive their prescription drug benefits through a Medicare Prescription Drug Plan.

As the service-based premium subsidy does not increase over time, PERACare enrollees are required to pay the entire increase in annual health care costs each year, resulting in monthly contributions that increase more rapidly over time than the total cost of coverage.

### Non-Economic Assumptions

The non-economic decremental assumptions such as rates of withdrawal, retirement and disability used in the determination of the pension liabilities also apply to the OPEB plans. Listed below are the additional actuarial assumptions, specific to the determination of OPEB liabilities, which also are considered for the December 31, 2017, actuarial valuation.

Current PERACare participants are assumed to maintain their current health care benefit elections in perpetuity. For active members retiring directly from covered employment, Exhibit L provides the assumed participation rates. The participation of current PERACare enrollees and members retiring directly from active service is adjusted to reflect the increasing rate of participation with age, as described in Exhibit L. The health care participation rates were updated and became effective for the December 31, 2016, actuarial valuation based on the results of the 2016 experience analysis. These assumptions are reviewed annually and adjusted as necessary.

Survivors of retirees under the PERA benefit structure electing health care coverage are eligible to receive the subsidy. To anticipate future liabilities driven by these survivors, it is assumed that 70 percent of the current members assumed to elect PERACare coverage will choose a joint and survivor optional payment and thus, their survivors will qualify for the subsidy. This assumption was determined from actual census data and current plan elections of current benefit recipients. This assumption was supported by the results of the 2016 experience analysis and remains in effect as of the current actuarial valuation. The assumed average number of years a covered male spouse is older than a covered female spouse is three years for a male retiree and one year for a female retiree. These assumptions were determined from actual census data and were revised from the previous non-gender specific assumptions used in prior actuarial valuations. The age difference assumptions were based on the results of the 2016 experience analysis and became effective for the December 31, 2016, actuarial valuation.

For eligible inactive members, the current assumption that 25 percent are assumed to elect health care coverage upon commencement of their monthly benefit was supported by the 2016 experience analysis. For spousal participation, actual census data and current plan elections of current benefit recipients were used. Based on the results of the 2016 experience analysis, the assumed percentage of eligible inactive members and future retirees electing coverage for their spouses was reduced from 25 percent to 20 percent for all divisions except the DPS Division, which remains at 15 percent, effective for the December 31, 2016, actuarial valuation.

For eligible inactive members, an average age at which health benefits are to begin must be assumed. Here, the assumed age of initial benefit receipt is determined using the same approach used for terminating active members who are assumed to leave their contributions in the plan in order to be eligible for a pension benefit at their retirement date. This assumption varies from age 50 to age 65 depending on benefit structure and years of service. This approach became effective for the December 31, 2015, actuarial valuation and was supported by the results of the 2016 experience analysis.

## HEALTH CARE TRUST FUNDS—OPEB

Exhibit M shows the assumed plan elections for current and future Medicare-eligible retirees who are not eligible for premium-free Medicare Part A. The assumptions became effective for the December 31, 2015, actuarial valuation and were supported by the results of the 2016 experience analysis. However, these assumptions are reviewed annually and most recently were adjusted effective for the December 31, 2016, actuarial valuation.

For those current PERACare enrollees who are age 65 and older, the premium-free Medicare Part A eligibility status is provided by PERA and is assumed to be maintained in perpetuity. For current PERACare enrollees not yet age 65, estimated to have been hired prior to April 1, 1986, and not assumed eligible for premium-free Medicare Part A coverage through their spouse, and for those active employees hired prior to April 1, 1986, Exhibit N lists the percentage, by estimated age at hire, of PERACare enrollees assumed to not qualify for premium-free Medicare Part A benefits, thus qualifying for the applicable "No Part A" subsidy. These assumptions are reviewed annually and adjusted as necessary. The current assumptions were last revised and effective for the December 31, 2015, actuarial valuation and were supported by the results of the 2016 experience analysis with one exception. Effective for the December 31, 2016, actuarial valuation, the percentage of disability retirees enrolled in PERACare assumed to qualify for the "No Part A" subsidy was increased from 5 percent to 10 percent. Regarding spousal coverage, of the PERACare enrollees assumed to receive the "No Part A" subsidy from the PERA benefit structure, 10 percent are assumed to cover a spouse. This assumption was supported by the 2016 experience analysis and remains in effect as of the current actuarial valuation.

The revised pre- and post-retirement and disability retirement mortality assumptions described in the Division Trust Funds subsection of this Actuarial Section appropriately reflect PERA's recent and anticipated plan experience and are used to estimate the value of expected future subsidy payments. Exhibits A, B, C, D, and E in the Division Trust Funds subsection of this Actuarial Section, list the healthy pre-retirement mortality rates at sample ages and Exhibit I lists the healthy post-retirement mortality rates and values at sample ages.

### **Annual Increase Assumptions**

As the service-based premium subsidy does not increase over time, there is no need for an assumption regarding increasing benefit amounts.

### **Actuarial Studies**

All actuarial studies described in the Division Trust Funds subsection of this Actuarial Section titled, Actuarial Studies, incorporated a review and analysis of actuarial methods and assumptions pertaining to the HCTF and the DPS HCTF.

### **Changes Since Last Actuarial Valuation**

#### **Changes in Actuarial Methods**

There are no changes in actuarial methods reflected in the December 31, 2017, actuarial valuation since the last actuarial valuation as of December 31, 2016.

#### **Changes in Actuarial Assumptions**

In addition to the "Changes in Actuarial Assumptions" noted in the Division Trust Funds subsection of this Actuarial Section, listed below are the actuarial assumption changes incorporated into the December 31, 2017, actuarial valuation specific to the HCTF and the DPS HCTF:

- Initial per capita health care costs for those PERACare enrollees under the PERA benefit structure who are expected to attain age 65 and older ages and are not eligible for premium-free Medicare Part A benefits have been updated to reflect the change in costs for the 2018 plan year.
- The health care cost trend rates for Medicare Part A premiums have been revised to reflect the current expectation of future increases in rates of inflation applicable to Medicare Part A premiums.

#### **Changes in Plan Provisions**

The following changes to contributions and the PERAChoice program have occurred since the last actuarial valuation as of December 31, 2016. Although the changes are expected to affect the actuarial projections related to the Health Care Trust Funds due to an anticipated impact to future plan funding and plan participation, these changes have no effect on the results of the December 31, 2017, actuarial valuation for funding purposes.

Following the 2018 legislative session, Governor Hickenlooper signed into law SB 18-200, which impacts the Health Care Trust Funds by:

- Redefining PERA-includable salary to include:
  - Contributions to IRC Section 125 and 132 plans for new members, effective July 1, 2019, and
  - Compensation for unused sick leave converted to cash payments applicable to all members, effective upon enactment.
- Expanding PERAChoice for new members hired on or after January 1, 2019, applicable to:
  - Certain members of the State Division: Classified college and university employees.
  - All members of the Local Government Division.

#### **Significant Events (Dollars in Thousands)**

The significant events during 2017, recognized in the actuarial valuation as of December 31, 2017, include:

- The enactment of pension reforms, pursuant to SB 18-200, as detailed above.
- The CFPD disaffiliated from the Local Government Division on December 2, 2017, thereby ending participation in the HCTF. For the purpose of the December 31, 2017, actuarial valuation, liabilities were determined assuming no additional service accruals related to possible future premium subsidy benefits for the disaffiliated membership of the CFPD that had not refunded their PERA

member contribution accounts. This resulted in an actuarial loss of \$5. The total disaffiliation payment of \$1,159 was allocated to the Local Government Division Trust Fund and the HCTF in the amount of \$1,063 and \$96, respectively.

### **Differences in Actuarial Valuation Methods and Assumptions**

- The actuarial valuation for funding purposes was performed as of December 31, 2017. The actuarial valuation for accounting and financial reporting purposes was performed as of December 31, 2016, and the total OPEB liability was rolled forward to the measurement date as of December 31, 2017.
- Census data used for the actuarial valuation for funding purposes reflects membership data as of December 31, 2017, and the census data used for the actuarial valuation for accounting and financial reporting purposes reflects membership data as of December 31, 2016. Therefore, all summaries and schedules, regarding actuarial valuation results for funding purposes, shown in the Actuarial Section, reflect census data as of December 31, 2017.
- The actuarial valuation for funding purposes applies an asset valuation method that recognizes a four-year smoothed market value of assets for purposes of determining the UAAL. The actuarial valuation for accounting and financial reporting purposes applies the fair value of assets to determine the net OPEB liability.
- Actuarial assumptions pertaining to initial per capita health care costs and health care trend rates were updated to 2018 for the actuarial valuation for funding purposes. These same assumptions for the actuarial valuation for accounting and financial reporting purposes were applied using the 2017 values and rates, respectively.

## HEALTH CARE TRUST FUNDS—OPEB

## Actuarial Assumptions: Exhibits J–N

The following exhibits (Exhibits J through N) show the actuarial assumptions employed to determine the actuarial valuation results. The basic economic and demographic actuarial assumptions as detailed in Exhibits A through I, in the Division Trust Funds subsection of the Actuarial Section, also were applied, as applicable, for purposes of determining OPEB liabilities.

## Exhibit J: Initial Health Care Costs, Age-Related Morbidity, and Trend Rate Assumptions—PERA Benefit Structure

## INITIAL HEALTH CARE COSTS

(In Actual Dollars)

Plan	Initial Costs for 2018 for Members Without Medicare Part A <sup>1</sup>			Initial Costs for 2017 for Members Without Medicare Part A <sup>2</sup>		
	Monthly Cost	Monthly Premium	Monthly Cost Adjusted to Age 65	Monthly Cost	Monthly Premium	Monthly Cost Adjusted to Age 65
Self-Funded Medicare Supplement Plans	\$736	\$367	\$289	\$725	\$362	\$285
Kaiser Permanente Medicare Advantage HMO	602	236	300	582	231	290
Rocky Mountain Health Plans Medicare HMO	611	251	270	601	236	276
UnitedHealthcare Medicare HMO	686	213	400	686	181	428
2018 Monthly Medicare Part A Premium — \$422						
2017 Monthly Medicare Part A Premium — \$413						

<sup>1</sup> Assumptions used in the actuarial valuation as of December 31, 2017, performed for funding purposes.<sup>2</sup> Assumptions used in the actuarial valuation as of December 31, 2016, performed for accounting and financial reporting purposes.

## AGE-RELATED MORBIDITY ASSUMPTIONS

Participant Age	Annual Increase
65–69	3.0%
70–74	2.5%
75–79	2.0%
80–84	1.0%
85–89	0.5%
90 and older	0.0%

HEALTH CARE COST TREND RATE ASSUMPTIONS<sup>1,2</sup>

Year	PERACare Medicare Plans	Medicare Part A Premiums
2018	5.00%	3.25%
2019	5.00%	3.50%
2020	5.00%	3.75%
2021	5.00%	4.00%
2022	5.00%	4.25%
2023	5.00%	4.50%
2024	5.00%	4.75%
2025+	5.00%	5.00%

HEALTH CARE COST TREND RATE ASSUMPTIONS<sup>1,3</sup>

Year	PERACare Medicare Plans	Medicare Part A Premiums
2017	5.00%	3.00%
2018	5.00%	3.25%
2019	5.00%	3.50%
2020	5.00%	3.75%
2021	5.00%	4.00%
2022	5.00%	4.00%
2023	5.00%	4.25%
2024+	5.00%	4.25%

<sup>1</sup> Applies only to PERACare enrollees who are age 65 or older and who are not eligible for premium-free Medicare Part A.<sup>2</sup> Assumptions used in the actuarial valuation as of December 31, 2017, performed for funding purposes.<sup>3</sup> Assumptions used in the actuarial valuation as of December 31, 2016, performed for accounting and financial reporting purposes.Exhibit K: Additional Premium Subsidy Assumptions—DPS Benefit Structure<sup>1</sup>

Years of Service	Monthly Subsidy for Members Without Medicare Part A	Years of Service	Monthly Subsidy for Members Without Medicare Part A
20+	\$115.00	10	\$57.50
19	109.25	9	51.75
18	103.50	8	46.00
17	97.75	7	40.25
16	92.00	6	34.50
15	86.25	5	28.75
14	80.50	4	23.00
13	74.75	3	17.25
12	69.00	2	11.50
11	63.25	1	5.75

<sup>1</sup> Health care assumptions for future PERACare enrollees who are age 65 or older and who are assumed to not be eligible for premium-free Medicare Part A.

## HEALTH CARE TRUST FUNDS—OPEB

## Exhibit L: Health Care Participation Rate Assumptions

Attained Age(s)	Percent Electing Health Care Coverage		Attained Age(s)	Percent Electing Health Care Coverage	
	Other Divisions	DPS Division		Other Divisions	DPS Division
15 – 48	20%	20%	61	50%	60%
49	25%	25%	62	55%	60%
50	25%	25%	63	55%	60%
51	35%	35%	64	55%	60%
52	35%	35%	65	55%	60%
53	40%	40%	66	55%	60%
54	40%	50%	67	55%	60%
55	40%	50%	68	55%	60%
56	45%	50%	69	55%	60%
57	45%	50%	70	55%	60%
58	50%	55%	71	55%	60%
59	50%	55%	72+	60%	65%
60	50%	55%			

## Exhibit M: Medicare Health Care Plan Election Rate Assumptions

Medicare plan elections for future retirees who are not eligible for premium-free Medicare Part A are assumed as follows:

Medicare Plan	Percent Electing Medicare Plan	
	Other Divisions	DPS Division
Self-Funded Medicare Supplement Plans <sup>1</sup>	60%	40%
Kaiser Permanente Medicare Advantage HMO	25%	35%
Rocky Mountain Health Plans Medicare HMO	10%	5%
UnitedHealthcare Medicare HMO	5%	20%

<sup>1</sup> Eighty (80) percent of those PERACare enrollees participating in the self-funded plans are assumed to elect MS #1, 17 percent MS #2, and 3 percent MS #3.

Medicare plan elections for current, pre-Medicare retirees who are not eligible for premium-free Medicare Part A are assumed as follows:

Medicare Plan	Percent Electing Medicare Plan	
	Pre-Medicare Anthem Plans	Pre-Medicare Kaiser Plans
Self-Funded Medicare Supplement Plans <sup>1</sup>	88%	2%
Kaiser Permanente Medicare Advantage HMO	1%	92%
Rocky Mountain Health Plans Medicare HMO	6%	2%
UnitedHealthcare Medicare HMO	5%	4%

<sup>1</sup> Eighty (80) percent of those PERACare enrollees participating in the self-funded plans are assumed to elect MS #1, 17 percent MS #2, and 3 percent MS #3.

## Exhibit N: Percent Qualifying for “No Part A” Subsidy Assumptions

Hire Age	Percent Qualifying for “No Part A” Subsidy	
	HCTF <sup>1, 2</sup>	DPS HCTF <sup>2</sup>
15 – 24	17%	17%
25 – 29	11%	11%
30+	4%	4%

<sup>1</sup> Ten (10) percent of the PERACare enrollees assumed to qualify for the “No Part A” subsidy from the PERA benefit structure are assumed to cover a spouse.

<sup>2</sup> Ten (10) percent of the PERACare enrollees receiving health care benefits as a result of disability retirement are assumed to qualify for the “No Part A” subsidy. One-hundred (100) percent of eligible inactive (or deferred vested) members enrolled in PERACare are assumed to obtain the 40 or more quarters of Medicare-covered employment required for premium-free Medicare Part A coverage as a result of their subsequent employment.

## HEALTH CARE TRUST FUNDS—OPEB

## Summary of Funding Progress

The PERA funding objective is to pay long-term benefit promises through contributions that remain approximately level from year to year as a percent of covered payroll earned by PERA members. The following information in this section provides an overview of funding progress:

- The solvency test shows the degree to which existing liabilities are funded, including prior history.
- A schedule of funding progress shows the UAAL as a percentage of annual covered payroll, including prior history.
- A schedule detailing actuarial gains and losses, by source, for the current year.
- The scheduled contribution requirements based on the December 31, 2017, actuarial valuation for the period ending December 31, 2019.

Consideration of the plans' current funded ratio, the unfunded liabilities in relation to annual covered payroll, historic trends, including significant gains and losses, and the schedule of future contributions should provide sufficient information to appropriately measure funding progress.

## Solvency Test

The solvency test is one means of checking funding progress. In this test, the plan's actuarial value of assets typically are compared with: (A) member contributions (with interest) on deposit, (B) the liabilities for future benefits to persons who have retired, died or become disabled, and to those who have terminated service with the right to a future benefit, and (C) the liabilities for service already rendered by active members. Since the HCTF and the DPS HCTF are funded only through employer contributions, there are no member contribution accounts (liability A). Each table below and on the next page shows the funded level of the liabilities for future benefits to current retirees (liability B) and the unfunded liabilities associated with service already rendered by active members (liability C).

## SOLVENCY TEST

(Dollars in Thousands)

Valuation Date	Aggregate Accrued Liabilities			Actuarial Value of Plan Assets	Portion of Actuarial Accrued Liabilities Covered by Valuation Assets		
	Active Member Contributions (A)	Retirees, Beneficiaries, and Inactive Members (B)	Employer-Financed Portion of Active Members (C)		Liability (A)	Liability (B)	Liability (C)
<b>HCTF</b>							
12/31/2008	N/A	\$969,288	\$399,345	\$255,976	N/A	26.4%	0.0%
12/31/2009	N/A	1,241,349	521,892	260,341	N/A	21.0%	0.0%
12/31/2010	N/A	1,179,809	463,184	288,193	N/A	24.4%	0.0%
12/31/2011	N/A	1,251,579	459,211	282,228	N/A	22.5%	0.0%
12/31/2012	N/A	1,259,557	463,938	285,097	N/A	22.6%	0.0%
12/31/2013	N/A	1,092,438	464,968	293,556	N/A	26.9%	0.0%
12/31/2014	N/A	1,085,995	448,466	297,377	N/A	27.4%	0.0%
12/31/2015	N/A	1,099,045	457,224	285,588	N/A	26.0%	0.0%
12/31/2016	N/A	1,153,015	403,747	270,150	N/A	23.4%	0.0%
<b>12/31/2017</b>	<b>N/A</b>	<b>1,178,160</b>	<b>403,062</b>	<b>260,282</b>	<b>N/A</b>	<b>22.1%</b>	<b>0.0%</b>
<b>DPS HCTF<sup>1</sup></b>							
12/31/2010	N/A	\$58,432	\$20,081	\$14,086	N/A	24.1%	0.0%
12/31/2011	N/A	57,093	20,382	14,448	N/A	25.3%	0.0%
12/31/2012	N/A	54,727	22,942	14,443	N/A	26.4%	0.0%
12/31/2013	N/A	52,106	24,530	15,482	N/A	29.7%	0.0%
12/31/2014	N/A	50,998	25,028	16,502	N/A	32.4%	0.0%
12/31/2015	N/A	49,891	25,006	17,557	N/A	35.2%	0.0%
12/31/2016	N/A	51,357	21,488	18,945	N/A	36.9%	0.0%
<b>12/31/2017</b>	<b>N/A</b>	<b>50,796</b>	<b>19,496</b>	<b>21,117</b>	<b>N/A</b>	<b>41.6%</b>	<b>0.0%</b>

Please see page 195 for footnote references.

## HEALTH CARE TRUST FUNDS—OPEB

## SOLVENCY TEST (CONTINUED)

(Dollars in Thousands)

Valuation Date	Aggregate Accrued Liabilities			Actuarial Value of Plan Assets	Portion of Actuarial Accrued Liabilities Covered by Valuation Assets		
	Active Member Contributions (A)	Retirees, Beneficiaries, and Inactive Members (B)	Employer-Financed Portion of Active Members (C)		Liability (A)	Liability (B)	Liability (C)
<b>Total of Health Care Trust Funds<sup>2,3</sup></b>							
12/31/2008	N/A	\$969,288	\$399,345	\$255,976	N/A	26.4%	0.0%
12/31/2009	N/A	1,241,349	521,892	260,341	N/A	21.0%	0.0%
12/31/2010	N/A	1,238,241	483,265	302,279	N/A	24.4%	0.0%
12/31/2011	N/A	1,308,672	479,593	296,676	N/A	22.7%	0.0%
12/31/2012	N/A	1,314,284	486,880	299,540	N/A	22.8%	0.0%
12/31/2013	N/A	1,144,544	489,498	309,038	N/A	27.0%	0.0%
12/31/2014	N/A	1,136,993	473,494	313,879	N/A	27.6%	0.0%
12/31/2015	N/A	1,148,936	482,230	303,145	N/A	26.4%	0.0%
12/31/2016	N/A	1,204,372	425,235	289,095	N/A	24.0%	0.0%
<b>12/31/2017</b>	<b>N/A</b>	<b>1,228,956</b>	<b>422,558</b>	<b>281,399</b>	<b>N/A</b>	<b>22.9%</b>	<b>0.0%</b>

<sup>1</sup> The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.<sup>2</sup> Results prior to December 31, 2010, do not include the DPS HCTF.<sup>3</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

## HEALTH CARE TRUST FUNDS—OPEB

## Unfunded Actuarial Accrued Liability

UAALs are the difference between actuarially calculated liabilities for service already rendered and the valuation assets of the fund.

It is natural for unfunded liabilities to exist in a defined benefit OPEB plan.

The following factors resulted in higher liabilities (or losses) during 2017:

- Lower investment returns than assumed in 2014, 2015, and 2016.
- More members retired at earlier ages than expected.
- More service and disability retirements were experienced than expected.
- Fewer members terminated PERA-covered employment and withdrew their accounts than expected.
- More survivor benefits were granted than anticipated.

- New PERA members had some service resulting in accrued liabilities.
- Actual payroll contributions were less than the determined ADC for the HCTF.
- Unfavorable claims experience.

The following factors resulted in lower liabilities (or gains) during 2017:

- Higher investment return than assumed in 2017.
- Retirees experienced shorter lifespans than expected.
- Favorable benefit utilization.
- Actual payroll contributions were greater than the determined ADC for the DPS HCTF.

## SCHEDULE OF FUNDING PROGRESS

(Dollars in Thousands)

(A) Valuation Date	(B) Actuarial Value of Plan Assets	(C) Actuarial Accrued Liabilities	(D) Unfunded Actuarial Accrued Liabilities (UAAL) (C)–(B)	(E) Funded Ratio (B)/(C)	(F) Annual Covered Payroll	(G) UAAL As a % of Covered Payroll (D)/(F)
<b>HCTF</b>						
12/31/2008	\$255,976	\$1,368,633	\$1,112,657	18.7%	\$6,931,405	16.1%
12/31/2009	260,341	1,763,241	1,502,900	14.8%	7,048,992	21.3%
12/31/2010	288,193	1,642,993	1,354,800	17.5%	7,035,419	19.3%
12/31/2011	282,228	1,710,790	1,428,562	16.5%	6,972,596	20.5%
12/31/2012	285,097	1,723,495	1,438,398	16.5%	6,766,713	21.3%
12/31/2013	293,556	1,557,406	1,263,850	18.8%	6,982,560	18.1%
12/31/2014	297,377	1,534,461	1,237,084	19.4%	7,211,351	17.2%
12/31/2015	285,588	1,556,269	1,270,681	18.4%	7,485,545	17.0%
12/31/2016	270,150	1,556,762	1,286,612	17.4%	7,716,894	16.7%
12/31/2017	260,282	1,581,222	1,320,940	16.5%	7,927,280	16.7%
<b>DPS HCTF<sup>1</sup></b>						
12/31/2010	\$14,086	\$78,513	\$64,427	17.9%	\$470,774	13.7%
12/31/2011	14,448	77,475	63,027	18.6%	491,646	12.8%
12/31/2012	14,443	77,669	63,226	18.6%	510,872	12.4%
12/31/2013	15,482	76,636	61,154	20.2%	547,660	11.2%
12/31/2014	16,502	76,026	59,524	21.7%	584,319	10.2%
12/31/2015	17,557	74,897	57,340	23.4%	621,115	9.2%
12/31/2016	18,945	72,845	53,900	26.0%	642,177	8.4%
12/31/2017	21,117	70,292	49,175	30.0%	658,198	7.5%
<b>Total of Health Care Trust Funds<sup>2, 3</sup></b>						
12/31/2008	\$255,976	\$1,368,633	\$1,112,657	18.7%	\$6,931,405	16.1%
12/31/2009	260,341	1,763,241	1,502,900	14.8%	7,048,992	21.3%
12/31/2010	302,279	1,721,506	1,419,227	17.6%	7,506,193	18.9%
12/31/2011	296,676	1,788,265	1,491,589	16.6%	7,464,242	20.0%
12/31/2012	299,540	1,801,164	1,501,624	16.6%	7,277,585	20.6%
12/31/2013	309,038	1,634,042	1,325,004	18.9%	7,530,220	17.6%
12/31/2014	313,879	1,610,487	1,296,608	19.5%	7,795,670	16.6%
12/31/2015	303,145	1,631,166	1,328,021	18.6%	8,106,660	16.4%
12/31/2016	289,095	1,629,607	1,340,512	17.7%	8,359,071	16.0%
12/31/2017	281,399	1,651,514	1,370,115	17.0%	8,585,478	16.0%

<sup>1</sup> The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

<sup>2</sup> Results prior to December 31, 2010, do not include the DPS HCTF.

<sup>3</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Note: A history of contributions by Health Care Trust Fund, the ADC compared to the actual employer contributions paid, including the deficiency (or excess), for each of the last ten years, is shown in the Schedule of Employer Contributions, found on pages 117–118 in the RSI in the Financial Section.

## HEALTH CARE TRUST FUNDS—OPEB

## Actuarial Gains and Losses

## ANALYSIS OF FINANCIAL EXPERIENCE

(Dollars in Millions)

	HCTF	DPS HCTF
<b>Amounts</b>		
From differences between assumed and actual experience on liabilities		
Age and service retirements <sup>1</sup>	\$2.2	\$0.1
Disability retirements <sup>2</sup>	0.2	0.0
Deaths <sup>3</sup>	(0.1)	(0.1)
Withdrawals <sup>4</sup>	3.0	0.0
New members <sup>5</sup>	2.3	0.2
Other <sup>6</sup>	(13.9)	(4.0)
Subtotal	(6.3)	(3.8)
From differences between assumed and actual experience on assets		
(0.6)	(0.1)	
From change in plan assumptions	21.6	1.0
From change in actuarial methods	—	—
From change in plan provisions	—	—
<b>Total actuarial (gains)/losses on 2017 activities</b>	<b>\$14.7</b>	<b>(\$2.9)</b>
<b>Total actuarial (gains)/losses on 2016 activities</b>	<b>(\$5.6)</b>	<b>(\$2.1)</b>

<sup>1</sup> Age and service retirements: If members retire at older ages than assumed, there is a gain. If members retire at younger ages than assumed, there is a loss.<sup>2</sup> Disability retirements: If disability claims are lower than assumed, there is a gain. If disability claims are higher than assumed, there is a loss.<sup>3</sup> Deaths: If survivor claims are lower than assumed, there is a gain. If survivor claims are higher than assumed, there is a loss. If retirees die sooner than assumed, there is a gain. If retirees live longer than assumed, there is a loss.<sup>4</sup> Withdrawal from employment: If more members terminate and more liabilities are released by withdrawals than assumed, there is a gain. If fewer liabilities are released by terminations than assumed, there is a loss.<sup>5</sup> New members: If new members entering the plan have prior service, there is a loss.<sup>6</sup> Other: Miscellaneous gains and losses result from purchased service transfers, claims experience, benefit utilization, changes in the actuary's valuation software, data adjustments, timing of financial transactions, etc.

## Actuarial Valuation Results

Contribution rates for the year ending December 31, 2019, are derived from the results of the December 31, 2017, annual actuarial valuation and are determined in advance for purposes of budgeting and consideration of any necessary legislative action.

## SCHEDULE OF COMPUTED EMPLOYER CONTRIBUTION RATES FOR THE 2019 FISCAL YEAR

	Expressed as a Percentage of Member Payroll	
	HCTF	DPS HCTF
<b>Contributions</b>		
Service retirement benefits	0.18%	0.17%
Disability retirement benefits	0.01%	0.01%
Survivor benefits	0.00%	0.00%
Separation benefits	0.04%	0.03%
Total normal cost	0.23%	0.21%
Less member contributions	(0.00%)	(0.00%)
<b>Employer normal cost</b>	<b>0.23%</b>	<b>0.21%</b>
Percentage available to amortize unfunded actuarial accrued liabilities	0.79%	0.81%
Amortization period	37 years	11 years
<b>Total employer contribution rate for actuarially funded benefits</b>	<b>1.11%</b>	<b>0.60%</b>

## HEALTH CARE TRUST FUNDS—OPEB

*Annual Actuarial Valuation Statistics*

As of December 31, 2017, the Funded Ratio, the UAAL, the ADC for 2019 as a percentage of covered payroll, and the amortization period are shown in the following table. The results in this table are based on the actuarial valuation for funding purposes.

**ACTUARIAL STATISTICS***(Dollars in Thousands)*

Trust Fund	Funded Ratio	UAAL	ADC <sup>1</sup>	Amortization Period
HCTF	16.5%	\$1,320,940	1.11%	37 Years
DPS HCTF	30.0%	49,175	0.60%	11 Years
<b>Total of Health Care Trust Funds<sup>2</sup></b>		<b>\$1,370,115</b>		

<sup>1</sup> Determined considering the 30-year target amortization period defined in the OPEB funding policy for purposes of funding benchmarks and RSI reporting as shown in the Financial Section.

<sup>2</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**Funded Ratio***(Dollars in Thousands)*

The funded ratio for the plan is determined by dividing the actuarial value of assets by the AAL. The actuarial value of assets is not the current market value but a market-related value, which recognizes the differences between actual and expected investment experience for each year in equal amounts over a four-year period. The actuarial value of the assets as of December 31, 2017, was \$281,399 compared to a market value of assets of \$298,530, and to the AAL of \$1,651,514. The funded ratio for each of the funds, based on the actuarial value of assets, at December 31 for each of the last five years is shown below.

Trust Fund	2013	2014	2015	2016	2017
HCTF	18.8%	19.4%	18.4%	17.4%	16.5%
DPS HCTF	20.2%	21.7%	23.4%	26.0%	30.0%
<b>Total of Health Care Trust Funds<sup>1</sup></b>	<b>18.9%</b>	<b>19.5%</b>	<b>18.6%</b>	<b>17.7%</b>	<b>17.0%</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

The Board's OPEB funding policy states that the targeted actuarial funded ratio is greater than or equal to 110 percent on a combined trust fund basis. The funded ratios listed above give an indication of progress made toward achieving the stated objective. A larger funded ratio indicates that a plan is better funded. As an example, for every \$1.00 of the actuarially determined benefits earned for the HCTF as of December 31, 2017, approximately \$0.16 of assets are available for payment based on the actuarial value of assets. These benefits earned will be payable over a period dependent upon factors, such as, the life span of members after their retirement and participation in PERACare. Therefore, it is not imperative that the AAL equal the actuarial value of assets at any given moment in time.

At December 31, 2017, and December 31, 2016, PERA had the following funded status for Health Care Trust Funds as shown on the next page.

## HEALTH CARE TRUST FUNDS—OPEB

## FUNDED STATUS FOR THE HEALTH CARE TRUST FUNDS

(Dollars in Thousands)

	Market Value of Assets <sup>1</sup>		Actuarial Value of Assets <sup>2</sup>	
	12/31/2016	12/31/2017	12/31/2016	12/31/2017
<b>Health Care Trust Fund</b>				
Actuarial accrued liability <sup>3</sup>	\$1,556,762	\$1,581,222	\$1,556,762	\$1,581,222
Assets held to pay those liabilities	260,228	276,222	270,150	260,282
<b>Unfunded actuarial accrued liability</b>	<b>\$1,296,534</b>	<b>\$1,305,000</b>	<b>\$1,286,612</b>	<b>\$1,320,940</b>
Funded ratio	16.7%	17.5%	17.4%	16.5%
<b>DPS Health Care Trust Fund</b>				
Actuarial accrued liability <sup>3</sup>	\$72,845	\$70,292	\$72,845	\$70,292
Assets held to pay those liabilities	18,337	22,308	18,945	21,117
<b>Unfunded actuarial accrued liability</b>	<b>\$54,508</b>	<b>\$47,984</b>	<b>\$53,900</b>	<b>\$49,175</b>
Funded ratio	25.2%	31.7%	26.0%	30.0%
<b>Total of Health Care Trust Funds<sup>4</sup></b>				
Actuarial accrued liability <sup>3</sup>	\$1,629,607	\$1,651,514	\$1,629,607	\$1,651,514
Assets held to pay those liabilities	278,565	298,530	289,095	281,399
<b>Unfunded actuarial accrued liability<sup>5</sup></b>	<b>\$1,351,042</b>	<b>\$1,352,984</b>	<b>\$1,340,512</b>	<b>\$1,370,115</b>
Funded ratio	17.1%	18.1%	17.7%	17.0%

<sup>1</sup> The market value of assets is the fair value of the investments.<sup>2</sup> The actuarial value of assets is calculated by spreading any market gains or losses above or below the assumed rate of return over four years.<sup>3</sup> Based upon an assumed rate of return on investments of 7.25 percent and an assumed rate of 7.25 percent to discount the liabilities to be paid in the future to a value as of December 31, 2016, and December 31, 2017.<sup>4</sup> The data in this table is aggregated for information purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.<sup>5</sup> In aggregate, the market value of the assets as of December 31, 2017, is \$17,131 greater than the actuarial value of assets calculated by the actuaries, as they are recognizing the gains and losses in value over four years, rather than only in the year they occurred. The remaining gains and (losses) to be smoothed for 2015 are (\$4,500), for 2016 are (\$217), and for 2017 are \$21,848.

## HEALTH CARE TRUST FUNDS—OPEB

**Sensitivity of Actuarial Valuation to Changes in Assumed Investment Rate of Return and Discount Rate**

The most important long-term driver of an OPEB plan is investment income. The investment return assumption and the discount rate for liabilities should be based on an estimated long-term investment yield for the plan, considering the nature and mix of current and expected plan investments and the basis used to determine the actuarial value of assets.

To understand the importance of the investment rate of return, which is used to discount the actuarial liabilities, a one and one-half, and one-half percent fluctuation in the investment rate of return and discount rate would change the funded ratio, UAAL, and ADC (for contributions for the fiscal year ended December 31, 2019) as shown on the tables below and on the next page.

**INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 5.75 PERCENT**

(Dollars in Thousands)

Trust Fund	Actuarial Value of Assets			Market Value of Assets UAAL
	Funded Ratio	UAAL	ADC	
HCTF	14.0%	\$1,582,778	1.20%	\$1,564,074
DPS HCTF	25.9%	59,901	0.69%	58,501
<b>Total of Health Care Trust Funds<sup>1</sup></b>		<b>\$1,642,679</b>		<b>\$1,622,575</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 6.75 PERCENT**

(Dollars in Thousands)

Trust Fund	Actuarial Value of Assets			Market Value of Assets UAAL
	Funded Ratio	UAAL	ADC	
HCTF	15.6%	\$1,401,169	1.14%	\$1,384,307
DPS HCTF	28.6%	52,472	0.61%	51,212
<b>Total of Health Care Trust Funds<sup>1</sup></b>		<b>\$1,453,641</b>		<b>\$1,435,519</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**CURRENT INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 7.25 PERCENT**

(Dollars in Thousands)

Trust Fund	Actuarial Value of Assets			Market Value of Assets UAAL
	Funded Ratio	UAAL	ADC	
HCTF	16.5%	\$1,320,940	1.11%	\$1,305,000
DPS HCTF	30.0%	49,175	0.60%	47,984
<b>Total of Health Care Trust Funds<sup>1</sup></b>		<b>\$1,370,115</b>		<b>\$1,352,984</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

## HEALTH CARE TRUST FUNDS—OPEB

**INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 7.75 PERCENT***(Dollars in Thousands)*

Trust Fund	Actuarial Value of Assets			Market Value of Assets UAAL
	Funded Ratio	UAAL	ADC	
HCTF	17.3%	\$1,246,838	1.08%	\$1,231,820
DPS HCTF	31.5%	46,121	0.57%	45,000
<b>Total of Health Care Trust Funds<sup>1</sup></b>		<b>\$1,292,959</b>		<b>\$1,276,820</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

**INVESTMENT RETURN ASSUMPTION (DISCOUNT RATE) EQUAL TO 8.75 PERCENT***(Dollars in Thousands)*

Trust Fund	Actuarial Value of Assets			Market Value of Assets UAAL
	Funded Ratio	UAAL	ADC	
HCTF	19.1%	\$1,114,709	1.04%	\$1,101,533
DPS HCTF	34.4%	40,648	0.53%	39,668
<b>Total of Health Care Trust Funds<sup>1</sup></b>		<b>\$1,155,357</b>		<b>\$1,141,201</b>

<sup>1</sup> The data in this table is aggregated for informational purposes. The assets of each trust fund are for the sole purpose of its members and cannot be used by another fund.

Note: The time-weighted, net-of-fees annualized rate of return for the pooled investment assets was 9.5 percent for the past five years and 6.0 percent for the past 10 years. The 35-year annualized gross-of-fees rate of return for the pooled investment assets was 9.5 percent.

## HEALTH CARE TRUST FUNDS—OPEB

## Plan Data

Benefit recipients and members of PERA consisted of the following as of December 31, 2017:

## MEMBERSHIP—HEALTH CARE TRUST FUNDS

	HCTF	DPS HCTF	2017
Retirees and beneficiaries	111,436	7,044	118,480
Terminated employees eligible but not yet receiving benefits	25,977	1,596	27,573
Inactive members not eligible for benefits	219,329	10,919	230,248
Active members	191,778	15,991	207,769
<b>Total</b>	<b>548,520</b>	<b>35,550</b>	<b>584,070</b>

## PARTICIPATION IN THE HEALTH CARE PLANS FOR RETIREES AND SURVIVORS CURRENTLY RECEIVING RETIREMENT BENEFITS

	HCTF	DPS HCTF	Total
<b>Enrolled in PERACare</b>			
Under age 65	12,470	526	12,996
Age 65 and older	44,004	3,290	47,294
	56,474	3,816	60,290
<b>Not enrolled in PERACare</b>			
Under age 65	14,848	604	15,452
Age 65 and older	40,114	2,624	42,738
	54,962	3,228	58,190
<b>Total retirees and survivors currently receiving benefits</b>	<b>111,436</b>	<b>7,044</b>	<b>118,480</b>

## HEALTH CARE TRUST FUNDS—OPEB

## SCHEDULE OF RETIREES, BENEFICIARIES, AND SURVIVORS ADDED TO AND REMOVED FROM THE BENEFIT PAYROLL

(In Actual Dollars)

Valuation Date	No.	Added to Payroll Annual Benefits	No.	Removed from Payroll Annual Benefits	No.	Payroll—End of Year Annual Benefits	Average Annual Benefits	Increase in Average Benefits
<b>HCTF<sup>1</sup></b>								
12/31/2008					44,885	\$78,323,211	\$1,745	—
12/31/2009	3,435	\$7,886,217	1,582	\$2,442,462	46,738	81,765,552	1,749	0.2%
12/31/2010	3,633	8,290,281	1,653	2,623,104	48,718	85,247,016	1,750	0.1%
12/31/2011	3,399	7,638,162	1,900	2,999,430	50,217	86,755,011	1,728	(1.3%)
12/31/2012	3,489	7,844,610	2,040	3,548,532	51,666	90,123,660	1,744	0.9%
12/31/2013	3,256	7,098,720	1,881	3,383,139	53,041	91,009,965	1,716	(1.6%)
12/31/2014	3,231	6,954,234	2,196	3,945,282	54,076	91,222,002	1,687	(1.7%)
12/31/2015	3,271	6,998,325	2,255	3,920,028	55,092	91,545,543	1,662	(1.5%)
12/31/2016	3,217	6,921,114	2,520	4,463,334	55,789	91,567,554	1,641	(1.3%)
12/31/2017	3,352	7,255,971	2,667	7,153,713	56,474	91,669,812	1,623	(1.1%)
<b>DPS HCTF<sup>1, 2</sup></b>								
12/31/2010	3,944	\$6,446,394	—	\$—	3,944	\$6,446,394	\$1,634	—
12/31/2011	203	411,792	189	292,905	3,958	6,296,871	1,591	(2.6%)
12/31/2012	168	340,929	165	258,957	3,961	6,086,352	1,537	(3.4%)
12/31/2013	198	428,532	164	241,845	3,995	6,098,082	1,526	(0.7%)
12/31/2014	184	368,943	217	346,587	3,962	5,961,324	1,505	(1.4%)
12/31/2015	174	360,111	206	330,648	3,930	5,829,741	1,483	(1.5%)
12/31/2016	156	322,230	201	302,220	3,885	5,703,954	1,468	(1.0%)
12/31/2017	149	325,128	218	445,188	3,816	5,583,894	1,463	(0.3%)
<b>Total of Health Care Trust Funds<sup>1, 3</sup></b>								
12/31/2008					44,885	\$78,323,211	\$1,745	—
12/31/2009	3,435	\$7,886,217	1,582	\$2,442,462	46,738	81,765,552	1,749	0.2%
12/31/2010	7,577 <sup>4</sup>	14,736,675	1,653	2,623,104	52,662 <sup>4</sup>	91,693,410	1,741	(0.5%)
12/31/2011	3,602	8,049,954	2,089	3,292,335	54,175	93,051,882	1,718	(1.3%)
12/31/2012	3,657	8,185,539	2,205	3,807,489	55,627	96,210,012	1,730	0.7%
12/31/2013	3,454	7,527,252	2,045	3,624,984	57,036	97,108,047	1,703	(1.6%)
12/31/2014	3,415	7,323,177	2,413	4,291,869	58,038	97,183,326	1,674	(1.7%)
12/31/2015	3,445	7,358,436	2,461	4,250,676	59,022	97,375,284	1,650	(1.4%)
12/31/2016	3,373	7,243,344	2,721	4,765,554	59,674	97,271,508	1,630	(1.2%)
12/31/2017	3,501	7,581,099	2,885	7,598,901	60,290	97,253,706	1,613	(1.0%)

<sup>1</sup> The annual benefit is based upon creditable service and varies by attained age. Results do not include benefits valued for "No Part A" benefits or RDS subsidies prior to December 31, 2013.

<sup>2</sup> The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

<sup>3</sup> Data prior to 2010 does not include the DPS HCTF.

<sup>4</sup> Includes the addition of 3,944 beneficiaries due to the DPSRS merger.

## HEALTH CARE TRUST FUNDS—OPEB

## SCHEDULE OF ACTIVE MEMBER ACTUARIAL VALUATION DATA

As of December 31

(In Actual Dollars)

Year	Number of Participating Employers <sup>1</sup>	Number of Active Members	Annual Payroll for Active Members	Average Annual Pay for Active Members	% Increase (Decrease) in Average Annual Pay
<b>HCTF</b>					
2008	413	190,684	\$6,931,404,440	\$36,350	—
2009	411	190,206	7,048,991,770	37,060	1.95%
2010	489 <sup>2</sup>	187,924	7,035,419,174	37,438	1.02%
2011	496 <sup>2</sup>	186,170	6,972,597,196	37,453	0.04%
2012	500 <sup>2</sup>	182,524	6,766,713,013	37,073	(1.01%)
2013	516 <sup>2</sup>	185,367	6,982,560,466	37,669	1.61%
2014	531 <sup>2</sup>	187,336	7,211,350,491	38,494	2.19%
2015	534 <sup>2</sup>	188,040	7,485,544,867	39,808	3.41%
2016	542 <sup>2</sup>	190,741	7,716,892,488	40,457	1.63%
<b>2017</b>	<b>408</b>	<b>191,778<sup>3</sup></b>	<b>7,927,279,994</b>	<b>41,336</b>	<b>2.17%</b>
<b>DPS HCTF<sup>4</sup></b>					
2010	28 <sup>2</sup>	13,171	\$470,773,746	\$35,743	—
2011	27 <sup>2</sup>	13,571	491,646,251	36,228	1.36%
2012	29 <sup>2</sup>	13,911	510,872,366	36,724	1.37%
2013	31 <sup>2</sup>	14,816	547,659,912	36,964	0.65%
2014	34 <sup>2</sup>	15,414	584,319,269	37,908	2.55%
2015	38 <sup>2</sup>	15,929	621,114,573	38,993	2.86%
2016	42 <sup>2</sup>	15,950	642,177,158	40,262	3.25%
<b>2017</b>	<b>1</b>	<b>15,991<sup>5</sup></b>	<b>658,198,306</b>	<b>41,161</b>	<b>2.23%</b>
<b>Total of Health Care Trust Funds<sup>6</sup></b>					
2008	413	190,684	\$6,931,404,440	\$36,350	—
2009	411	190,206	7,048,991,770	37,060	1.95%
2010	517 <sup>2</sup>	201,095	7,506,192,920	37,327	0.72%
2011	523 <sup>2</sup>	199,741	7,464,243,447	37,370	0.12%
2012	529 <sup>2</sup>	196,435	7,277,585,379	37,048	(0.86%)
2013	547 <sup>2</sup>	200,183	7,530,220,378	37,617	1.54%
2014	565 <sup>2</sup>	202,750	7,795,669,760	38,450	2.21%
2015	572 <sup>2</sup>	203,969	8,106,659,440	39,745	3.37%
2016	584 <sup>2</sup>	206,691	8,359,069,646	40,442	1.75%
<b>2017</b>	<b>409</b>	<b>207,769<sup>7</sup></b>	<b>8,585,478,300</b>	<b>41,322</b>	<b>2.18%</b>

<sup>1</sup> Prior to 2017, employer counts were based on separate units of government. Beginning in 2017, new guidance under GASB 74 classifies a primary government and its component units as one employer. The 2017 employer count is presented for purposes of complying with GASB 74 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

<sup>2</sup> Includes charter schools operating within the School and DPS Divisions.

<sup>3</sup> As of December 31, 2017, 8,284 active members in the HCTF were Medicare-eligible. This information for prior years was not required.

<sup>4</sup> The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

<sup>5</sup> As of December 31, 2017, 498 active members in the DPS HCTF were Medicare-eligible. This information for prior years was not required.

<sup>6</sup> Data prior to 2010 does not include the DPS HCTF.

<sup>7</sup> As of December 31, 2017, a total of 8,782 active members in the HCTF and DPS HCTF were Medicare-eligible. This information for prior years was not required.



# STATISTICAL SECTION



# Statistical Section

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The Statistical Section presents detailed information that assists users in utilizing the basic financial statements, notes to basic financial statements, and required supplementary information to assess the economic condition of PERA.

## Overview

### Financial Trends

The following schedules show trend information about the changes and growth in PERA's fiduciary net position over the past 10 years:

- *Changes in Fiduciary Net Position*
- *Benefits and Refund Deductions From Fiduciary Net Position by Type*

### Operating Information

The following schedules contain information related to the services that PERA provides and the activities it performs:

- *Member and Benefit Recipient Statistics*<sup>1</sup>
- *Breakdown of Membership by Percentage*<sup>1</sup>
- *Schedule of Average Retirement Benefits Payable—All Division Trust Funds*<sup>1</sup>
- *Schedule of Average Retirement Benefits Payable*<sup>1</sup>
- *Colorado PERA Benefit Payments—All Division Trust Funds*<sup>1</sup>
- *Schedule of Retirees and Survivors by Types of Benefits*<sup>1</sup>
- *Schedule of Average Benefit Payments*<sup>1</sup>
- *Schedule of Contribution Rate History*
- *Principal Participating Employers*
- *Schedule of Affiliated Employers*

Note: Schedules and information are derived from PERA internal sources unless otherwise noted.

<sup>1</sup> Schedules and data are provided by the consulting actuary, Cavanaugh Macdonald Consulting, LLC.

## CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

### State Division Trust Fund

	2008	2009	2010	2011	2012
<b>Additions</b>					
Employer contributions <sup>1</sup>	\$270,353	\$297,240	\$287,624	\$283,222	\$335,073
Member contributions <sup>1</sup>	191,481	194,168	223,240	258,678	227,058
Purchased service	13,315	8,830	12,496	11,277	16,358
Investment income (loss)	(3,745,843)	1,742,571	1,553,142	232,669	1,511,244
Other	7	3	1	331	150
<b>Total additions</b>	<b>(3,270,687)</b>	<b>2,242,812</b>	<b>2,076,503</b>	<b>786,177</b>	<b>2,089,883</b>
<b>Deductions</b>					
Benefit payments	999,279	1,071,725	1,122,435	1,174,707	1,231,922
Refunds	56,716	58,416	68,844	70,090	69,221
Disability insurance premiums	1,794	2,004	1,661	1,685	1,570
Administrative expenses	8,639	8,729	8,942	8,685	8,568
Other	6,613	(1,519)	(726)	(4,546)	3,911
<b>Total deductions</b>	<b>1,073,041</b>	<b>1,139,355</b>	<b>1,201,156</b>	<b>1,250,621</b>	<b>1,315,192</b>
<b>Change in fiduciary net position</b>	<b>(4,343,728)</b>	<b>1,103,457</b>	<b>875,347</b>	<b>(464,444)</b>	<b>774,691</b>
<b>Fiduciary net position held at beginning of year</b>	<b>14,852,029</b>	<b>10,508,301</b>	<b>11,611,758</b>	<b>12,487,105</b>	<b>12,022,661</b>
<b>Fiduciary net position held at end of year</b>	<b>\$10,508,301</b>	<b>\$11,611,758</b>	<b>\$12,487,105</b>	<b>\$12,022,661</b>	<b>\$12,797,352</b>
	2013	2014	2015	2016	2017
<b>Additions</b>					
Employer contributions <sup>1</sup>	\$401,658	\$444,372	\$484,005	\$521,804	\$563,977
Member contributions <sup>1</sup>	202,799	211,610	217,980	223,005	228,978
Purchased service	22,241	22,446	26,946	24,528	27,442
Investment income	1,931,658	780,762	210,337	947,981	2,391,683
Other	4,869	3,289	5,023	8,708	15,860
<b>Total additions</b>	<b>2,563,225</b>	<b>1,462,479</b>	<b>944,291</b>	<b>1,726,026</b>	<b>3,227,940</b>
<b>Deductions</b>					
Benefit payments	1,295,780	1,352,293	1,417,862	1,483,828	1,554,290
Refunds	68,735	61,152	63,567	60,137	58,696
Disability insurance premiums	2,229	2,309	2,088	2,106	2,035
Administrative expenses	9,780	10,067	10,779	11,271	11,745
Other	3,593	3,171	3,406	3,040	3,652
<b>Total deductions</b>	<b>1,380,117</b>	<b>1,428,992</b>	<b>1,497,702</b>	<b>1,560,382</b>	<b>1,630,418</b>
<b>Change in fiduciary net position</b>	<b>1,183,108</b>	<b>33,487</b>	<b>(553,411)</b>	<b>165,644</b>	<b>1,597,522</b>
<b>Fiduciary net position held at beginning of year</b>	<b>12,797,352</b>	<b>13,980,460</b>	<b>14,013,947</b>	<b>13,460,536</b>	<b>13,626,180</b>
<b>Fiduciary net position held at end of year</b>	<b>\$13,980,460</b>	<b>\$14,013,947</b>	<b>\$13,460,536</b>	<b>\$13,626,180</b>	<b>\$15,223,702</b>

<sup>1</sup> Employer and member contribution rate history is shown on pages 239–244.

**CHANGES IN FIDUCIARY NET POSITION**

For the Years Ended December 31

(*Dollars in Thousands*)

**School Division Trust Fund**

	2008	2009	2010	2011	2012
<b>Additions</b>					
Employer contributions <sup>1</sup>	\$430,215	\$480,239	\$519,044	\$541,962	\$573,586
Member contributions <sup>1</sup>	304,686	314,571	316,446	315,958	313,923
Purchased service	15,020	10,152	13,096	14,465	17,406
Investment income (loss)	(5,842,787)	2,741,797	2,469,517	370,045	2,434,176
Other	19	12	25	544	246
<b>Total additions</b>	<b>(5,092,847)</b>	<b>3,546,771</b>	<b>3,318,128</b>	<b>1,242,974</b>	<b>3,339,337</b>
<b>Deductions</b>					
Benefit payments	1,449,907	1,563,315	1,642,350	1,731,348	1,832,643
Refunds	65,659	70,910	79,012	78,543	77,154
Disability insurance premiums	2,886	3,186	2,802	2,619	2,522
Administrative expenses	12,815	13,226	17,104	16,322	16,086
Other	3,272	9,121	9,396	9,839	9,157
<b>Total deductions</b>	<b>1,534,539</b>	<b>1,659,758</b>	<b>1,750,664</b>	<b>1,838,671</b>	<b>1,937,562</b>
<b>Change in fiduciary net position</b>	<b>(6,627,386)</b>	<b>1,887,013</b>	<b>1,567,464</b>	<b>(595,697)</b>	<b>1,401,775</b>
<b>Fiduciary net position held at beginning of year</b>	<b>23,043,186</b>	<b>16,415,800</b>	<b>18,302,813</b>	<b>19,870,277</b>	<b>19,274,580</b>
<b>Fiduciary net position held at end of year</b>	<b>\$16,415,800</b>	<b>\$18,302,813</b>	<b>\$19,870,277</b>	<b>\$19,274,580</b>	<b>\$20,676,355</b>
	2013	2014	2015	2016	2017
<b>Additions</b>					
Employer contributions <sup>1</sup>	\$624,784	\$686,323	\$754,182	\$812,740	\$857,740
Member contributions <sup>1</sup>	322,217	334,585	348,537	359,059	368,740
Purchased service	19,285	21,935	23,841	27,422	30,313
Investment income	3,136,269	1,274,862	344,000	1,569,026	3,982,275
Other	139	112	96	109	106
<b>Total additions</b>	<b>4,102,694</b>	<b>2,317,817</b>	<b>1,470,656</b>	<b>2,768,356</b>	<b>5,239,174</b>
<b>Deductions</b>					
Benefit payments	1,932,756	2,032,628	2,134,754	2,231,475	2,334,003
Refunds	76,980	77,171	70,298	65,715	74,637
Disability insurance premiums	3,655	3,748	3,400	3,454	3,347
Administrative expenses	18,523	19,290	20,865	21,991	23,019
Other	7,132	4,376	9,178	17,443	22,484
<b>Total deductions</b>	<b>2,039,046</b>	<b>2,137,213</b>	<b>2,238,495</b>	<b>2,340,078</b>	<b>2,457,490</b>
<b>Change in fiduciary net position</b>	<b>2,063,648</b>	<b>180,604</b>	<b>(767,839)</b>	<b>428,278</b>	<b>2,781,684</b>
<b>Fiduciary net position held at beginning of year</b>	<b>20,676,355</b>	<b>22,740,003</b>	<b>22,920,607</b>	<b>22,152,768</b>	<b>22,581,046</b>
<b>Fiduciary net position held at end of year</b>	<b>\$22,740,003</b>	<b>\$22,920,607</b>	<b>\$22,152,768</b>	<b>\$22,581,046</b>	<b>\$25,362,730</b>

<sup>1</sup> Employer and member contribution rate history is shown on pages 239–244.

**CHANGES IN FIDUCIARY NET POSITION**

For the Years Ended December 31

(*Dollars in Thousands*)

**Local Government Division Trust Fund**

	2008	2009	2010	2011	2012
<b>Additions</b>					
Employer contributions <sup>1</sup>	\$79,457	\$84,456	\$89,515	\$91,780	\$86,113
Member contributions <sup>1</sup>	58,508	57,598	56,728	58,590	54,827
Purchased service	3,820	4,460	3,671	3,902	13,927
Investment income (loss)	(778,885)	381,350	355,964	53,130	368,492
Other	(2)	2	9	78	2,663
<b>Total additions</b>	<b>(637,102)</b>	<b>527,866</b>	<b>505,887</b>	<b>207,480</b>	<b>526,022</b>
<b>Deductions</b>					
Benefit payments	132,696	150,036	165,770	179,449	195,945
Refunds	18,219	19,648	22,942	22,686	42,941
Disability insurance premiums	560	591	496	442	410
Administrative expenses	2,102	2,160	2,215	2,157	2,035
Other	2,014	2,737	5,235	2,737	2,072
<b>Total deductions</b>	<b>155,591</b>	<b>175,172</b>	<b>196,658</b>	<b>207,471</b>	<b>243,403</b>
<b>Change in fiduciary net position</b>	<b>(792,693)</b>	<b>352,694</b>	<b>309,229</b>	<b>9</b>	<b>282,619</b>
<b>Fiduciary net position held at beginning of year</b>	<b>3,014,274</b>	<b>2,221,581</b>	<b>2,574,275</b>	<b>2,883,504</b>	<b>2,883,513</b>
<b>Fiduciary net position held at end of year</b>	<b>\$2,221,581</b>	<b>\$2,574,275</b>	<b>\$2,883,504</b>	<b>\$2,883,513</b>	<b>\$3,166,132</b>
	2013	2014	2015	2016	2017
<b>Additions</b>					
Employer contributions <sup>1</sup>	\$67,197	\$68,719	\$70,415	\$75,132	\$78,291
Member contributions <sup>1</sup>	42,627	43,792	45,400	48,470	50,472
Purchased service	7,363	5,498	6,586	3,981	6,325
Employer disaffiliation	—	186,006	—	—	1,063
Investment income	482,297	200,394	56,328	261,276	669,011
Other	14	14	15	17	14
<b>Total additions</b>	<b>599,498</b>	<b>504,423</b>	<b>178,744</b>	<b>388,876</b>	<b>805,176</b>
<b>Deductions</b>					
Benefit payments	217,875	232,055	244,948	258,967	274,258
Refunds	32,480	24,436	20,410	12,938	14,530
Disability insurance premiums	479	481	431	439	430
Administrative expenses	2,021	2,091	2,253	2,395	2,541
Other	4,463	2,204	1,661	1,140	3,837
<b>Total deductions</b>	<b>257,318</b>	<b>261,267</b>	<b>269,703</b>	<b>275,879</b>	<b>295,596</b>
<b>Change in fiduciary net position</b>	<b>342,180</b>	<b>243,156</b>	<b>(90,959)</b>	<b>112,997</b>	<b>509,580</b>
<b>Fiduciary net position held at beginning of year</b>	<b>3,166,132</b>	<b>3,508,312</b>	<b>3,751,468</b>	<b>3,660,509</b>	<b>3,773,506</b>
<b>Fiduciary net position held at end of year</b>	<b>\$3,508,312</b>	<b>\$3,751,468</b>	<b>\$3,660,509</b>	<b>\$3,773,506</b>	<b>\$4,283,086</b>

<sup>1</sup> Employer and member contribution rate history is shown on pages 239–244.

**CHANGES IN FIDUCIARY NET POSITION**

For the Years Ended December 31

(*Dollars in Thousands*)

**Judicial Division Trust Fund**

	2008	2009	2010	2011	2012
<b>Additions</b>					
Employer contributions <sup>1</sup>	\$5,105	\$5,793	\$5,654	\$5,430	\$5,922
Member contributions <sup>1</sup>	2,806	3,001	3,465	4,120	3,628
Purchased service	392	(3)	109	5	180
Investment income (loss)	(61,192)	29,977	27,400	4,105	28,063
Other	—	—	—	6	2,556
<b>Total additions</b>	<b>(52,889)</b>	<b>38,768</b>	<b>36,628</b>	<b>13,666</b>	<b>40,349</b>
<b>Deductions</b>					
Benefit payments	13,356	15,011	15,394	16,809	17,606
Refunds	—	30	104	513	605
Disability insurance premiums	26	31	26	26	27
Administrative expenses	21	22	61	61	61
Other	(322)	(1,778)	(2,491)	(1,043)	22
<b>Total deductions</b>	<b>13,081</b>	<b>13,316</b>	<b>13,094</b>	<b>16,366</b>	<b>18,321</b>
<b>Change in fiduciary net position</b>	<b>(65,970)</b>	<b>25,452</b>	<b>23,534</b>	<b>(2,700)</b>	<b>22,028</b>
<b>Fiduciary net position held at beginning of year</b>	<b>240,873</b>	<b>174,903</b>	<b>200,355</b>	<b>223,889</b>	<b>221,189</b>
<b>Fiduciary net position held at end of year</b>	<b>\$174,903</b>	<b>\$200,355</b>	<b>\$223,889</b>	<b>\$221,189</b>	<b>\$243,217</b>
	2013	2014	2015	2016	2017
<b>Additions</b>					
Employer contributions <sup>1</sup>	\$6,587	\$7,070	\$7,702	\$8,024	\$8,080
Member contributions <sup>1</sup>	3,224	3,461	3,772	3,928	3,955
Purchased service	240	835	425	109	908
Investment income	37,096	15,299	4,149	19,783	51,173
Other	1,451	256	3,247	2,800	2,379
<b>Total additions</b>	<b>48,598</b>	<b>26,921</b>	<b>19,295</b>	<b>34,644</b>	<b>66,495</b>
<b>Deductions</b>					
Benefit payments	18,616	19,800	21,158	22,734	25,250
Refunds	385	60	—	109	7
Disability insurance premiums	40	43	42	45	41
Administrative expenses	69	72	77	81	86
Other	52	100	166	122	153
<b>Total deductions</b>	<b>19,162</b>	<b>20,075</b>	<b>21,443</b>	<b>23,091</b>	<b>25,537</b>
<b>Change in fiduciary net position</b>	<b>29,436</b>	<b>6,846</b>	<b>(2,148)</b>	<b>11,553</b>	<b>40,958</b>
<b>Fiduciary net position held at beginning of year</b>	<b>243,217</b>	<b>272,653</b>	<b>279,499</b>	<b>277,351</b>	<b>288,904</b>
<b>Fiduciary net position held at end of year</b>	<b>\$272,653</b>	<b>\$279,499</b>	<b>\$277,351</b>	<b>\$288,904</b>	<b>\$329,862</b>

<sup>1</sup> Employer and member contribution rate history is shown on pages 239–244.

**CHANGES IN FIDUCIARY NET POSITION**

For the Years Ended December 31

(Dollars in Thousands)

**DPS Division Trust Fund<sup>1</sup>**

	2010	2011	2012	2013
<b>Additions</b>				
Employer contributions <sup>2</sup>	\$6,493	\$12,859	\$14,703	\$25,157
Member contributions <sup>2</sup>	36,824	39,422	41,124	43,564
Plan transfer	2,750,566	—	—	—
Purchased service	2,056	1,792	1,924	1,834
Investment income	367,145	55,081	354,867	452,919
Other	5	77	146	269
<b>Total additions</b>	<b>3,163,089</b>	<b>109,231</b>	<b>412,764</b>	<b>523,743</b>
<b>Deductions</b>				
Benefit payments	215,825	221,113	228,742	237,921
Refunds	3,029	4,412	5,821	6,733
Disability insurance premiums	311	238	220	338
Administrative expenses	2,944	1,914	1,919	2,240
Other	54	2,409	55	150
<b>Total deductions</b>	<b>222,163</b>	<b>230,086</b>	<b>236,757</b>	<b>247,382</b>
<b>Change in fiduciary net position</b>	<b>2,940,926</b>	<b>(120,855)</b>	<b>176,007</b>	<b>276,361</b>
<b>Fiduciary net position held at beginning of year</b>	<b>—</b>	<b>2,940,926</b>	<b>2,820,071</b>	<b>2,996,078</b>
<b>Fiduciary net position held at end of year</b>	<b>\$2,940,926</b>	<b>\$2,820,071</b>	<b>\$2,996,078</b>	<b>\$3,272,439</b>
	2014	2015	2016	2017
<b>Additions</b>				
Employer contributions <sup>2</sup>	\$18,478	\$8,494	\$17,071	<b>\$27,578</b>
Member contributions <sup>2</sup>	47,083	49,973	52,740	<b>54,354</b>
Plan transfer	—	—	—	—
Purchased service	2,326	3,585	2,112	<b>2,466</b>
Investment income	182,823	49,172	218,415	<b>548,585</b>
Other	13	11	3,264	<b>3,870</b>
<b>Total additions</b>	<b>250,723</b>	<b>111,235</b>	<b>293,602</b>	<b>636,853</b>
<b>Deductions</b>				
Benefit payments	247,005	255,068	263,152	<b>271,189</b>
Refunds	8,063	7,897	8,521	<b>10,277</b>
Disability insurance premiums	366	358	398	<b>378</b>
Administrative expenses	2,377	2,599	2,754	<b>2,857</b>
Other	1,560	1,775	129	<b>89</b>
<b>Total deductions</b>	<b>259,371</b>	<b>267,697</b>	<b>274,954</b>	<b>284,790</b>
<b>Change in fiduciary net position</b>	<b>(8,648)</b>	<b>(156,462)</b>	<b>18,648</b>	<b>352,063</b>
<b>Fiduciary net position held at beginning of year</b>	<b>3,272,439</b>	<b>3,263,791</b>	<b>3,107,329</b>	<b>3,125,977</b>
<b>Fiduciary net position held at end of year</b>	<b>\$3,263,791</b>	<b>\$3,107,329</b>	<b>\$3,125,977</b>	<b>\$3,478,040</b>

<sup>1</sup> The Denver Public Schools (DPS) Division Trust Fund was established on January 1, 2010, and received the net assets of the Denver Public Schools Retirement System (DPSRS).

<sup>2</sup> Employer and member contribution rate history is shown on pages 239–244.

**CHANGES IN FIDUCIARY NET POSITION**

For the Years Ended December 31

(Dollars in Thousands)

**Voluntary Investment Program**

	2008 <sup>1</sup>	2009	2010	2011	2012
<b>Additions</b>					
Employer contributions	\$3,866	\$3,383	\$3,827	\$3,610	\$3,697
Member contributions	157,937	134,645	132,674	126,331	119,013
Plan transfer	—	18,358	—	—	—
Investment income (loss)	(500,862)	291,029	194,500	(5,752)	236,775
Other	4,472	3,654	3,697	3,298	2,075
<b>Total additions</b>	<b>(334,587)</b>	<b>451,069</b>	<b>334,698</b>	<b>127,487</b>	<b>361,560</b>
<b>Deductions</b>					
Refunds	87,571	75,351	102,056	133,719	144,171
Administrative expenses	4,965	4,664	5,178	4,717	2,827
Other	—	—	—	29	234
<b>Total deductions</b>	<b>92,536</b>	<b>80,015</b>	<b>107,234</b>	<b>138,465</b>	<b>147,232</b>
Change in fiduciary net position	(427,123)	371,054	227,464	(10,978)	214,328
Fiduciary net position held at beginning of year	1,730,930	1,303,807	1,674,861	1,902,325	1,891,347
Fiduciary net position held at end of year	<b>\$1,303,807</b>	<b>\$1,674,861</b>	<b>\$1,902,325</b>	<b>\$1,891,347</b>	<b>\$2,105,675</b>

	2013	2014	2015	2016	2017
<b>Additions</b>					
Employer contributions	\$3,679	\$3,866	\$3,889	\$4,740	\$5,072
Member contributions	120,203	126,112	129,990	129,909	135,303
Investment income (loss)	423,877	188,199	(11,773)	206,933	469,233
Other	2,141	2,291	2,237	2,170	2,207
<b>Total additions</b>	<b>549,900</b>	<b>320,468</b>	<b>124,343</b>	<b>343,752</b>	<b>611,815</b>
<b>Deductions</b>					
Refunds	142,064	144,329	158,215	154,202	162,019
Administrative expenses	3,137	3,050	3,010	2,814	2,877
Other	624	839	1,019	1,172	1,411
<b>Total deductions</b>	<b>145,825</b>	<b>148,218</b>	<b>162,244</b>	<b>158,188</b>	<b>166,307</b>
Change in fiduciary net position	404,075	172,250	(37,901)	185,564	445,508
Fiduciary net position held at beginning of year	2,105,675	2,509,750	2,682,000	2,644,099	2,829,663
Fiduciary net position held at end of year	<b>\$2,509,750</b>	<b>\$2,682,000</b>	<b>\$2,644,099</b>	<b>\$2,829,663</b>	<b>\$3,275,171</b>

<sup>1</sup> To improve trend analysis, the year has been restated to remove the Defined Contribution Retirement Plan which was reported as a component of the Voluntary Investment Program. For 2008, the Defined Contribution Plan was a component plan in the Voluntary Investment Program Trust. In 2009, the Defined Contribution Retirement Plan became a separate trust.

**CHANGES IN FIDUCIARY NET POSITION**

For the Years Ended December 31

(Dollars in Thousands)

**Defined Contribution Retirement Plan**

	2008 <sup>1</sup>	2009	2010	2011	2012
<b>Additions</b>					
Employer contributions	\$1,946	\$5,899	\$6,428	\$7,034	\$7,997
Member contributions	1,564	4,652	6,896	9,732	8,364
Plan transfer	—	18,374	11	—	—
Investment income (loss)	(841)	5,060	5,519	(1,130)	9,046
Other	3	14	35	40	2
<b>Total additions</b>	<b>2,672</b>	<b>33,999</b>	<b>18,889</b>	<b>15,676</b>	<b>25,409</b>
<b>Deductions</b>					
Refunds	215	1,377	2,886	5,176	4,869
Administrative expenses	8	143	94	282	848
Other	—	—	—	5	22
<b>Total deductions</b>	<b>223</b>	<b>1,520</b>	<b>2,980</b>	<b>5,463</b>	<b>5,739</b>
Change in fiduciary net position	2,449	32,479	15,909	10,213	19,670
Fiduciary net position held at beginning of year	2,547	4,996	37,475	53,384	63,597
Fiduciary net position held at end of year	<b>\$4,996</b>	<b>\$37,475</b>	<b>\$53,384</b>	<b>\$63,597</b>	<b>\$83,267</b>
	2013	2014	2015	2016	2017
<b>Additions</b>					
Employer contributions	\$11,090	\$11,531	\$12,428	\$13,060	\$14,309
Member contributions	8,828	9,179	9,830	10,382	11,411
Investment income (loss)	17,416	6,745	(2,466)	12,601	29,372
Other	6	8	9	92	39
<b>Total additions</b>	<b>37,340</b>	<b>27,463</b>	<b>19,801</b>	<b>36,135</b>	<b>55,131</b>
<b>Deductions</b>					
Refunds	6,314	8,690	9,419	8,932	10,593
Administrative expenses	744	738	774	726	739
Other	49	69	48	97	116
<b>Total deductions</b>	<b>7,107</b>	<b>9,497</b>	<b>10,241</b>	<b>9,755</b>	<b>11,448</b>
Change in fiduciary net position	30,233	17,966	9,560	26,380	43,683
Fiduciary net position held at beginning of year	83,267	113,500	131,466	141,026	167,406
Fiduciary net position held at end of year	<b>\$113,500</b>	<b>\$131,466</b>	<b>\$141,026</b>	<b>\$167,406</b>	<b>\$211,089</b>

<sup>1</sup> To improve trend analysis, the year has been restated to report changes in fiduciary net position which were included in the Voluntary Investment Program. For 2008, the Defined Contribution Plan was a component plan in the Voluntary Investment Program Trust. In 2009, the Defined Contribution Retirement Plan became a separate trust.

CHANGES IN FIDUCIARY NET POSITION

For the Years Ended December 31

(Dollars in Thousands)

Deferred Compensation Plan<sup>1</sup>

	2009	2010	2011	2012	2013
<b>Additions</b>					
Employer contributions	\$12	\$12	\$51	\$14	\$20
Member contributions	23,875	44,203	42,253	39,851	44,449
Plan transfer	336,504	24	4	—	—
Investment income	40,443	42,232	10,335	49,344	88,565
Other	1,820	917	984	354	428
<b>Total additions</b>	<b>402,654</b>	<b>87,388</b>	<b>53,627</b>	<b>89,563</b>	<b>133,462</b>
<b>Deductions</b>					
Refunds	8,745	20,869	27,524	27,627	32,854
Administrative expenses	507	822	834	1,105	1,094
Other	50	168	185	278	430
<b>Total deductions</b>	<b>9,302</b>	<b>21,859</b>	<b>28,543</b>	<b>29,010</b>	<b>34,378</b>
Change in fiduciary net position	393,352	65,529	25,084	60,553	99,084
Fiduciary net position held at beginning of year	—	393,352	458,881	483,965	544,518
Fiduciary net position held at end of year	<b>\$393,352</b>	<b>\$458,881</b>	<b>\$483,965</b>	<b>\$544,518</b>	<b>\$643,602</b>
	2014	2015	2016	2017	
<b>Additions</b>					
Employer contributions	\$43	\$27	\$26	\$50	
Member contributions	50,370	49,719	51,601	57,088	
Investment income (loss)	32,133	(6,427)	51,372	105,027	
Other	478	484	496	510	
<b>Total additions</b>	<b>83,024</b>	<b>43,803</b>	<b>103,495</b>	<b>162,675</b>	
<b>Deductions</b>					
Refunds	35,584	39,945	41,922	47,067	
Administrative expenses	1,074	1,071	963	993	
Other	517	562	604	698	
<b>Total deductions</b>	<b>37,175</b>	<b>41,578</b>	<b>43,489</b>	<b>48,758</b>	
Change in fiduciary net position	45,849	2,225	60,006	113,917	
Fiduciary net position held at beginning of year	643,602	689,451	691,676	751,682	
Fiduciary net position held at end of year	<b>\$689,451</b>	<b>\$691,676</b>	<b>\$751,682</b>	<b>\$865,599</b>	

<sup>1</sup> On July 1, 2009, the State of Colorado's Deferred Compensation Plan assets transferred to PERA, which became the administrator of that plan under the provisions of SB 09-66.

**CHANGES IN FIDUCIARY NET POSITION**

For the Years Ended December 31

(*Dollars in Thousands*)

**Health Care Trust Fund**

	2008	2009	2010	2011	2012
<b>Additions</b>					
Employer contributions <sup>1</sup>	\$72,599	\$74,073	\$74,047	\$73,449	\$72,553
Retiree health care premiums	102,644	106,903	110,158	108,689	107,104
Federal health care subsidies	13,743	13,633	25,751	14,151	14,198
Investment income (loss)	(72,423)	35,483	34,676	5,153	36,710
Other	12,803	12,721	16,035	10,574	11,668
<b>Total additions</b>	<b>129,366</b>	<b>242,813</b>	<b>260,667</b>	<b>212,016</b>	<b>242,233</b>
<b>Deductions</b>					
Benefit payments	196,769	192,656	192,044	203,419	218,768
Administrative expenses	11,838	12,170	11,131	12,481	13,514
<b>Total deductions</b>	<b>208,607</b>	<b>204,826</b>	<b>203,175</b>	<b>215,900</b>	<b>232,282</b>
Change in fiduciary net position	(79,241)	37,987	57,492	(3,884)	9,951
Fiduciary net position held at beginning of year	269,432	190,191	228,178	285,670	281,786
Fiduciary net position held at end of year	<b>\$190,191</b>	<b>\$228,178</b>	<b>\$285,670</b>	<b>\$281,786</b>	<b>\$291,737</b>
	2013	2014	2015	2016	2017
<b>Additions</b>					
Employer contributions <sup>1</sup>	\$72,784	\$75,631	\$78,463	\$80,825	\$83,077
Retiree health care premiums	114,364	105,459	127,873	138,021	—
Federal health care subsidies	15,731	—	—	—	—
Employer disaffiliation	—	3,994	—	—	96
Investment income	46,097	18,203	4,807	19,021	44,990
Other	10,522	9,813	9,993	9,175	9,760
<b>Total additions</b>	<b>259,498</b>	<b>213,100</b>	<b>221,136</b>	<b>247,042</b>	<b>137,923</b>
<b>Deductions</b>					
Benefit payments	222,860	200,627	234,414	243,662	102,665
Administrative expenses	13,766	16,612	19,261	19,166	19,162
Other	—	832	594	491	102
<b>Total deductions</b>	<b>236,626</b>	<b>218,071</b>	<b>254,269</b>	<b>263,319</b>	<b>121,929</b>
Change in fiduciary net position	22,872	(4,971)	(33,133)	(16,277)	15,994
Fiduciary net position held at beginning of year	291,737	314,609	309,638	276,505	260,228
Fiduciary net position held at end of year	<b>\$314,609</b>	<b>\$309,638</b>	<b>\$276,505</b>	<b>\$260,228</b>	<b>\$276,222</b>

<sup>1</sup> Employer contribution rate history is shown on page 244.

**CHANGES IN FIDUCIARY NET POSITION**

For the Years Ended December 31

(Dollars in Thousands)

**DPS Health Care Trust Fund<sup>1</sup>**

	2010	2011	2012	2013
<b>Additions</b>				
Employer contributions <sup>2</sup>	\$4,762	\$5,029	\$5,243	\$5,558
Plan transfer	13,510	—	—	—
Retiree health care premiums	4,747	4,529	4,295	4,719
Federal health care subsidies	1,252	499	488	563
Investment income	1,992	424	1,800	2,277
Other	109	374	216	312
<b>Total additions</b>	<b>26,372</b>	<b>10,855</b>	<b>12,042</b>	<b>13,429</b>
<b>Deductions</b>				
Benefit payments	11,012	10,770	11,027	11,222
Administrative expenses	569	501	547	561
<b>Total deductions</b>	<b>11,581</b>	<b>11,271</b>	<b>11,574</b>	<b>11,783</b>
Change in fiduciary net position	14,791	(416)	468	1,646
Fiduciary net position held at beginning of year	—	14,791	14,375	14,843
Fiduciary net position held at end of year	<b>\$14,791</b>	<b>\$14,375</b>	<b>\$14,843</b>	<b>\$16,489</b>
	2014	2015	2016	2017
<b>Additions</b>				
Employer contributions <sup>2</sup>	\$6,003	\$6,371	\$6,723	\$6,930
Retiree health care premiums	4,442	6,275	6,738	—
Investment income	938	254	1,235	3,305
Other	281	301	289	242
<b>Total additions</b>	<b>11,664</b>	<b>13,201</b>	<b>14,985</b>	<b>10,477</b>
<b>Deductions</b>				
Benefit payments	10,432	12,442	12,748	5,694
Administrative expenses	668	822	818	808
Other	32	22	18	4
<b>Total deductions</b>	<b>11,132</b>	<b>13,286</b>	<b>13,584</b>	<b>6,506</b>
Change in fiduciary net position	532	(85)	1,401	3,971
Fiduciary net position held at beginning of year	16,489	17,021	16,936	18,337
Fiduciary net position held at end of year	<b>\$17,021</b>	<b>\$16,936</b>	<b>\$18,337</b>	<b>\$22,308</b>

<sup>1</sup> The Denver Public Schools Health Care Trust Fund (DPS HCTF) was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

<sup>2</sup> Employer contribution rate history is shown on page 244.

**CHANGES IN FIDUCIARY NET POSITION**

For the Years Ended December 31

(Dollars in Thousands)

**Life Insurance Reserve**

	2008	2009	2010	2011	2012
<b>Additions</b>					
Life insurance premiums	\$1,772	\$—	\$—	\$—	\$—
Investment income (loss)	(4,693)	2,496	2,280	503	2,020
<b>Total additions</b>	<b>(2,921)</b>	<b>2,496</b>	<b>2,280</b>	<b>503</b>	<b>2,020</b>
<b>Deductions</b>					
Life insurance premiums and claims	2,820	575	545	547	62
Administrative expenses	486	576	575	573	510
<b>Total deductions</b>	<b>3,306</b>	<b>1,151</b>	<b>1,120</b>	<b>1,120</b>	<b>572</b>
Change in fiduciary net position	(6,227)	1,345	1,160	(617)	1,448
Fiduciary net position held at beginning of year	18,755	12,528	13,873	15,033	14,416
Fiduciary net position held at end of year	<b>\$12,528</b>	<b>\$13,873</b>	<b>\$15,033</b>	<b>\$14,416</b>	<b>\$15,864</b>

	2013	2014	2015	2016	2017
<b>Additions</b>					
Investment income	\$2,630	\$1,068	\$302	\$1,289	<b>\$3,241</b>
<b>Total additions</b>	<b>2,630</b>	<b>1,068</b>	<b>302</b>	<b>1,289</b>	<b>3,241</b>
<b>Deductions</b>					
Life insurance premiums	131	196	250	306	373
Administrative expenses	871	871	805	1,032	493
<b>Total deductions</b>	<b>1,002</b>	<b>1,067</b>	<b>1,055</b>	<b>1,338</b>	<b>866</b>
Change in fiduciary net position	1,628	1	(753)	(49)	2,375
Fiduciary net position held at beginning of year	15,864	17,492	17,493	16,740	<b>16,691</b>
Fiduciary net position held at end of year	<b>\$17,492</b>	<b>\$17,493</b>	<b>\$16,740</b>	<b>\$16,691</b>	<b>\$19,066</b>

## BENEFITS AND REFUND DEDUCTIONS FROM FIDUCIARY NET POSITION BY TYPE

For the Years Ended December 31

(Dollars in Thousands)

### State Division Trust Fund

Type of Benefit	2008	2009	2010	2011	2012
Age and service benefits:					
Retirees	\$910,475	\$979,419	\$1,031,628	\$1,083,722	\$1,140,055
Disability	76,056	78,799	77,830	77,715	78,689
Survivors	12,748	13,507	12,977	13,270	13,178
<b>Total benefits</b>	<b>\$999,279</b>	<b>\$1,071,725</b>	<b>\$1,122,435</b>	<b>\$1,174,707</b>	<b>\$1,231,922</b>

Type of Refund	2008	2009	2010	2011	2012
Separation					
Death	\$51,047	\$53,668	\$59,330	\$65,525	\$65,627
Purchased service	5,014	3,760	9,047	3,986	3,503
Total refunds	655	988	467	579	91
<b>Total refunds</b>	<b>\$56,716</b>	<b>\$58,416</b>	<b>\$68,844</b>	<b>\$70,090</b>	<b>\$69,221</b>

Type of Benefit	2013	2014	2015	2016	2017
Age and service benefits:					
Retirees	\$1,202,238	\$1,257,767	\$1,322,592	\$1,387,374	\$1,456,159
Disability	79,854	80,753	81,310	82,221	83,280
Survivors	13,688	13,773	13,960	14,233	14,851
<b>Total benefits</b>	<b>\$1,295,780</b>	<b>\$1,352,293</b>	<b>\$1,417,862</b>	<b>\$1,483,828</b>	<b>\$1,554,290</b>

Type of Refund	2013	2014	2015	2016	2017
Separation					
Death	\$64,072	\$57,895	\$58,274	\$54,606	\$52,079
Purchased service	4,411	3,058	5,213	5,464	6,561
Total refunds	252	199	80	67	56
<b>Total refunds</b>	<b>\$68,735</b>	<b>\$61,152</b>	<b>\$63,567</b>	<b>\$60,137</b>	<b>\$58,696</b>

### School Division Trust Fund

Type of Benefit	2008	2009	2010	2011	2012
Age and service benefits:					
Retirees	\$1,378,531	\$1,490,293	\$1,568,637	\$1,657,071	\$1,757,279
Disability	59,019	60,532	60,920	61,150	62,140
Survivors	12,357	12,490	12,793	13,127	13,224
<b>Total benefits</b>	<b>\$1,449,907</b>	<b>\$1,563,315</b>	<b>\$1,642,350</b>	<b>\$1,731,348</b>	<b>\$1,832,643</b>

Type of Refund	2008	2009	2010	2011	2012
Separation					
Death	\$61,259	\$67,330	\$74,423	\$74,446	\$73,075
Purchased service	3,530	2,725	4,206	3,676	3,815
Total refunds	870	855	383	421	264
<b>Total refunds</b>	<b>\$65,659</b>	<b>\$70,910</b>	<b>\$79,012</b>	<b>\$78,543</b>	<b>\$77,154</b>

Type of Benefit	2013	2014	2015	2016	2017
Age and service benefits:					
Retirees	\$1,855,195	\$1,952,989	\$2,053,108	\$2,149,415	\$2,249,855
Disability	63,741	65,780	67,203	67,416	68,537
Survivors	13,820	13,859	14,443	14,644	15,611
<b>Total benefits</b>	<b>\$1,932,756</b>	<b>\$2,032,628</b>	<b>\$2,134,754</b>	<b>\$2,231,475</b>	<b>\$2,334,003</b>

Type of Refund	2008	2009	2010	2011	2012
Separation					
Death	\$73,215	\$73,522	\$66,494	\$60,873	\$68,265
Purchased service	3,282	3,521	3,621	4,756	6,313
Total refunds	483	128	183	86	59
<b>Total refunds</b>	<b>\$76,980</b>	<b>\$77,171</b>	<b>\$70,298</b>	<b>\$65,715</b>	<b>\$74,637</b>

**BENEFITS AND REFUND DEDUCTIONS FROM FIDUCIARY NET POSITION BY TYPE**

For the Years Ended December 31

(Dollars in Thousands)

**Local Government Division Trust Fund**

Type of Benefit	2008	2009	2010	2011	2012
Age and service benefits:					
Retirees	\$116,951	\$133,732	\$149,260	\$162,681	\$178,845
Disability	13,900	14,407	14,572	14,727	15,096
Survivors	1,845	1,897	1,938	2,041	2,004
Total benefits	<b>\$132,696</b>	<b>\$150,036</b>	<b>\$165,770</b>	<b>\$179,449</b>	<b>\$195,945</b>

Type of Refund

	2008	2009	2010	2011	2012
Separation	\$16,742	\$18,703	\$21,999	\$21,316	\$41,696
Death	1,399	574	750	1,283	1,154
Purchased service	78	371	193	87	91
Total refunds	<b>\$18,219</b>	<b>\$19,648</b>	<b>\$22,942</b>	<b>\$22,686</b>	<b>\$42,941</b>

Type of Benefit	2013	2014	2015	2016	2017
Age and service benefits:					
Retirees	\$199,821	\$213,962	\$226,400	\$240,432	\$255,105
Disability	16,022	16,045	16,327	16,274	16,775
Survivors	2,032	2,048	2,221	2,261	2,378
Total benefits	<b>\$217,875</b>	<b>\$232,055</b>	<b>\$244,948</b>	<b>\$258,967</b>	<b>\$274,258</b>

Type of Refund

	2013	2014	2015	2016	2017
Separation	\$31,268	\$23,034	\$18,062	\$12,017	\$13,095
Death	1,201	1,401	2,317	921	1,434
Purchased service	11	1	31	—	1
Total refunds	<b>\$32,480</b>	<b>\$24,436</b>	<b>\$20,410</b>	<b>\$12,938</b>	<b>\$14,530</b>

**Judicial Division Trust Fund**

Type of Benefit	2008	2009	2010	2011	2012
Age and service benefits:					
Retirees	\$12,113	\$13,734	\$14,126	\$15,563	\$16,333
Disability	850	913	917	889	897
Survivors	393	364	351	357	376
Total benefits	<b>\$13,356</b>	<b>\$15,011</b>	<b>\$15,394</b>	<b>\$16,809</b>	<b>\$17,606</b>

Type of Refund

	2008	2009	2010	2011	2012
Separation	\$—	\$30	\$104	\$513	\$250
Death	—	—	—	—	355
Total refunds	<b>\$—</b>	<b>\$30</b>	<b>\$104</b>	<b>\$513</b>	<b>\$605</b>

Type of Benefit	2013	2014	2015	2016	2017
Age and service benefits:					
Retirees	\$17,362	\$18,573	\$19,901	\$21,485	\$23,993
Disability	908	917	938	939	933
Survivors	346	310	319	310	324
Total benefits	<b>\$18,616</b>	<b>\$19,800</b>	<b>\$21,158</b>	<b>\$22,734</b>	<b>\$25,250</b>

Type of Refund

	2008	2009	2010	2011	2012
Separation	\$385	\$60	\$—	\$109	\$7
Total refunds	<b>\$385</b>	<b>\$60</b>	<b>\$—</b>	<b>\$109</b>	<b>\$7</b>

**BENEFITS AND REFUND DEDUCTIONS FROM FIDUCIARY NET POSITION BY TYPE**

For the Years Ended December 31

(Dollars in Thousands)

**DPS Division Trust Fund<sup>1</sup>**

	2010	2011	2012	2013
<b>Type of Benefit</b>				
Age and service benefits:				
Retirees	\$207,398	\$212,524	\$220,106	\$228,692
Disability	6,886	7,078	7,070	7,592
Survivors	1,541	1,511	1,566	1,637
<b>Total benefits</b>	<b>\$215,825</b>	<b>\$221,113</b>	<b>\$228,742</b>	<b>\$237,921</b>
<b>Type of Refund</b>				
Separation				
	\$2,947	\$4,322	\$5,602	\$6,558
Death	82	82	217	160
Purchased service	—	8	2	15
<b>Total refunds</b>	<b>\$3,029</b>	<b>\$4,412</b>	<b>\$5,821</b>	<b>\$6,733</b>
	2014	2015	2016	2017
<b>Type of Benefit</b>				
Age and service benefits:				
Retirees	\$237,955	\$245,683	\$253,641	\$261,361
Disability	7,482	7,804	7,929	8,221
Survivors	1,568	1,581	1,582	1,607
<b>Total benefits</b>	<b>\$247,005</b>	<b>\$255,068</b>	<b>\$263,152</b>	<b>\$271,189</b>
<b>Type of Refund</b>				
Separation				
	\$7,424	\$7,685	\$7,894	\$9,873
Death	631	207	616	349
Purchased service	8	5	11	55
<b>Total refunds</b>	<b>\$8,063</b>	<b>\$7,897</b>	<b>\$8,521</b>	<b>\$10,277</b>

<sup>1</sup> The DPS Division Trust Fund was established on January 1, 2010, and received the net assets of DPSRS.

## MEMBER AND BENEFIT RECIPIENT STATISTICS<sup>1</sup>

(In Actual Dollars)

	State Division	School Division	Local Government Division	Judicial Division	DPS Division	Total
<b>Active Members</b>						
Active members as of December 31, 2017	55,686	122,990	12,770	332	15,991	207,769
<b>Retirements during 2017</b>						
Disability retirements	91	77	11	—	16	195
Service retirements	1,881	3,106	400	24	256	5,667
<b>Total</b>	<b>1,972</b>	<b>3,183</b>	<b>411</b>	<b>24</b>	<b>272</b>	<b>5,862</b>
<b>Retirement benefits</b>						
Total receiving disability and service retirement benefits on December 31, 2016	37,112	60,829	6,883	347	6,804	111,975
Total retiring during 2017	1,972	3,183	411	24	272	5,862
Cobeneficiaries continuing after retiree's death	250	261	48	6	47	612
Returning to retirement rolls from suspension	9	18	2	—	2	31
<b>Total</b>	<b>39,343</b>	<b>64,291</b>	<b>7,344</b>	<b>377</b>	<b>7,125</b>	<b>118,480</b>
Retirees and cobeneficiaries deceased during year	1,027	1,239	157	13	218	2,654
Retirees suspending benefits to return to work	7	17	1	—	—	25
<b>Total receiving retirement benefits</b>	<b>38,309</b>	<b>63,035</b>	<b>7,186</b>	<b>364</b>	<b>6,907</b>	<b>115,801<sup>2</sup></b>
Annual retirement benefits for retirees as of December 31, 2017	\$1,561,426,620	\$2,356,098,372	\$274,869,828	\$25,615,152	\$272,652,864	\$4,490,662,836
Average monthly benefit on December 31, 2017	\$3,397	\$3,115	\$3,188	\$5,864	\$3,290	\$3,232
Average monthly benefit for all members who retired during 2017	\$2,866	\$2,304	\$2,669	\$7,747	\$2,608	\$2,555
<b>Survivor benefits</b>						
Survivor benefit accounts						
Total survivors being paid on December 31, 2017	923	1,128	165	11	130	2,357 <sup>2</sup>
Annual benefits payable to survivors as of December 31, 2017	\$20,598,924	\$19,002,216	\$3,672,684	\$366,780	\$2,483,640	\$46,124,244
<b>Future benefits</b>						
Future retirements to age 62 or 65	6,788	16,439	2,741	9	1,596	27,573
Total annual future benefits	\$71,846,074	\$127,971,384	\$36,557,571	\$273,635	\$16,554,035	\$253,202,699
Future survivor beneficiaries of inactive members	132	164	18	1	7	322 <sup>2</sup>
Total annual future benefits	\$1,757,496	\$2,076,636	\$232,668	\$9,120	\$90,552	\$4,166,472

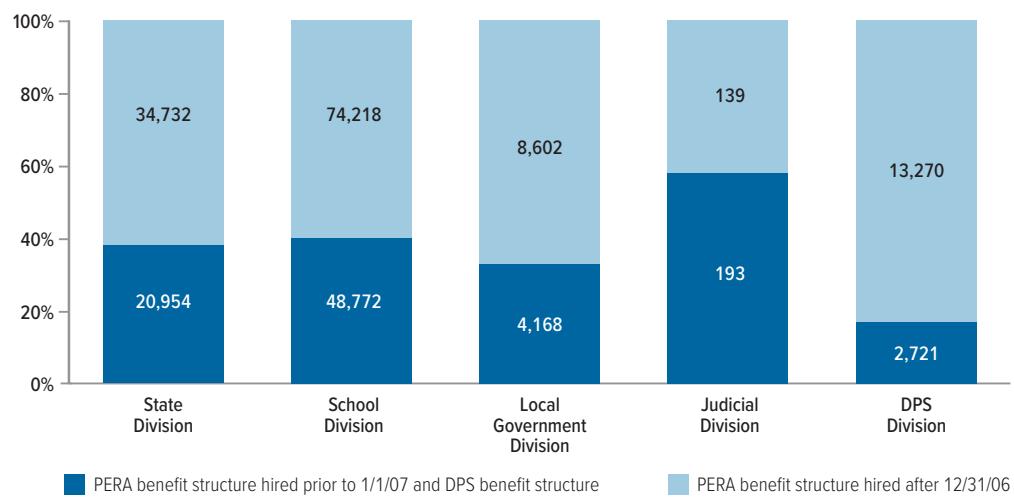
<sup>1</sup> In addition, as of December 31, 2017, there was a total of 230,248 non-vested terminated members due a refund of their contributions as follows: State Division—75,350; School Division—120,037; Local Government Division—23,937; Judicial Division—5; DPS Division—10,919.

<sup>2</sup> These line items make up the total for retirees and beneficiaries reported on page 62 in Note 1 of the Financial Section.

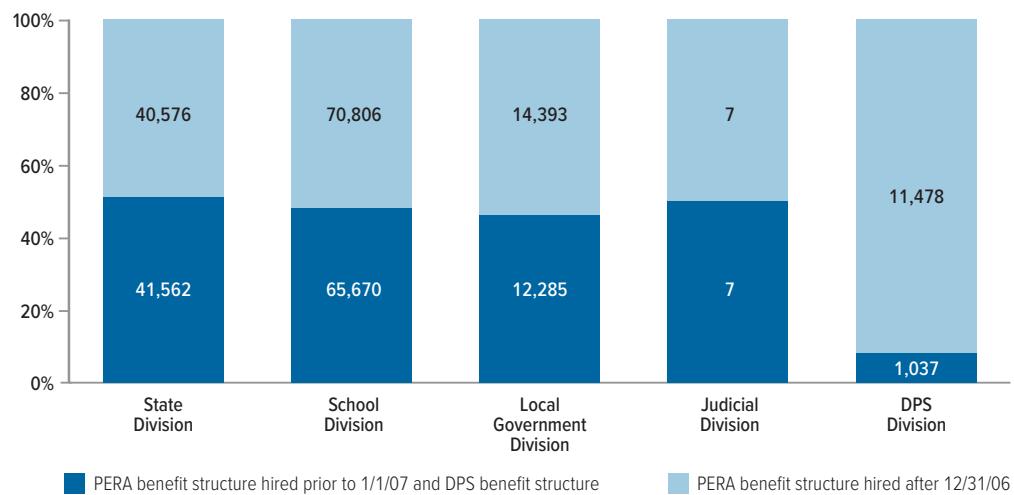
## BREAKDOWN OF MEMBERSHIP BY PERCENTAGE

As of December 31, 2017

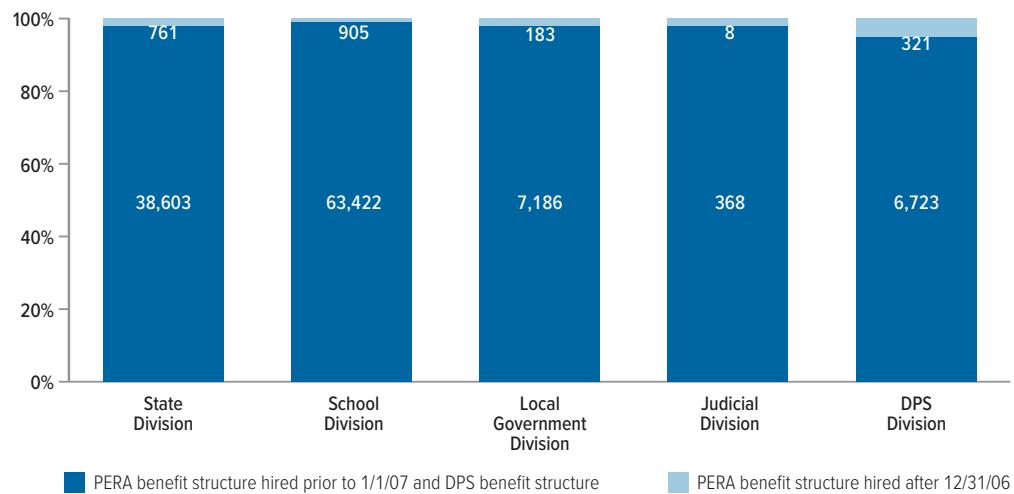
### Active Members



### Inactive Members (Vested and Non-Vested)



### Retirees and Survivors (Includes Deferred Survivors)



**SCHEDULE OF AVERAGE RETIREMENT BENEFITS PAYABLE—ALL DIVISION TRUST FUNDS<sup>1,2</sup>**

(In Actual Dollars)

Year Ended	Average Monthly Benefit	Average Age at Retirement	Average Current Age of Retirees	Average Years of Service at Retirement	Average Age at Death
12/31/2008	\$2,772	58.0	69.0	23.2	N/A
12/31/2009	2,885	58.0	69.3	23.3	N/A
12/31/2010	2,905	58.1	69.7	23.6	N/A
12/31/2011	2,966	58.1	69.9	23.6	N/A
12/31/2012	3,020	58.2	70.0	23.5	N/A
12/31/2013	3,068	58.2	70.4	23.5	82.0 <sup>3</sup>
12/31/2014	3,112	58.3	70.7	23.4	82.8
12/31/2015	3,153	58.4	70.9	23.3	82.2
12/31/2016	3,193	58.5	71.2	23.2	82.5
12/31/2017	3,232	58.6	71.5	23.1	82.5

<sup>1</sup> Includes disability retirements, but not survivor benefits.

<sup>2</sup> Data prior to December 31, 2010, does not include the DPS Division.

<sup>3</sup> Information not available prior to December 31, 2013.

**SCHEDULE OF AVERAGE RETIREMENT BENEFITS PAYABLE<sup>1</sup>**

(In Actual Dollars)

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
<b>For All Retirees Year Ended 12/31/2017</b>					
Average monthly benefit	\$3,397	\$3,115	\$3,188	\$5,864	\$3,290
Average age at retirement	58.4	58.7	58.4	61.8	59.3
Average age	71.7	71.3	69.3	74.3	74.2
Average years of service at retirement	22.9	23.3	21.5	23.2	24.4
Average age at death	82.1	82.8	78.2	82.9	85.2
<b>For Members Who Retired During 2017</b>					
Average monthly benefit	\$2,866	\$2,304	\$2,669	\$7,747	\$2,608
Average age	61.7	61.7	61.9	66.1	62.0
Average years of service	20.6	20.4	18.7	25.6	19.3
<b>For All Retirees Year Ended 12/31/2016</b>					
Average monthly benefit	\$3,345	\$3,086	\$3,145	\$5,624	\$3,248
Average age at retirement	58.3	58.6	58.2	61.6	59.2
Average age	71.4	71.0	69.0	74.2	74.0
Average years of service at retirement	22.9	23.4	21.7	23.0	24.7
Average age at death	82.4	82.7	80.1	84.2	83.3
<b>For Members Who Retired During 2016</b>					
Average monthly benefit	\$2,812	\$2,303	\$2,467	\$6,192	\$2,520
Average age	61.6	61.4	61.2	65.6	62.6
Average years of service	20.7	20.7	18.1	21.4	19.2
<b>For All Retirees Year Ended 12/31/2015</b>					
Average monthly benefit	\$3,294	\$3,052	\$3,114	\$5,379	\$3,206
Average age at retirement	58.2	58.5	58.1	61.4	59.1
Average age	71.2	70.7	68.6	74.5	73.9
Average years of service at retirement	23.0	23.5	21.8	22.9	25.0
Average age at death	81.7	82.2	79.6	78.9	85.3
<b>For Members Who Retired During 2015</b>					
Average monthly benefit	\$2,828	\$2,293	\$2,750	\$7,030	\$2,493
Average age	61.4	61.3	61.1	65.1	62.9
Average years of service	21.0	20.7	19.7	25.7	18.7

Please see page 225 for footnote references.

**SCHEDULE OF AVERAGE RETIREMENT BENEFITS PAYABLE<sup>1</sup> (CONTINUED)**  
*(In Actual Dollars)*

	State Division	School Division	Local Government Division	Judicial Division	DPS Division
<b>For All Retirees Year Ended 12/31/2014</b>					
Average monthly benefit	\$3,241	\$3,019	\$3,067	\$5,158	\$3,169
Average age at retirement	58.1	58.4	58.0	61.4	59.0
Average age	71.0	70.4	68.3	74.5	73.7
Average years of service at retirement	23.0	23.6	21.9	22.7	25.3
Average age at death	82.2	83.1	78.8	81.1	85.2
<b>For Members Who Retired During 2014</b>					
Average monthly benefit	\$2,760	\$2,405	\$2,352	\$4,969	\$2,593
Average age	61.3	60.9	61.3	66.2	63.2
Average years of service	20.8	21.0	18.4	20.0	19.6
<b>For All Retirees Year Ended 12/31/2013</b>					
Average monthly benefit	\$3,185	\$2,980	\$3,044	\$5,077	\$3,121
Average age at retirement	58.0	58.3	57.8	61.3	58.8
Average age	70.8	70.0	67.9	74.2	73.5
Average years of service at retirement	23.0	23.6	22.1	22.8	25.5
Average age at death <sup>2</sup>	82.5	81.4	78.6	88.2	84.8
<b>For Members Who Retired During 2013</b>					
Average monthly benefit	\$2,837	\$2,455	\$2,509	\$6,857	\$2,776
Average age	60.7	60.8	60.1	64.9	61.7
Average years of service	21.2	21.3	18.9	26.2	19.6
<b>For All Retirees Year Ended 12/31/2012</b>					
Average monthly benefit	\$3,124	\$2,939	\$3,007	\$4,889	\$3,064
Average age at retirement	58.0	58.2	57.7	61.2	58.8
Average age	70.4	69.7	67.5	73.7	73.3
Average years of service at retirement	23.0	23.7	22.2	22.6	25.8
<b>For Members Who Retired During 2012</b>					
Average monthly benefit	\$2,890	\$2,425	\$2,876	\$4,841	\$2,540
Average age	60.2	60.3	59.8	63.9	62.5
Average years of service	21.8	21.3	20.9	22.7	19.7
<b>For All Retirees Year Ended 12/31/2011</b>					
Average monthly benefit	\$3,056	\$2,895	\$2,948	\$4,739	\$3,009
Average age at retirement	58.0	58.2	57.5	61.0	58.7
Average age	70.3	69.5	67.8	73.7	73.2
Average years of service at retirement	23.0	23.8	22.3	22.4	26.0
<b>For Members Who Retired During 2011</b>					
Average monthly benefit	\$3,010	\$2,527	\$2,896	\$5,130	\$2,665
Average age	60.2	60.3	59.3	63.4	62.0
Average years of service	22.3	22.1	21.2	23.4	20.5

<sup>1</sup> Includes disability retirements, but not survivor benefits.

<sup>2</sup> Information not available prior to December 31, 2013.

## COLORADO PERA BENEFIT PAYMENTS—ALL DIVISION TRUST FUNDS

As of December 31, 2017

(In Actual Dollars)

### PERA Benefit Payments<sup>1,2</sup>

At the end of 2017, PERA was paying benefits to more than 118,000 retired public employees and their beneficiaries who received an average benefit of \$3,204 per month. For benefit recipients, this may be the primary source of retirement income as most PERA benefit recipients do not qualify for Social Security payments.

The PERA service retirement formula for calculating benefits, specified in State law as of December 31, 2017, is 2.5 percent multiplied by years of service multiplied by Highest Average Salary (HAS). As of December 31, 2017, HAS<sup>3</sup> is defined in State law as one-twelfth of the average of the highest annual salaries on which contributions were paid that are associated with three periods of 12 consecutive months of service credit. The three 12-month periods do not have to be consecutive, nor do they have to be the last three years of employment.

These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year salary increase limitation for HAS calculation purposes. The year-to-year limit for members who were eligible to retire on January 1, 2011, and hired before January 1, 2007, is 15 percent. All other members are subject to an 8 percent year-to-year limit in their HAS calculation. This annual limit applied to salaries in the HAS years is designed to moderate salary “spiking.”

Approximately 68.5 percent of recipients receive less than \$50,000 a year in PERA benefits, as the graph below demonstrates. Slightly less than 1.7 percent (1,994) of PERA benefit recipients receive an annual benefit payment of \$100,000 or more. Generally, these benefit recipients had high salaries and a significant number of years of service credit.

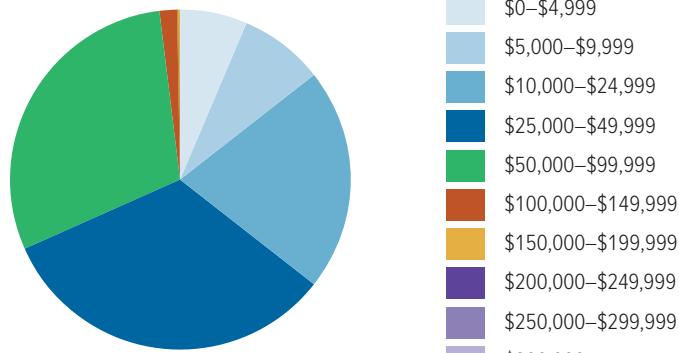
<sup>1</sup> Includes amounts paid under replacement benefit arrangements.

<sup>2</sup> Does not include deferred survivors and benefits that ended or were suspended in 2017.

<sup>3</sup> Some members of the DPS benefit structure and members in the Judicial Division have different HAS calculations.

### PERA Benefit Payments by Dollar Amount of Annual Benefit/Number of Benefit Recipients

Benefit Range <sup>1</sup>	Number of Benefit Recipients <sup>2</sup>
\$0–\$4,999	7,855
\$5,000–\$9,999	9,291
\$10,000–\$24,999	25,100
\$25,000–\$49,999	38,638
\$50,000–\$99,999	35,280
\$100,000–\$149,999	1,814
\$150,000–\$199,999	132
\$200,000–\$249,999	38
\$250,000–\$299,999	6
\$300,000+	4
<b>Total Benefit Recipients</b>	<b>118,158</b>



<sup>1</sup> Includes amounts paid under replacement benefit arrangements.

<sup>2</sup> Does not include 322 deferred survivors.

## COLORADO PERA BENEFIT PAYMENTS—ALL DIVISION TRUST FUNDS

As of December 31, 2017

(In Actual Dollars)

### Benefit Payments by Decile

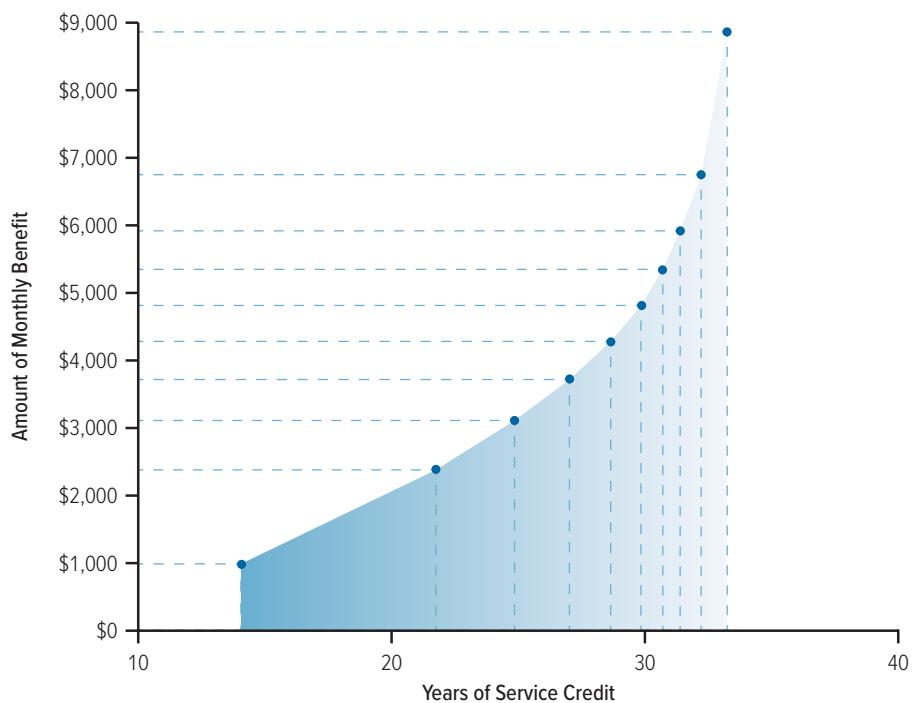
Another way to examine the data is to group benefit recipients and the benefits they receive into benefit payment ranges as a percentage of the total. The table below shows that, for the one-third of PERA benefit recipients (40,154) in the lowest decile, the average benefit is \$11,880 a year. This group retired at an average age of 60 with just over 14 years of service credit. For the top decile, on the other end of the scale, the average benefit is \$106,656 a year. However, this group, on average, had over 33 years of service credit, which is more than twice the length of the average service credit of those in the lowest decile. For the 5,862 new retirees in 2017, the average monthly benefit is \$2,560. These members retired at an average age of 62 with 20.30 years of service credit.

Decile	Number of Benefit Recipients <sup>1</sup>	Percent of Benefit Recipients	Average Monthly Benefit <sup>2</sup>	Average Age at Retirement	Average Service Credit
1%–10%	40,154	33.99%	\$990	60	14.05
11%–20%	15,895	13.45%	2,381	58	21.75
21%–30%	12,156	10.29%	3,114	58	24.86
31%–40%	10,170	8.61%	3,722	58	27.03
41%–50%	8,831	7.47%	4,287	57	28.65
51%–60%	7,854	6.65%	4,820	57	29.85
61%–70%	7,069	5.98%	5,355	57	30.72
71%–80%	6,386	5.40%	5,928	57	31.40
81%–90%	5,596	4.74%	6,764	57	32.22
91%–100%	4,047	3.42%	8,888	58	33.26
<b>Total</b>	<b>118,158</b>	<b>100.00%</b>	<b>3,204</b>	<b>58</b>	<b>22.91</b>

<sup>1</sup> Does not include 322 deferred survivors.

<sup>2</sup> Includes amounts paid under replacement benefit arrangements.

### Average Monthly Benefit Payment by Years of Service Credit



## SCHEDULE OF RETIREES AND SURVIVORS BY TYPES OF BENEFITS

As of December 31, 2017

**Types of Benefits**

- 1—Age and service retirement.
- 2—Disability retirement.
- 3—Survivor payment—Option 3.
- 4—Survivor payment—children, spouse, or dependent parent.
- 5—Surviving spouse with future benefit.
- 6—Former member with future benefit.

**Option Selected**

Retirees select one of the following options at retirement:

- 1—Single-life benefit.
- 2—Joint benefit with 1/2 to surviving cobeneficiary.
- 3—Joint and survivor benefit.
- 4—Joint benefit with 1/2 to either survivor. (No longer offered to members retiring.)

**Surviving Cobeneficiary**

Retiree has predeceased the cobeneficiary.

**Surviving Retiree**

Cobeneficiary has predeceased the retiree.

**State Division**

Amount of Monthly Benefit (In Actual Dollars)	Total (Columns 1–5)	Types of Benefits					
		1	2	3	4	5	6
\$1–\$1,000	5,344	4,718	268	22	265	71	4,776
\$1,001–\$2,000	6,868	5,120	1,369	41	288	50	1,508
\$2,001–\$3,000	7,519	6,102	1,263	26	120	8	344
\$3,001–\$4,000	6,502	6,098	315	28	59	2	97
\$4,001–\$5,000	4,823	4,697	91	15	19	1	31
\$5,001+	8,308	8,239	29	30	10	—	27
<b>Total</b>	<b>39,364</b>	<b>34,974</b>	<b>3,335</b>	<b>162</b>	<b>761</b>	<b>132</b>	<b>6,783</b>

Amount of Monthly Benefit <sup>1</sup> (In Actual Dollars)	Option Selected				Surviving Cobeneficiary	Surviving Retiree
	1	2	3	4		
\$1–\$1,000	3,297	315	780	3	563	28
\$1,001–\$2,000	3,679	723	1,060	2	955	70
\$2,001–\$3,000	4,086	997	1,395	4	812	71
\$3,001–\$4,000	3,402	1,121	1,353	1	493	43
\$4,001–\$5,000	2,418	944	1,119	2	281	24
\$5,001+	3,930	1,805	2,159	6	336	32
<b>Total</b>	<b>20,812</b>	<b>5,905</b>	<b>7,866</b>	<b>18</b>	<b>3,440</b>	<b>268</b>

<sup>1</sup> For Types of Benefits 1 and 2 above.

SCHEDULE OF RETIREES AND SURVIVORS BY TYPES OF BENEFITS

As of December 31, 2017

**Types of Benefits**

- 1—Age and service retirement.
- 2—Disability retirement.
- 3—Survivor payment—Option 3.
- 4—Survivor payment—children, spouse, or dependent parent.
- 5—Surviving spouse with future benefit.
- 6—Former member with future benefit.

**Option Selected**

Retirees select one of the following options at retirement:

- 1—Single-life benefit.
- 2—Joint benefit with 1/2 to surviving cobeneficiary.
- 3—Joint and survivor benefit.
- 4—Joint benefit with 1/2 to either survivor. (No longer offered to members retiring.)

**Surviving Cobeneficiary**

Retiree has predeceased the cobeneficiary.

**Surviving Retiree**

Cobeneficiary has predeceased the retiree.

**School Division**

Amount of Monthly Benefit (In Actual Dollars)	Total (Columns 1–5)	Types of Benefits					
		1	2	3	4	5	6
\$1–\$1,000	13,469	12,064	752	41	508	104	13,523
\$1,001–\$2,000	10,339	8,867	1,125	33	276	38	2,363
\$2,001–\$3,000	9,447	8,594	693	15	132	13	390
\$3,001–\$4,000	9,158	8,751	332	18	50	7	106
\$4,001–\$5,000	8,708	8,552	122	13	20	1	37
\$5,001+	13,206	13,140	43	14	8	1	14
<b>Total</b>	<b>64,327</b>	<b>59,968</b>	<b>3,067</b>	<b>134</b>	<b>994</b>	<b>164</b>	<b>16,433</b>

Amount of Monthly Benefit (In Actual Dollars)	Option Selected				Surviving Cobeneficiary	Surviving Retiree
	1	2	3	4		
\$1–\$1,000	9,071	893	1,904	3	877	68
\$1,001–\$2,000	6,346	1,250	1,477	8	837	74
\$2,001–\$3,000	5,516	1,505	1,498	2	683	83
\$3,001–\$4,000	5,531	1,760	1,390	5	359	38
\$4,001–\$5,000	4,993	1,913	1,504	3	238	23
\$5,001+	8,251	2,813	1,855	9	237	18
<b>Total</b>	<b>39,708</b>	<b>10,134</b>	<b>9,628</b>	<b>30</b>	<b>3,231</b>	<b>304</b>

<sup>1</sup> For Types of Benefits 1 and 2 above.

SCHEDULE OF RETIREES AND SURVIVORS BY TYPES OF BENEFITS

As of December 31, 2017

**Types of Benefits**

- 1—Age and service retirement.
- 2—Disability retirement.
- 3—Survivor payment—Option 3.
- 4—Survivor payment—children, spouse, or dependent parent.
- 5—Surviving spouse with future benefit.
- 6—Former member with future benefit.

**Option Selected**

Retirees select one of the following options at retirement:

- 1—Single-life benefit.
- 2—Joint benefit with 1/2 to surviving cobeneficiary.
- 3—Joint and survivor benefit.
- 4—Joint benefit with 1/2 to either survivor. (No longer offered to members retiring.)

**Surviving Cobeneficiary**

Retiree has predeceased the cobeneficiary.

**Surviving Retiree**

Cobeneficiary has predeceased the retiree.

Local Government Division

Amount of Monthly Benefit (In Actual Dollars)	Total (Columns 1–5)	Types of Benefits					
		1	2	3	4	5	6
\$1–\$1,000	1,286	1,175	56	6	40	9	1,656
\$1,001–\$2,000	1,478	1,114	297	8	52	7	686
\$2,001–\$3,000	1,286	1,015	236	10	24	1	267
\$3,001–\$4,000	1,058	977	66	5	9	1	87
\$4,001–\$5,000	824	804	14	5	1	—	32
\$5,001+	1,437	1,425	7	4	1	—	13
<b>Total</b>	<b>7,369</b>	<b>6,510</b>	<b>676</b>	<b>38</b>	<b>127</b>	<b>18</b>	<b>2,741</b>

Amount of Monthly Benefit <sup>1</sup> (In Actual Dollars)	Option Selected				Surviving Cobeneficiary	Surviving Retiree
	1	2	3	4		
\$1–\$1,000	818	90	198	—	121	4
\$1,001–\$2,000	805	163	273	2	156	12
\$2,001–\$3,000	646	210	281	—	102	12
\$3,001–\$4,000	549	213	224	—	52	5
\$4,001–\$5,000	399	175	217	—	27	—
\$5,001+	620	356	409	—	47	—
<b>Total</b>	<b>3,837</b>	<b>1,207</b>	<b>1,602</b>	<b>2</b>	<b>505</b>	<b>33</b>

<sup>1</sup> For Types of Benefits 1 and 2 above.

SCHEDULE OF RETIREES AND SURVIVORS BY TYPES OF BENEFITS

As of December 31, 2017

**Types of Benefits**

- 1—Age and service retirement.
- 2—Disability retirement.
- 3—Survivor payment—Option 3.
- 4—Survivor payment—children, spouse, or dependent parent.
- 5—Surviving spouse with future benefit.
- 6—Former member with future benefit.

**Option Selected**

Retirees select one of the following options at retirement:

- 1—Single-life benefit.
- 2—Joint benefit with 1/2 to surviving cobeneficiary.
- 3—Joint and survivor benefit.
- 4—Joint benefit with 1/2 to either survivor. (No longer offered to members retiring.)

**Surviving Cobeneficiary**

Retiree has predeceased the cobeneficiary.

**Surviving Retiree**

Cobeneficiary has predeceased the retiree.

Judicial Division

Amount of Monthly Benefit (In Actual Dollars)	Total (Columns 1–5)	Types of Benefits					
		1	2	3	4	5	6
\$1–\$1,000	17	15	1	—	—	1	1
\$1,001–\$2,000	28	24	1	—	3	—	2
\$2,001–\$3,000	35	29	3	—	3	—	3
\$3,001–\$4,000	31	25	3	—	3	—	2
\$4,001–\$5,000	35	30	4	—	1	—	1
\$5,001+	230	221	8	1	—	—	—
<b>Total</b>	<b>376</b>	<b>344</b>	<b>20</b>	<b>1</b>	<b>10</b>	<b>1</b>	<b>9</b>

Amount of Monthly Benefit (In Actual Dollars)	Option Selected				Surviving Cobeneficiary	Surviving Retiree
	1	2	3	4		
\$1–\$1,000	6	1	3	—	6	—
\$1,001–\$2,000	11	1	4	—	9	—
\$2,001–\$3,000	5	6	8	—	13	—
\$3,001–\$4,000	8	4	12	—	4	—
\$4,001–\$5,000	10	3	11	—	10	—
\$5,001+	71	54	86	—	18	—
<b>Total</b>	<b>111</b>	<b>69</b>	<b>124</b>	<b>—</b>	<b>60</b>	<b>—</b>

<sup>1</sup> For Types of Benefits 1 and 2 above.

SCHEDULE OF RETIREES AND SURVIVORS BY TYPES OF BENEFITS

As of December 31, 2017

**Types of Benefits**

- 1—Age and service retirement.
- 2—Disability retirement.
- 3—Survivor payment—Option 3.
- 4—Survivor payment—children, spouse, or dependent parent.
- 5—Surviving spouse with future benefit.
- 6—Former member with future benefit.

**Option Selected**

Retirees select one of the following options at retirement:

- 1—Single-life benefit.
- 2—Joint benefit with 1/2 to surviving cobeneficiary.
- 3—Joint and survivor benefit.
- 4—Joint benefit with 1/2 to either survivor. (No longer offered to members retiring.)

**Surviving Cobeneficiary**

Retiree has predeceased the cobeneficiary.

**Surviving Retiree**

Cobeneficiary has predeceased the retiree.

**DPS Division**

Amount of Monthly Benefit (In Actual Dollars)	Total (Columns 1–5)	Types of Benefits					
		1	2	3	4	5	6
\$1–\$1,000	828	689	80	1	54	4	1,120
\$1,001–\$2,000	1,182	1,034	120	1	25	2	382
\$2,001–\$3,000	1,177	1,053	88	14	21	1	70
\$3,001–\$4,000	1,344	1,288	46	7	3	—	15
\$4,001–\$5,000	1,336	1,315	18	3	—	—	—
\$5,001+	1,177	1,172	4	1	—	—	3
<b>Total</b>	<b>7,044</b>	<b>6,551</b>	<b>356</b>	<b>27</b>	<b>103</b>	<b>7</b>	<b>1,590</b>

Amount of Monthly Benefit <sup>2</sup> (In Actual Dollars)	Option Selected <sup>1</sup>					Surviving Cobeneficiary	Surviving Retiree	Cobeneficiaries Both Deceased
	1	2	3	4	5			
\$1–\$1,000	516	24	126	—	72	30	1	
\$1,001–\$2,000	705	87	203	—	108	48	3	
\$2,001–\$3,000	611	97	256	—	106	70	1	
\$3,001–\$4,000	654	118	339	—	141	82	—	
\$4,001–\$5,000	621	112	388	—	119	92	1	
\$5,001+	582	114	353	—	86	41	—	
<b>Total</b>	<b>3,689</b>	<b>552</b>	<b>1,665</b>	<b>—</b>	<b>632</b>	<b>363</b>	<b>6</b>	

<sup>1</sup> Below are the equivalent DPS benefit structure options:

PERA Option 1 = Options A, B, and D (D is discontinued)

PERA Option 2 = Options P2 and E (E is discontinued)

PERA Option 3 = Options P3 and C (C is discontinued)

<sup>2</sup> For Types of Benefits 1 and 2 above.

## SCHEDULE OF AVERAGE BENEFIT PAYMENTS

(In Actual Dollars)

## State Division

Year Retired	Years of Service Credit						
	0-5	5-10	10-15	15-20	20-25	25-30	30+
<b>Period 1/1/2017 to 12/31/2017</b>							
Average monthly benefit	\$233	\$704	\$1,287	\$2,102	\$3,025	\$4,355	\$5,618
Average highest average salary	\$3,134	\$3,869	\$4,312	\$4,860	\$5,532	\$6,465	\$7,162
Number of service retirees	102	238	253	271	338	357	322
<b>Period 1/1/2016 to 12/31/2016</b>							
Average monthly benefit	\$240	\$641	\$1,285	\$2,050	\$2,983	\$4,128	\$5,593
Average highest average salary	\$3,010	\$3,477	\$4,394	\$4,790	\$5,397	\$6,130	\$6,957
Number of service retirees	103	244	233	238	319	357	319
<b>Period 1/1/2015 to 12/31/2015</b>							
Average monthly benefit	\$241	\$770	\$1,339	\$2,111	\$2,934	\$4,121	\$5,232
Average highest average salary	\$2,851	\$4,043	\$4,506	\$4,766	\$5,260	\$6,074	\$6,490
Number of service retirees	82	246	214	222	293	348	324
<b>Period 1/1/2014 to 12/31/2014</b>							
Average monthly benefit	\$228	\$626	\$1,239	\$1,996	\$2,930	\$4,002	\$5,438
Average highest average salary	\$2,960	\$3,421	\$4,046	\$4,609	\$5,351	\$5,904	\$6,642
Number of service retirees	64	204	218	212	278	327	261
<b>Period 1/1/2013 to 12/31/2013</b>							
Average monthly benefit	\$269	\$628	\$1,288	\$1,997	\$2,853	\$4,165	\$5,285
Average highest average salary	\$2,836	\$3,508	\$4,030	\$4,527	\$5,150	\$6,196	\$6,617
Number of service retirees	64	173	151	167	236	296	252
<b>Period 1/1/2012 to 12/31/2012</b>							
Average monthly benefit	\$236	\$634	\$1,259	\$2,121	\$2,855	\$4,126	\$5,035
Average highest average salary	\$2,487	\$3,355	\$4,141	\$4,661	\$5,248	\$5,969	\$6,268
Number of service retirees	60	182	196	206	284	351	343
<b>Period 1/1/2011 to 12/31/2011</b>							
Average monthly benefit	\$160	\$690	\$1,214	\$1,956	\$2,863	\$4,096	\$5,307
Average highest average salary	\$2,254	\$3,425	\$4,027	\$4,413	\$5,181	\$6,002	\$6,661
Number of service retirees	53	184	130	143	237	331	305
<b>Period 1/1/2010 to 12/31/2010</b>							
Average monthly benefit	\$266	\$617	\$1,089	\$2,200	\$2,816	\$4,011	\$5,156
Average highest average salary	\$2,569	\$3,212	\$3,504	\$4,923	\$5,102	\$5,983	\$6,394
Number of service retirees	34	171	127	164	305	430	362
<b>Period 1/1/2009 to 12/31/2009</b>							
Average monthly benefit	\$181	\$530	\$1,160	\$1,952	\$2,848	\$3,974	\$5,087
Average highest average salary	\$2,223	\$2,903	\$3,750	\$4,397	\$5,159	\$5,790	\$6,426
Number of service retirees	25	131	129	143	241	406	361
<b>Period 1/1/2008 to 12/31/2008</b>							
Average monthly benefit	\$271	\$482	\$1,049	\$1,774	\$2,437	\$3,499	\$4,672
Average highest average salary	\$2,730	\$2,686	\$3,608	\$4,319	\$4,716	\$5,428	\$6,031
Number of service retirees	14	123	122	106	276	294	530

Note: As of December 31, 2017, HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate "spiking." Some members of the DPS benefit structure and members in the Judicial Division have different HAS calculations.

**SCHEDULE OF AVERAGE BENEFIT PAYMENTS**  
(In Actual Dollars)

**School Division**

Year Retired	Years of Service Credit						
	0–5	5–10	10–15	15–20	20–25	25–30	30+
<b>Period 1/1/2017 to 12/31/2017</b>							
Average monthly benefit	\$185	\$433	\$925	\$1,582	\$2,418	\$3,794	\$4,891
Average highest average salary	\$1,980	\$2,351	\$3,118	\$3,615	\$4,393	\$5,547	\$6,067
Number of service retirees	159	370	463	485	611	590	428
<b>Period 1/1/2016 to 12/31/2016</b>							
Average monthly benefit	\$127	\$430	\$879	\$1,684	\$2,304	\$3,727	\$4,695
Average highest average salary	\$1,796	\$2,325	\$2,924	\$3,799	\$4,156	\$5,388	\$5,851
Number of service retirees	118	384	388	408	565	589	422
<b>Period 1/1/2015 to 12/31/2015</b>							
Average monthly benefit	\$221	\$436	\$899	\$1,565	\$2,400	\$3,682	\$4,621
Average highest average salary	\$2,015	\$2,317	\$3,058	\$3,538	\$4,322	\$5,347	\$5,741
Number of service retirees	110	372	398	397	544	618	395
<b>Period 1/1/2014 to 12/31/2014</b>							
Average monthly benefit	\$194	\$467	\$939	\$1,661	\$2,407	\$3,726	\$4,778
Average highest average salary	\$2,108	\$2,580	\$3,189	\$3,706	\$4,372	\$5,422	\$5,908
Number of service retirees	106	362	401	392	531	597	465
<b>Period 1/1/2013 to 12/31/2013</b>							
Average monthly benefit	\$201	\$474	\$976	\$1,687	\$2,448	\$3,685	\$4,739
Average highest average salary	\$1,791	\$2,726	\$3,197	\$3,721	\$4,357	\$5,318	\$5,886
Number of service retirees	79	350	339	311	492	571	441
<b>Period 1/1/2012 to 12/31/2012</b>							
Average monthly benefit	\$216	\$473	\$815	\$1,632	\$2,411	\$3,682	\$4,592
Average highest average salary	\$1,696	\$2,575	\$2,800	\$3,546	\$4,368	\$5,370	\$5,791
Number of service retirees	96	365	349	380	534	634	509
<b>Period 1/1/2011 to 12/31/2011</b>							
Average monthly benefit	\$214	\$462	\$806	\$1,625	\$2,430	\$3,617	\$4,632
Average highest average salary	\$1,980	\$2,563	\$2,683	\$3,526	\$4,344	\$5,235	\$5,804
Number of service retirees	71	336	273	334	506	651	497
<b>Period 1/1/2010 to 12/31/2010</b>							
Average monthly benefit	\$212	\$464	\$780	\$1,543	\$2,393	\$3,603	\$4,602
Average highest average salary	\$2,193	\$2,572	\$2,500	\$3,336	\$4,243	\$5,207	\$5,722
Number of service retirees	56	297	252	305	585	755	601
<b>Period 1/1/2009 to 12/31/2009</b>							
Average monthly benefit	\$165	\$440	\$825	\$1,671	\$2,384	\$3,508	\$4,515
Average highest average salary	\$1,928	\$2,311	\$2,663	\$3,512	\$4,246	\$5,047	\$5,632
Number of service retirees	33	268	191	232	459	618	495
<b>Period 1/1/2008 to 12/31/2008</b>							
Average monthly benefit	\$369	\$383	\$706	\$1,238	\$2,183	\$2,994	\$4,313
Average highest average salary	\$2,965	\$2,373	\$2,534	\$2,948	\$4,125	\$4,567	\$5,554
Number of service retirees	22	218	197	156	523	553	847

Note: As of December 31, 2017, HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate "spiking." Some members of the DPS benefit structure and members in the Judicial Division have different HAS calculations.

**SCHEDULE OF AVERAGE BENEFIT PAYMENTS**  
(In Actual Dollars)

**Local Government Division**

Year Retired	Years of Service Credit						
	0–5	5–10	10–15	15–20	20–25	25–30	30+
<b>Period 1/1/2017 to 12/31/2017</b>							
Average monthly benefit	\$240	\$621	\$1,282	\$2,202	\$3,241	\$4,687	\$5,720
Average highest average salary	\$4,224	\$3,889	\$4,675	\$5,056	\$6,165	\$6,969	\$7,260
Number of service retirees	29	60	72	52	78	54	55
<b>Period 1/1/2016 to 12/31/2016</b>							
Average monthly benefit	\$323	\$686	\$1,401	\$2,195	\$2,761	\$4,569	\$5,378
Average highest average salary	\$4,580	\$4,031	\$5,104	\$5,506	\$5,255	\$6,796	\$6,648
Number of service retirees	15	73	77	49	55	52	46
<b>Period 1/1/2015 to 12/31/2015</b>							
Average monthly benefit	\$252	\$663	\$1,202	\$2,255	\$3,152	\$3,970	\$5,814
Average highest average salary	\$3,727	\$4,141	\$4,581	\$5,481	\$5,960	\$5,896	\$7,317
Number of service retirees	16	64	62	36	76	70	60
<b>Period 1/1/2014 to 12/31/2014</b>							
Average monthly benefit	\$241	\$680	\$1,185	\$2,190	\$3,110	\$4,068	\$4,796
Average highest average salary	\$4,005	\$3,912	\$4,206	\$5,106	\$5,805	\$6,299	\$6,037
Number of service retirees	15	87	63	42	61	59	48
<b>Period 1/1/2013 to 12/31/2013</b>							
Average monthly benefit	\$211	\$650	\$1,259	\$2,156	\$2,733	\$4,020	\$5,692
Average highest average salary	\$3,013	\$3,743	\$4,467	\$5,107	\$5,311	\$6,024	\$7,353
Number of service retirees	16	58	47	36	49	73	34
<b>Period 1/1/2012 to 12/31/2012</b>							
Average monthly benefit	\$536	\$839	\$1,264	\$2,524	\$3,095	\$4,323	\$4,943
Average highest average salary	\$4,726	\$4,538	\$4,213	\$5,649	\$5,626	\$6,465	\$6,275
Number of service retirees	27	96	77	83	138	138	99
<b>Period 1/1/2011 to 12/31/2011</b>							
Average monthly benefit	\$338	\$665	\$1,011	\$1,985	\$2,908	\$4,093	\$5,337
Average highest average salary	\$5,959	\$3,988	\$3,469	\$4,616	\$5,333	\$6,070	\$6,712
Number of service retirees	13	48	33	32	42	78	60
<b>Period 1/1/2010 to 12/31/2010</b>							
Average monthly benefit	\$401	\$725	\$1,053	\$1,955	\$2,776	\$4,540	\$5,024
Average highest average salary	\$3,879	\$4,141	\$3,516	\$4,482	\$5,184	\$6,476	\$6,414
Number of service retirees	8	46	32	41	73	116	124
<b>Period 1/1/2009 to 12/31/2009</b>							
Average monthly benefit	\$327	\$579	\$1,496	\$1,991	\$2,869	\$3,712	\$4,755
Average highest average salary	\$2,981	\$3,088	\$4,420	\$4,380	\$5,249	\$5,634	\$5,970
Number of service retirees	9	43	37	35	49	83	90
<b>Period 1/1/2008 to 12/31/2008</b>							
Average monthly benefit	\$485	\$605	\$1,072	\$1,625	\$2,867	\$3,453	\$5,245
Average highest average salary	\$5,531	\$3,547	\$3,832	\$4,043	\$5,522	\$5,503	\$7,011
Number of service retirees	9	42	25	27	45	59	135

Note: As of December 31, 2017, HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate “spiking.” Some members of the DPS benefit structure and members in the Judicial Division have different HAS calculations.

**SCHEDULE OF AVERAGE BENEFIT PAYMENTS**  
(In Actual Dollars)

**Judicial Division**

Year Retired	Years of Service Credit						
	0–5	5–10	10–15	15–20	20–25	25–30	30+
<b>Period 1/1/2017 to 12/31/2017</b>							
Average monthly benefit	\$—	\$1,929	\$3,419	\$6,000	\$—	\$8,369	\$11,366
Average highest average salary	\$—	\$13,295	\$9,786	\$12,308	\$—	\$12,825	\$13,840
Number of service retirees	—	3	3	2	—	8	8
<b>Period 1/1/2016 to 12/31/2016</b>							
Average monthly benefit	\$679	\$1,868	\$3,471	\$5,044	\$5,641	\$8,291	\$10,086
Average highest average salary	\$6,905	\$12,839	\$12,526	\$12,043	\$11,450	\$13,030	\$13,340
Number of service retirees	2	2	1	6	3	7	5
<b>Period 1/1/2015 to 12/31/2015</b>							
Average monthly benefit	\$—	\$—	\$4,012	\$4,158	\$5,913	\$7,635	\$9,227
Average highest average salary	\$—	\$—	\$13,045	\$11,602	\$11,664	\$12,097	\$12,331
Number of service retirees	—	—	2	1	6	4	6
<b>Period 1/1/2014 to 12/31/2014</b>							
Average monthly benefit	\$—	\$1,505	\$2,767	\$4,432	\$6,197	\$7,806	\$7,287
Average highest average salary	\$—	\$9,209	\$10,444	\$10,910	\$11,182	\$12,370	\$9,350
Number of service retirees	—	3	3	1	4	2	3
<b>Period 1/1/2013 to 12/31/2013</b>							
Average monthly benefit	\$—	\$—	\$3,596	\$—	\$—	\$9,561	\$9,427
Average highest average salary	\$—	\$—	\$9,119	\$—	\$—	\$11,271	\$10,871
Number of service retirees	—	—	3	—	—	1	4
<b>Period 1/1/2012 to 12/31/2012</b>							
Average monthly benefit	\$—	\$713	\$3,376	\$4,438	\$7,013	\$6,927	\$2,582
Average highest average salary	\$—	\$4,363	\$10,256	\$8,787	\$12,913	\$10,988	\$3,077
Number of service retirees	—	4	1	2	2	8	1
<b>Period 1/1/2011 to 12/31/2011</b>							
Average monthly benefit	\$—	\$962	\$2,332	\$3,156	\$5,642	\$4,768	\$7,974
Average highest average salary	\$—	\$8,192	\$10,487	\$8,704	\$10,430	\$7,818	\$9,925
Number of service retirees	—	1	2	3	5	3	5
<b>Period 1/1/2010 to 12/31/2010</b>							
Average monthly benefit	\$—	\$—	\$2,246	\$—	\$5,734	\$7,313	\$8,959
Average highest average salary	\$—	\$—	\$7,685	\$—	\$10,717	\$10,602	\$10,999
Number of service retirees	—	—	1	—	1	4	4
<b>Period 1/1/2009 to 12/31/2009</b>							
Average monthly benefit	\$—	\$1,006	\$2,549	\$4,238	\$5,555	\$7,012	\$8,330
Average highest average salary	\$—	\$3,171	\$7,858	\$10,304	\$10,302	\$10,449	\$10,297
Number of service retirees	—	1	2	1	5	3	6
<b>Period 1/1/2008 to 12/31/2008</b>							
Average monthly benefit	\$—	\$—	\$—	\$—	\$5,148	\$8,780	\$7,031
Average highest average salary	\$—	\$—	\$—	\$—	\$9,636	\$11,871	\$9,982
Number of service retirees	—	—	—	—	3	1	3

Note: As of December 31, 2017, HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate “spiking.” Some members of the DPS benefit structure and members in the Judicial Division have different HAS calculations.

**SCHEDULE OF AVERAGE BENEFIT PAYMENTS**  
(In Actual Dollars)

**DPS Division<sup>1</sup>**

Year Retired	Years of Service Credit						
	0–5	5–10	10–15	15–20	20–25	25–30	30+
<b>Period 1/1/2017 to 12/31/2017</b>							
Average monthly benefit	\$176	\$555	\$1,305	\$2,089	\$3,242	\$4,544	\$5,416
Average highest average salary	\$2,466	\$2,926	\$4,325	\$5,263	\$5,682	\$6,625	\$6,835
Number of service retirees	8	59	21	38	52	58	20
<b>Period 1/1/2016 to 12/31/2016</b>							
Average monthly benefit	\$163	\$611	\$1,462	\$1,989	\$3,415	\$4,133	\$5,342
Average highest average salary	\$1,938	\$3,536	\$4,816	\$4,955	\$6,055	\$5,876	\$6,785
Number of service retirees	4	59	40	60	59	56	24
<b>Period 1/1/2015 to 12/31/2015</b>							
Average monthly benefit	\$230	\$702	\$1,588	\$1,994	\$3,147	\$4,159	\$5,254
Average highest average salary	\$1,908	\$4,275	\$5,022	\$4,808	\$5,523	\$7,318	\$6,391
Number of service retirees	12	55	36	37	60	56	19
<b>Period 1/1/2014 to 12/31/2014</b>							
Average monthly benefit	\$472	\$810	\$1,379	\$2,233	\$3,091	\$4,243	\$4,862
Average highest average salary	\$3,399	\$4,593	\$4,489	\$5,569	\$5,607	\$6,250	\$5,891
Number of service retirees	15	39	44	49	72	44	32
<b>Period 1/1/2013 to 12/31/2013</b>							
Average monthly benefit	\$276	\$890	\$1,365	\$1,847	\$3,214	\$4,350	\$5,049
Average highest average salary	\$2,532	\$5,835	\$4,861	\$4,618	\$5,754	\$6,611	\$6,097
Number of service retirees	15	30	31	32	69	57	27
<b>Period 1/1/2012 to 12/31/2012</b>							
Average monthly benefit	\$274	\$840	\$1,507	\$2,099	\$3,032	\$3,589	\$4,568
Average highest average salary	\$2,645	\$4,483	\$4,919	\$5,238	\$5,454	\$5,478	\$5,682
Number of service retirees	8	38	31	42	70	38	33
<b>Period 1/1/2011 to 12/31/2011</b>							
Average monthly benefit	\$1,297	\$996	\$1,479	\$2,060	\$3,373	\$4,188	\$4,290
Average highest average salary	\$2,751	\$4,789	\$4,956	\$4,948	\$5,910	\$6,046	\$5,198
Number of service retirees	8	30	35	38	57	38	26
<b>Period 1/1/2010 to 12/31/2010</b>							
Average monthly benefit	\$1,203	\$867	\$1,386	\$1,943	\$2,870	\$3,971	\$4,710
Average highest average salary	\$3,568	\$4,608	\$4,335	\$5,151	\$5,312	\$5,893	\$5,944
Number of service retirees	5	17	20	25	42	33	30

<sup>1</sup> The DPS Division Trust Fund was established on January 1, 2010, and received the net assets of DPSRS.

Note: As of December 31, 2017, HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate “spiking.” Some members of the DPS benefit structure and members in the Judicial Division have different HAS calculations.

**SCHEDULE OF AVERAGE BENEFIT PAYMENTS**  
(In Actual Dollars)

**All Division Trust Funds<sup>1</sup>**

Year Retired	Years of Service Credit						
	0–5	5–10	10–15	15–20	20–25	25–30	30+
<b>Period 1/1/2017 to 12/31/2017</b>							
Average monthly benefit	\$207	\$553	\$1,088	\$1,819	\$2,707	\$4,102	\$5,302
Average highest average salary	\$2,606	\$3,064	\$3,684	\$4,196	\$4,940	\$6,039	\$6,662
Number of service retirees	298	730	812	848	1,079	1,067	833
<b>Period 1/1/2016 to 12/31/2016</b>							
Average monthly benefit	\$192	\$540	\$1,096	\$1,882	\$2,621	\$3,955	\$5,137
Average highest average salary	\$2,530	\$2,979	\$3,730	\$4,375	\$4,746	\$5,783	\$6,402
Number of service retirees	242	762	739	761	1,001	1,061	816
<b>Period 1/1/2015 to 12/31/2015</b>							
Average monthly benefit	\$231	\$587	\$1,101	\$1,802	\$2,686	\$3,879	\$5,006
Average highest average salary	\$2,445	\$3,198	\$3,753	\$4,112	\$4,848	\$5,738	\$6,225
Number of service retirees	220	737	712	693	979	1,096	804
<b>Period 1/1/2014 to 12/31/2014</b>							
Average monthly benefit	\$229	\$564	\$1,084	\$1,839	\$2,674	\$3,863	\$5,005
Average highest average salary	\$2,620	\$3,135	\$3,641	\$4,207	\$4,875	\$5,674	\$6,165
Number of service retirees	200	695	729	696	946	1,029	809
<b>Period 1/1/2013 to 12/31/2013</b>							
Average monthly benefit	\$233	\$555	\$1,117	\$1,822	\$2,640	\$3,896	\$4,999
Average highest average salary	\$2,352	\$3,196	\$3,644	\$4,111	\$4,747	\$5,710	\$6,229
Number of service retirees	174	611	571	546	846	998	758
<b>Period 1/1/2012 to 12/31/2012</b>							
Average monthly benefit	\$270	\$589	\$1,038	\$1,913	\$2,677	\$3,910	\$4,779
Average highest average salary	\$2,413	\$3,174	\$3,480	\$4,227	\$4,870	\$5,721	\$5,999
Number of service retirees	191	685	654	713	1,028	1,169	985
<b>Period 1/1/2011 to 12/31/2011</b>							
Average monthly benefit	\$265	\$576	\$989	\$1,770	\$2,657	\$3,817	\$4,919
Average highest average salary	\$2,480	\$3,063	\$2,941	\$3,605	\$4,371	\$5,351	\$6,012
Number of service retirees	145	599	473	550	847	1,101	893
<b>Period 1/1/2010 to 12/31/2010<sup>2</sup></b>							
Average monthly benefit	\$292	\$549	\$922	\$1,795	\$2,572	\$3,836	\$4,846
Average highest average salary	\$2,515	\$2,979	\$2,767	\$3,754	\$4,401	\$5,454	\$5,881
Number of service retirees	103	531	432	535	1,006	1,338	1,121
<b>Period 1/1/2009 to 12/31/2009</b>							
Average monthly benefit	\$193	\$482	\$1,024	\$1,802	\$2,585	\$3,703	\$4,779
Average highest average salary	\$2,180	\$2,564	\$3,263	\$3,911	\$4,643	\$5,377	\$5,995
Number of service retirees	67	443	359	411	754	1,110	952
<b>Period 1/1/2008 to 12/31/2008</b>							
Average monthly benefit	\$362	\$439	\$854	\$1,471	\$2,313	\$3,194	\$4,527
Average highest average salary	\$3,405	\$2,602	\$3,009	\$3,553	\$4,411	\$4,915	\$5,859
Number of service retirees	45	383	344	289	847	907	1,515

<sup>1</sup> Data prior to December 31, 2010, does not include the DPS Division.

<sup>2</sup> The DPS Division Trust Fund was established on January 1, 2010, and received the net assets of DPSRS.

Note: As of December 31, 2017, HAS is defined as one-twelfth of the average of the highest annual salaries associated with three periods of 12 consecutive months of service credit. These three periods are tied to a fourth 12-month period which becomes the base year for the year-to-year increase limitation, which is designed to moderate “spiking.” Some members of the DPS benefit structure and members in the Judicial Division have different HAS calculations.

## SCHEDULE OF CONTRIBUTION RATE HISTORY

State Division (Members Other Than State Troopers)<sup>1</sup>

Years			Percent of Covered Payroll			
		Member Contribution Rate	Employer Contribution Rate <sup>2</sup>	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement	Total Contribution Rate
8/1/1931	to	6/30/1938	3.50%	—	—	3.50%
7/1/1938	to	6/30/1949	3.50%	3.50%	—	7.00%
7/1/1949	to	6/30/1958	5.00%	5.00%	—	10.00%
7/1/1958	to	6/30/1969	6.00%	6.00%	—	12.00%
7/1/1969	to	6/30/1970	7.00%	7.00%	—	14.00%
7/1/1970	to	6/30/1971	7.00%	8.00%	—	15.00%
7/1/1971	to	6/30/1973	7.00%	8.50%	—	15.50%
7/1/1973	to	6/30/1974	7.75%	9.50%	—	17.25%
7/1/1974	to	6/30/1975	7.75%	10.50%	—	18.25%
7/1/1975	to	8/31/1980	7.75%	10.64%	—	18.39%
9/1/1980	to	12/31/1981	7.75%	12.20%	—	19.95%
1/1/1982	to	6/30/1987	8.00%	12.20%	—	20.20%
7/1/1987	to	6/30/1988	8.00%	10.20%	—	18.20%
7/1/1988	to	6/30/1991	8.00%	12.20%	—	20.20%
7/1/1991	to	4/30/1992	8.00%	11.60%	—	19.60%
5/1/1992	to	6/30/1992	8.00%	5.60% <sup>3</sup>	—	13.60%
7/1/1992	to	6/30/1993	8.00%	10.60%	—	18.60%
7/1/1993	to	6/30/1997	8.00%	11.60%	—	19.60%
1/1/2006	to	12/31/2006	8.00%	10.15%	0.50%	18.65%
1/1/2007	to	12/31/2007	8.00%	10.15%	1.00%	19.15%
1/1/2008	to	12/31/2008	8.00%	10.15%	1.40%	0.50% 20.05%
1/1/2009	to	12/31/2009	8.00%	10.15%	1.80%	1.00% 20.95%
1/1/2010	to	6/30/2010	8.00%	10.15%	2.20%	1.50% 21.85%
7/1/2010	to	12/31/2010	10.50% <sup>4</sup>	7.65% <sup>4</sup>	2.20%	1.50% 21.85%
1/1/2011	to	12/31/2011	10.50% <sup>4</sup>	7.65% <sup>4</sup>	2.60%	2.00% 22.75%
1/1/2012	to	6/30/2012	10.50% <sup>4</sup>	7.65% <sup>4</sup>	3.00%	2.50% 23.65%
7/1/2012	to	12/31/2012	8.00%	10.15%	3.00%	2.50% 23.65%
1/1/2013	to	12/31/2013	8.00%	10.15%	3.40%	3.00% 24.55%
1/1/2014	to	12/31/2014	8.00%	10.15%	3.80%	3.50% 25.45%
1/1/2015	to	12/31/2015	8.00%	10.15%	4.20%	4.00% 26.35%
1/1/2016	to	12/31/2016	8.00%	10.15%	4.60%	4.50% 27.25%
1/1/2017	to	12/31/2017	8.00%	10.15%	5.00%	5.00% 28.15%

<sup>1</sup> State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

<sup>2</sup> All employer contribution rates shown since July 1, 1985, include the Health Care Trust Fund (HCTF) allocation.

<sup>3</sup> Legislation created an annual reduction equal to 1.0 percent of salary retroactive to July 1, 1991, to be taken during May and June of 1992.

<sup>4</sup> Senate Bills 10-146 and 11-076 required member contributions to increase by 2.50 percent and employer contributions to decrease by 2.50 percent.

## SCHEDULE OF CONTRIBUTION RATE HISTORY

State Troopers<sup>1</sup>

Years	Percent of Covered Payroll					Total Contribution Rate
	Member Contribution Rate	Employer Contribution Rate <sup>2</sup>	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement		
7/1/1945 to 6/30/1969	7.00%	7.00%	—	—	—	14.00%
7/1/1969 to 6/30/1970	8.00%	8.00%	—	—	—	16.00%
7/1/1970 to 6/30/1971	8.00%	9.00%	—	—	—	17.00%
7/1/1971 to 6/30/1973	8.00%	9.50%	—	—	—	17.50%
7/1/1973 to 6/30/1974	8.75%	10.50%	—	—	—	19.25%
7/1/1974 to 6/30/1975	8.75%	11.50%	—	—	—	20.25%
7/1/1975 to 8/31/1980	8.75%	11.64%	—	—	—	20.39%
9/1/1980 to 12/31/1981	8.75%	13.20%	—	—	—	21.95%
1/1/1982 to 6/30/1987	9.00%	13.20%	—	—	—	22.20%
7/1/1987 to 6/30/1988	9.00%	11.20%	—	—	—	20.20%
7/1/1988 to 6/30/1989	9.00%	13.20%	—	—	—	22.20%
7/1/1989 to 4/30/1992	12.30%	13.20%	—	—	—	25.50%
5/1/1992 to 6/30/1992	12.30%	7.20% <sup>3</sup>	—	—	—	19.50%
7/1/1992 to 6/30/1993	11.50%	12.20%	—	—	—	23.70%
7/1/1993 to 6/30/1997	11.50%	13.20%	—	—	—	24.70%
7/1/1997 to 6/30/1999	11.50%	13.10%	—	—	—	24.60%
7/1/1999 to 6/30/2001	10.00%	13.10%	—	—	—	23.10%
7/1/2001 to 6/30/2002	10.00%	12.60%	—	—	—	22.60%
7/1/2002 to 6/30/2003	10.00%	12.74%	—	—	—	22.74%
7/1/2003 to 12/31/2005	10.00%	12.85%	—	—	—	22.85%
1/1/2006 to 12/31/2006	10.00%	12.85%	0.50%	—	—	23.35%
1/1/2007 to 12/31/2007	10.00%	12.85%	1.00%	—	—	23.85%
1/1/2008 to 12/31/2008	10.00%	12.85%	1.40%	0.50%	—	24.75%
1/1/2009 to 12/31/2009	10.00%	12.85%	1.80%	1.00%	—	25.65%
1/1/2010 to 6/30/2010	10.00%	12.85%	2.20%	1.50%	—	26.55%
7/1/2010 to 12/31/2010	12.50% <sup>4</sup>	10.35% <sup>4</sup>	2.20%	1.50%	—	26.55%
1/1/2011 to 12/31/2011	12.50% <sup>4</sup>	10.35% <sup>4</sup>	2.60%	2.00%	—	27.45%
1/1/2012 to 6/30/2012	12.50% <sup>4</sup>	10.35% <sup>4</sup>	3.00%	2.50%	—	28.35%
7/1/2012 to 12/31/2012	10.00%	12.85%	3.00%	2.50%	—	28.35%
1/1/2013 to 12/31/2013	10.00%	12.85%	3.40%	3.00%	—	29.25%
1/1/2014 to 12/31/2014	10.00%	12.85%	3.80%	3.50%	—	30.15%
1/1/2015 to 12/31/2015	10.00%	12.85%	4.20%	4.00%	—	31.05%
1/1/2016 to 12/31/2016	10.00%	12.85%	4.60%	4.50%	—	31.95%
<b>1/1/2017 to 12/31/2017</b>	<b>10.00%</b>	<b>12.85%</b>	<b>5.00%</b>	<b>5.00%</b>	<b>—</b>	<b>32.85%</b>

<sup>1</sup> State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

<sup>2</sup> All employer contribution rates shown since July 1, 1985, include the HCTF allocation.

<sup>3</sup> Legislation created an annual reduction equal to 1.0 percent of salary retroactive to July 1, 1991, to be taken during May and June of 1992.

<sup>4</sup> Senate Bills 10-146 and 11-076 required member contributions to increase by 2.50 percent and employer contributions to decrease by 2.50 percent.

SCHEDULE OF CONTRIBUTION RATE HISTORY

School Division<sup>1</sup>

			Percent of Covered Payroll				
Years			Member Contribution Rate	Employer Contribution Rate <sup>2</sup>	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement	Total Contribution Rate
1/1/1944	to	12/31/1949	3.50%	3.50%	—	—	7.00%
1/1/1950	to	6/30/1958	5.00%	5.00%	—	—	10.00%
7/1/1958	to	6/30/1969	6.00%	6.00%	—	—	12.00%
7/1/1969	to	12/31/1969	7.00%	6.00%	—	—	13.00%
1/1/1970	to	12/31/1970	7.00%	7.50%	—	—	14.50%
1/1/1971	to	12/31/1971	7.00%	8.50%	—	—	15.50%
1/1/1972	to	6/30/1973	7.00%	9.25%	—	—	16.25%
7/1/1973	to	12/31/1973	7.75%	9.25%	—	—	17.00%
1/1/1974	to	12/31/1974	7.75%	10.25%	—	—	18.00%
1/1/1975	to	12/31/1975	7.75%	11.25%	—	—	19.00%
1/1/1976	to	12/31/1980	7.75%	12.10%	—	—	19.85%
1/1/1981	to	12/31/1981	7.75%	12.50%	—	—	20.25%
1/1/1982	to	6/30/1987	8.00%	12.50%	—	—	20.50%
7/1/1987	to	6/30/1988	8.00%	11.50%	—	—	19.50%
7/1/1988	to	6/30/1991	8.00%	12.50%	—	—	20.50%
7/1/1991	to	6/30/1992	8.00%	12.20%	—	—	20.20%
7/1/1992	to	6/30/1997	8.00%	11.60%	—	—	19.60%
1/1/2006	to	12/31/2006	8.00%	10.15%	0.50%	—	18.65%
1/1/2007	to	12/31/2007	8.00%	10.15%	1.00%	—	19.15%
1/1/2008	to	12/31/2008	8.00%	10.15%	1.40%	0.50%	20.05%
1/1/2009	to	12/31/2009	8.00%	10.15%	1.80%	1.00%	20.95%
1/1/2010	to	12/31/2010	8.00%	10.15%	2.20%	1.50%	21.85%
1/1/2011	to	12/31/2011	8.00%	10.15%	2.60%	2.00%	22.75%
1/1/2012	to	12/31/2012	8.00%	10.15%	3.00%	2.50%	23.65%
1/1/2013	to	12/31/2013	8.00%	10.15%	3.40%	3.00%	24.55%
1/1/2014	to	12/31/2014	8.00%	10.15%	3.80%	3.50%	25.45%
1/1/2015	to	12/31/2015	8.00%	10.15%	4.20%	4.00%	26.35%
1/1/2016	to	12/31/2016	8.00%	10.15%	4.50%	4.50%	27.15%
1/1/2017	to	12/31/2017	8.00%	10.15%	4.50%	5.00%	27.65%

<sup>1</sup> State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

<sup>2</sup> All employer contribution rates shown since July 1, 1985, include the HCTF allocation.

State and School Division<sup>1</sup>

Percent of Covered Payroll			
Years		Member Contribution Rate	Employer Contribution Rate <sup>2</sup>
7/1/1997	to	6/30/1998	8.00%
7/1/1998	to	6/30/2000	8.00%
7/1/2000	to	6/30/2001	8.00%
7/1/2001	to	6/30/2002	8.00%
7/1/2002	to	6/30/2003	8.00%
7/1/2003	to	12/31/2005	8.00%
			10.15%

<sup>1</sup> State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

<sup>2</sup> The employer contribution rates shown include the HCTF allocation.

## SCHEDULE OF CONTRIBUTION RATE HISTORY

Local Government Division<sup>1</sup>

Years	Percent of Covered Payroll					Total Contribution Rate
	Member Contribution Rate	Employer Contribution Rate <sup>2</sup>	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement		
1/1/1944 to 12/31/1949	3.50%	3.50%	—	—	—	7.00%
1/1/1950 to 6/30/1958	5.00%	5.00%	—	—	—	10.00%
7/1/1958 to 6/30/1969	6.00%	6.00%	—	—	—	12.00%
7/1/1969 to 12/31/1969	7.00%	6.00%	—	—	—	13.00%
1/1/1970 to 12/31/1970	7.00%	7.00%	—	—	—	14.00%
1/1/1971 to 6/30/1973	7.00%	7.50%	—	—	—	14.50%
7/1/1973 to 12/31/1973	7.75%	7.50%	—	—	—	15.25%
1/1/1974 to 12/31/1974	7.75%	8.50%	—	—	—	16.25%
1/1/1975 to 12/31/1975	7.75%	9.50%	—	—	—	17.25%
1/1/1976 to 12/31/1980	7.75%	9.86%	—	—	—	17.61%
1/1/1981 to 12/31/1981	7.75%	10.20%	—	—	—	17.95%
1/1/1982 to 6/30/1991	8.00%	10.20%	—	—	—	18.20%
7/1/1991 to 12/31/2000	8.00%	10.00%	—	—	—	18.00%
1/1/2001 to 12/31/2001	8.00%	9.43%	—	—	—	17.43%
1/1/2002 to 12/31/2002	8.00%	9.19%	—	—	—	17.19%
1/1/2003 to 12/31/2003	8.00%	9.60%	—	—	—	17.60%
1/1/2004 to 12/31/2005	8.00%	10.00%	—	—	—	18.00%
1/1/2006 to 12/31/2006	8.00%	10.00%	0.50%	—	—	18.50%
1/1/2007 to 12/31/2007	8.00%	10.00%	1.00%	—	—	19.00%
1/1/2008 to 12/31/2008	8.00%	10.00%	1.40%	0.50%	—	19.90%
1/1/2009 to 12/31/2009	8.00%	10.00%	1.80%	1.00%	—	20.80%
1/1/2010 to 12/31/2017	8.00%	10.00%	2.20%	1.50%	—	21.70%

<sup>1</sup> The Local Government Division Trust Fund was the Municipal Division Trust Fund prior to January 1, 2006.

<sup>2</sup> All employer contribution rates shown since July 1, 1985, include the HCTF allocation.

## SCHEDULE OF CONTRIBUTION RATE HISTORY

## Judicial Division

Years			Percent of Covered Payroll				Total Contribution Rate
			Member Contribution Rate	Employer Contribution Rate <sup>1</sup>	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement	
7/1/1949	to	6/30/1957	5.00%	5.00%	—	—	10.00%
7/1/1957	to	6/30/1973	6.00%	12.00%	—	—	18.00%
7/1/1973	to	6/30/1980	7.00%	12.00%	—	—	19.00%
7/1/1980	to	8/30/1980	7.00%	13.00%	—	—	20.00%
9/1/1980	to	12/31/1981	7.00%	15.00%	—	—	22.00%
1/1/1982	to	6/30/1987	8.00%	15.00%	—	—	23.00%
7/1/1987	to	6/30/1988	8.00%	13.00%	—	—	21.00%
7/1/1988	to	6/30/2000	8.00%	15.00%	—	—	23.00%
7/1/2000	to	6/30/2001	8.00%	14.00%	—	—	22.00%
7/1/2001	to	6/30/2003	8.00%	11.82%	—	—	19.82%
7/1/2003	to	6/30/2004	8.00%	12.66%	—	—	20.66%
7/1/2004	to	12/31/2005	8.00%	13.66%	—	—	21.66%
1/1/2006	to	12/31/2006	8.00%	13.66%	0.50%	—	22.16%
1/1/2007	to	12/31/2007	8.00%	13.66%	1.00%	—	22.66%
1/1/2008	to	12/31/2008	8.00%	13.66%	1.40%	0.50%	23.56%
1/1/2009	to	12/31/2009	8.00%	13.66%	1.80%	1.00%	24.46%
1/1/2010	to	6/30/2010	8.00%	13.66%	2.20%	1.50%	25.36%
7/1/2010	to	6/30/2012	10.50% <sup>2</sup>	11.16% <sup>2</sup>	2.20%	1.50%	25.36%
7/1/2012	to	12/31/2017	8.00%	13.66%	2.20%	1.50%	25.36%

<sup>1</sup> All employer contribution rates shown since July 1, 1985, include the HCTF allocation.

<sup>2</sup> Senate Bills 10-146 and 11-076 required member contributions to increase by 2.50 percent and employer contributions to decrease by 2.50 percent.

DPS Division<sup>1</sup>

Years			Percent of Covered Payroll				Total Contribution Rate
			Member Contribution Rate	Employer Contribution Rate <sup>2</sup>	Amortization Equalization Disbursement	Supplemental Amortization Equalization Disbursement	
1/1/2010	to	12/31/2010	8.00%	13.75%	2.20%	1.50%	(15.04%) 10.41%
1/1/2011	to	12/31/2011	8.00%	13.75%	2.60%	2.00%	(14.72%) 11.63%
1/1/2012	to	12/31/2012	8.00%	13.75%	3.00%	2.50%	(15.37%) 11.88%
1/1/2013	to	12/31/2013	8.00%	13.75%	3.40%	3.00%	(14.51%) 13.64%
1/1/2014	to	12/31/2014	8.00%	13.75%	3.80%	3.50%	(16.89%) 12.16%
1/1/2015	to	12/31/2015	8.00%	10.15% <sup>4</sup>	4.20%	4.00%	(15.97%) 10.38%
1/1/2016	to	12/31/2016	8.00%	10.15%	4.50%	4.50%	(15.54%) 11.61%
1/1/2017	to	12/31/2017	8.00%	10.15%	4.50%	5.00%	(14.56%) 13.09%

<sup>1</sup> The DPS Division Trust Fund was established on January 1, 2010, and received the net assets of DPSRS.

<sup>2</sup> All employer contribution rates shown include the DPS HCTF allocation.

<sup>3</sup> An offset to the DPS Division rate is provided for under C.R.S. § 24-51-412. See Note 4 in the Financial Section.

<sup>4</sup> On June 3, 2015, House Bill 15-1391 reduced the employer contribution rate with a retroactive effective date of January 1, 2015.

SCHEDULE OF CONTRIBUTION RATE HISTORY

Employer Contributions to Health Care Trust Funds

Division/Years		Percent of Covered Payroll Allocated from Employer Contribution to Health Care Trust Funds
<b>State Division<sup>1</sup></b>		
7/1/1985	to	6/30/1997
1/1/2006	to	<b>12/31/2017</b>
<b>School Division<sup>1</sup></b>		
7/1/1985	to	6/30/1997
1/1/2006	to	<b>12/31/2017</b>
<b>State and School Division<sup>1</sup></b>		
7/1/1997	to	6/30/1999
7/1/1999	to	12/31/2000
1/1/2001	to	12/31/2001
1/1/2002	to	12/31/2002
1/1/2003	to	6/30/2004
7/1/2004	to	12/31/2005
<b>Local Government Division<sup>2</sup></b>		
7/1/1985	to	6/30/1999
7/1/1999	to	12/31/2000
1/1/2001	to	12/31/2001
1/1/2002	to	12/31/2002
1/1/2003	to	12/31/2003
1/1/2004	to	6/30/2004
7/1/2004	to	<b>12/31/2017</b>
<b>Judicial Division</b>		
7/1/1985	to	6/30/1999
7/1/1999	to	12/31/2000
1/1/2001	to	12/31/2002
1/1/2003	to	12/31/2003
1/1/2004	to	6/30/2004
7/1/2004	to	<b>12/31/2017</b>
<b>DPS Division<sup>3</sup></b>		
1/1/2010	to	<b>12/31/2017</b>

<sup>1</sup> State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

<sup>2</sup> The Local Government Division Trust Fund was the Municipal Division Trust Fund prior to January 1, 2006.

<sup>3</sup> The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Health Benefit Trust.

Employer Contributions to MatchMaker<sup>1</sup>

Division/Years		Percent of Covered Payroll Available from Employer Contribution for MatchMaker (Maximum Match)
<b>State and School Division<sup>2</sup></b>		
1/1/2001	to	12/31/2002
1/1/2003	to	12/31/2003
1/1/2004	to	5/31/2004
<b>Local Government Division<sup>3</sup></b>		
1/1/2001	to	12/31/2001
1/1/2002	to	12/31/2002
1/1/2003	to	12/31/2003
1/1/2004	to	5/31/2004
<b>Judicial Division</b>		
1/1/2001	to	12/31/2002
1/1/2003	to	12/31/2003
1/1/2004	to	5/31/2004

<sup>1</sup> Legislation enacted in 2004 ended MatchMaker contributions by June 1, 2004.

<sup>2</sup> State and School Divisions merged July 1, 1997, and separated on January 1, 2006.

<sup>3</sup> The Local Government Division Trust Fund was the Municipal Division Trust Fund prior to January 1, 2006.

## PRINCIPAL PARTICIPATING EMPLOYERS

### State Division Trust Fund<sup>1,2</sup>

Employer	2017			2014		
	Covered Active Members December 31	Rank	Percentage of Total System	Covered Active Members December 31	Rank	Percentage of Total System
State of Colorado	51,022	1	91.62%	50,508	1	91.33%

<sup>1</sup> Guidance under GASB 67 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2014 is not available.

<sup>2</sup> This schedule was compiled using the definition of an employer as promulgated by GASB 67. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

### School Division Trust Fund<sup>1,2</sup>

Employer	2017			2014		
	Covered Active Members December 31	Rank	Percentage of Total System	Covered Active Members December 31	Rank	Percentage of Total System
Jefferson County School District R-1	12,295	1	10.00%	12,184	1	10.19%
Douglas County School District Re 1	9,100	2	7.40%	8,345	2	6.98%
Cherry Creek School District 5	7,929	3	6.45%	7,670	3	6.41%
Adams-Arapahoe School District 28J	5,271	4	4.29%	5,453	4	4.56%
Adams 12 Five Star Schools	5,075	5	4.13%	5,261	5	4.40%
Boulder Valley School District RE2	4,763	6	3.87%	4,678	6	3.91%
Colorado Springs School District 11	4,448	7	3.62%	4,292	8	3.59%
Poudre School District R-1	4,401	8	3.58%	4,425	7	3.70%
St. Vrain Valley School District RE1J	4,388	9	3.57%	4,189	9	3.50%
Academy School District #20	3,829	10	3.11%	3,660	10	3.06%

<sup>1</sup> Guidance under GASB 67 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2014 is not available.

<sup>2</sup> This schedule was compiled using the definition of an employer as promulgated by GASB 67. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

### Local Government Division Trust Fund<sup>1,2</sup>

Employer	2017			2014		
	Covered Active Members December 31	Rank	Percentage of Total System	Covered Active Members December 31	Rank	Percentage of Total System
City of Colorado Springs	3,271	1	25.61%	3,054	1	25.27%
Boulder County	2,112	2	16.54%	2,067	2	17.11%
City of Boulder	1,566	3	12.26%	1,413	3	11.69%

<sup>1</sup> Guidance under GASB 67 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2014 is not available.

<sup>2</sup> This schedule was compiled using the definition of an employer as promulgated by GASB 67. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

## PRINCIPAL PARTICIPATING EMPLOYERS

### Judicial Division Trust Fund<sup>1,2</sup>

Employer	2017			2014		
	Covered Active Members December 31	Rank	Percentage of Total System	Covered Active Members December 31	Rank	Percentage of Total System
Judicial Department	315	1	94.88%	318	1	95.21%

<sup>1</sup> Guidance under GASB 67 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2014 is not available.

<sup>2</sup> This schedule was compiled using the definition of an employer as promulgated by GASB 67. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

### DPS Division Trust Fund<sup>1,2</sup>

Employer	2017			2014		
	Covered Active Members December 31	Rank	Percentage of Total System	Covered Active Members December 31	Rank	Percentage of Total System
Denver Public School District No. 1	15,991	1	100.00%	15,414	1	100.00%

<sup>1</sup> Guidance under GASB 67 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2014 is not available.

<sup>2</sup> This schedule was compiled using the definition of an employer as promulgated by GASB 67. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

### Health Care Trust Fund<sup>1,2</sup>

Employer	2017		
	Covered Active Members December 31	Rank	Percentage of Total System
State of Colorado	51,022	1	26.60%
Jefferson County School District R-1	12,295	2	6.41%
Douglas County School District Re 1	9,100	3	4.75%
Cherry Creek School District 5	7,929	4	4.13%
Adams-Arapahoe School District 28J	5,271	5	2.75%
Adams 12 Five Star Schools	5,075	6	2.65%
Boulder Valley School District RE2	4,763	7	2.48%
Colorado Springs School District 11	4,448	8	2.32%

<sup>1</sup> New guidance under GASB Statement No. 74 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2017 is not available.

<sup>2</sup> This schedule was compiled using the definition of an employer as promulgated by GASB 74 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

### DPS Health Care Trust Fund<sup>1,2</sup>

Employer	2017		
	Covered Active Members December 31	Rank	Percentage of Total System
Denver Public School District No. 1	15,991	1	100.00%

<sup>1</sup> New guidance under GASB Statement No. 74 classifies a primary government and its component units as one employer. Due to this change, data for the number of members by employer for years prior to 2017 is not available.

<sup>2</sup> This schedule was compiled using the definition of an employer as promulgated by GASB 74 only. For all other purposes, the definition of an employer is governed by Title 24, Article 51 of the C.R.S., PERA's Rules, 8 CCR 1502-1, and, if applicable, the employer's affiliation agreement with PERA.

## SCHEDULE OF AFFILIATED EMPLOYERS

### State Division

#### Agencies and Instrumentalities

CollegeInvest  
College Assist  
Colorado Association of School Boards  
Colorado Association of School Executives  
Colorado Council on the Arts  
Colorado High School Activities Association  
Colorado Public Employees' Retirement Association  
Colorado Water Resources & Power Development Authority  
Colorado Community College System  
Department of Agriculture  
Department of Corrections  
Department of Education  
Department of Health Care Policy and Financing  
Department of Human Services  
Department of Labor and Employment  
Department of Law  
Department of Local Affairs  
Department of Military and Veterans Affairs  
Department of Natural Resources  
Department of Personnel and Administration  
Department of Public Health and Environment  
Department of Public Safety  
Department of Regulatory Agencies  
Department of Revenue  
Department of State  
Department of the Treasury  
Department of Transportation  
Fire and Police Pension Association  
General Assembly  
Joint Budget Committee  
Judicial Department  
Legislative Council  
Office of the District Attorneys  
Office of the Governor  
Office of Legislative Legal Services  
Office of the Lieutenant Governor  
Office of the State Auditor  
Pinnacol Assurance  
School for the Deaf and the Blind  
Special District Association of Colorado  
State Historical Society

#### Institutions of Higher Education

Adams State University  
Aims Community College  
Arapahoe Community College  
Auraria Higher Education Center  
Aurora Community College  
Colorado Mesa University  
Colorado Mountain College  
Colorado Northwestern Community College  
Colorado School of Mines  
Colorado State University  
Colorado State University at Pueblo  
Commission on Higher Education  
Denver Community College  
Fort Lewis College  
Front Range Community College  
Lamar Community College  
Metropolitan State University of Denver  
Morgan Community College  
Northeastern Junior College  
Otero Junior College  
Pikes Peak Community College  
Pueblo Vocational Community College  
Red Rocks Community College  
State Board for Community Colleges and Occupational Education  
Trinidad State Junior College  
University of Colorado  
University of Northern Colorado  
Western State Colorado University

**SCHEDULE OF AFFILIATED EMPLOYERS****School Division<sup>1</sup>****Adams County**

Adams 12 Five Star Schools  
Adams County School District 14  
Bennett School District 29J  
Brighton School District 27J  
Mapleton School District 1  
Strasburg School District 31J  
Westminster Public Schools

**Alamosa County**

Alamosa County School District Re-11J  
Sangre de Cristo School District Re-22J

**Arapahoe County**

Adams-Arapahoe School District 28J  
Byers School District 32J  
Cherry Creek School District 5  
Deer Trail School District 26J  
Englewood School District 1  
Littleton School District 6  
Sheridan School District 2

**Archuleta County**

Archuleta County School District 50 Jt

**Baca County**

Campo School District RE-6  
Pritchett School District RE-3  
Springfield School District RE-4  
Vilas School District RE-5  
Walsh School District RE-1

**Bent County**

Las Animas School District RE-1  
McClave School District RE-2

**Boulder County**

Boulder Valley School District RE2  
St. Vrain Valley School District RE1J

**Chaffee County**

Buena Vista School District R-31  
Salida School District R-32J

**Cheyenne County**

Cheyenne County School District Re-5  
Kit Carson School District R-1

**Clear Creek County**

Clear Creek School District RE-1

**Conejos County**

North Conejos School District RE1J  
Sanford School District 6J  
South Conejos School District RE 10

**Costilla County**

Centennial School District R-1  
Sierra Grande School District R-30

**Crowley County**

Crowley County School District RE-1

**Custer County**

Custer County Consolidated School District C-1

**Delta County**

Delta County School District 50J

**Dolores County**

Dolores County School District Re No. 2

**Douglas County**

Douglas County School District Re 1

**Eagle County**

Eagle County School District Re 50

**Elbert County**

Agate School District 300  
Big Sandy School District 100J  
Elbert School District 200  
Elizabeth School District C-1  
Kiowa School District C-2

**El Paso County**

Academy School District #20  
Calhan School District RJ1  
Cheyenne Mountain School District 12  
Colorado Springs School District 11  
Edison School District 54 Jt  
Ellicott School District 22  
Falcon School District 49  
Fountain School District 8  
Hanover School District 28  
Harrison School District 2  
Lewis-Palmer School District 38  
Manitou Springs School District 14  
Miami/Yoder School District 60 Jt  
Peyton School District 23 Jt  
Widefield School District 3

**Fremont County**

Canon City School District Re-1  
Cotopaxi School District Re-3  
Florence School District Re-2

**Garfield County**

Garfield School District 16  
Garfield School District Re-2  
Roaring Fork School District Re-1

<sup>1</sup> The list of employers in the School Division does not include charter schools operating within the respective public school districts and under the Colorado Charter School Institute.

**SCHEDULE OF AFFILIATED EMPLOYERS****School Division<sup>1</sup> (continued)****Gilpin County**

Gilpin County School District Re-1

**Grand County**

East Grand School District 2

West Grand School District 1

**Gunnison County**

Gunnison Watershed School District Re1J

**Hinsdale County**

Hinsdale County School District Re-1

**Huerfano County**

Huerfano School District Re-1

LaVeta School District Re-2

**Jackson County**

North Park School District R-1

**Jefferson County**

Jefferson County School District R-1

**Kiowa County**

Kiowa County School District RE-1

Plainview School District Re-2

**Kit Carson County**

Arriba-Flagler Consolidated School District No. 20

Bethune School District R-5

Burlington School District Re-6J

Hi-Plains School District R-23

Stratton School District R-4

**Lake County**

Lake County School District R-1

**La Plata County**

Bayfield School District 10Jt-R

Durango School District 9-R

Ignacio School District 11 Jt

**Larimer County**

Estes Park School District

Poudre School District R-1

Thompson School District R-2J

**Las Animas County**

Aguilar Reorganized School District 6

Branson Reorganized School District 82

Hoehne Reorganized School District 3

Kim Reorganized School District 88

Primero Reorganized School District 2

Trinidad School District 1

**Lincoln County**

Genoa/Hugo School District C-113

Karval School District Re 23

Limon School District Re 4J

**Logan County**

Buffalo School District Re-4

Frenchman School District Re-3

Plateau School District Re-5

Valley School District Re-1

**Mesa County**

De Beque School District 49 Jt

Mesa County Valley School District 51

Plateau Valley School District 50

**Mineral County**

Creede Consolidated School District 1

**Moffat County**

Moffat County School District Re No. 1

**Montezuma County**

Dolores School District RE 4A

Mancos School District Re-6

Montezuma-Cortez School District Re 1

**Montrose County**

Montrose County School District Re-1J

West End School District Re-2

**Morgan County**

Brush School District Re-2 (J)

Fort Morgan School District Re-3

Weldon Valley School District Re-20 (J)

Wiggins School District Re-50 (J)

**Otero County**

Cheraw School District 31

East Otero School District R1

Fowler School District R4J

Manzanola School District 3J

Rocky Ford School District R2

Swink School District 33

**Ouray County**

Ouray School District R-1

Ridgway School District R-2

**Park County**

Park County School District Re-2

Platte Canyon School District 1

**Phillips County**

Haxtun School District Re-2J

Holyoke School District Re-1J

<sup>1</sup> The list of employers in the School Division does not include charter schools operating within the respective public school districts and under the Colorado Charter School Institute.

**SCHEDULE OF AFFILIATED EMPLOYERS****School Division<sup>1</sup> (continued)****Pitkin County**

Aspen School District 1

**Prowers County**

Granada School District Re-1

Holly School District Re-3

Lamar School District Re-2

Wiley School District Re-13 Jt

**Pueblo County**

Pueblo City School District 60

Pueblo County Rural School District 70

**Rio Blanco County**

Meeker School District RE1

Rangely School District RE4

**Rio Grande County**

Del Norte School District C-7

Monte Vista School District C-8

Sargent School District Re-33J

**Routt County**

Hayden School District Re 1

South Routt School District Re 3

Steamboat Springs School District Re 2

**Saguache County**

Center Consolidated School District 26 Jt

Moffat School District 2

Mountain Valley School District Re 1

**San Juan County**

Silverton School District 1

**San Miguel County**

Norwood School District R-2J

Telluride School District R-1

**Sedgwick County**

Julesburg School District Re 1

Revere School District Re3

**Summit County**

Summit School District Re 1

**Teller County**

Cripple Creek-Victor School District Re-1

Woodland Park School District RE-2

**Washington County**

Akron School District R-1

Arickaree School District R-2

Lone Star School District 101

Otis School District R-3

Woodlin School District R-104

**Weld County**

Ault-Highland School District Re-9

Briggsdale School District Re-10

Eaton School District Re-2

Gilcrest School District Re-1

Greeley School District 6

Johnstown-Milliken School District Re-5J

Keenesburg School District Re-3

Pawnee School District Re-12

Platte Valley School District Re-7

Prairie School District Re-11

Weld School District Re-8

Windsor School District Re-4

**Yuma County**

Idalia School District RJ-3

Liberty School District J-4

Wray School District RD-2

Yuma School District 1

**Boards of Cooperative Educational Services (BOCES)**

Adams County BOCES

Centennial BOCES

Colorado Digital BOCES

Colorado River BOCES

East Central BOCES

Expeditionary Learning School BOCES

Grand Valley BOCES

Mt. Evans BOCES

Mountain BOCES

Northeast BOCES

Northwest Colorado BOCES

Pikes Peak BOCES

Rio Blanco BOCES

San Juan BOCES

San Luis Valley BOCES

Santa Fe Trail BOCES

South Central BOCES

Southeastern BOCES

Uncompahgre BOCES

Ute Pass BOCES

**Vocational Schools**

Delta-Montrose Area Vocational School

**Other**

Colorado Consortium for Earth and Space Science Education

<sup>1</sup> The list of employers in the School Division does not include charter schools operating within the respective public school districts and under the Colorado Charter School Institute.

**SCHEDULE OF AFFILIATED EMPLOYERS****Local Government Division**

Adams and Jefferson County Hazardous Response Authority  
Alamosa Housing Authority  
Arapahoe Park and Recreation District  
Aurora Housing Authority  
Baca Grande Water & Sanitation District  
Beulah Water Works District  
Black Hawk-Central City Sanitation District  
Blanca-Fort Garland Metropolitan District  
Boulder County  
Boulder County Public Trustee's Office  
Boxelder Sanitation District  
Brush Housing Authority  
Carbon Valley Park & Recreation District  
Castle Pines Metropolitan District  
Castle Pines North Metropolitan District  
Center Housing Authority  
Central Colorado Water Conservancy District  
Cheyenne Wells Housing Authority  
City of Alamosa  
City of Boulder  
City of Castle Pines  
City of Colorado Springs  
City of Fort Morgan  
City of Las Animas  
City of Lone Tree  
City of Manitou Springs  
City of Pueblo  
City of Wray  
City of Yuma  
Clearview Library District  
Collbran Conservancy District  
Colorado District Attorneys' Council  
Colorado First Conservation District  
Colorado Health Facilities Authority  
Colorado Housing and Finance Authority  
Colorado Library Consortium  
Colorado River Fire Protection District  
Colorado School District Self Insurance Pool  
Colorado Springs Utilities  
Columbine Knolls-Grove Metropolitan Recreation District  
Costilla Housing Authority  
County Technical Services, Inc.  
Cucharas Sanitation & Water District  
Douglas County Libraries  
Douglas County Housing Partnership  
Durango Fire Protection District  
East Cheyenne Groundwater Management District  
East Larimer County Water District  
Eastern Rio Blanco Metropolitan Recreation & Park District  
Eaton Housing Authority  
Elbert County Library District  
Elizabeth Park and Recreation District  
El Paso-Teller County Emergency Telephone Service Authority  
Estes Park Housing Authority  
Estes Park Local Marketing District  
Estes Valley Fire Protection District  
Estes Valley Public Library District  
Forest Lakes Metropolitan District  
Fremont Conservation District  
Fremont Sanitation District  
Garfield County Housing Authority  
Grand Junction Regional Airport Authority  
Grand Valley Fire Protection District  
Green Mountain Water and Sanitation District  
GVR Metropolitan District  
Housing Authority of Arriba  
Housing Authority of the City of Boulder  
Housing Authority of the City of Colorado Springs  
Housing Authority of the County of Adams  
Housing Authority of the Town of Limon  
Lamar Housing Authority  
Lamar Utilities Board  
Left Hand Water District  
Longmont Housing Authority  
Longs Peak Water District  
Louisville Fire Protection District  
Meeker Cemetery District  
Meeker Regional Library District  
Meeker Sanitation District  
Montrose Fire Protection District  
Montrose Recreation District  
Monument Sanitation District  
Morgan Conservation District  
Morgan County Quality Water District  
Mountain View Fire Protection District  
Mountain Water and Sanitation District  
Niwot Sanitation District  
North Carter Lake Water District  
North Chaffee County Regional Library  
Northeast Colorado Health Department  
Northeastern Colorado Association of Local Governments  
Park Center Water District  
Pikes Peak Regional Building Department  
Pine Drive Water District  
Plum Creek Water Reclamation Authority  
Pueblo City-County Health Department  
Pueblo Library District  
Pueblo Transit Authority  
Pueblo Urban Renewal Authority  
Rampart Regional Library District  
Rangely Regional Library District  
Red Feather Mountain Library District  
Red, White & Blue Fire Protection District  
Republican River Water Conservation District

SCHEDULE OF AFFILIATED EMPLOYERS

**Local Government Division (continued)**

Rio Blanco Fire Protection District	Town of Firestone
Rio Blanco Water Conservancy District	Town of Lake City
Routt County Conservation District	Town of Lochbuie
Sable-Altura Fire Protection District	Town of Mountain Village
San Luis Valley Development Resources Group	Town of Platteville
San Luis Valley Water Conservancy District	Town of Rico
San Miguel County Public Library	Town of Rye
San Miguel Regional and Telluride Housing Authority	Town of Seibert
Scientific and Cultural Facilities District	Town of Silver Plume
Sheridan Sanitation District #1	Town of Timnath
Soldier Canyon Water Treatment Authority	Tri-County Health Department
Statewide Internet Portal Authority	Tri-Lakes Wastewater Treatment Facility
Steamboat II Water and Sanitation District	Upper Colorado Environmental Plant Center
Strasburg Metropolitan Parks & Recreation District	Upper Thompson Sanitation District
St. Vrain Sanitation District	Washington-Yuma Counties Combined Communications Center
Tabernash Meadows Water and Sanitation District	Weld County Department of Public Health and Environment
Town of Alma	West Greeley Conservation District
Town of Bayfield	Western Rio Blanco Metropolitan Recreation and Park District
Town of Crawford	White River Conservation District
Town of Dinosaur	Wray Housing Authority
Town of Eckley	Yuma Housing Authority
Town of Estes Park	

## SCHEDULE OF AFFILIATED EMPLOYERS

### Judicial Division

1st-22nd District Court	Mineral County Court
Adams County Court	Moffat County Court
Alamosa County Court	Montezuma County Court
Arapahoe County Court	Montrose County Court
Archuleta County Court	Morgan County Court
Baca County Court	Otero County Court
Bent County Court	Ouray County Court
Boulder County Court	Park County Court
Broomfield County Court	Phillips County Court
Chaffee County Court	Pitkin County Court
Cheyenne County Court	Prowers County Court
Clear Creek County Court	Pueblo County Court
Conejos County Court	Rio Blanco County Court
Costilla County Court	Rio Grande County Court
Court of Appeals	Routt County Court
Crowley County Court	Saguache County Court
Custer County Court	San Juan County Court
Delta County Court	San Miguel County Court
Denver County Court	Sedgwick County Court
Denver Juvenile Court	Summit County Court
Denver Probate Court	Supreme Court
Dolores County Court	Teller County Court
Douglas County Court	Washington County Court
Eagle County Court	Weld County Court
Elbert County Court	Yuma County Court
El Paso County Court	
Fremont County Court	
Garfield County Court	
Gilpin County Court	
Grand County Court	
Gunnison County Court	
Hinsdale County Court	
Huerfano County Court	
Jackson County Court	
Jefferson County Court	
Kiowa County Court	
Kit Carson County Court	
Lake County Court	
La Plata County Court	
Larimer County Court	
Las Animas County Court	
Lincoln County Court	
Logan County Court	
Mesa County Court	

### DPS Division<sup>1</sup>

Denver Public School District No. 1

<sup>1</sup> The list of employers in the DPS Division does not include charter schools operating within the Denver Public Schools school district.







**Colorado Public Employees' Retirement Association**  
1301 Pennsylvania Street  
Denver, Colorado 80203  
1-800-759-7372 | [www.copera.org](http://www.copera.org)