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COLORADO PERA

Report on the Actuarial Valuation of the Public Employees' Retirement Association of Colorado

Prepared as of December 31, 2017

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The experience and dedication you deserve

June 18, 2018

The Board of Trustees
Public Employees' Retirement Association of Colorado
1301 Pennsylvania Street
Denver, CO 80203-2386

Dear Trustees:

We are pleased to submit the results of the annual actuarial valuation of the Public Employees' Retirement Association of Colorado (PERA), prepared as of December 31, 2017. The purpose of this report is to provide a summary of the funded status of PERA as of December 31, 2017, to calculate actuarially determined contribution rates based on the Board's Funding Policies and to evaluate the sufficiency of the current statutory contribution rates.

Effective this fiscal year, the Health Care Trust Fund (HCTF) and the Denver Public Schools Health Care Trust Fund (DPS HCTF) were required to comply with the financial reporting requirements under Governmental Accounting Standards Board (GASB) Statement No. 74. The necessary disclosure information has been provided in separate reports.

This valuation reflects several 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 and is included in Schedule J of this report. In addition, a revision of the Defined Benefit Pension Funding Policy was adopted by the Board of Trustees on January 19, 2018 and is included in Schedule I of this report.
- Senate Bill 2018-200 (SB 18-200) was enacted on June 4, 2018. The changes to the Summary of Main Plan Provisions, shown in Schedule G 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
    - 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

The results indicate that the combined employer and member contribution rates are sufficient to fund the normal cost for all members, each division's unfunded accrued liability, the Annual Increase Reserve (AIR) Fund, and provide additional contributions to help finance both Health Care Trust Funds. The resulting amortization periods for each division as of December 31, 2017, with and without recognition of future increases to the Amortization Equalization Disbursement (AED) and the Supplemental Amortization Equalization Disbursement (SAED), are shown in the following table:

	Amortization Period with Current AED & SAED	Amortization Period with Future AED & SAED
State Division	33 years	33 years
School Division	38 years	38 years
Local Government Division	22 years	22 years
Judicial Division	33 years	24 years
Denver Public Schools (DPS) Division	Infinite	Infinite
Health Care Trust Fund (HCTF)	37 years	37 years
DPS Health Care Trust Fund (DPS HCTF)	11 years	11 years

Members who begin membership after December 31, 2019 will be covered by a different benefit structure with a lower normal cost rate, so, as members who began membership prior to January 1, 2020 leave covered employment and are replaced by members in the lower cost benefit structure, the total normal cost rate is expected to decline. As a result, the portion of the total statutory contribution rate available to pay off the UAAL is expected to increase each year in the future until all active members in the valuation are covered by the provisions in the most recent benefit tier. While this is expected to improve the System's financial health in future years, it is impossible to anticipate the long-term funding progress without performing an open group projection of future valuation results. Such projections are performed to assist the Board in evaluating the long-term funding of each division, but the projections are completed after the valuation report is issued.

The December 31, 2017 valuation results for the DPS Division are based upon the current, statutory levels of funding. Colorado statutes call for a "true-up" in 2020, and every five years following, with the expressed purpose of adjusting the total DPS contribution rate to ensure equalization of the ratio of unfunded actuarial accrued liability over payroll between the DPS and School Divisions at the end of the 30-year period beginning January 1, 2010. As such, future levels of funding for the DPS Division may differ from those assumed.

We have prepared the Schedule of Funding Progress and Trend Information shown in the Comprehensive Annual Financial Report, and all supporting schedules, including the Schedule of Active Member Data, the Solvency Test and the Analysis of Financial Experience.

Additional Information and Disclosures

The information contained in this report is intended to be used by PERA for funding purposes for the fiscal year ending on December 31, 2019, and its use for other purposes may not be appropriate. Calculations for purposes other than funding the PERA benefits described in this report may produce significantly different results. These results supersede all December 31, 2017 actuarial valuation results for PERA, including draft versions of this document, issued prior to the date of this report. PERA should rely only on the December 31, 2017 actuarial valuation results and actuarially determined contribution (ADC) rates for the fiscal year ending on December 31, 2019 provided herein.

The results contained in this report were prepared by qualified actuaries according to generally accepted actuarial principles and practices, and in compliance with Actuarial Standards of Practice issued by the Actuarial Standards Board. The promised benefits of PERA are included in the ADC rates which are developed using the entry age normal (level percentage of pay) actuarial cost method. Four-year smoothed market value of assets is used for actuarial valuation purposes. In accordance with the Funding Policies adopted by the Board of Trustees for pension and OPEB benefits, the UAAL is being amortized by regular annual contributions as a level percentage of payroll within a closed 30-year period for the legacy UAAL as of December 31, 2014 for pension benefits, and December 31, 2017 for OPEB benefits. Gains and losses in subsequent years are amortized within a closed 30 year period, on the assumption that payroll will increase by 3.50% annually and each amortization period will decrease by one each year until reaching 0 years. PERA sponsored benefit enhancements and reductions are amortized over the number of years, as determined by the Board, to represent the anticipated duration of payment of the enhancement or, if a reduction, duration of the benefit to the plan. Please see Schedule D of this report for the amortization payment schedule of the legacy UAAL and all subsequent gains and losses.

The measurement of liabilities and assets for PERA sponsored benefit programs used as the basis for much of the information presented in this report was performed as of December 31, 2017 (“the valuation date”) based on the following information provided by PERA and/or PERA’s Third Party Administrators for valuation purposes:

- Census data for active and retired members as of December 31, 2017;
- Current provisions, including changes since December 31, 2016; and,
- Pertinent financial information as of December 31, 2017.

We did not audit the supplied information, but it was reviewed for reasonableness and consistency. In certain situations, the supplied information was adjusted to account for normal differences in collection dates and/or methods. As a result, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it is reliable for the purposes stated herein. The results and conclusions contained in this report depend on the integrity of this information, and if any of the supplied information or analyses change, our results and conclusions may be different and this report may need to be revised. Likewise, this report may need to be revised to reflect any significant event that affects the valuations of PERA sponsored benefit programs subsequent to the valuation date.

Valuation results as of December 31, 2017 are based on the assumptions adopted by the Board of Trustees, which are summarized in various sections of this report. We believe that the actuarial assumptions used to measure PERA obligations and assets as of December 31, 2017 are reasonably related to the actual experience and to the expectations of anticipated experience under the Fund. The actuarial cost method, the asset valuation method, and the amortization methods and amortization periods used for pension and OPEB funding purposes were selected by the Board of Trustees and are prescribed methods for the purposes of the December 31, 2017 actuarial valuations of PERA sponsored benefit programs. We provided guidance concerning the use of these methods, and we believe that they are appropriate for funding purposes.

Future actuarial results may differ significantly from the current results presented in this report 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 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. **This report does not consider all possible scenarios.**

The funded status measurements included in this report are based on the assumptions and methods used to determine the PERA sponsored benefit obligations and asset values as of the valuation date. Funded status measurements for funding purposes may not be appropriate for assessing the sufficiency of PERA assets to cover the estimated cost of settling PERA’s benefit obligations. Likewise, funded status measurements for financial accounting purposes may not be appropriate for assessing the need for or the amount of future actuarially determined contributions. In certain contexts, funded status measurements also would be different if a market value of assets was used in those calculations instead of an actuarial value of assets.

Cavanaugh Macdonald Consulting, LLC does not provide legal, investment, or accounting advice. Thus, the information contained in this report is not intended to supersede or supplant the advice and interpretations of PERA or its legal, investing, or accounting partners.

This is to certify that the independent consulting actuary is a member of the American Academy of Actuaries and has experience in performing valuations for public pension and OPEB plans. The undersigned are familiar with the relevant aspects of pension and/or other postemployment benefit plan valuations and meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained in this report. All sections of this report, including any appendices and attachments, are considered an integral part of the actuarial opinions.

The Table of Contents, which immediately follows, outlines the material contained in the report.

Respectfully submitted,

Edward A. Macdonald, ASA, FCA, MAAA
President

Edward J. Koebel, FCA, EA, MAAA
Principal and Consulting Actuary

Alisa Bennett, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

Jeffrey Gann, FSA, EA, MAAA
Senior Actuary

Table of Contents

Section I – Summary of Principal Results

REPORT ON THE ACTUARIAL VALUATION OF
THE PUBLIC EMPLOYEES' RETIREMENT ASSOCIATION OF COLORADO
PREPARED AS OF DECEMBER 31, 2017

1. For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results for State Division, School Division, Local Government Division, Judicial Division, Denver Public Schools (DPS) Division, the Health Care Trust Fund and the DPS Health Care Trust Fund are summarized below:

SUMMARY OF PRINCIPAL RESULTS FOR STATE DIVISION
($ IN THOUSANDS)

VALUATION DATE	12/31/2017	12/31/2016
Number of Active Members		
Non-Troopers	54,814	54,889
Troopers	872	836
Total	55,686	55,725
Annual Reported Payroll		
Non-Troopers	$ 2,696,006	$ 2,637,890
Troopers	78,201	72,761
Total	$ 2,774,207	$ 2,710,651
Number of Retired Members and Survivors	39,364	38,140
Annual Retirement Benefits	$ 1,575,960	$ 1,518,223
Total Assets:		
Actuarial Value	$ 14,256,410	$ 14,026,332
Market Value	$ 15,105,378	$ 13,538,772
Actuarial Accrued Liability	$ 24,782,085	$ 25,669,916
Unfunded Actuarial Accrued Liability (UAAL)	$ 10,525,675	$ 11,643,584
Actuarial Value Funded Ratio	57.5%	54.6%
CONTRIBUTIONS FOR YEAR ENDING	**12/31/2019**	**12/31/2018**
Employer Contribution Rate:		
Total Normal Cost Rate	10.72%	10.87%
Less Member Contribution Rate	(8.43)%	(8.05)%
Employer Normal Cost Rate	2.29%	2.82%
UAAL Contribution Rate	20.99%	23.48%
Actuarially Determined Contribution	23.28%	26.30%
Reduction for AED and SAED	(10.00)%	(10.00)%
Total Employer Contribution Rate	13.28%	16.30%
Equivalent Single Amortization Period*	26 years	27 years

*The equivalent single amortization period for the State Division reflects an adjustment for the impact of AED and SAED contributions received from employers on the estimated pensionable payroll of employees electing to participate in the defined contribution plan.

SUMMARY OF PRINCIPAL RESULTS FOR SCHOOL DIVISION
($ IN THOUSANDS)

VALUATION DATE	12/31/2017	12/31/2016
Number of Active Members	122,990	121,945
Annual Reported Payroll	$ 4,471,357	$ 4,349,320
Number of Retired Members and Survivors	64,327	62,102
Annual Retirement Benefits	$ 2,365,336	$ 2,284,090
Assets:		
Actuarial Value	$ 23,780,045	$ 23,263,344
Market Value	$ 25,204,920	$ 22,465,388
Actuarial Accrued Liability	$ 40,046,215	$ 41,352,968
Unfunded Actuarial Accrued Liability (UAAL)	$ 16,266,170	$18,089,624
Actuarial Value Funded Ratio	59.4%	56.3%
CONTRIBUTIONS FOR YEAR ENDING	**12/31/2019**	**12/31/2018**
Employer Contribution Rate:		
Total Normal Cost Rate	12.00%	12.22%
Less Employee Contribution Rate	(8.38)%	(8.00)%
Employer Normal Cost Rate	3.62%	4.22%
UAAL Contribution Rate	19.97%	22.58%
Actuarially Determined Contribution	23.59%	26.80%
Reduction for AED and SAED	(10.00)%	(10.00)%
Total Employer Contribution Rate	13.59%	16.80%
Equivalent Single Amortization Period	28 years	28 years

SUMMARY OF PRINCIPAL RESULTS FOR LOCAL GOVERNMENT DIVISION
($ IN THOUSANDS)

VALUATION DATE	12/31/2017	12/31/2016
Number of Active Members	12,770	12,736
Annual Reported Payroll	$ 632,768	$ 608,223
Number of Retired Members and Survivors	7,369	7,065
Annual Retirement Benefits	$ 277,273	$ 264,510
Assets:		
Actuarial Value	$ 4,009,413	$ 3,879,197
Market Value	$ 4,249,852	$ 3,748,369
Actuarial Accrued Liability	$ 5,045,932	$ 5,213,052
Unfunded Actuarial Accrued Liability (UAAL)	$ 1,036,519	$ 1,333,855
Actuarial Value Funded Ratio	79.5%	74.4%
CONTRIBUTIONS FOR YEAR ENDING	**12/31/2019**	**12/31/2018**
Employer Contribution Rate:		
Total Normal Cost Rate	10.22%	10.36%
Less Employee Contribution Rate	(8.38)%	(8.00)%
Employer Normal Cost Rate	1.84%	2.36%
UAAL Contribution Rate	8.91%	11.91%
Actuarially Determined Contribution	10.75%	14.27%
Reduction for AED and SAED	(3.70)%	(3.70)%
Total Employer Contribution Rate	7.05%	10.57%
Equivalent Single Amortization Period	28 years	28 years

Section I – Summary of Principal Results

SUMMARY OF PRINCIPAL RESULTS FOR JUDICIAL DIVISION
($ IN THOUSANDS)

VALUATION DATE	**12/31/2017**	**12/31/2016**
Number of Active Members	332	335
Annual Reported Payroll	$ 48,948	$ 48,700
Number of Retired Members and Survivors	376	361
Annual Retirement Benefits	$ 25,840	$ 23,926
Assets:		
Actuarial Value	$ 310,085	$ 297,888
Market Value	$ 328,459	$ 287,888
Actuarial Accrued Liability	$ 428,108	$ 447,117
Unfunded Actuarial Accrued Liability (UAAL)	$ 118,023	$ 149,229
Actuarial Value Funded Ratio	72.4%	66.6%
CONTRIBUTIONS FOR YEAR ENDING	**12/31/2019**	**12/31/2018**
Employer Contribution Rate:		
Total Normal Cost Rate	17.03%	18.50%
Less Employee Contribution Rate	(8.38)%	(8.00)%
Employer Normal Cost Rate	8.65%	10.50%
UAAL Contribution Rate	13.25%	16.76%
Actuarially Determined Contribution	21.90%	27.26%
Reduction for AED and SAED	(8.88)%	(8.77)%
Total Employer Contribution Rate	13.02%	18.49%
Equivalent Single Amortization Period	28 years	28 years

Section I – Summary of Principal Results

SUMMARY OF PRINCIPAL RESULTS FOR DENVER PUBLIC SCHOOLS DIVISION
($ IN THOUSANDS)

VALUATION DATE	12/31/2017	12/31/2016
Number of Active Members		
DPS Benefit Structure	3,246	3,586
PERA Benefit Structure	12,745	12,364
Total	15,991	15,950
Annual Reported Payroll		
DPS Benefit Structure	$ 202,547	$ 220,511
PERA Benefit Structure	455,651	421,666
Total	$ 658,198	$ 642,177
Number of Retired Members and Survivors	7,044	6,941
Annual Retirement Benefits	$ 273,762	$ 269,039
Assets:		
Actuarial Value	$ 3,257,770	$ 3,220,935
Market Value	$ 3,452,667	$ 3,108,233
Actuarial Accrued Liability	$ 4,088,526	$ 4,246,430
Unfunded Actuarial Accrued Liability (UAAL)	$ 830,756	$ 1,025,495
Actuarial Value Funded Ratio	79.7%	75.9%
CONTRIBUTIONS FOR YEAR ENDING	**12/31/2019**	**12/31/2018**
Employer Contribution Rate:		
Total Normal Cost Rate	12.69%	12.89%
Less Employee Contribution Rate	(8.38)%	(8.00)%
Employer Normal Cost Rate	4.31%	4.89%
UAAL Contribution Rate	6.83%	8.61%
Actuarially Determined Contribution	11.14%	13.50%
Reduction for AED and SAED	(10.00)%	(10.00)%
Total Employer Contribution Rate	1.14%	3.50%
Equivalent Single Amortization Period	28 years	28 years

Section I – Summary of Principal Results

SUMMARY OF PRINCIPAL RESULTS FOR HEALTH CARE TRUST FUND
($ IN THOUSANDS)

VALUATION DATE	12/31/2017	12/31/2016
Number of Active Members	191,778	190,741
Annual Reported Payroll	$ 7,927,280	$ 7,716,894
Number of Retired Members and Survivors	56,474	55,789
Assets:		
Actuarial Value	$ 260,282	$ 270,150
Market Value	$ 276,222	$ 260,228
Actuarial Accrued Liability	$1,581,222	$1,556,762
Unfunded Actuarial Accrued Liability (UAAL)	$1,320,940	$1,286,612
Actuarial Value Funded Ratio	16.5%	17.4%
CONTRIBUTIONS FOR YEAR ENDING	**12/31/2019**	**12/31/2018**
Employer Contribution Rate:		
Normal Cost Rate	0.23%	0.24%
UAAL Contribution Rate	0.88%	0.88%
Actuarially Determined Contribution (ADC)	1.11%	1.12%
Equivalent Single Amortization Period	30 years	30 years

Section I – Summary of Principal Results

SUMMARY OF PRINCIPAL RESULTS FOR DPS HEALTH CARE TRUST FUND
($ IN THOUSANDS)

VALUATION DATE	12/31/2017	12/31/2016
Number of Active Members	15,991	15,950
Annual Reported Payroll	$ 658,198	$ 642,177
Number of Retired Members and Survivors	3,816	3,885
Assets:		
Actuarial Value	$ 21,117	$ 18,945
Market Value	$ 22,308	$ 18,337
Actuarial Accrued Liability	$ 70,292	$ 72,845
Unfunded Actuarial Accrued Liability (UAAL)	$ 49,175	$ 53,900
Actuarial Value Funded Ratio	30.0%	26.0%
CONTRIBUTIONS FOR YEAR ENDING	**12/31/2019**	**12/31/2018**
Employer Contribution Rate:		
Normal Cost Rate	0.21%	0.23%
UAAL Contribution Rate	0.39%	0.44%
Actuarially Determined Contribution (ADC)	0.60%	0.67%
Equivalent Single Amortization Period	30 years	30 years

2. Comments on the valuation results as of December 31, 2017 are given in Section IV and further discussion of the contribution levels is set out in Section V.

3. The valuation takes into account the effect of amendments to the PERA and DPS benefit structures through the valuation date. The Main Provisions of PERA and DPS, as summarized in Schedule G, were taken into account in the current valuation. This valuation reflects several 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 and is included in Schedule J of this report. In addition, a revision of the Defined Benefit Pension Funding Policy was adopted by the Board of Trustees on January 19, 2018 and is included in Schedule I of this report.
   - Senate Bill 2018-200 (SB 18-200) was enacted on June 4, 2018. The changes to the Summary of Main Plan Provisions, shown in Schedule G 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
  - 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

The following table shows the change in the Unfunded Actuarial Accrued Liability (UAAL), the decrease in the Actuarially Determined Contribution (ADC) and the decrease in the amortization period as a result of the change in main plan provisions from SB 18-200 described above:

Division	Change in UAAL ($ in millions)	Change in ADC	Change in Amortization Period*
State	$(1,592.7)	(3.76)%	(35.0) years
School	$(2,632.3)	(3.93)%	N/A
Local Government	$(325.9)	(3.40)%	(16.7) years
Judicial	$(34.4)	(5.90)%	N/A
DPS	$(247.0)	(2.57)%	N/A
Total	$(4,832.3)	N/A	N/A

* Three of the Divisions had an infinite period before the plan changes so the change in the amortization period cannot be measured.

3. Schedule E of this report outlines the full set of actuarial assumptions and methods used in the current valuation. In addition to the assumption changes made to reflect the provisions of SB 18-200, the following changes have been made to certain assumptions since the previous valuation of the HCTF and DPS HCTF:

Assumption Changes

- Initial per capita health care costs for those PERACare enrollees under the PERA Benefit Structure who are expected to be age 65 and older 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 applicable to Medicare Part A premiums were revised to reflect the current expectation of future increases in Medicare Part A premiums.

The following table shows the change in the Unfunded Actuarial Accrued Liability (UAAL), the Actuarially Determined Contribution (ADC), and the amortization period as a result of the change in methods and assumptions described above:

Plan	Change in UAAL ($ in millions)	Change in ADC	Change in Amortization Period
HCTF	$21.6	0.03%	None
DPS HCTF	$1.0	0.01%	None

4. A complete breakdown of the amortization payments of the Unfunded Actuarial Accrued Liability (UAAL) is provided in Schedule D. For the pension divisions and the HCTFs, this schedule is based on the Funding Policies adopted by the Board of Trustees for the PERA pension and OPEB plans.

5. On a Market Value of Assets basis, the Plan's investment return for 2017 was 18.11%, resulting in an investment gain when compared to the Plan's assumed investment return for 2017 of 7.25%. However, as the Plan recognizes 25% of each year's investment gains or losses, only a portion of this investment gain will be recognized in the development of the December 31, 2017 Actuarial Value of Assets (AVA), along with the amounts deferred from the prior three years. As the investment gains and losses to be recognized in the December 31, 2017 AVA were, in aggregate, gains, the investment return on an AVA basis was actually 0.40% higher than the assumed investment return for 2017 of 7.25%, or 7.65%. Schedule B shows the development of the Actuarial Value of Assets. The following table shows the decrease in the UAAL as a result of the AVA return being higher than the assumed rate for 2017 of 7.25%:

Group	Change in UAAL ($ in millions)
State Division	$(50.7)
School Division	$(94.6)
Local Government Division	$(17.6)
Judicial Division	$(1.4)
DPS Division	$(11.2)
Total Pension Divisions	$(175.5)
HCTF	$(0.6)
DPS HCTF	$(0.1)
Total HCTFs	$(0.7)

6. The net demographic experience for all divisions was an actuarial loss. The main causes of the actuarial losses were retirement (more retirements than expected) and withdrawal (fewer terminations than expected) experience. These losses were offset by gains on salary increases, which were lower than expected for all divisions. In addition, there was a small gain on mortality experience (more retiree deaths than expected). Please refer to pages 44 and 45 of this report for a complete breakdown of actuarial gains and losses by division.

7. Actual contributions during the fiscal year ending December 31, 2017 to fund pension benefits were less than the Actuarially Determined Contribution (ADC), resulting in an increase to the UAAL. Based upon the valuation results, the total increase in the December 31, 2017 pension UAAL due to contributions, in aggregate, being less than the ADC, was $195.2 million. The HCTF received payroll contributions below the ADC, however, members' purchased service transfers made-up the difference. The DPS HCTF contributions continue to exceed the ADC, resulting in a decrease to the expected UAAL.

8. 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 during 2011, 2012 and 2013. The amount of the credit for the 2019 calendar year is 14.00% of salary. This credit is expected to decline as a percentage of active member payroll, as currently structured, resulting in an expected amortization period below 30 years. Colorado statutes call for a "true-up" in 2020, and every five years following, with the expressed purpose of adjusting the total DPS Contribution Rate to ensure equalization of the

ratio of unfunded actuarial accrued liability over payroll between the DPS and School Divisions at the end of the 30-year period that began January 1, 2010.

9. For benefit recipients of the PERA Benefit Structure with a membership date after December 31, 2006, the liabilities associated with future post-retirement benefit increases are assumed to be limited to the market value of the Annual Increase Reserve (AIR), as these future post-retirement benefit increases are granted only to the extent affordable in accordance with Colorado Statutes. This assumption was adopted as of the December 31, 2007 actuarial funding valuation in recognition of annual post-retirement benefit increase provisions enacted in 2006. As such, the assets and liabilities associated with post-retirement benefit increases financed by the AIR are excluded from the assets and liabilities presented in this report.

10. As shown in the Summary of Principal Results, the funded ratio is the ratio of the actuarial value of assets to the actuarial accrued liability and is different based on market value of assets. The funded ratio is an indication of progress in funding the promised benefits. Since the ratio is less than 100%, there is a need for additional contributions toward payment of the unfunded actuarial accrued liability. In addition, this funded ratio does not have any relationship to measuring sufficiency if the plan had to settle its liabilities.

Section II – Membership Data

1. The membership data used as the basis for the valuation were furnished by PERA. The following table shows the number of active members and their annual reported payroll as of December 31, 2017 on the basis of which the valuation was prepared.

THE NUMBER AND ANNUAL REPORTED PAYROLL OF ACTIVE MEMBERS AS OF DECEMBER 31, 2017 ($ IN THOUSANDS)

GROUP	NUMBER	ANNUAL REPORTED PAYROLL
State Division	55,686	$ 2,774,207
School Division	122,990	4,471,357
Local Government Division	12,770	632,768
Judicial Division	332	48,948
Denver Public Schools Division	15,991	658,198
Total	207,769	$ 8,585,478

2. The following table shows a ten-year history of active member valuation data.

SCHEDULE OF TOTAL ACTIVE MEMBER VALUATION DATA*

VALUATION DATE	NUMBER	ANNUAL REPORTED PAYROLL ($ IN THOUSANDS)	AVERAGE ANNUAL REPORTED PAYROLL	% CHANGE IN AVERAGE PAYROLL
12/31/2017	207,769	$ 8,585,478	$ 41,322	2.18%
12/31/2016	206,691	8,359,071	40,442	1.75%
12/31/2015	203,969	8,106,660	39,745	3.37%
12/31/2014	202,750	7,795,670	38,450	2.21%
12/31/2013	200,183	7,530,220	37,617	1.54%
12/31/2012	196,435	7,277,585	37,048	(0.86)%
12/31/2011	199,741	7,464,242	37,370	0.12%
12/31/2010	201,095	7,506,193	37,327	0.72%
12/31/2009	190,206	7,048,993	37,060	1.95%
12/31/2008	190,684	6,931,405	36,350	3.43%

* The December 31, 2009 numbers and prior do not include the Denver Public Schools Division which was merged into PERA on January 1, 2010.

3. The following table shows the number and annual retirement benefits payable to retired members and survivors on the rolls of PERA as of the valuation date.

THE NUMBER AND ANNUAL RETIREMENT BENEFITS OF RETIRED MEMBERS AND SURVIVORS OF DECEASED MEMBERS ON THE ROLLS AS OF DECEMBER 31, 2017 ($ IN THOUSANDS)

TYPE OF RETIREMENT	GROUP					
	STATE DIVISION	SCHOOL DIVISION	LOCAL GOVERNMENT DIVISION	JUDICIAL DIVISION	DENVER PUBLIC SCHOOLS DIVISION	TOTAL
Service:						
Number	34,974	59,968	6,510	344	6,551	108,347
Annual Benefits	$1,469,625	$2,275,059	$256,515	$24,453	$262,765	$4,288,417
Avg. Annual Benefits	$42.021	$37.938	$39.403	$71.084	$40.111	$39.580
Avg. Age	71.8	71.4	69.5	74.4	74.5	71.6
Disability:						
Number	3,335	3,067	676	20	356	7,454
Annual Benefits	$84,109	$69,313	$16,875	$1,013	$8,438	$179,748
Avg. Annual Benefits	$25.220	$22.600	$24.963	$50.650	$23.702	$24.114
Avg. Age	69.7	69.6	67.8	73.2	69.2	69.5
Survivors*:						
Number	1,055	1,292	183	12	137	2,679
Annual Benefits	$22,226	$20,964	$3,883	$ 374	$2,559	$50,006
Avg. Annual Benefits	$21.067	$16.226	$21.219	$31.167	$18.679	$18.666
Avg. Age	59.2	59.5	59.2	72.8	67.1	59.8
Total:						
Number	39,364	64,327	7,369	376	7,044	118,480
Annual Benefits	$1,575,960	$2,365,336	$277,273	$25,840	$273,762	$4,518,171
Avg. Annual Benefits	$40.036	$36.771	$37.627	$68.723	$38.865	$38.134
Avg. Age	71.3	71.1	69.1	74.3	74.1	71.2

* Includes deferred survivors

4. Tables in Schedule H show the distribution by age and service of the number and total annual compensation of active members for each division included in the valuation. The tables also show the breakdown of all members for each division by tier.

Section III – Assets

1. Schedule C shows the additions and deductions to PERA's assets for the year preceding the valuation date and a reconciliation of the fund balances at market value. The following table shows the market value of assets for each division as of the last two valuation dates:

COMPARISON OF MARKET VALUE OF ASSETS AT DECEMBER 31, 2017 AND DECEMBER 31, 2016 ($ IN THOUSANDS)

GROUP	DECEMBER 31, 2017 MARKET VALUE	DECEMBER 31, 2016 MARKET VALUE
State Division	$ 15,105,378	$ 13,538,772
School Division	25,204,920	22,465,388
Local Government Division	4,249,852	3,748,369
Judicial Division	328,459	287,888
Denver Public Schools Division	3,452,667	3,108,233
Health Care Trust Fund	276,222	260,228
DPS Health Care Trust Fund	22,308	18,337
Total Market Value of Assets	$ 48,639,806	$ 43,427,215

4. The four-year market related actuarial value of assets used for the current valuation was $45,895,121,604. Schedule B shows the development of the actuarial value of assets as of December 31, 2017. The following table shows the actuarial value of assets for each division as of the last two valuation dates:

COMPARISON OF ACTUARIAL VALUE OF ASSETS AT DECEMBER 31, 2017 AND DECEMBER 31, 2016 ($ IN THOUSANDS)

GROUP	DECEMBER 31, 2017 ACTUARIAL VALUE	DECEMBER 31, 2016 ACTUARIAL VALUE
State Division	$ 14,256,410	$ 14,026,332
School Division	23,780,045	23,263,344
Local Government Division	4,009,413	3,879,197
Judicial Division	310,085	297,888
Denver Public Schools	3,257,770	3,220,935
Health Care Trust Fund	260,282	270,150
DPS Health Care Trust Fund	21,117	18,945
Total Actuarial Value of Assets	$ 45,895,122	$ 44,976,791

Section III – Assets (continued)

5. The estimated dollar-weighted historical returns for market value of assets and actuarial value of assets for the last ten years, as calculated by the actuaries, are as follows:

YEAR ENDING	MARKET VALUE	ACTUARIAL VALUE
December 31, 2017	18.11%	7.65%
December 31, 2016	7.27%	6.95%
December 31, 2015	1.54%	8.60%
December 31, 2014	5.74%	9.04%
December 31, 2013	15.57%	11.09%
December 31, 2012	12.98%	10.94%
December 31, 2011	1.91%	(0.33)%
December 31, 2010	13.84%	0.94%
December 31, 2009	17.14%	0.85%
December 31, 2008	(25.78)%	2.08%

State Division

1. The total valuation balance sheet on account of benefits shows that the State Division has total prospective benefit liabilities of $27,116,746,039, of which $16,740,449,864 is for the prospective benefits payable on account of present retired members and survivors of deceased members, $654,973,073 is for the prospective benefits payable on account of present inactive members, and $9,721,323,102 is for the prospective benefits payable on account of present active members. Against these prospective benefit liabilities the State Division has a total present actuarial value of assets of $14,256,409,942 as of December 31, 2017. The difference of $12,860,336,097 between the total prospective liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of benefits. Of this amount, $1,850,746,758 is the present value of future contributions expected to be made by members (current rate of 8.0% of salary for non-state troopers and 10.0% of salary for state troopers increasing to 10.0% and 12.0%, respectively as a result of the passage of SB 18-200), and the balance of $11,009,589,339 represents the present value of future contributions payable by the employers.

2. The employers' contributions to the State Division on account of benefits consist of four amounts set by statute. The basic amount is 9.13% of salary for non-state troopers and 11.83% of salary for state troopers (after reduction for the Health Care Trust Fund Contribution of 1.02% of salary). These rates will be increasing by 0.25% effective July 1, 2019 as a result of the passage of SB 18-200. For members of the PERA Benefit Structure hired on or after January 1, 2007, an allocation of the statutory rates of 1.00% of salary is made each year to pre-fund the Annual Increase Reserve which provides post-retirement increases for these members in retirement. In addition, an annual direct distribution from the state treasury will be made to the State Division until the Fund is 100% funded. The allocation for each year is estimated at $78.489 million. This additional amount is considered in the number of years to amortize the Unfunded Actuarial Accrued Liability and not included in the employer contribution rate shown on page 30. Lastly, employers will make Amortization Equalization Disbursement (AED) and Supplemental Amortization Equalization Disbursement (SAED) contributions in the future at the following rates:

Year	AED	SAED
2017 and later	5.00	5.00

State Division (continued)

3. The valuation indicates an employer normal cost rate of 2.29% of salary is required to provide the benefits for the State Division. After adjusting for administrative expenses, prospective employer normal costs at this rate have a present value of $483,914,143. When this amount is subtracted from $11,009,589,339, which is the present value of the total future contributions to be made by the employers, there remains $10,525,675,196 as the amount of future actuarial accrued liability contributions.

4. After recognizing the required employer normal cost rates, the remaining basic contribution amounts to 16.51% of salary. Contributions at this level will amortize the unfunded actuarial accrued liability of $10,525,675,196 over 33 years, assuming the aggregate payroll of the State Division increases by 3.50% each year.

5. Effective July 1, 2005, Colorado PERA began receiving employer contributions on compensation paid to PERA retirees who are working at PERA affiliated employers. The employer rate is the total rate within the division, including both AED and SAED. Effective January 1, 2011, Colorado PERA began receiving employee contributions on compensation paid to PERA retirees who are working at PERA affiliated employers. The working retiree does not accrue an additional benefit and is not eligible for a refund of these contributions.

School Division

1. The total valuation balance sheet on account of benefits shows that the School Division has total prospective benefit liabilities of $44,556,350,630, of which $25,861,986,057 is for the prospective benefits payable on account of present retired members and survivors of deceased members, $1,075,553,236 is for the prospective benefits payable on account of present inactive members, and $17,618,811,337 is for the prospective benefits payable on account of present active members. Against these prospective benefit liabilities the School Division has a total present actuarial value of assets of $23,780,045,308 as of December 31, 2017. The difference of $20,776,305,322 between the total prospective liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of benefits. Of this amount, $3,206,120,619 is the present value of future contributions expected to be made by members (current rate of 8.0% of salary increasing to 10.0% of salary as a result of the passage of SB 18-200), and the balance of $17,570,184,703 represents the present value of future contributions payable by the employers.

2. The employers' contributions to the School Division on account of benefits consist of four amounts set by statute. The basic amount is 9.13% of salary (after reduction for the Health Care Trust Fund Contribution of 1.02% of salary). This rate will be increasing by 0.25% effective July 1, 2019 as a result of the passage of SB 18-200. For members of the PERA Benefit Structure hired on or after January 1, 2007, an allocation of the statutory rates of 1.00% of salary is made each year to pre-fund the Annual Increase Reserve which provides post-retirement increases for these members in retirement. In addition, an annual direct distribution from the state treasury will be made to the School Division until the Fund is 100% funded. The allocation for each year is estimated at $126.505 million. This additional amount is considered in the number of years to amortize the Unfunded Actuarial Accrued Liability and not included in the employer contribution rate shown on page 30. Lastly, employers will make Amortization Equalization Disbursement (AED) and Supplemental Amortization Equalization Disbursement (SAED) contributions in the future at the following rates:

Year	AED	SAED
2017	4.50	5.00
2018 and later	4.50	5.50

School Division (continued)

3. The valuation indicates an employer normal cost rate of 3.62% of salary is required to provide the benefits for the School Division. After adjusting for administrative expenses, prospective employer normal costs at this rate have a present value of $1,304,015,509. When this amount is subtracted from $17,570,184,703, which is the present value of the total future contributions to be made by the employers, there remains $16,266,169,194 as the amount of future actuarial accrued liability contributions.

4. After recognizing the required employer normal cost rates, the remaining basic contribution amounts to 15.18% of salary. Contributions at this level will amortize the unfunded actuarial accrued liability of $16,266,169,194 over 38 years, assuming the aggregate payroll of the School Division increases by 3.50% each year.

5. Effective July 1, 2005, Colorado PERA began receiving employer contributions on compensation paid to PERA retirees who are working at PERA affiliated employers. The employer rate is the total rate within the division, including both AED and SAED. Effective January 1, 2011, Colorado PERA began receiving employee contributions on compensation paid to PERA retirees who are working at PERA affiliated employers. The working retiree does not accrue an additional benefit and is not eligible for a refund of these contributions.

Local Government Division

1. The total valuation balance sheet on account of benefits shows that the Local Government Division has total prospective benefit liabilities of $5,539,224,043, of which $3,177,551,189 is for the prospective benefits payable on account of present retired members and survivors of deceased members, $304,974,846 is for the prospective benefits payable on account of present inactive members, and $2,056,698,008 is for the prospective benefits payable on account of present active members. Against these prospective benefit liabilities the Local Government Division has a total present actuarial value of assets of $4,009,412,912 as of December 31, 2017. The difference of $1,529,811,131 between the total prospective liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of benefits. Of this amount, $406,044,850 is the present value of future contributions expected to be made by members (current rate of 8.0% of salary increasing to 10.0% of salary as a result of passage of SB 18-200), and the balance of $1,123,766,281 represents the present value of future contributions payable by the employers.

2. The employers' contributions to the Local Government Division on account of benefits consist of three amounts set by statute. The basic amount is 8.98% of salary (after reduction for the Health Care Trust Fund Contribution of 1.02% of salary). For members of the PERA Benefit Structure hired on or after January 1, 2007, an allocation of the statutory rates of 1.00% of salary is made each year to pre-fund the Annual Increase Reserve which provides post-retirement increases for these members in retirement. In addition, employers will make Amortization Equalization Disbursement (AED) and Supplemental Amortization Equalization Disbursement (SAED) contributions in the future at the following rates:

Year	AED	SAED
2017 and later	2.20%	1.50%

Local Government Division (continued)

3. The valuation indicates an employer normal cost rate of 1.84% of salary is required to provide the benefits for the Local Government Division. After adjusting for administrative expenses, prospective employer normal costs at this rate have a present value of $87,247,178. When this amount is subtracted from $1,123,766,281, which is the present value of the total future contributions to be made by the employers, there remains $1,036,519,103 as the amount of future actuarial accrued liability contributions.

4. After recognizing the required employer normal cost rates, the remaining basic contribution amounts to 10.28% of salary. Contributions at this level will amortize the unfunded actuarial accrued liability of $1,036,519,103 over 22 years, assuming the aggregate payroll of the Local Government Division increases by 3.50% each year.

5. Effective July 1, 2005, Colorado PERA began receiving employer contributions on compensation paid to PERA retirees who are working at PERA affiliated employers. The employer rate is the total rate within the division, including both AED and SAED. Effective January 1, 2011, Colorado PERA began receiving employee contributions on compensation paid to PERA retirees who are working at PERA affiliated employers. The working retiree does not accrue an additional benefit and is not eligible for a refund of these contributions.

Judicial Division

1. The total valuation balance sheet on account of benefits shows that the Judicial Division has total prospective benefit liabilities of $496,097,661, of which $274,800,174 is for the prospective benefits payable on account of present retired members and survivors of deceased members, $2,741,458 is for the prospective benefits payable on account of present inactive members, and $218,556,029 is for the prospective benefits payable on account of present active members. Against these prospective benefit liabilities the Judicial Division has a total present actuarial value of assets of $310,084,726 as of December 31, 2017. The difference of $186,012,935 between the total prospective liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of benefits. Of this amount, $36,656,862 is the present value of future contributions expected to be made by members (current rate of 8.0% of salary increasing to 10.0% of salary as a result of the passage of SB 18-200), and the balance of $149,356,073 represents the present value of future contributions payable by the employers.

2. The employers' contributions to the Judicial Division on account of benefits consist of four amounts set by statute. The basic amount is 12.64% of salary (after reduction for the Health Care Trust Fund Contribution of 1.02% of salary). This rate will be increasing by 0.25% effective July 1, 2019 as a result of the passage of SB 18-200. For members of the PERA Benefit Structure hired on or after January 1, 2007, an allocation of the statutory rates of 1.00% of salary is made each year to pre-fund the Annual Increase Reserve which provides post-retirement increases for these members in retirement. In addition, an annual direct distribution from the state treasury will be made to the Judicial Division until the Fund is 100% funded. The allocation for each year is estimated at $1.385 million. This additional amount is considered in the number of years to amortize the Unfunded Actuarial Accrued Liability and not included in the employer contribution rate shown on page 30. Lastly, employers will make Amortization Equalization Disbursement (AED) and Supplemental Amortization Equalization Disbursement (SAED) contributions in the future at the following rates:

Judicial Division (continued)

Year	AED	SAED
2017 - 2018	2.20%	1.50%
2019*	3.40%	3.40%
2020*	3.80%	3.80%
2021*	4.20%	4.20%
2022*	4.60%	4.60%
2023 and later*	5.00%	5.00%

*Reflects the funding changes made to the Judicial Division in regards to HB17-1265, the Judicial (AED and SAED restart) Funding Bill, that was signed into law on May 25, 2017.

3. The valuation indicates an employer normal cost rate of 8.65% of salary is required to provide the benefits for the Judicial Division. After adjusting for administrative expenses, prospective employer normal costs at this rate have a present value of $31,332,600. When this amount is subtracted from $149,356,073, which is the present value of the total future contributions to be made by the employers, there remains $118,023,473 as the amount of future actuarial accrued liability contributions.

4. After recognizing the required employer normal cost rates, the remaining basic contribution amounts to 10.51% of salary. Contributions at this level will never amortize the unfunded actuarial accrued liability of $118,023,473 over 33 years, assuming the aggregate payroll of the Judicial Division increases by 3.50% each year. After recognizing the value of future increases in AED and SAED contributions, the amortization period is reduced to 24 years.

5. Effective July 1, 2005, Colorado PERA began receiving employer contributions on compensation paid to PERA retirees who are working at PERA affiliated employers. The employer rate is the total rate within the division, including both AED and SAED. Effective January 1, 2011, Colorado PERA began receiving employee contributions on compensation paid to PERA retirees who are working at PERA affiliated employers. The working retiree does not accrue an additional benefit and is not eligible for a refund of these contributions.

Denver Public Schools Division

1. The total valuation balance sheet on account of benefits shows that the Denver Public Schools Division has total prospective benefit liabilities of $4,810,035,433, of which $2,753,468,131 is for the prospective benefits payable on account of present retired members and survivors of deceased members, $113,785,413 is for the prospective benefits payable on account of present inactive members, and $1,942,781,889 is for the prospective benefits payable on account of present active members. Against these prospective benefit liabilities the Denver Public Schools Division has a total present actuarial value of assets of $3,257,769,807 as of December 31, 2017. The difference of $1,552,265,626 between the total prospective liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of benefits. Of this amount, $513,829,016 is the present value of future contributions expected to be made by members (current rate of 8.0% of salary increasing to 10.0% of salary as a result of the passage of SB 18-200), and the balance of $1,038,436,610 represents the present value of future contributions payable by the employers.

2. The employers' contributions to the Denver Public Schools Division on account of benefits consist of four amounts set by statute. The basic amount is 9.13% of salary (after reduction for the DPS Health Care Trust Fund Contribution of 1.02% of salary). This rate will be increasing by 0.25% effective July 1, 2019 as a result of the passage of SB 18-200. For members of the PERA Benefit Structure hired on or after January 1, 2010, an allocation of the statutory rates of 1.00% of salary is made each year to pre-fund the Annual Increase Reserve which provides post-retirement increases for these members in retirement. In addition, an annual direct distribution from the state treasury will be made to the DPS Division until the Fund is 100% funded. The allocation for each year is estimated at $18.621 million. This additional amount is considered in the number of years to amortize the Unfunded Actuarial Accrued Liability and not included in the employer contribution rate shown on page 30. Lastly, employers will make Amortization Equalization Disbursement (AED) and Supplemental Amortization Equalization Disbursement (SAED) contributions in the future at the following rates:

Year	AED	SAED
2017	4.50	5.00
2018 and later	4.50	5.50

Denver Public Schools Division (continued)

3. The valuation indicates an employer normal cost rate of 4.31% of salary is required to provide the benefits for the Denver Public Schools Division. After adjusting for administrative expenses, prospective employer normal costs at this rate have a present value of $207,679,963. When this amount is subtracted from $1,038,436,610, which is the present value of the total future contributions to be made by the employers, there remains $830,756,647 as the amount of future actuarial accrued liability contributions.

4. Actual employer contributions 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 during 2011, 2012 and 2013. The amount of the credit for the 2018 fiscal year is $99,609,045 and for the 2019 fiscal year is $98,304,136 (estimated to be 14.70% of salary for 2018 and 14.00% of salary for 2019), not considering any refinancing that may happen in the future.

5. After recognizing the required employer normal cost rates and the PCOP credit, the remaining basic contribution amounts to 0.32% of salary. Contributions at this level will never amortize the unfunded actuarial accrued liability of $830,756,647, assuming the aggregate payroll of the Denver Public Schools Division increases by 3.50% each year. As currently structured, the PCOP credit is expected to decline as a percentage of active member payroll. Colorado statutes call for a "true-up" in 2020, and every five years following, with the expressed purpose of adjusting the total DPS Contribution rate to ensure equalization of the ratio of unfunded actuarial accrued liability over payroll between the DPS and School Divisions at the end of the 30-year period beginning January 1, 2010.

6. Effective January 1, 2010, Colorado PERA began receiving employer contributions on compensation paid to DPS Benefit Structure retirees who are working at PERA affiliated employers. The employer rate is the total rate within the division, including both AED and SAED. Effective January 1, 2011, Colorado PERA began receiving employee contributions on compensation paid to PERA retirees who are working at PERA affiliated employers. The working retiree does not accrue an additional benefit and is not eligible for a refund of these contributions.

Health Care Trust Fund (HCTF)

1. The total valuation balance sheet on account of health care benefits shows the HCTF has total prospective health care benefit liabilities of $1,707,844,691, of which $1,139,725,125 is for the prospective benefits payable on account of present PERACare enrollees receiving a health care subsidy pursuant to law, $38,434,579 is for the prospective benefits payable on account of present eligible inactive members, and $529,684,987 is for the prospective benefits payable on account of present active members. These amounts are net of any PERACare enrollee premiums required for enrollment in PERACare. Against these prospective health care benefit liabilities, the HCTF has a total present actuarial value of assets of $260,281,736 as of December 31, 2017. The difference of $1,447,562,955 between the total prospective liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of health care benefits. As active members do not contribute to the HCTF, the present value of future contributions payable by employers is $1,447,562,955.

2. The employers' contributions to the HCTF consist of a statutorily mandated 1.02% of salary. The valuation indicates an employer normal cost rate of 0.23% of salary is required to provide the health care benefits funded by the HCTF.

3. At the rate noted in paragraph 2, prospective employer normal costs have a present value of $126,623,016. When this amount is subtracted from $1,447,562,955, which is the present value of the total future contributions to be made by the employers, there remains $1,320,939,939 as the amount of future actuarial accrued liability contributions.

4. After recognizing the required normal cost rate, the remaining contribution amounts to 0.79% of salary. Contributions at this level will amortize the unfunded actuarial accrued liability of $1,320,939,939 over 37 years.

DPS Health Care Trust Fund (DPS HCTF)

1. The total valuation balance sheet on account of health care benefits shows the DPS HCTF has total prospective health care benefit liabilities of $80,539,953, of which $49,898,722 is for the prospective benefits payable on account of present PERACare enrollees receiving a health care subsidy pursuant to law, $897,555 is for the prospective benefits payable on account of present deferred vested members, and $29,743,676 is for the prospective benefits payable on account of present active members. These amounts are net of any PERACare enrollee premiums required for enrollment in PERACare. Against these prospective health care benefit liabilities, the DPS HCTF has a total present actuarial value of assets of $21,117,173 as of December 31, 2017. The difference of $59,422,780 between the total prospective liabilities and the total present actuarial value of assets represents the present value of contributions to be made in the future on account of health care benefits. As active members do not contribute to the DPS HCTF, the present value of future contributions payable by employers is $59,422,780.

2. The employers' contributions to the DPS HCTF consist of a statutorily mandated 1.02% of salary. The valuation indicates an employer normal cost rate of 0.21% of salary is required to provide the health care benefits funded by the DPS HCTF.

3. At the rate noted in paragraph 2, prospective employer normal costs have a present value of $10,247,494. When this amount is subtracted from $59,422,780, which is the present value of the total future contributions to be made by the employers, there remains $49,175,286 as the amount of future actuarial accrued liability contributions.

4. After recognizing the required normal cost rate, the remaining contribution amounts to 0.81% of salary. Contributions at this level will amortize the unfunded actuarial accrued liability of $49,175,286 over 11 years.

Section V – Contributions Payable by Employers (continued)

1. The statutory employer contribution rates for each division are shown in the following table:

Division	Employer Contribution Rate
State	
Non-Troopers	10.15%
Troopers	12.85
School	10.15
Local Government	10.00
Judicial	13.66
Denver Public Schools (DPS)	10.15

SB 18-200 increased employer contribution rates by 0.25% effective July 1, 2019 for State, School, Judicial and DPS Divisions only

2. For each division, 1.02% of the statutory rates shown above are allocated to the Health Care Trust Funds.

3. In addition to the statutory rates shown in paragraph 1, AED contributions and SAED contributions are to be made by all employers in amounts shown in the tables from Section IV. Those amounts are continued in each division until the division's actuarial funded ratio exceeds 103%. At that time, the amount of the AED and SAED will each be reduced by 0.5% of payroll.

4. For the DPS Division, the statutory rates, including AED and SAED contributions are being offset annually by an amount equivalent to that which Denver Public Schools pays to finance principal and interest payments on Pension Certificates of Participation (PCOPs) issued in 1997 and 2008 and refinanced during 2011, 2012 and 2013.

5. Lastly, SB 18-200 initiated an annual Direct Distribution from the state treasury of $225 million, effective July 1, 2018 for State, School, Judicial and DPS Divisions only until each division is 100% funded. Amounts to each division were allocated based on December 31, 2017 annual payroll amounts. These amounts are not reflected in the employer contribution rates on the next page but are considered in the number of years to amortize the unfunded actuarial accrued liability (UAAL).

6. The tables on the following pages show the development of the normal cost rate, the UAAL payment, amortization period and the actuarially determined contribution rate based on the Funding Policy for each division as well as for the Health Care Trust Funds.

Section V – Contributions Payable by Employers (continued)

2019 Employer Contribution Rate
Expressed as Percentage of Active Member Payroll

	State Division	School Division	Local Government Division	Judicial Division	Denver Public Schools Division
Contribution For					
Normal Cost					
Service Retirement Benefits	7.10%	8.33%	6.63%	14.38%	8.33%
Disability Benefits	0.37%	0.24%	0.27%	0.73%	0.31%
Survivor Benefits	0.15%	0.13%	0.15%	0.46%	0.12%
Separation Benefits	2.70%	2.90%	2.77%	1.06%	3.53%
Administrative Expense Load	0.40%	0.40%	0.40%	0.40%	0.40%
Total	10.72%	12.00%	10.22%	17.03%	12.69%
Member Current Contributions*	8.43%	8.38%	8.38%	8.38%	8.38%
Employer Normal Cost	2.29%	3.62%	1.84%	8.65%	4.31%
Employer Contribution Rate*	18.80%	18.80%	12.12%	19.16%	4.63%**
Percent Available to Amortize Unfunded Actuarial Accrued Liability (UAAL)	16.51%	15.18%	10.28%	10.51%	0.32%
Number of Years to Amortize UAAL (reflects the annual direct distribution of $225 million)	33 years	38 years	22 years	33 years	Infinite^
Actuarially Determined Employer Contribution Rate to pay Normal Cost and amortize UAAL based on Funding Policy (in addition to assumed AED and SAED payments throughout the amortization period)	13.28%	13.59%	7.05%	13.02%	1.14%

* Weighted average for State Division and Employer Contribution Rate is adjusted by contributions to the AIR for all divisions. The Employer Contribution rate does not reflect the direct distribution of $225 million from the state treasury.

** For DPS Division:

Employer Statutory	9.65%	(weighted)
AED and SAED	10.00	
DPS HCTF	(1.02)	
PCOP Credit	(14.00)	
Net	4.63%	

*** On both a current contribution basis and with future increases to AED and SAED.

^ The infinite amortization period of the DPS Division reflects the expected level of the DPS Division's 2019 employer contribution offsets resulting from the cost of certain Pension Certificates of Participation (PCOP). As the PCOP offsets are expected to reduce over time, the realized amortization period is expected to be lower if the DPS Division's statutory employer contribution amounts are maintained at their current level. Additionally, Colorado statutes call for a "true-up" in 2020, and every five years following, with the expressed purpose of adjusting the total DPS Division contribution rate to ensure equalization of the ratio of unfunded actuarial accrued liability over payroll between the DPS Division and the School Division as of December 31, 2039. The initial and most recent true-up resulted in an employer contribution rate for the DPS Division of 10.15%, an amount in excess of that indicated by the statutory equalization ratio.

2019 Employer Contribution Rate

Expressed as Percentage of Active Member Payroll

Contribution For	Health Care Trust Fund	DPS Health Care Trust Fund
Normal Cost		
Service Retirement Benefits	0.18%	0.17%
Disability Benefits	0.01%	0.01%
Survivor Benefits	0.00%	0.00%
Separation Benefits	0.04%	0.03%
Total	0.23%	0.21%
Member Current Contributions	0.00%	0.00%
Employer Normal Cost	0.23%	0.21%
Employer Contribution Rate	1.02%	1.02%
Percent Available to Amortize Unfunded Actuarial Accrued Liability (UAAL)	0.79%	0.81%
Number of Years to Amortize UAAL	37 years	11 years
Actuarially Determined Employer Contribution Rate to pay Normal Cost and amortize UAAL over 30 years	1.11%	0.60%

Section VI – Accounting and Historical Funding Information

1. The Governmental Accounting Standards Board (GASB) issued Statement Nos. 67 and 74, which replaced Statement Nos. 25 and 43, respectively. The information required under GASB 67 and GASB 74 are provided in separate reports. However, we have included certain items for informational purposes only. One such item is a distribution of the number of employees by type of membership, as follows:

NUMBER OF ALL MEMBERS*
AS OF DECEMBER 31, 2017

GROUP	NUMBER					
	State Division	School Division	Local Government Division	Judicial Division	Denver Public Schools Division	Total
Retirees and survivors currently receiving benefits	39,364	64,327	7,369	376	7,044	118,480
Terminated employees entitled to benefits but not yet receiving benefits	6,788	16,439	2,741	9	1,596	27,573
Inactive Members	75,350	120,037	23,937	5	10,919	230,248
Active Members						
Vested						
General employees	29,982	66,939	6,020	262	7,052	110,255
State troopers	676	0	0	0	0	676
Non-vested						
General employees	24,832	56,051	6,750	70	8,939	96,642
State troopers	196	0	0	0	0	196
Total Active Members	55,686	122,990	12,770	332	15,991	207,769
Totals	177,188	323,793	46,817	722	35,550	584,070

* Census data as of the December 31, 2017, actuarial valuation for funding purposes which will be used for accounting and financial disclosure for the December 31, 2018 Measurement Date.

NUMBER OF ALL MEMBERS*
AS OF DECEMBER 31, 2017

GROUP	NUMBER		
	Health Care Trust Fund	DPS Health Care Trust Fund	Total
Retirees and survivors currently receiving benefits	56,474	3,816	60,290
Terminated employees entitled to benefits but not yet receiving benefits	25,977	1,596	27,573
Inactive Members	N/A	N/A	N/A
Active Members	191,778	15,991	207,769
Totals	274,229	21,403	295,632

* Census data as of the December 31, 2017, actuarial valuation for funding purposes which will be used for accounting and financial disclosure for the December 31, 2018 Measurement Date

Section VI – Accounting and Historical Funding Information (continued)

Another such item to be disclosed is the schedule of funding progress as shown below.

SCHEDULE OF FUNDING PROGRESS
($ IN THOUSANDS)

Actuarial Valuation Date	Actuarial Value of Plan Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b – a)	Funded Ratio (a / b)	Reported Payroll (c)	UAAL as a Percentage of Reported Payroll ((b – a) / c)
STATE DIVISION						
12/31/2017	$ 14,256,410	$ 24,782,085	$ 10,525,675	57.5%	$ 2,774,207	379.4%
12/31/2016	14,026,332	25,669,916	11,643,584	54.6%	2,710,651	429.5%
12/31/2015	13,882,820	24,085,671	10,202,851	57.6%	2,641,867	386.2%
12/31/2014	13,523,488	23,408,321	9,844,833	57.8%	2,564,670	385.4%
12/31/2013	13,129,460	22,843,725	9,714,265	57.5%	2,474,965	392.5%
12/31/2012	12,538,675	21,191,495	8,652,820	59.2%	2,384,934	362.8%
12/31/2011	12,010,045	20,826,543	8,816,498	57.7%	2,393,791	368.3%
12/31/2010	12,791,946	20,356,176	7,564,230	62.8%	2,392,080	316.2%
12/31/2009	13,382,736	19,977,217	6,594,481	67.0%	2,384,137	276.6%
12/31/2008	13,914,371	20,498,668	6,584,297	67.9%	2,371,639	277.6%
SCHOOL DIVISION						
12/31/2017	$ 23,780,045	$ 40,046,215	$ 16,266,170	59.4%	$ 4,471,357	363.8%
12/31/2016	23,263,344	41,352,968	18,089,624	56.3%	4,349,320	415.9%
12/31/2015	22,871,661	37,677,153	14,805,492	60.7%	4,235,290	349.6%
12/31/2014	22,143,356	36,386,532	14,243,176	60.9%	4,063,236	350.5%
12/31/2013	21,369,380	35,437,312	14,067,932	60.3%	3,938,650	357.2%
12/31/2012	20,266,574	32,619,033	12,352,459	62.1%	3,819,066	323.4%
12/31/2011	19,266,110	31,986,199	12,720,089	60.2%	3,821,603	332.8%
12/31/2010	20,321,736	31,339,754	11,018,018	64.8%	3,900,662	282.5%
12/31/2009	21,054,910	30,412,815	9,357,905	69.2%	3,922,175	238.6%
12/31/2008	21,733,329	31,000,202	9,266,873	70.1%	3,804,927	243.5%
LOCAL GOVERNMENT DIVISION						
12/31/2017	$ 4,009,413	$ 5,045,932	$ 1,036,519	79.5%	$ 632,768	163.8%
12/31/2016	3,879,197	5,213,052	1,333,855	74.4%	608,223	219.3%
12/31/2015	3,777,161	4,780,698	1,003,537	79.0%	561,518	178.7%
12/31/2014	3,629,400	4,610,967	981,567	78.7%	540,468	181.6%
12/31/2013	3,291,298	4,502,282	1,210,984	73.1%	529,003	228.9%
12/31/2012	3,098,721	4,157,621	1,058,900	74.5%	523,668	202.2%
12/31/2011	2,882,691	4,160,015	1,277,324	69.3%	718,169	177.9%
12/31/2010	2,926,045	4,005,566	1,079,521	73.0%	705,265	153.1%
12/31/2009	2,932,628	3,850,821	918,193	76.2%	705,097	130.2%
12/31/2008	2,933,296	3,838,083	904,787	76.4%	718,902	125.9%

SCHEDULE OF FUNDING PROGRESS
($ IN THOUSANDS)

Actuarial Valuation Date	Actuarial Value of Plan Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b – a)	Funded Ratio (a / b)	Reported Payroll (c)	UAAL as a Percentage of Reported Payroll ((b – a) / c)
JUDICIAL DIVISION						
12/31/2017	$ 310,085	$ 428,108	$ 118,023	72.4%	$ 48,948	241.1%
12/31/2016	297,888	447,117	149,229	66.6%	48,700	306.4%
12/31/2015	286,891	401,966	115,075	71.4%	46,870	245.5%
12/31/2014	270,866	371,253	100,387	73.0%	42,977	233.6%
12/31/2013	256,800	351,598	94,798	73.0%	39,942	237.3%
12/31/2012	238,807	326,897	88,090	73.1%	39,045	225.6%
12/31/2011	221,515	319,437	97,922	69.3%	39,033	250.9%
12/31/2010	227,814	303,839	76,025	75.0%	37,412	203.2%
12/31/2009	228,714	295,696	66,982	77.3%	37,583	178.2%
12/31/2008	230,967	288,058	57,091	80.2%	35,937	158.9%
DENVER PUBLIC SCHOOLS DIVISION						
12/31/2017	$ 3,257,770	$ 4,088,526	$ 830,756	79.7%	$ 658,198	126.2%
12/31/2016	3,220,935	4,246,430	1,025,495	75.9%	642,177	159.7%
12/31/2015	3,207,327	3,905,240	697,913	82.1%	621,115	112.4%
12/31/2014	3,151,456	3,816,093	664,637	82.6%	584,319	113.7%
12/31/2013	3,075,895	3,785,872	709,977	81.2%	547,660	129.6%
12/31/2012	2,936,695	3,495,549	558,854	84.0%	510,872	109.4%
12/31/2011	2,804,706	3,442,527	637,821	81.5%	491,646	129.7%
12/31/2010	2,961,720	3,332,814	371,094	88.9%	470,774	78.8%
HEALTH CARE TRUST FUND						
12/31/2017	$260,282	$1,581,222	$1,320,940	16.5%	$7,927,280	16.7%
12/31/2016	270,150	1,556,762	1,286,612	17.4%	7,716,894	16.7%
12/31/2015	285,588	1,556,269	1,270,681	18.4%	7,485,545	17.0%
12/31/2014	297,377	1,534,461	1,237,084	19.4%	7,211,351	17.2%
12/31/2013	293,556	1,557,406	1,263,850	18.8%	6,982,560	18.1%
12/31/2012	285,097	1,723,495	1,438,398	16.5%	6,766,713	21.3%
12/31/2011	282,228	1,710,790	1,428,562	16.5%	6,972,596	20.5%
12/31/2010	288,193	1,642,993	1,354,800	17.5%	7,035,419	19.3%
12/31/2009	260,341	1,763,241	1,502,900	14.8%	7,048,992	21.3%
12/31/2008	255,976	1,368,633	1,112,657	18.7%	6,931,405	16.1%
DPS HEALTH CARE TRUST FUND						
12/31/2017	$21,117	$70,292	$49,175	30.0%	$658,198	7.5%
12/31/2016	18,945	72,845	53,900	26.0%	642,177	8.4%
12/31/2015	17,557	74,897	57,340	23.4%	621,115	9.2%
12/31/2014	16,502	76,026	59,524	21.7%	584,319	10.2%
12/31/2013	15,482	76,636	61,154	20.2%	547,660	11.2%
12/31/2012	14,443	77,669	63,226	18.6%	510,872	12.4%
12/31/2011	14,448	77,475	63,027	18.6%	491,646	12.8%
12/31/2010	14,086	78,513	64,427	17.9%	470,774	13.7%

3.

SCHEDULE OF EMPLOYER CONTRIBUTIONS*

Calendar Year	Actuarially Determined Contribution in Dollars ($ in thousands)	Actuarially Determined Contribution as a Percentage of Pay	Percentage Of ADC Contributed
State Division			
2017	$630,022	22.71%	87%
2016	604,746	22.31%	84%
2015	590,457	22.35%	80%
2014	524,475	20.45%	83%
2013	495,241	20.01%	79%
2012	393,991	16.52%**	83%
2011	326,274	13.63%**	85%
2010	452,821	18.93%**	62%
2009	426,999	17.91%	69%
2008	437,567	18.45%	61%
School Division			
2017	$1,007,844	22.54%	83%
2016	972,508	22.36%	82%
2015	929,223	21.94%	79%
2014	798,426	19.65%	84%
2013	779,459	19.79%	79%
2012	672,156	17.60%	84%
2011	601,138	15.73%	89%
2010	731,374	18.75%	70%
2009	649,512	16.56%	73%
2008	653,686	17.18%	65%
Local Government Division			
2017	$ 75,426	11.92%	101%
2016	72,865	11.98%	99%
2015	76,479	13.62%	89%
2014	63,667	11.78%	397%
2013	56,180	10.62%	116%
2012	51,267	9.79%	163%
2011	64,492	8.98%	139%
2010	86,818	12.31%	101%
2009	78,548	11.14%	106%
2008	85,909	11.95%	91%

* All contribution amounts are exclusive of AIR Contributions.

** The State Division 2010, 2011 and 2012 ADCs have been adjusted to reflect the contribution rate swap of 2.5% of payroll for the period July 1, 2010 through June 30, 2012 decreasing the employer contribution rate.

SCHEDULE OF EMPLOYER CONTRIBUTIONS*

Calendar Year	Actuarially Determined Contribution in Dollars ($ in thousands)	Actuarially Determined Contribution as a Percentage of Pay	Percentage Of ADC Contributed
Judicial Division			
2017	$ 11,033	22.54%	72%
2016	10,748	22.07%	73%
2015	10,054	21.45%	75%
2014	8,625	20.07%	81%
2013	8,599	21.53%	76%
2012	7,137	18.28%**	82%
2011	6,362	16.30%**	84%
2010	6,970	18.63%**	80%
2009	6,419	17.08%	90%
2008	6,346	17.66%	80%
Denver Public Schools Division			
2017	$ 67,663	10.28%	35%
2016	67,172	10.46%	20%
2015	68,695	11.06%	8%
2014	56,504	9.67%	28%
2013	63,145	11.53%	37%
2012	49,044	9.60%	27%
2011	58,260	11.85%***	20%
2010	68,780	14.61%****	8%

* All contribution amounts are exclusive of AIR Contributions.

** The Judicial Division 2010, 2011 and 2012 ADCs have been adjusted to reflect the contribution rate swap of 2.5% of payroll for the period July 1, 2010 through June 30, 2012 decreasing the employer contribution rate.

*** Blended Rate for 2011 from 2008 and 2009 Annual Valuations from previous DPSRS actuary

**** Blended Rate for 2010 from 2007 and 2008 Annual Valuations from previous DPSRS actuary

Section VI – Accounting and Historical Funding Information (continued)

SCHEDULE OF EMPLOYER CONTRIBUTIONS

Calendar Year	Actuarially Determined Contribution (ADC) (a)	PERA Payroll Allocations (b)	Retiree Drug Subsidy (RDS) Contribution (c)	Total Contribution (d) = (b)+(c)	Percentage of ADC Contributed (e) = (d)/(a)
Health Care Trust Fund					
2017	$ 85,614,624	$ 83,172,633	$ 0	$ 83,172,633	97%
2016	84,114,123	80,825,145	0	80,825,145	96%
2015	86,083,768	78,462,738	0	78,462,738	91%
2014	95,189,820	79,625,680	0	79,625,680	84%
2013	86,583,744	72,785,209	15,731,044	88,516,253	102%
2012	79,847,213	72,556,763	14,197,649	86,754,412	109%
2011	89,249,242	73,448,775	14,151,366	87,600,141	98%
2010	78,796,693	74,047,581	14,168,745	88,216,326	112%
2009	78,948,710	74,072,676	13,633,368	87,706,044	111%
2008	76,938,596	72,599,167	13,742,749	86,341,916	112%
DPS Health Care Trust Fund					
2017	$ 4,475,748	$ 6,930,014	$ 0	$ 6,930,014	155%
2016	4,816,328	6,722,556	0	6,722,556	140%
2015	5,031,032	6,370,903	0	6,370,903	127%
2014	5,083,575	6,003,241	394	6,003,635	118%
2013	4,709,876	5,557,244	562,761	6,120,005	130%
2012	4,700,022	5,243,219	488,054	5,731,273	122%
2011	4,523,143	5,029,151	498,974	5,528,125	122%
2010	4,465,261	4,761,581	536,814	5,298,395	119%

The ADCs shown above reflect a 12-month lag between the valuation date and the beginning of the applicable calendar year.

To comply with GASB 43, beginning with the results of the December 31, 2005 valuation, the unfunded actuarial accrued liability (UAAL) is amortized over a maximum of 30 years in determining the ADC. For the results of the valuations from December 31, 2005 through December 31, 2012, the following changes were implemented to comply with GASB 43 as clarified by GASB Technical Bulletin 2006-1:

- All liabilities were determined without a reduction for expected future RDS payments.
- The total HCTF contribution was determined to be the statutory employer contribution plus that year's actual RDS payments.

Effective January 1, 2014, PERACare discontinued its participation in the Centers for Medicare & Medicaid Services' (CMS) Retiree Drug Subsidy (RDS) Program. As of 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 (PDP). As the Medicare Part D subsidies implicit in the lower costs for PDPs may be recognized in the liability under GASB Statements No. 43 and No. 45, the liability associated with the premium subsidies funded by estimated RDS receipts has been eliminated and, therefore, is not included in the results of valuations dated on or after December 31, 2013.

Beginning with the year ending on December 31, 2019, the ADC is determined based on the PERA Defined Benefit OPEB Plan Funding Policy that was adopted by the Board of Trustees on January 19, 2018. Please see Schedule J of this report for additional details.

Section VII – Derivation of Experience Gains and Losses

Pension Changes in Unfunded Actuarial Accrued Liabilities (UAAL)

During Calendar Year 2017

($ in Millions)

	State Division	School Division	Local Gov't Division	Judicial Division	Denver Public Schools Division	Total Pension
1) Beginning of Year:						
a) Unfunded Actuarial Accrued Liability	$11,643.6	$18,089.6	$1,333.9	$ 149.2	$ 1,025.5	$32,241.8
b) Normal Cost	297.0	540.3	63.4	9.2	84.7	994.6
c) Total Required Contributions	853.3	1,365.6	126.0	14.9	120.3	2,480.1
d) Total Actual Contributions*	822.2	1,237.2	132.9	15.1	84.2	2,291.6
2) End of Year:						
a) Expected UAAL from previous valuation (1a) x 1.0725 + [1(b) – 1(c)] x 1.03625	$11,911.3	$18,545.9	$1,365.7	$154.1	$1,063.0	$33,040.0
b) Expected UAAL on actual contributions (1a) x 1.0725 + [1(b)] – (1d)] x 1.03625	11,943.5	18,678.9	1,358.6	153.9	1,100.3	33,235.2
c) Increase in UAAL due to Deficiency (2b) – (2a)	32.2	133.0	(7.1)	(0.2)	37.3	195.2
3) Changes on this Year's Activities						
a) Liability Gain/(Loss)	$(225.6)	$(314.2)	$(21.4)	$0.1	$11.4	$(549.7)
b) Investment Gain/(Loss)	50.7	94.6	17.6	1.4	11.2	175.5
c) Change in Plan Assumptions	0.0	0.0	0.0	0.0	0.0	0.0
d) Change in Plan Provisions	1,592.7	2,632.3	325.9	34.4	247.0	4,832.3
e) Change in Methods	0.0	0.0	0.0	0.0	0.0	0.0
f) Total	$1,417.8	$2,412.7	$322.1	$35.9	$269.6	$4,458.1
4) Actual UAAL at End of Year (2a) + (2c) – (3f)	$10,525.7	$16,266.2	$1,036.5	$ 118.0	$ 830.7	$28,777.1

* Includes members' purchased service transfers and other additions.

Section VII – Derivation of Experience Gains and Losses (continued)

HCTF and DPS HCTF

Changes in Unfunded Actuarial Accrued Liability (UAAL)

During Calendar Year 2017

($ in Millions)

	HCTF	DPS HCTF
1) Beginning of Year:		
a) Unfunded Actuarial Accrued Liability (UAAL)	$1,286.6	$53.9
b) Normal Cost	19.3	1.5
c) Total Required Contributions	85.6	4.5
d) Total Actual Contributions*	90.4	7.0
2) End of Year:		
a) Expected UAAL from previous valuation (1a) x 1.0725 + [1(b) – 1(c)] x 1.03625	$1,311.2	$54.7
b) Expected UAAL on actual contributions (1a) x 1.0725 + [1(b)] – (1d)] x 1.03625	1,306.2	52.1
c) Change in UAAL due to contributions (2b) – (2a)	(5.0)	(2.6)
3) Changes on this Year's Activities		
a) Liability Gain/(Loss)	$6.3	$3.8
b) Investment Gain/(Loss)	0.6	0.1
c) Change in Plan Assumptions	(21.6)	(1.0)
d) Change in Plan Provisions	0.0	0.0
e) Change in Methods	0.0	0.0
f) Total	$(14.7)	$2.9
4) Actual UAAL at End of Year (2a) + (2c) – (3f)	$1,320.9	$49.2

* Includes members' purchased service transfers.

Section VII – Derivation of Experience Gains and Losses (continued)

Pension Gains & (Losses) from Experience

During Calendar Year 2017

($ in Millions)

Type of Activity	State Division	School Division	Local Gov't Division	Judicial Division	Denver Public Schools Division	Total
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	($73.2)	($111.8)	($8.3)	($2.0)	($16.1)	$(211.4)
Disability Retirements. If disability claims are less than assumed, there is a gain. If more claims, a loss.	(11.5)	(7.9)	(1.5)	0.1	(2.1)	$(22.9)
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	(5.8)	(6.0)	(0.7)	0.1	(0.5)	$(12.9)
Termination of Employment. If more liabilities are released by terminations than assumed, there is a gain. If smaller releases, a loss.	(78.9)	(162.8)	(17.5)	(0.4)	8.4	$(251.2)
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	46.6	117.7	21.4	4.2	24.4	$214.3
New Members. Additional actuarial accrued liability will produce a loss.	(82.3)	(98.6)	(15.5)	(1.4)	(40.5)	$(238.3)
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	50.7	94.6	17.6	1.4	11.2	$175.5
Death after Retirement. If retirants live longer than assumed, there is a loss. If not as long, a gain.	11.8	0.8	8.8	0.4	12.1	$33.9
Other. Miscellaneous gains and losses resulting from changes in valuation software, data adjustments, timing of financial transactions, etc.	(32.3)	(45.6)	(8.1)	(0.9)	25.7	$(61.2)
Net Gain/(Loss) During Year from Experience	$(174.9)	$(219.6)	$(3.8)	$1.5	$22.6	$(374.2)

Section VII – Derivation of Experience Gains and Losses (continued)

HCTF and DPS HCTF

Gains & (Losses) from Experience

During Calendar Year 2017

($ in Millions)

Type of Activity	HCTF	DPS HCTF
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	$(2.2)	$(0.1)
Disability Retirements. If disability claims are less than assumed, there is a gain. If more claims, a loss.	(0.2)	0.0
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	(0.1)	0.0
Termination of Employment. If more liabilities are released by terminations than assumed, there is a gain. If smaller releases, a loss.	(3.0)	0.0
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	0.0	0.0
New Members. Additional actuarial accrued liability will produce a loss.	(2.3)	(0.2)
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	0.6	0.1
Death after Retirement. If retirants live longer than assumed, there is a loss. If not as long, a gain.	0.2	0.1
Other. Gains and losses resulting from claims experience, changes in plan participation/benefit utilization, changes in valuation software, data adjustments, timing of financial transactions, etc.	13.9	4.0
Net Gain/(Loss) During Year from Experience	$6.9	$3.9

Please note that the estimates provided in the table above were prepared using streamlined calculation techniques. They are intended to provide an "order of magnitude" indication of the allocation of 2017 calendar year experience gains and losses to the categories listed above. Results based on more refined calculations may yield findings and conclusions different than those suggested by the streamlined methodology shown above.

Section VII – Derivation of Experience Gains and Losses (continued)

Pension Gains & (Losses) as a Percentage of Actuarial Accrued Liabilities

During Calendar Year 2017

($ in Millions)

Type of Activity	State Division	School Division	Local Gov't Division	Judicial Division	Denver Public Schools Division	Total Pension
Actuarial Accrued Liability at the Beginning of the Year	$25,669.9	$41,353.0	$5,213.1	$447.1	$4,246.4	$76,929.5
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	(0.3)%	(0.3)%	(0.2)%	(0.4)%	(0.4)%	(0.3)%
Disability Retirements. If disability claims are less than assumed, there is a gain. If more claims, a loss.	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Termination from Employment. If more liabilities are released by terminations than assumed, there is a gain. If smaller releases, a loss.	(0.3)%	(0.4)%	(0.3)%	(0.1)%	0.2 %	(0.3)%
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	0.2 %	0.3 %	0.4 %	0.9 %	0.6 %	0.3 %
New Members. Additional actuarial accrued liability will produce a loss.	(0.3)%	(0.2)%	(0.3)%	(0.3)%	(1.0)%	(0.3)%
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	0.2 %	0.2 %	0.3 %	0.3 %	0.3 %	0.2 %
Death after Retirement. If retirants live longer than assumed, there is a loss. If not as long, a gain.	0.0 %	0.0 %	0.2 %	0.1 %	0.3 %	0.0 %
Other. Miscellaneous gains and losses resulting from changes in valuation software, data adjustments, timing of financial transactions, etc.	(0.1)%	(0.1)%	(0.2)%	(0.2)%	0.6 %	(0.1)%
Gain (or Loss) During Year from Experience	(0.6)%	(0.5)%	(0.1)%	0.3 %	0.6 %	(0.5)%

Section VII – Derivation of Experience Gains and Losses (continued)

HCTF and DPS HCTF

Gains & (Losses) as a Percentage of Actuarial Accrued Liabilities

During Calendar Year 2017

($ in Millions)

Type of Activity	HCTF	DPS HCTF
Actuarial Accrued Liability at the Beginning of the Year	$1,556.8	$72.8
Age & Service Retirements. If members retire at older ages, there is a gain. If younger ages, a loss.	(0.1)%	(0.1)%
Disability Retirements. If disability claims are less than assumed, there is a gain. If more claims, a loss.	0.0 %	0.0 %
Death-in Service Benefits. If survivor claims are less than assumed, there is a gain. If more claims, there is a loss.	0.0 %	0.0 %
Termination of Employment. If more liabilities are released by terminations than assumed, there is a gain. If smaller releases, a loss.	(0.2)%	0.0 %
Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss.	0.0 %	0.0 %
New Members. Additional actuarial accrued liability will produce a loss.	(0.1)%	(0.3)%
Investment Income. If there is a greater investment income than assumed, there is a gain. If less income, a loss.	0.0 %	0.1 %
Death after Retirement. If retirants live longer than assumed, there is a loss. If not as long, a gain.	0.0 %	0.1 %
Other. Gains and losses resulting from claims experience, changes in plan participation/benefit utilization, changes in valuation software, data adjustments, timing of financial transactions, etc.	0.9 %	5.5 %
Net Gain/(Loss) During Year from Experience	0.5 %	5.3 %

Please note that the estimates provided in the table above were prepared using streamlined calculation techniques. They are intended to provide an "order of magnitude" indication of the allocation of 2017 calendar year experience gains and losses to the categories listed above. Results based on more refined calculations may yield findings and conclusions different than those suggested by the streamlined methodology shown above.

Section VIII – Additional Information for Health Care Trust Funds

HCTF Subsidy Analysis

Calendar Year	Administrative Expenses	Claims & HMO Premiums	Total Costs (2)+(3)	PERA Subsidy	
				Amount	Percentage (5)/(4)
(1)	(2)	(3)	(4)	(5)	(6)
2017	$16,764,561	$322,724,014	$339,488,575	$119,429,766	35%
2016	17,191,422	308,638,003	325,829,425	122,832,804	38%
2015	17,427,167	299,491,591	316,918,758	123,969,209	39%
2014	15,039,802	282,839,340	297,879,142	110,208,226	37%
2013	11,432,638	331,655,337	343,087,975	104,492,638	30%
2012	11,238,351	320,746,116	331,984,467	109,059,949	33%
2011	11,009,812	296,318,871	307,328,683	91,816,866	30%
2010	9,711,601	273,798,971	283,510,572	77,565,425	27%
2009	7,878,395	261,533,889	269,412,284	80,110,149	30%
2008	7,839,386	258,685,119	266,524,505	88,469,990	33%

DPS HCTF Subsidy Analysis

Calendar Year	Administrative Expenses	Claims & HMO Premiums	Total Costs (2)+(3)	DPS Subsidy	
				Amount	Percentage (5)/(4)
(1)	(2)	(3)	(4)	(5)	(6)
2017	$654,368	$19,115,690	$19,770,058	$6,348,388	32%
2016	674,716	19,188,078	19,862,794	6,684,449	34%
2015	664,771	18,913,393	19,578,164	6,831,344	35%
2014	535,270	18,568,484	19,103,754	6,524,980	34%
2013	397,301	23,483,334	23,880,635	6,366,156	27%
2012	383,943	22,993,959	23,377,902	6,652,676	28%
2011	392,263	23,026,025	23,418,288	6,165,753	26%
2010	460,196	22,531,118	22,991,314	6,233,170	27%

Notes:

- Based on information provided by PERA as of December 31 for each calendar year. Some component items may be categorized differently for financial accounting or other purposes.
- Administrative Expenses total includes expenses associated with claims administration.
- Claims and HMO Premiums total reflects actual claims and premiums paid (net of any premium variance).
- The subsidy analysis schedule presented above was revised, beginning with the December 31, 2006 valuation report, for all years shown to include the premiums paid by retirees for HMOs in the claims and HMO premiums and in the total cost columns. The total cost includes all health care costs for retirees, beneficiaries and actives. Also, claims experience gains and losses are now included in the actual PERA and DPS subsidies.

Schedule A – Valuation Balance Sheet and Solvency Test

VALUATION BALANCE SHEET
SHOWING THE PRESENT AND PROSPECTIVE ASSETS AND LIABILITIES OF
THE PUBLIC EMPLOYEES' RETIREMENT ASSOCIATION OF COLORADO
AS OF DECEMBER 31, 2017

STATE DIVISION

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Present Assets		$ 14,256,409,942
Present value of future members' contributions		1,850,746,758
Present value of future employer contributions		
Normal cost	$ 483,914,143	
Unfunded actuarial accrued liability contributions	10,525,675,196	
Total prospective employer contributions		$ 11,009,589,339
Total Present and Prospective Assets		$ 27,116,746,039
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		
Retired members	$ 16,531,495,521	
Survivors	208,954,343	
Total		$ 16,740,449,864
Present value of prospective benefits payable on account of inactive members		654,973,073
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	$ 8,278,707,696	
Disability retirement benefits	211,363,880	
Survivor benefits	101,787,213	
Separation benefits	1,129,464,313	
Total		$ 9,721,323,102
Total Actuarial Liabilities		$ 27,116,746,039

Schedule A – Valuation Balance Sheet and Solvency Test (continued)

VALUATION BALANCE SHEET
SHOWING THE PRESENT AND PROSPECTIVE ASSETS AND LIABILITIES OF
THE PUBLIC EMPLOYEES' RETIREMENT ASSOCIATION OF COLORADO
AS OF DECEMBER 31, 2017

SCHOOL DIVISION

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Present Assets		$ 23,780,045,308
Present value of future members' contributions		3,206,120,619
Present value of future employer contributions		
Normal cost	$ 1,304,015,509	
Unfunded actuarial accrued liability contributions	16,266,169,194	
Total prospective employer contributions		$ 17,570,184,703
Total Present and Prospective Assets		$ 44,556,350,630
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		
Retired members	$ 25,668,690,627	
Survivors	193,295,430	
Total		$ 25,861,986,057
Present value of prospective benefits payable on account of inactive members		1,075,553,236
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	$ 15,131,896,542	
Disability retirement benefits	219,485,149	
Survivor benefits	132,498,055	
Separation benefits	2,134,931,591	
Total		$ 17,618,811,337
Total Actuarial Liabilities		$ 44,556,350,630

VALUATION BALANCE SHEET
SHOWING THE PRESENT AND PROSPECTIVE ASSETS AND LIABILITIES OF
THE PUBLIC EMPLOYEES' RETIREMENT ASSOCIATION OF COLORADO
AS OF DECEMBER 31, 2017

LOCAL GOVERNMENT DIVISION

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Present Assets		$ 4,009,412,912
Present value of future members' contributions		406,044,850
Present value of future employer contributions		
Normal cost	$ 87,247,178	
Unfunded actuarial accrued liability contributions	1,036,519,103	
Total prospective employer contributions		$ 1,123,766,281
Total Present and Prospective Assets		$ 5,539,224,043
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		
Retired members	$ 3,137,299,022	
Survivors	40,252,167	
Total		$ 3,177,551,189
Present value of prospective benefits payable on account of inactive members		304,974,846
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	$ 1,732,265,493	
Disability retirement benefits	34,755,588	
Survivor benefits	22,400,720	
Separation benefits	267,276,207	
Total		$ 2,056,698,008
Total Actuarial Liabilities		$ 5,539,224,043

Schedule A – Valuation Balance Sheet and Solvency Test (continued)

VALUATION BALANCE SHEET
SHOWING THE PRESENT AND PROSPECTIVE ASSETS AND LIABILITIES OF
THE PUBLIC EMPLOYEES' RETIREMENT ASSOCIATION OF COLORADO
AS OF DECEMBER 31, 2017

JUDICIAL DIVISION

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Present Assets		$ 310,084,726
Present value of future members' contributions		36,656,862
Present value of future employer contributions		
Normal cost	$ 31,332,600	
Unfunded actuarial accrued liability contributions	118,023,473	
Total prospective employer contributions		$ 149,356,073
Total Present and Prospective Assets		$ 496,097,661
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		
Retired members	$ 271,205,025	
Survivors	3,595,149	
Total		$ 274,800,174
Present value of prospective benefits payable on account of inactive members		2,741,458
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	$ 203,933,194	
Disability retirement benefits	5,245,241	
Survivor benefits	4,662,886	
Separation benefits	4,714,708	
Total		$ 218,556,029
Total Actuarial Liabilities		$ 496,097,661

VALUATION BALANCE SHEET
SHOWING THE PRESENT AND PROSPECTIVE ASSETS AND LIABILITIES OF
THE PUBLIC EMPLOYEES' RETIREMENT ASSOCIATION OF COLORADO
AS OF DECEMBER 31, 2017

DENVER PUBLIC SCHOOLS DIVISION

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Present Assets		$ 3,257,769,807
Present value of future members' contributions		513,829,016
Present value of future employer contributions		
Normal cost	$ 207,679,963	
Unfunded actuarial accrued liability contributions	830,756,647	
Total prospective employer contributions		$ 1,038,436,610
Total Present and Prospective Assets		$ 4,810,035,433
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of retired members and survivors of deceased members now drawing retirement benefits		
Retired members	$ 2,729,336,524	
Survivors	24,131,607	
Total		$ 2,753,468,131
Present value of prospective benefits payable on account of inactive members		113,785,413
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	$ 1,569,661,340	
Disability retirement benefits	35,180,894	
Survivor benefits	15,606,295	
Separation benefits	322,333,360	
Total		$ 1,942,781,889
Total Actuarial Liabilities		$ 4,810,035,433

Schedule A – Valuation Balance Sheet and Solvency Test (continued)

VALUATION BALANCE SHEET
SHOWING THE PRESENT AND PROSPECTIVE ASSETS AND LIABILITIES OF
THE PUBLIC EMPLOYEES' RETIREMENT ASSOCIATION OF COLORADO
AS OF DECEMBER 31, 2017

HEALTH CARE TRUST FUND

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Present Assets		$ 260,281,736
Present value of future members' contributions		$0
Present value of future employer contributions		
Normal cost	$ 126,623,016	
Unfunded actuarial accrued liability contributions	1,320,939,939	
Total prospective employer contributions		$ 1,447,562,955
Total Present and Prospective Assets		$ 1,707,844,691
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of present benefit recipients enrolled in PERA Care and receiving a health care subsidy pursuant to law		
Retired members	$ 1,134,547,686	
Survivors	5,177,439	
Total		$ 1,139,725,125
Present value of prospective benefits payable on account of eligible inactive members		38,434,579
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	$ 471,170,295	
Disability retirement benefits	17,701,998	
Survivor benefits	1,489,153	
Separation benefits	39,323,541	
Total		$ 529,684,987
Total Actuarial Liabilities		$ 1,707,844,691

Schedule A – Valuation Balance Sheet and Solvency Test (continued)

VALUATION BALANCE SHEET
SHOWING THE PRESENT AND PROSPECTIVE ASSETS AND LIABILITIES OF
THE PUBLIC EMPLOYEES' RETIREMENT ASSOCIATION OF COLORADO
AS OF DECEMBER 31, 2017

DPS HEALTH CARE TRUST FUND

PRESENT AND PROSPECTIVE ASSETS		
Actuarial Value of Present Assets		$ 21,117,173
Present value of future members' contributions		$0
Present value of future employer contributions		
Normal cost	$ 10,247,494	
Unfunded actuarial accrued liability contributions	49,175,286	
Total prospective employer contributions		$ 59,422,780
Total Present and Prospective Assets		$ 80,539,953
ACTUARIAL LIABILITIES		
Present value of benefits payable on account of present benefit recipients enrolled in PERA Care and receiving a health care subsidy pursuant to law		
Retired members	$ 49,898,722	
Survivors	0	
Total		$ 49,898,722
Present value of prospective benefits payable on account of deferred vested members		897,555
Present value of prospective benefits payable on account of present active members:		
Service retirement benefits	$ 26,070,736	
Disability retirement benefits	1,140,146	
Survivor benefits	47,977	
Separation benefits	2,484,817	
Total		$ 29,743,676
Total Actuarial Liabilities		$ 80,539,953

Schedule A – Valuation Balance Sheet and Solvency Test (continued)

SOLVENCY TEST
($ IN THOUSANDS)

	Aggregate Accrued Liabilities For*				Portion of Accrued Liabilities Covered by Valuation Assets		
	(1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Valuation Assets	(1)	(2)	(3)
Division	**By Division as of December 31, 2017**						
State	$2,668,406	$17,395,423	$4,718,256	$14,256,410	100.0%	66.6%	0.0%
School	4,212,088	26,937,539	8,896,588	23,780,045	100.0%	72.6%	0.0%
Local	544,525	3,482,526	1,018,881	4,009,413	100.0%	99.5%	0.0%
Judicial	54,973	277,542	95,593	310,085	100.0%	91.9%	0.0%
DPS	419,239	2,867,254	802,033	3,257,770	100.0%	99.0%	0.0%
TOTAL	$7,899,231	$50,960,284	$15,531,351	$45,613,723	100.0%	74.0%	0.0%
Valuation Date	**Historical Totals**						
12/31/2017	$7,899,231	$50,960,284	$15,531,351	$45,613,723	100.0%	74.0%	0.0%
12/31/2016	7,793,748	52,702,177	16,433,558	44,687,696	100.0%	70.0%	0.0%
12/31/2015	7,675,951	47,843,813	15,330,964	44,025,860	100.0%	76.0%	0.0%
12/31/2014	7,579,127	46,088,397	14,925,642	42,718,566	100.0%	76.2%	0.0%
12/31/2013	7,513,091	44,469,682	14,938,016	41,122,833	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%
12/31/2011	7,468,008	39,328,881	13,937,832	37,185,067	100.0%	75.6%	0.0%
12/31/2010	7,377,837	37,530,979	14,429,333	39,229,261	100.0%	84.9%	0.0%
12/31/2009	7,068,660	33,621,499	13,846,390	37,598,988	100.0%	90.8%	0.0%
12/31/2008	6,992,382	34,524,824	14,107,805	38,811,963	100.0%	92.2%	0.0%

* Results do not include the Health Care Trust Funds.

Schedule A – Valuation Balance Sheet and Solvency Test (continued)

SOLVENCY TEST
($ IN THOUSANDS)

Valuation Date	Aggregate Accrued Liabilities For: (1) Active Member Contributions	(2) Retirees, Survivors and Inactive Members	(3) Active Members (Employer Financed Portion)	Valuation Assets	Portion of Accrued Liabilities Covered by Valuation Assets: (1)	(2)	(3)
Health Care Trust Fund							
12/31/2017	$0	$1,178,160	$403,062	$260,282	N/A	22.1%	0.0%
12/31/2016	0	1,153,015	403,747	270,150	N/A	23.4%	0.0%
12/31/2015	0	1,099,045	457,224	285,588	N/A	26.0%	0.0%
12/31/2014	0	1,085,995	448,466	297,377	N/A	27.4%	0.0%
12/31/2013	0	1,092,438	464,968	293,556	N/A	26.9%	0.0%
12/31/2012	0	1,259,557	463,938	285,097	N/A	22.6%	0.0%
12/31/2011	0	1,251,579	459,211	282,228	N/A	22.5%	0.0%
12/31/2010	0	1,179,809	463,184	288,193	N/A	24.4%	0.0%
12/31/2009	0	1,241,349	521,892	260,341	N/A	21.0%	0.0%
12/31/2008	0	969,288	399,345	255,976	N/A	26.4%	0.0%
DPS Health Care Trust Fund							
12/31/2017	$0	$50,796	$19,496	$21,117	N/A	41.6%	0.0%
12/31/2016	0	51,357	21,488	18,945	N/A	36.9%	0.0%
12/31/2015	0	49,891	25,006	17,557	N/A	35.2%	0.0%
12/31/2014	0	50,998	25,028	16,502	N/A	32.4%	0.0%
12/31/2013	0	52,106	24,530	15,482	N/A	29.7%	0.0%
12/31/2012	0	54,727	22,942	14,443	N/A	26.4%	0.0%
12/31/2011	0	57,093	20,382	14,448	N/A	25.3%	0.0%
12/31/2010	0	58,432	20,081	14,086	N/A	24.1%	0.0%

Schedule B – Development of the Actuarial Value of Assets

DEVELOPMENT OF THE DECEMBER 31, 2017
ACTUARIAL VALUE OF ASSETS

STATE DIVISION

(1)		Actuarial Value Beginning of Year	$ 14,026,331,996
(2)		Market Value End of Year	$ 15,105,378,385
(3)		Market Value Beginning of Year	$ 13,538,772,410
(4)		Cash Flow	
	a.	Contributions	$ 806,026,397
	b.	Benefit Payments and Other Deductions	(1,618,673,714)
	c.	Other Additions	16,193,892
	d.	Administrative Expenses	(11,744,733)
	e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	$ (808,198,158)
(5)		Investment Income	
	a.	Market total: (2) – (3) – (4)e	$ 2,374,804,133
	b.	Assumed Rate	7.25%
	c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	$ 952,263,816
	d.	Amount for Phased-in Recognition: (5)a – (5)c	$ 1,422,540,317
(6)		Phased-In Recognition of Investment Income	
	a.	Current Year: 0.25 x (5)d	$ 355,635,079
	b.	First Prior Year	(7,983,970)
	c.	Second Prior Year	(201,968,870)
	d.	Third Prior Year	(59,669,951)
	e.	Total Recognized Investment Gain / (Loss)	$ 86,012,288
(7)		Actuarial Value End of Year: (1) + (4)e + (5)c + (6)e	$ 14,256,409,942

DEVELOPMENT OF THE DECEMBER 31, 2017
ACTUARIAL VALUE OF ASSETS

SCHOOL DIVISION

(1)	Actuarial Value Beginning of Year		$ 23,263,343,921
(2)	Market Value End of Year		$ 25,204,919,910
(3)	Market Value Beginning of Year		$ 22,465,387,820
(4)	Cash Flow		
	a.	Contributions	$ 1,236,867,185
	b.	Benefit Payments and Other Deductions	(2,434,471,331)
	c.	Other Additions	333,552
	d.	Administrative Expenses	(23,018,690)
	e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	$ (1,220,289,284)
(5)	Investment Income		
	a.	Market total: (2) – (3) – (4)e	$ 3,959,821,374
	b.	Assumed Rate	7.25%
	c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	$ 1,584,505,130
	d.	Amount for Phased-in Recognition: (5)a – (5)c	$ 2,375,316,244
(6)	Phased-In Recognition of Investment Income		
	a.	Current Year: 0.25 x (5)d	$ 593,829,061
	b.	First Prior Year	(12,322,678)
	c.	Second Prior Year	(331,967,225)
	d.	Third Prior Year	(97,053,617)
	e.	Total Recognized Investment Gain / (Loss)	$ 152,485,541
(7)	Actuarial Value End of Year: (1) + (4)e + (5)c + (6)e		$ 23,780,045,308

Schedule B – Development of the Actuarial Value of Assets (continued)

DEVELOPMENT OF THE DECEMBER 31, 2017
ACTUARIAL VALUE OF ASSETS

LOCAL GOVERNMENT DIVISION

(1)	Actuarial Value Beginning of Year		$ 3,879,197,057
(2)	Market Value End of Year		$ 4,249,852,277
(3)	Market Value Beginning of Year		$ 3,748,369,298
(4)	Cash Flow		
	a.	Contributions	$ 131,685,482
	b.	Benefit Payments and Other Deductions	(293,053,988)
	c.	Other Additions	106,590
	d.	Administrative Expenses	(2,541,497)
	e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	$ (163,803,413)
	f.	Receivable Contributions	1,063,119
	g.	Total Net Cash Flow: [(4)e + (4)f]	$ (162,740,294)
(5)	Investment Income		
	a.	Market total: (2) – (3) – (4)g	$ 664,223,273
	b.	Assumed Rate	7.25%
	c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	$ 265,818,900
	d.	Amount for Phased-in Recognition: (5)a – (5)c	$ 398,404,373
(6)	Phased-In Recognition of Investment Income		
	a.	Current Year: 0.25 x (5)d	$ 99,601,093
	b.	First Prior Year	(1,902,162)
	c.	Second Prior Year	(54,559,593)
	d.	Third Prior Year	(16,002,089)
	e.	Total Recognized Investment Gain / (Loss)	$ 27,137,249
(7)	Actuarial Value End of Year: (1) + (4)g + (5)c + (6)e		$ 4,009,412,912

Schedule B – Development of the Actuarial Value of Assets (continued)

DEVELOPMENT OF THE DECEMBER 31, 2017
ACTUARIAL VALUE OF ASSETS

JUDICIAL DIVISION

(1)	Actuarial Value Beginning of Year	$	297,888,464
(2)	Market Value End of Year	$	328,458,690
(3)	Market Value Beginning of Year	$	287,888,462
(4)	Cash Flow		
	a. Contributions	$	12,752,197
	b. Benefit Payments and Other Deductions		(25,451,584)
	c. Other Additions		2,380,677
	d. Administrative Expenses		(85,589)
	e. Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	$	(10,404,299)
(5)	Investment Income		
	a. Market total: (2) – (3) – (4)e	$	50,974,527
	b. Assumed Rate		7.25%
	c. Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	$	20,494,758
	d. Amount for Phased-in Recognition: (5)a – (5)c	$	30,479,769
(6)	Phased-In Recognition of Investment Income		
	a. Current Year: 0.25 x (5)d	$	7,619,942
	b. First Prior Year		(176,660)
	c. Second Prior Year		(4,132,541)
	d. Third Prior Year		(1,204,938)
	e. Total Recognized Investment Gain / (Loss)	$	2,105,803
(7)	Actuarial Value End of Year: (1) + (4)e + (5)c + (6)e	$	310,084,726

DEVELOPMENT OF THE DECEMBER 31, 2017
ACTUARIAL VALUE OF ASSETS

DENVER PUBLIC SCHOOLS DIVISION

(1)	Actuarial Value Beginning of Year		$	3,220,935,045
(2)	Market Value End of Year		$	3,452,666,927
(3)	Market Value Beginning of Year		$	3,108,232,941
(4)	Cash Flow			
	a.	Contributions	$	80,294,895
	b.	Benefit Payments and Other Deductions		(281,932,605)
	c.	Other Additions		3,882,783
	d.	Administrative Expenses		(2,857,244)
	e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	$	(200,612,171)
(5)	Investment Income			
	a.	Market total: (2) – (3) – (4)e	$	545,046,157
	b.	Assumed Rate		7.25%
	c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	$	218,074,697
	d.	Amount for Phased-in Recognition: (5)a – (5)c	$	326,971,460
(6)	Phased-In Recognition of Investment Income			
	a.	Current Year: 0.25 x (5)d	$	81,742,865
	b.	First Prior Year		(1,774,807)
	c.	Second Prior Year		(46,781,861)
	d.	Third Prior Year		(13,813,961)
	e.	Total Recognized Investment Gain / (Loss)	$	19,372,236
(7)	Actuarial Value End of Year: (1) + (4)e + (5)c + (6)e		$	3,257,769,807

DEVELOPMENT OF THE DECEMBER 31, 2017
ACTUARIAL VALUE OF ASSETS

HEALTH CARE TRUST FUND

(1)	Actuarial Value Beginning of Year		$	270,149,671
(2)	Market Value End of Year		$	276,221,671
(3)	Market Value Beginning of Year		$	260,228,470
(4)	Cash Flow			
	a.	Contributions	$	90,336,291
	b.	Benefit Payments and Other Deductions		(116,960,710)
	c.	Other Additions		0
	d.	Administrative Expenses		(2,469,057)
	e.	Net Cash Flow During Period: [(4)a + (4)b + (4)c + (4)d]	$	(29,093,476)
	f.	Receivable Contributions		95,911
	g.	Total Net Cash Flow [(4)e + (4)f]	$	(28,997,565)
(5)	Investment Income			
	a.	Market total: [(2) – (3) – (4)g]	$	44,990,766
	b.	Assumed Rate		7.25%
	c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	$	17,811,926
	d.	Amount for Phased-in Recognition: [(5)a – (5)c]	$	27,178,840
(6)	Phased-In Recognition of Investment Income			
	a.	Current Year: [0.25 x (5)d]	$	6,794,710
	b.	First Prior Year		(98,215)
	c.	Second Prior Year		(4,247,768)
	d.	Third Prior Year		(1,131,023)
	e.	Total Recognized Investment Gain / (Loss)	$	1,317,704
(7)	Actuarial Value End of Year: [(1) + (4)g + (5)c + (6)e]		$	260,281,736

Schedule B – Development of the Actuarial Value of Assets (continued)

DEVELOPMENT OF THE DECEMBER 31, 2017
ACTUARIAL VALUE OF ASSETS

DPS HEALTH CARE TRUST FUND

(1)	Actuarial Value Beginning of Year		$	18,944,588
(2)	Market Value End of Year		$	22,307,633
(3)	Market Value Beginning of Year		$	18,337,228
(4)	Cash Flow			
	a.	Contributions	$	7,013,845
	b.	Benefit Payments and Other Deductions		(6,190,665)
	c.	Other Additions		0
	d.	Administrative Expenses		(157,722)
	e.	Net Cash Flow: [(4)a + (4)b + (4)c + (4)d]	$	665,458
	f.	Receivable Contributions		0
	g.	Total Net Cash Flow [(4)e + (4)f]	$	665,458
(5)	Investment Income			
	a.	Market total: [(2) – (3) – (4)g]	$	3,304,947
	b.	Assumed Rate		7.25%
	c.	Amount of Immediate Recognition [(3) x (5)b] + [(4)e x (5)b x 0.5]	$	1,353,572
	d.	Amount for Phased-in Recognition: [(5)a – (5)c]	$	1,951,375
(6)	Phased-In Recognition of Investment Income			
	a.	Current Year: [0.25 x (5)d]	$	487,844
	b.	First Prior Year		(10,268)
	c.	Second Prior Year		(252,537)
	d.	Third Prior Year		(71,484)
	e.	Total Recognized Investment Gain / (Loss)	$	153,555
(7)	Actuarial Value End of Year: [(1) + (4)g + (5)c + (6)e]		$	21,117,173

SUMMARY OF CHANGES IN NET ASSETS
FOR THE YEAR ENDING DECEMBER 31, 2017

STATE DIVISION

Additions for the Year		
Contributions:		
Members (including purchased service)	$ 256,404,619	
Employers	549,621,778	
Total		$ 806,026,397
Other Additions		16,193,892
Net Investment Income		2,374,804,133
TOTAL		$ 3,197,024,422
Deductions for the Year		
Benefit Payments (including refunds and disability insurance)	$ 1,615,021,313	
Other deductions	3,652,401	
Administrative Expenses	11,744,733	
TOTAL		$ 1,630,418,447
Excess of Additions Over Deductions		$ 1,566,605,975
Reconciliation of Asset Balances		
Market Value of Assets as of 12/31/2016		$ 13,538,772,410
Excess of Additions over Deductions		1,566,605,975
Market Value of Assets as of 12/31/2017*		$ 15,105,378,385

* The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B). Final Market Value of Assets is $15,223,701,690 and includes the amount in the Annual Increase Reserve of $118,323,305 for post-retirement benefit increases for members of the PERA Benefit Structure hired on or after January 1, 2007.

SUMMARY OF CHANGES IN NET ASSETS
FOR THE YEAR ENDING DECEMBER 31, 2017

SCHOOL DIVISION

Additions for the Year		
Contributions:		
Members (including purchased service)	$ 399,029,899	
Employers	837,837,286	
Total		$ 1,236,867,185
Other Additions		333,552
Net Investment Income		3,959,821,374
TOTAL		$ 5,197,022,111
Deductions for the Year		
Benefit Payments (including refunds and disability insurance)	$ 2,411,986,842	
Other deductions	22,484,489	
Administrative Expenses	23,018,690	
TOTAL		$ 2,457,490,021
Excess of Additions Over Deductions		$ 2,739,532,090
Reconciliation of Asset Balances		
Market Value of Assets as of 12/31/2016		$ 22,465,387,820
Excess of Additions over Deductions		2,739,532,090
Market Value of Assets as of 12/31/2017*		$ 25,204,919,910

* The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B). Final Market Value of Assets is $25,362,729,968 and includes the amount in the Annual Increase Reserve of $157,810,058 for post-retirement benefit increases for members of the PERA Benefit Structure hired on or after January 1, 2007.

SUMMARY OF CHANGES IN NET ASSETS
FOR THE YEAR ENDING DECEMBER 31, 2017

LOCAL GOVERNMENT DIVISION

Additions for the Year		
Contributions:		
Members (including purchased service)	$ 56,784,993	
Employers	74,900,489	
Receivables for Transactions During the Period	1,063,119	
Total		$ 132,748,601
Other Additions		106,590
Net Investment Income		664,223,273
TOTAL		$ 797,078,464
Deductions for the Year		
Benefit Payments (including refunds and disability insurance)	$ 289,217,276	
Other deductions	3,836,712	
Administrative Expenses	2,541,497	
TOTAL		$ 295,595,485
Excess of Additions Over Deductions		$ 501,482,979
Reconciliation of Asset Balances		
Market Value of Assets as of 12/31/2016		$ 3,748,369,298
Excess of Additions over Deductions		501,482,979
Market Value of Assets as of 12/31/2017*		$ 4,249,852,277

* The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B). Final Market Value of Assets is $4,283,086,391 and includes the amount in the Annual Increase Reserve of $33,234,114 for post-retirement benefit increases for members of the PERA Benefit Structure hired on or after January 1, 2007.

SUMMARY OF CHANGES IN NET ASSETS
FOR THE YEAR ENDING DECEMBER 31, 2017

JUDICIAL DIVISION

Additions for the Year		
Contributions:		
Members (including purchase service)	$ 4,863,546	
Employers	7,888,651	
Total		$ 12,752,197
Other Additions		2,380,677
Net Investment Income		50,974,527
TOTAL		$ 66,107,401
Deductions for the Year		
Benefit Payments (including refunds and disability insurance)	$ 25,298,826	
Other deductions	152,758	
Administrative Expenses	85,589	
TOTAL		$ 25,537,173
Excess of Additions Over Deductions		$ 40,570,228
Reconciliation of Asset Balances		
Market Value of Assets as of 12/31/2016		$ 287,888,462
Excess of Additions over Deductions		40,570,228
Market Value of Assets as of 12/31/2017*		$ 328,458,690

* The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B). Final Market Value of Assets is $329,861,979 and includes the amount in the Annual Increase Reserve of $1,403,289 for post-retirement benefit increases for members of the PERA Benefit Structure hired on or after January 1, 2007.

Schedule C – Summary of Changes in Net Assets (continued)

SUMMARY OF CHANGES IN NET ASSETS
FOR THE YEAR ENDING DECEMBER 31, 2017

DENVER PUBLIC SCHOOLS DIVISION

Additions for the Year		
Contributions:		
Members (including purchase service)	$ 56,816,863	
Employers	23,478,032	
Total		$ 80,294,895
Other Additions		3,882,783
Net Investment Income		545,046,157
TOTAL		$ 629,223,835
Deductions for the Year		
Benefit Payments (including refunds and disability insurance)	$ 281,843,655	
Other deductions	88,950	
Administrative Expenses	2,857,244	
TOTAL		$ 284,789,849
Excess of Additions Over Deductions		$ 344,433,986
Reconciliation of Asset Balances		
Market Value of Assets as of 12/31/2016		$ 3,108,232,941
Excess of Additions over Deductions		344,433,986
Market Value of Assets as of 12/31/2017*		$ 3,452,666,927

* The Market Value of Assets shown above is used in the determination of the Actuarial Value of Assets (Schedule B). Final Market Value of Assets is $3,478,039,873 and includes the amount in the Annual Increase Reserve of $25,372,946 for post-retirement benefit increases for those who became members of the PERA Benefit Structure on or after January 1, 2010.

SUMMARY OF CHANGES IN NET ASSETS
FOR THE YEAR ENDING DECEMBER 31, 2017

HEALTH CARE TRUST FUND

Additions for the Year		
Contributions:		
Members' Purchased Service Transfer	$ 7,259,569	
Employer Payroll	83,076,722	
Receivables for Transactions During the Period	95,911	
Total		$ 90,432,202
Other Additions		0
Net Investment Income		44,990,766
TOTAL ADDITIONS		$ 135,422,968
Deductions for the Year		
Net Benefit Payments:		
Claims, Claim Expenses, and Carrier Premiums	$ 116,960,710	
Payables for Transactions During the Period	0	
Total		$ 116,960,710
Administrative Expenses		2,469,057
Other Deductions		0
TOTAL DEDUCTIONS		$ 119,429,767
Excess of Additions Over Deductions		$ 15,993,201
Reconciliation of Asset Balances		
Market Value of Assets as of 12/31/2016		$ 260,228,470
Excess of Additions over Deductions		15,993,201
Market Value of Assets as of 12/31/2017		$ 276,221,671

SUMMARY OF CHANGES IN NET ASSETS
FOR THE YEAR ENDING DECEMBER 31, 2017

DPS HEALTH CARE TRUST FUND

Additions for the Year		
Contributions:		
Members' Purchased Service Transfer	$ 83,831	
Employer Payroll	6,930,014	
Receivables for Transactions During the Period	0	
Total		$ 7,013,845
Other Additions		0
Net Investment Income		3,304,947
TOTAL ADDITIONS		$ 10,318,792
Deductions for the Year		
Net Benefit Payments:		
Claims, Claim Expenses, and Carrier Premiums	$ 6,190,665	
Payables for Transactions During the Period	0	
Total		$ 6,190,665
Administrative Expenses		157,722
Other Deductions		0
TOTAL DEDUCTIONS		$ 6,348,387
Excess of Additions Over Deductions		$ 3,970,405
Reconciliation of Asset Balances		
Market Value of Assets as of 12/31/2016		$ 18,337,228
Excess of Additions over Deductions		3,970,405
Market Value of Assets as of 12/31/2017		$ 22,307,633

UAAL AMORTIZATION SCHEDULE
STATE DIVISION
($ IN THOUSANDS)

Description	Original Balance	Outstanding Balance as of 12/31/2016	1/1/2017 Amortization Payment	Outstanding Balance as of 12/31/2017	1/1/2018 Amortization Payment	Amortization Period as of 12/31/2017
December 31, 2014 Legacy UAAL	$9,884,833	$10,279,105	$590,015	$10,413,311	$610,666	27 Years
December 31, 2015 Contribution Deficiency	116,762	118,822	6,820	120,373	7,059	27 Years
December 31, 2015 UAAL Base	7	8	1	8	1	28 Years
December 31, 2016 Contribution Deficiency	94,394	94,394	5,418	95,627	5,608	27 Years
December 31, 2016 UAAL Base	1,151,255	1,151,255	63,527	1,168,931	65,750	29 Years
December 31, 2017 Contribution Deficiency	77,802	N/A	N/A	77,802	4,562	27 Years
December 31, 2017 Plan Change	(1,592,699)	N/A	N/A	(1,592,699)	(97,874)	25 Years
December 31, 2017 UAAL Base	242,322	N/A	N/A	242,322	13,372	30 Years
Total		**$11,643,584**	**$665,781**	**$10,525,675**	**$609,144**	
Projected Payroll			**$2,835,204**		**$2,902,288**	
Total as a Percentage of Projected Payroll			**23.48%**		**20.99%**	

According to the Funding Policy, each year the Contribution Deficiency/(Surplus) will increase (or decrease) the existing Legacy UAAL as of December 31, 2014 and will amortized by the remaining period of the initial 30-year period from the date of the valuation.

Prior to January 1, 2017, the UAAL amortization payment for the State Division reflects an adjustment for the impact of AED and SAED contributions received from employers on the estimated pensionable payroll of employees electing to participate in the defined contribution plan.

UAAL AMORTIZATION SCHEDULE
SCHOOL DIVISION
($ IN THOUSANDS)

Description	Original Balance	Outstanding Balance as of 12/31/2016	1/1/2017 Amortization Payment	Outstanding Balance as of 12/31/2017	1/1/2018 Amortization Payment	Amortization Period as of 12/31/2017
December 31, 2014 Legacy UAAL	$14,243,176	$14,766,276	$847,577	$14,959,067	$877,242	27 Years
December 31, 2015 Contribution Deficiency	187,761	191,073	10,967	193,568	11,351	27 Years
December 31, 2015 UAAL Base	107,402	109,417	6,155	110,976	6,370	28 Years
December 31, 2016 Contribution Deficiency	172,767	172,767	9,917	175,023	10,264	27 Years
December 31, 2016 UAAL Base	2,850,091	2,850,091	157,270	2,893,852	162,775	29 Years
December 31, 2017 Contribution Deficiency	164,974	N/A	N/A	164,974	9,675	27 Years
December 31, 2017 Plan Change	(2,632,265)	N/A	N/A	(2,632,265)	(161,757)	25 Years
December 31, 2017 UAAL Base	400,975	N/A	N/A	400,975	22,126	30 Years
Total		**$18,089,624**	**$1,031,886**	**$16,266,170**	**$938,046**	
Projected Payroll			**$4,569,303**		**$4,697,326**	
Total as a Percentage of Projected Payroll			**22.58%**		**19.97%**	

According to the Funding Policy, each year the Contribution Deficiency/(Surplus) will increase (or decrease) the existing Legacy UAAL as of December 31, 2014 and will be amortized by the remaining period of the initial 30-year period from the date of the valuation.

UAAL AMORTIZATION SCHEDULE
LOCAL GOVERNMENT DIVISION
($ IN THOUSANDS)

Description	Original Balance	Outstanding Balance as of 12/31/2016	1/1/2017 Amortization Payment	Outstanding Balance as of 12/31/2017	1/1/2018 Amortization Payment	Amortization Period as of 12/31/2017
December 31, 2014 Legacy UAAL	$981,567	$1,017,617	$58,411	$1,030,903	$60,455	27 Years
December 31, 2015 Contribution Deficiency	8,412	8,560	491	8,672	509	27 Years
December 31, 2015 UAAL Base	(4,853)	(4,944)	(278)	(5,014)	(288)	28 Years
December 31, 2016 Contribution Deficiency	924	924	53	936	55	27 Years
December 31, 2016 UAAL Base	311,698	311,698	17,200	316,483	17,802	29 Years
December 31, 2017 Contribution Deficiency	795	N/A	N/A	795	47	27 Years
December 31, 2017 Plan Change	(325,772)	N/A	N/A	(325,772)	(20,019)	25 Years
December 31, 2017 Disaffiliation Change	(110)	N/A	N/A	(110)	(13)	10 Years
December 31, 2017 UAAL Base	9,626	N/A	N/A	9,626	531	30 Years
Total		**$1,333,855**	**$75,877**	**$1,036,519**	**$59,079**	
Projected Payroll			**$636,963**		**$662,822**	
Total as a Percentage of Projected Payroll			**11.91%**		**8.91%**	

According to the Funding Policy, each year the Contribution Deficiency/(Surplus) will increase (or decrease) the existing Legacy UAAL as of December 31, 2014 and will amortized by the remaining period of the initial 30-year period from the date of the valuation.

UAAL AMORTIZATION SCHEDULE
JUDICIAL DIVISION
($ IN THOUSANDS)

Description	Original Balance	Outstanding Balance as of 12/31/2016	1/1/2017 Amortization Payment	Outstanding Balance as of 12/31/2017	1/1/2018 Amortization Payment	Amortization Period as of 12/31/2017
December 31, 2014 Legacy UAAL	$100,387	$104,074	$5,974	$105,433	$6,183	27 Years
December 31, 2015 Contribution Deficiency	2,562	2,607	150	2,641	155	27 Years
December 31, 2015 UAAL Base	10,243	10,435	587	10,583	607	28 Years
December 31, 2016 Contribution Deficiency	2,963	2,963	170	3,002	176	27 Years
December 31, 2016 UAAL Base	29,150	29,150	1,608	29,598	1,665	29 Years
December 31, 2017 Contribution Deficiency	3,219	N/A	N/A	3,219	189	27 Years
December 31, 2017 Plan Change	(34,447)	N/A	N/A	(34,447)	(2,117)	25 Years
December 31, 2017 UAAL Base	(2,006)	N/A	N/A	(2,006)	(111)	30 Years
Total		**$149,229**	**$8,489**	**$118,023**	**$6,747**	
Projected Payroll			**$50,661**		**$50,922**	
Total as a Percentage of Projected Payroll			**16.76%**		**13.25%**	

According to the Funding Policy, each year the Contribution Deficiency/(Surplus) will increase (or decrease) the existing Legacy UAAL as of December 31, 2014 and will amortized by the remaining period of the initial 30-year period from the date of the valuation.

UAAL AMORTIZATION SCHEDULE
DENVER PUBLIC SCHOOLS DIVISION
($ IN THOUSANDS)

Description	Original Balance	Outstanding Balance as of 12/31/2016	1/1/2017 Amortization Payment	Outstanding Balance as of 12/31/2017	1/1/2018 Amortization Payment	Amortization Period as of 12/31/2017
December 31, 2014 Legacy UAAL	$664,637	$689,047	$39,551	$698,043	$40,935	27 Years
December 31, 2015 Contribution Deficiency	65,469	66,624	3,824	67,494	3,958	27 Years
December 31, 2015 UAAL Base	(44,659)	(45,497)	(2,559)	(46,145)	(2,649)	28 Years
December 31, 2016 Contribution Deficiency	54,386	54,386	3,122	55,096	3,231	27 Years
December 31, 2016 UAAL Base	260,935	260,935	14,398	264,942	14,903	29 Years
December 31, 2017 Contribution Deficiency	44,040	N/A	N/A	44,040	2,583	27 Years
December 31, 2017 Plan Change	(246,987)	N/A	N/A	(246,987)	(15,178)	25 Years
December 31, 2017 UAAL Base	(5,727)	N/A	N/A	(5,727)	(316)	30 Years
Total		**$1,025,495**	**$58,336**	**$830,756**	**$47,467**	
Projected Payroll			**$677,613**		**$694,542**	
Total as a Percentage of Projected Payroll			**8.61%**		**6.83%**	

According to the Funding Policy, each year the Contribution Deficiency/(Surplus) will increase (or decrease) the existing Legacy UAAL as of December 31, 2014 and will amortized by the remaining period of the initial 30-year period from the date of the valuation.

Schedule D – UAAL Amortization Schedules (continued)

UAAL AMORTIZATION SCHEDULE
HEALTH CARE TRUST FUND
($ IN THOUSANDS)

Description	Original Balance	Outstanding Balance as of 12/31/2016	1/1/2017 Amortization Payment	Outstanding Balance as of 12/31/2017	1/1/2018 Amortization Payment	Amortization Period as of 12/31/2017
December 31, 2017 Legacy UAAL	$1,320,935	N/A	N/A	$1,320,935	$72,890	30 Years
December 31, 2017 Disaffiliation Change	5	N/A	N/A	5	1	10 Years
Total		**N/A**	**N/A**	**$1,320,940**	**$72,891**	
Projected Payroll			**N/A**		**$8,313,358**	
Total as a Percentage of Projected Payroll			**N/A**		**0.88%**	

According to the Funding Policy, each year the Contribution Deficiency/(Surplus) will increase (or decrease) the existing Legacy UAAL as of December 31, 2017 and will amortized by the remaining period of the initial 30-year period from the date of the valuation.

UAAL AMORTIZATION SCHEDULE
DPS HEALTH CARE TRUST FUND
($ IN THOUSANDS)

Description	Original Balance	Outstanding Balance as of 12/31/2016	1/1/2017 Amortization Payment	Outstanding Balance as of 12/31/2017	1/1/2018 Amortization Payment	Amortization Period as of 12/31/2017
December 31, 2017 Legacy UAAL	$49,175	N/A	N/A	$49,175	$2,714	30 Years
Total		**N/A**	**N/A**	**$49,175**	**$2,714**	
Projected Payroll			**N/A**		**$694,542**	
Total as a Percentage of Projected Payroll			**N/A**		**0.39%**	

According to the Funding Policy, each year the Contribution Deficiency/(Surplus) will increase (or decrease) the existing Legacy UAAL as of December 31, 2017 and will amortized by the remaining period of the initial 30-year period from the date of the valuation.

Schedule E – Outline of Actuarial Assumptions and Methods

DISCOUNT RATE: 7.25% per year.

INVESTMENT RATE OF RETURN: 7.25% per year, net of investment expenses.

PRICE INFLATION ASSUMPTION: 2.40% per year.

WAGE INFLATION ASSUMPTION: 3.50% per year.

INTEREST CREDIT: 3.00% per annum on member contribution account balances.

EXPECTED ADMINISTRATIVE EXPENSES: 0.40% for all pension divisions. No estimated administrative expense loads for the fiscal year ending on December 31, 2019 were included in normal cost rates for the HCTF or DPS HCTF.

ACTUARIAL COST METHOD: Entry age normal (level percentage of pay) cost method. Actuarial gains and losses are reflected in the unfunded actuarial accrued liability. See Schedule F for a detailed explanation.

ASSET VALUATION METHOD: The actuarial value of assets is determined using the "four-year smoothed value" asset valuation method. Under this method, investment gains and losses are recognized in equal portions over a four-year period. Investment gains and losses are determined by comparing the actual return on market value for a given period to the anticipated earnings over the same period if the market value at the beginning of the period, contributions, benefit payments, and administrative expenses during the period earned the expected rate of return for the portion of the period that each was expected to be including in, or excluded from, plan assets. The expected rate of return for this purpose is equal to the investment rate of return assumption selected at the beginning of the period (in this case, 7.25% as of January 1, 2017). The resulting actuarial value of assets is not constrained to fall within a corridor around the market value of assets. Please see Schedule B for the development of the Actuarial Value of Assets as of the valuation date.

POST-RETIREMENT BENEFIT INCREASES: 1.50% per year for members of the DPS Benefit Structure or members of the PERA Benefit Structure with membership prior to 1/1/07; Members of the PERA Benefit Structure with membership after 12/31/06 paid from the AIR. In the determination of the Actuarially Determined Contribution rate, as a percentage of payroll, the AIR balance is excluded from both assets and liabilities.

WITHDRAWAL ASSUMPTION: It was assumed that 35% of the vested members who terminate elect to withdraw their contributions and matching employer contributions while the remaining 65% elect to leave their contributions in the plan in order to be eligible for a benefit at their retirement date. The only exception to this is the Judicial Division, which assumes 100% elect to leave their contributions in the plan in order to be eligible for a benefit at their retirement date. Current active members assumed to terminate service and leave their contributions in the plan in order to be eligible for a benefit at their retirement date are assumed to retire with a reduced benefit, if applicable, at an age based upon benefit structure, division, and/or service as shown in the following table:

Assumed Age of Initial Benefit Receipt	Benefit Structure, Division, and/or Service
50	PERA Benefit Structure Members (excluding Troopers) with 25 or More Years of Service
50	Troopers with 20 or More Years of Service
55	PERA Benefit Structure Members (excluding Troopers) with 20–25 Years of Service
60	PERA Benefit Structure Members with Less than 20 Years of Service
65	DPS Benefit Structure Members

INACTIVE MEMBERS: It was assumed that 100% of inactive members who terminated employment with less than five years of service elect to withdraw their contributions. Current inactive members in the PERA Benefit Structure who are assumed to leave their contributions in the plan in order to be eligible for a benefit at their retirement date are assumed to retire at age 62 with an unreduced pension benefit. Current inactive members in the DPS Benefit Structure who are assumed to leave their contributions in the plan in order to be eligible for a benefit at their retirement date are assumed to retire at age 65 with an unreduced pension benefit. For PERACare subsidies, the assumed age of initial benefit receipt is determined using the same approach used for terminating active members.

DEATH AFTER RETIREMENT: These assumptions are used to measure the probabilities of each benefit payment being made after retirement. Mortality improvement is anticipated under these assumptions, as recent mortality experience shows actual deaths 10-14 percent greater than expected under the selected tables.

For the State and Local Government Divisions, the mortality table, for post-retirement healthy mortality, used in evaluating allowances to be paid is the RP-2014 Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 73 percent factor applied to the rates for ages below 80 and a 108 percent factor applied to the rates for ages 80 and above, projected to 2018 using the MP-2015 projection scale, for males, and a 78 percent factor applied to the rates for ages below 80 and a 109 percent factor applied to the rates for ages 80 and above, projected to 2020 using the MP-2015 projection scale, for females.

For the School, Judicial, and DPS Divisions, the mortality table, for post-retirement healthy mortality, used in evaluating allowances to be paid is the RP-2014 White Collar Healthy Annuitant Mortality Table with adjustments for credibility and gender adjustments of a 93 percent factor applied to the rates for ages below 80 and a 113 percent factor applied to the rates for ages 80 and above, projected to 2018 using the MP-2015 projection scale, for males, and a 68 percent factor applied to the rates for ages below 80 and a 106 percent factor applied to the rates for ages 80 and above, projected to 2020 using the MP-2015 projection scale, for females.

For all disabled retirees, the RP-2014 Disabled Retiree Mortality Table, incorporating a 90 percent factor to both male rates and female rates was used for the period after disability retirement.

For future benefit recipients, the mortality assumption used to determine the factors for money purchase benefits, reduced service benefits for members who were not eligible to retire as of January 1, 2011, and cobeneficiary payment options is based upon the collective experience of all PERA divisions. For male rates, the RP-2014 Healthy Annuitant Mortality Table with adjustments for credibility and a 79 percent factor applied to the rates for ages below 80 and a 111 percent factor applied to the rates for ages 80 and above, projected to 2018 using the MP-2015 projection scale is assumed. For female rates, the RP-2014 White Collar Healthy Annuitant Mortality Table with adjustments for credibility and a 78 percent factor applied to the rates for ages below 80 and a 102 percent factor applied to the rates for ages 80 and above, projected to 2019 using the MP-2015 projection scale is assumed. Unisex factors are then developed using a male/female blend based upon factor type, benefit tier, and/or benefit structure.

PERCENT MARRIED: 100% of active members (80% of Denver Public Schools Division) are assumed to be married, with the wife 2 years younger than the husband.

DECREMENT TIMING AND ADJUSTMENT: Decrements are assumed to occur at the middle of the year, except that 100% retirement is assumed to occur at the beginning of the year. Decrement rates (or "probabilities") are assumed to be uniformly distributed throughout the year, and reflect multiple decrement effects.

STATE DIVISION
NON-TROOPERS

SALARY INCREASES: Representative values of the assumed annual rates of future salary increases are as follows and include wage inflation 3.50% per annum:

Sample Ages	Pay Increase Assumptions for an Individual Member: Merit & Seniority	Inflation & Productivity (Economy)	Total Increase (Next Year)
20	5.67%	3.50%	9.17%
25	3.75	3.50	7.25
30	2.80	3.50	6.30
35	2.05	3.50	5.55
40	1.50	3.50	5.00
45	0.85	3.50	4.35
50	0.50	3.50	4.00
55	0.10	3.50	3.60
60	0.00	3.50	3.50
65	0.00	3.50	3.50
70	0.00	3.50	3.50

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed annual rates of termination, death and disability are shown in the following tables:

	Percent of Members Separating Within the Next Year					
	Ultimate Termination		Death[1]		Disability	
Sample Ages	Males	Females	Males	Females	Males	Females
20	30.00%	20.00%	0.0199%	0.0075%	0.01%	0.01%
25	10.00	14.50	0.0237	0.0080	0.01	0.01
30	7.00	10.00	0.0222	0.0101	0.01	0.01
35	6.00	7.50	0.0257	0.0133	0.03	0.03
40	5.00	6.75	0.0308	0.0184	0.05	0.05
45	4.25	5.50	0.0477	0.0305	0.09	0.09
50	4.25	5.25	0.0827	0.0512	0.20	0.20
55	4.25	5.25	0.1369	0.0777	0.27	0.27
60	4.25	5.25	0.2302	0.1133	0.30	0.30
65	4.25	5.25	0.4064	0.1715	0.30	0.30
70	4.25	5.25	0.7195	0.2988	0.30	0.30

[1]Rates are shown for active members. Separate tables are used for post-retirement mortality.

STATE DIVISION
NON-TROOPERS

The select termination assumptions for members with less than five years of service are shown in the following table:

Completed Years of Service	Males	Females
0	41.50%	41.50%
1	20.50	21.50
2	14.50	16.00
3	11.50	13.00
4	9.50	11.50

RETIREMENT: Representative values of the assumed annual rates of service retirement are shown in the following table:

Retirement Ages	Percent of Members Who Are Eligible for Reduced Benefits Retiring Next Year		Percent of Members Who Are Eligible for Unreduced Benefits Retiring Next Year	
	Males	Females	Males	Females
50	9.5%	10.0%	60.0%	55.0%
51	9.5	10.0	50.0	40.0
52	9.5	10.0	42.0	36.0
53	9.5	10.0	38.0	34.0
54	9.5	10.0	32.0	26.0
55	9.5	10.0	25.0	25.0
56	9.5	10.0	20.0	24.0
57	9.5	10.0	20.0	20.0
58	9.5	10.0	18.0	18.0
59	9.5	10.0	20.0	18.0
60	9.5	10.0	20.0	21.0
61	9.5	10.0	18.0	18.0
62	9.5	10.0	22.0	19.0
63	9.5	10.0	20.0	19.0
64	9.5	10.0	20.0	19.0
65	0.0	0.0	24.0	22.0
66	0.0	0.0	26.0	26.0
67	0.0	0.0	25.0	24.0
68	0.0	0.0	22.0	25.0
69	0.0	0.0	22.0	24.0
70	0.0	0.0	25.0	25.0
71	0.0	0.0	25.0	25.0
72	0.0	0.0	25.0	25.0
73	0.0	0.0	25.0	25.0
74	0.0	0.0	25.0	25.0
75 & over	0.0	0.0	100.0	100.0

STATE DIVISION
TROOPERS

SALARY INCREASES: Representative values of the assumed annual rates of future salary increases are as follows and include wage inflation at 3.50% per annum:

Sample Ages	Merit & Seniority	Pay Increase Assumptions for an Individual Member Inflation & Productivity (Economy)	Total Increase (Next Year)
20	5.50%	3.50%	9.00%
25	3.75	3.50	7.25
30	2.80	3.50	6.30
35	2.05	3.50	5.55
40	1.50	3.50	5.00
45	1.20	3.50	4.70
50	0.80	3.50	4.30
55	0.40	3.50	3.90
60	0.00	3.50	3.50
65	0.00	3.50	3.50
70	0.00	3.50	3.50

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed annual rates of termination, death and disability are shown in the following tables:

	Percent of Members Separating Within the Next Year					
	Ultimate Termination[1]		Death[2]		Disability	
Sample Ages	Males	Females	Males	Females	Males	Females
20	8.00%	8.00%	0.0199%	0.0075%	0.01%	0.01%
25	6.00	6.00	0.0237	0.0080	0.02	0.02
30	4.00	4.00	0.0222	0.0101	0.04	0.04
35	3.75	3.75	0.0257	0.0133	0.06	0.06
40	3.00	3.00	0.0308	0.0184	0.10	0.10
45	3.00	3.00	0.0477	0.0305	0.25	0.25
50	3.00	3.00	0.0827	0.0512	0.30	0.30
55	3.00	3.00	0.1369	0.0777	0.30	0.30
60	3.00	3.00	0.2302	0.1133	0.30	0.30
65	3.00	3.00	0.4064	0.1715	0.30	0.30
70	3.00	3.00	0.7195	0.2988	0.30	0.30

[1]There are no select termination assumptions for the State Troopers.

[2]Rates are shown for active members. Separate tables are used for post-retirement mortality.

STATE DIVISION
TROOPERS

RETIREMENT: Representative values of the assumed annual rates of service retirement are shown in the following table:

Retirement Ages	Percent of Members Who Are Eligible for Reduced Benefits Retiring Next Year	Percent of Members Who Are Eligible for Unreduced Benefits Retiring Next Year
45		40.0%
46		40.0
47		40.0
48		40.0
49		40.0
50	10.0%	40.0
51	10.0	32.0
52	10.0	32.0
53	10.0	32.0
54	10.0	32.0
55	5.0	32.0
56	5.0	32.0
57	5.0	32.0
58	5.0	32.0
59	5.0	32.0
60	10.0	32.0
61	10.0	32.0
62	10.0	32.0
63	10.0	32.0
64	10.0	32.0
65 & over	0.0	100.0

SCHOOL AND DPS DIVISION (PERA BENEFIT STRUCTURE)

SALARY INCREASES: Representative values of the assumed annual rates of future salary increases are as follows and include wage inflation at 3.50% per annum:

	Pay Increase Assumptions for an Individual Member		
Sample Ages	Merit & Seniority	Inflation & Productivity (Economy)	Total Increase (Next Year)
20	6.20%	3.50%	9.70%
25	4.10	3.50	7.60
30	2.95	3.50	6.45
35	2.50	3.50	6.00
40	1.95	3.50	5.45
45	1.35	3.50	4.85
50	0.80	3.50	4.30
55	0.35	3.50	3.85
60	0.00	3.50	3.50
65	0.00	3.50	3.50
70	0.00	3.50	3.50

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed annual rates of termination, death and disability are shown in the following tables:

	Percent of Members Separating Within the Next Year					
	Ultimate Termination		Death[1]		Disability	
Sample Ages	Males	Females	Males	Females	Males	Females
20	20.00%	14.50%	0.0199%	0.0075%	0.01%	0.01%
25	10.00	12.00	0.0237	0.0080	0.01	0.01
30	6.50	8.00	0.0222	0.0101	0.01	0.01
35	5.25	6.50	0.0257	0.0133	0.02	0.02
40	4.25	5.00	0.0308	0.0184	0.04	0.04
45	4.00	5.00	0.0477	0.0305	0.06	0.06
50	4.00	5.00	0.0827	0.0512	0.09	0.09
55	4.00	5.00	0.1369	0.0777	0.15	0.15
60	4.00	5.00	0.2302	0.1133	0.21	0.21
65	4.00	5.00	0.4064	0.1715	0.21	0.21
70	4.00	5.00	0.7195	0.2988	0.21	0.21

[1]Rates are shown for active members. Separate tables are used for post-retirement mortality.

SCHOOL AND DPS DIVISION (PERA BENEFIT STRUCTURE)

The select termination assumptions for members with less than five years of service are shown in the following table:

Completed Years of Service	Males	Females
0	37.00%	34.00%
1	21.00	20.00
2	16.00	15.00
3	12.00	12.00
4	11.00	11.00

RETIREMENT: Representative values of the assumed annual rates of service retirement are shown in the following table:

Retirement Ages	Percent of Members Who Are Eligible for Reduced Benefits Retiring Next Year		Percent of Members Who Are Eligible for Unreduced Benefits Retiring Next Year	
	Males	Females	Males	Females
50	8.0%	8.0%	55.0%	60.0%
51	8.0	8.0	48.0	54.0
52	8.0	8.0	46.0	48.0
53	8.0	8.0	42.0	42.0
54	10.0	10.0	40.0	40.0
55	10.0	10.0	28.0	29.0
56	10.0	11.0	25.0	25.0
57	10.0	11.0	25.0	25.0
58	10.0	11.0	22.0	22.0
59	10.0	11.0	22.0	22.0
60	10.0	11.0	25.0	25.0
61	12.0	11.0	25.0	24.0
62	12.0	11.0	24.0	27.0
63	12.0	11.0	24.0	24.0
64	12.0	11.0	24.0	24.0
65	0.0	0.0	27.0	26.0
66	0.0	0.0	28.0	28.0
67	0.0	0.0	25.0	25.0
68	0.0	0.0	24.0	22.0
69	0.0	0.0	24.0	22.0
70	0.0	0.0	22.0	25.0
71	0.0	0.0	22.0	23.0
72	0.0	0.0	22.0	23.0
73	0.0	0.0	22.0	23.0
74	0.0	0.0	22.0	23.0
75 & over	0.0	0.0	100.0	100.0

LOCAL GOVERNMENT DIVISION

SALARY INCREASES: Representative values of the assumed annual rates of future salary increases are as follows and include wage inflation at 3.50% per annum:

Sample Ages	Pay Increase Assumptions for an Individual Member: Merit & Seniority	Inflation & Productivity (Economy)	Total Increase (Next Year)
20	6.95%	3.50%	10.45%
25	4.30	3.50	7.80
30	2.64	3.50	6.14
35	1.72	3.50	5.22
40	1.23	3.50	4.73
45	0.99	3.50	4.49
50	0.79	3.50	4.29
55	0.60	3.50	4.10
60	0.25	3.50	3.75
65	0.00	3.50	3.50
70	0.00	3.50	3.50

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed annual rates of termination, death and disability are shown in the following tables:

	Percent of Members Separating Within the Next Year					
	Ultimate Termination		Death[1]		Disability	
Sample Ages	Males	Females	Males	Females	Males	Females
20	13.00%	16.00%	0.0199%	0.0075%	0.01%	0.01%
25	12.00	16.00	0.0237	0.0080	0.01	0.01
30	8.00	11.00	0.0222	0.0101	0.01	0.01
35	6.00	9.00	0.0257	0.0133	0.03	0.03
40	5.25	6.50	0.0308	0.0184	0.04	0.04
45	4.50	6.50	0.0477	0.0305	0.11	0.11
50	4.50	6.00	0.0827	0.0512	0.15	0.15
55	4.50	6.00	0.1369	0.0777	0.17	0.17
60	4.50	6.00	0.2302	0.1133	0.25	0.25
65	4.50	6.00	0.4064	0.1715	0.25	0.25
70	4.50	6.00	0.7195	0.2988	0.25	0.25

[1]Rates are shown for active members. Separate tables are used for post-retirement mortality.

LOCAL GOVERNMENT DIVISION

The select termination assumptions for members with less than five years of service are shown in the following table:

Completed Years of Service	Males	Females
0	41.00%	39.00%
1	24.00	23.00
2	17.00	18.00
3	12.00	14.00
4	10.00	11.00

RETIREMENT: Representative values of the assumed annual rates of service retirement are shown in the following table:

Retirement Ages	Percent of Members Who Are Eligible for Reduced Benefits Retiring Next Year		Percent of Members Who Are Eligible for Unreduced Benefits Retiring Next Year	
	Males	Females	Males	Females
50	8.0%	9.0%	60.0%	60.0%
51	8.0	9.0	46.0	52.0
52	8.0	9.0	30.0	40.0
53	8.0	9.0	25.0	40.0
54	8.0	9.0	22.0	40.0
55	8.0	12.0	22.0	28.0
56	8.0	12.0	25.0	30.0
57	8.0	12.0	22.0	21.0
58	8.0	12.0	20.0	21.0
59	10.0	11.5	20.0	21.0
60	11.0	11.5	22.0	21.0
61	11.0	11.5	22.0	20.0
62	11.0	11.5	24.0	27.0
63	11.0	11.5	25.0	22.0
64	11.0	11.5	25.0	22.0
65	0.0	0.0	25.0	25.0
66	0.0	0.0	30.0	25.0
67	0.0	0.0	20.0	30.0
68	0.0	0.0	25.0	20.0
69	0.0	0.0	25.0	20.0
70	0.0	0.0	25.0	24.0
71	0.0	0.0	25.0	24.0
72	0.0	0.0	25.0	24.0
73	0.0	0.0	25.0	24.0
74	0.0	0.0	25.0	24.0
75 & over	0.0	0.0	100.0	100.0

JUDICIAL DIVISION

SALARY INCREASES: Representative values of the assumed annual rates of future salary increases are as follows and include wage inflation at 3.50% per annum:

	Pay Increase Assumptions for an Individual Member		
Sample Ages	Merit & Seniority	Inflation & Productivity (Economy)	Total Increase (Next Year)
30	1.50%	3.50%	5.00%
35	1.50	3.50	5.00
40	0.67	3.50	4.17
45	0.50	3.50	4.00
50	0.50	3.50	4.00
55	0.50	3.50	4.00
60	0.50	3.50	4.00
65	0.50	3.50	4.00
70	0.50	3.50	4.00

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed annual rates of termination, death and disability are shown in the following tables:

	Percent of Members Separating Within the Next Year					
	Termination[1]		Death[2]		Disability	
Sample Ages	Males	Females	Males	Females	Males	Females
30	1.65%	1.65%	0.0222%	0.0101%	0.01%	0.01%
35	1.65	1.65	0.0257	0.0133	0.02	0.02
40	1.65	1.65	0.0308	0.0184	0.04	0.04
45	1.65	1.65	0.0477	0.0305	0.08	0.08
50	1.65	1.65	0.0827	0.0512	0.10	0.10
55	1.65	1.65	0.1369	0.0777	0.20	0.20
60	1.65	1.65	0.2302	0.1133	0.30	0.30
65	1.65	1.65	0.4064	0.1715	0.30	0.30
70	1.65	1.65	0.7195	0.2988	0.30	0.30

[1]There are no select termination assumptions for the Judicial Division.

[2]Rates are shown for active members. Separate tables are used for post-retirement mortality.

JUDICIAL DIVISION

RETIREMENT: Representative values of the assumed annual rates of service retirement are shown in the following table:

Retirement Ages	Percent of Members Who Are Eligible for Reduced Benefits Retiring Next Year	Percent of Members Who Are Eligible for Unreduced Benefits Retiring Next Year
50	6.0%	6.0%
51	6.0	6.0
52	6.0	6.0
53	6.0	6.0
54	6.0	6.0
55	6.0	6.0
56	6.0	6.0
57	6.0	6.0
58	6.0	6.0
59	6.0	6.0
60	8.0	8.0
61	8.0	8.0
62	8.0	8.0
63	8.0	8.0
64	8.0	8.0
65	0.0	15.0
66	0.0	15.0
67	0.0	15.0
68	0.0	15.0
69	0.0	15.0
70	0.0	40.0
71	0.0	40.0
72	0.0	40.0
73	0.0	40.0
74	0.0	40.0
75 & over	0.0	100.0

ALL DIVISIONS (DPS BENEFIT STRUCTURE)

SALARY INCREASES: Representative values of the assumed annual rates of future salary increases are as follows and include wage inflation at 3.50% per annum:

	Pay Increase Assumptions for an Individual Member		
Sample Ages	Merit & Seniority	Inflation & Productivity (Economy)	Total Increase (Next Year)
20	3.50%	3.50%	7.00%
25	3.50	3.50	7.00
30	3.20	3.50	6.70
35	2.76	3.50	6.26
40	2.12	3.50	5.62
45	1.34	3.50	4.84
50	0.80	3.50	4.30
55	0.42	3.50	3.92
60	0.20	3.50	3.70
65	0.00	3.50	3.50
70	0.00	3.50	3.50

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed annual rates of termination, death and disability are shown in the following tables:

	Percent of Members Separating Within the Next Year					
	Termination[1]		Death[2]		Disability	
Sample Ages	Males	Females	Males	Females	Males	Females
20	8.00%	10.00%	0.0199%	0.0075%	0.01%	0.01%
25	8.00	10.00	0.0237	0.0080	0.01	0.01
30	7.00	9.00	0.0222	0.0101	0.01	0.01
35	7.00	8.00	0.0257	0.0133	0.02	0.02
40	5.75	6.50	0.0308	0.0184	0.05	0.05
45	5.00	4.50	0.0477	0.0305	0.09	0.09
50	4.50	4.50	0.0827	0.0512	0.20	0.20
55	4.25	4.50	0.1369	0.0777	0.24	0.24
60	4.25	4.50	0.2302	0.1133	0.38	0.38
65	4.25	4.50	0.4064	0.1715	0.40	0.40
70	4.25	4.50	0.7195	0.2988	0.40	0.40

[1]There are no select termination assumptions for DPS.

[2]Rates are shown for active members. Separate tables are used for post-retirement mortality.

ALL DIVISIONS (DPS BENEFIT STRUCTURE)

RETIREMENT: Representative values of the assumed annual rates of service retirement are shown in the following table:

Retirement Ages	Percent of Members Who Are Eligible for Reduced Benefits Retiring Next Year		Percent of Members Who Are Eligible for Unreduced Benefits Retiring Next Year	
	Males	Females	Males	Females
50	8.0%	5.0%	40.0%	40.0%
51	8.0	5.0	40.0	40.0
52	8.0	5.0	35.0	30.0
53	8.0	10.0	35.0	30.0
54	11.0	10.0	30.0	30.0
55	11.0	10.0	30.0	30.0
56	11.0	10.0	20.0	25.0
57	11.0	10.0	24.0	25.0
58	11.0	10.0	22.0	20.0
59	15.0	12.0	25.0	24.0
60	15.0	15.0	22.0	30.0
61	17.0	15.0	20.0	28.0
62	17.0	15.0	25.0	30.0
63	17.0	15.0	40.0	30.0
64	17.0	15.0	20.0	30.0
65	0.0	0.0	30.0	35.0
66	0.0	0.0	30.0	35.0
67	0.0	0.0	30.0	32.0
68	0.0	0.0	30.0	30.0
69	0.0	0.0	30.0	30.0
70	0.0	0.0	30.0	30.0
71	0.0	0.0	30.0	30.0
72	0.0	0.0	30.0	30.0
73	0.0	0.0	30.0	30.0
74	0.0	0.0	30.0	30.0
75 & over	0.0	0.0	100.0	100.0

SINGLE LIFE RETIREMENT VALUES AND RATES OF POST-RETIREMENT MORTALITY

Healthy Benefit Recipients								
State/Troopers/Local								
	Rates of Post-Retirement Mortality		Present Value of $1.00 Monthly for Life		Present Value of $1.00 Monthly Increasing 1.5% Annually		Future Life Expectancy (Years)	
Sample Ages	Males	Females	Males	Females	Males	Females	Males	Females
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

Healthy Benefit Recipients								
School/DPS/Judges								
	Rates of Post-Retirement Mortality		Present Value of $1.00 Monthly for Life		Present Value of $1.00 Monthly Increasing 1.5% Annually		Future Life Expectancy (Years)	
Sample Ages	Males	Females	Males	Females	Males	Females	Males	Females
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

SINGLE LIFE RETIREMENT VALUES AND RATES OF POST-RETIREMENT MORTALITY

Disabled Retirees								
	Rates of Post-Retirement Mortality		Present Value of $1.00 Monthly for Life		Present Value of $1.00 Monthly Increasing 1.5% Annually		Future Life Expectancy (Years)	
Sample Ages	Males	Females	Males	Females	Males	Females	Males	Females
40	0.990%	0.491%	$134.73	$145.58	$158.42	$173.47	30.30	36.07
45	1.534	0.814	128.67	140.02	150.06	165.39	26.97	32.09
50	1.836	1.072	123.52	134.58	142.79	157.46	24.09	28.49
55	2.103	1.303	117.81	128.53	134.85	148.80	21.32	25.05
60	2.394	1.530	110.85	121.21	125.50	138.66	18.55	21.69
65	2.852	1.877	102.18	111.96	114.27	126.43	15.77	18.35
70	3.631	2.538	91.80	100.74	101.33	112.20	13.05	15.12
75	4.886	3.694	80.02	88.16	87.13	96.81	10.49	12.15
80	6.895	5.493	67.25	75.03	72.22	81.26	8.15	9.54
85	10.197	8.138	54.22	62.08	57.47	66.33	6.12	7.33

Factors for Money Purchase Benefits, Reduced Service Benefits, and Cobeneficiary Payment Options								
	Rates of Post-Retirement Mortality		Present Value of $1.00 Monthly for Life		Present Value of $1.00 Monthly Increasing 1.5% Annually		Future Life Expectancy (Years)	
Sample Ages	Males	Females	Males	Females	Males	Females	Males	Females
40	0.031%	0.018%	$159.61	$162.21	$193.40	$197.72	44.21	47.40
45	0.048	0.031	155.17	158.73	186.20	191.76	39.29	42.45
50	0.275	0.163	149.07	153.94	176.96	184.06	34.40	37.53
55	0.430	0.224	142.77	148.47	167.44	175.44	29.93	32.86
60	0.591	0.302	135.05	141.18	156.23	164.59	25.62	28.24
65	0.778	0.471	125.10	131.62	142.51	151.14	21.39	23.71
70	1.150	0.775	112.29	119.43	125.78	134.88	17.27	19.33
75	1.840	1.331	96.39	104.27	106.04	115.69	13.33	15.16
80	3.717	2.733	77.71	86.37	83.98	94.13	9.72	11.33
85	7.618	5.600	59.76	68.26	63.53	73.13	6.85	8.15

METHODS AND ASSUMPTIONS SPECIFIC TO
THE PERA BENEFIT STRUCTURE FOR THE HEALTH CARE TRUST FUND

Health Care Participation Rates—Applicable to the PERA Benefit Structure

Current PERACare participants of the State, School (other than Denver Public Schools), Local Government, and the Judicial Divisions, are assumed to maintain their current health care benefit elections in perpetuity. For active members retiring directly from the State, School (other than Denver Public Schools), Local Government, and the Judicial Divisions, the following participation rates are assumed:

Attained Age(s)	Percent Electing Health Care Coverage
15–48	20%
49–50	25%
51–52	35%
53–55	40%
56–57	45%
58–61	50%
62–71	55%
72+	60%

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 the above table.

For eligible inactive members of the State, School (other than Denver Public Schools), Local Government, or the Judicial Divisions, 25% are assumed to elect health care coverage upon commencement of their monthly pension benefit.

For spousal participation, actual census data and current plan elections of current benefit recipients were used. For spouses of eligible inactive members and future retirees of the State, School (other than Denver Public Schools), Local Government, or the Judicial Divisions, 20% are assumed to elect coverage for their spouse. For current and future retirees, 70% are assumed to elect a joint and survivor benefit payment form. The age difference between female retirees and covered male spouses is assumed to be 1 year and the age difference between male retirees and female spouses is assumed to be 3 years.

PERA Benefit Structure Assumptions Specific to the "No Part A" Subsidy

Under Colorado Revised Statute 24-51-1206(4), the premiums charged to a PERACare enrollee who is age sixty-five or older and who is not eligible for premium-free benefits under Medicare Part A shall be no greater than the premium charged to a PERACare enrollee eligible for premium-free benefits under Medicare Part A with the same plan option, coverage level, and service credit. As a result, an additional, "No Part A" subsidy is paid under the PERA benefit structure on behalf of those PERACare enrollees who are age sixty-five or older and are not eligible for premium-free benefits under Medicare Part A.

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, 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, the following percentage of PERACare enrollees are assumed to not qualify for premium-free Medicare Part A benefits; thus qualifying for the "No Part A" subsidy from the PERA Benefit Structure:

Hire Age	Percent Qualifying for "No Part A" Subsidy
15–24	17%
25–29	11%
30+	4%

Of those PERACare enrollees assumed not qualify for premium-free Medicare Part A benefits and receive the "No Part A" subsidy from the PERA Benefit Structure, 10% are assumed to cover a spouse.

The qualifying assumptions are based upon the experience of current, Medicare eligible, PERACare enrollees. Date of hire and hire age are estimated based upon service and date of retirement for current benefit recipients, or service and the valuation date for active members. As a result, those who are re-employed or transfer to another PERA employer may have accumulated the required quarters of Medicare-covered employment.

90% of PERACare enrollees receiving health care benefits as a result of disability retirement are assumed to qualify for premium-free Medicare Part A. 100% of eligible inactive 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.

Currently, the additional plan costs or premiums associated with those PERACare enrollees not eligible for premium-free Medicare Part A coverage are less, in aggregate, than the costs of PERA paying the Medicare Part A premium on their behalf. However, future increases in the additional costs or premiums associated with PERACare enrollees not eligible for premium-free Medicare Part A coverage may, in aggregate, exceed the Medicare Part A premium. As a result, it is assumed PERA will make the decision to pay the Medicare Part A premium when more cost-effective to do so. In making the decision to pay the Medicare Part A premium, it is assumed PERA's decision will be based upon the level of additional plan costs, include the premium penalties associated with late enrollment in Medicare Part A, and be made when the additional cost, averaged across all plans, for all PERACare enrollees, exceeds the Medicare Part A premium. The valuation assumes this will occur in the year 2030.

Schedule E – Outline of Actuarial Assumptions and Methods (continued)

PERA Benefit Structure Assumptions Specific to the “No Part A” Subsidy (continued)

The premium penalty associated with enrollment in Medicare Part A after initial eligibility is 10% of the Part A premium and is payable for a period that is twice as long as the delay in enrollment. For example, someone enrolling at age 70 would need to pay the premium penalty for 10 years, assuming initial eligibility at age 65.

PERA Benefit Structure Health Care Plan Election Rates

Medicare plan elections for future retirees of the State, School, Local Government, Judicial, and Denver Public Schools Divisions under the PERA benefit structure who are not eligible for premium-free Medicare Part A, are assumed as follows:

	Percent Electing Medicare Plan	
Medicare Plan	**Other Divisions**	**DPS Division**
Self-Funded Medicare Supplement Plans	60%	40%
Kaiser Permanente Medicare Advantage HMO	25%	35%
Rocky Mountain Health Plans Medicare HMO	10%	5%
UnitedHealthcare Medicare HMO	5%	20%

Medicare plan elections for current, Pre-Medicare retirees of the State, School, Local Government, Judicial and Denver Public Schools Divisions under the PERA benefit structure, who are not eligible for premium-free Medicare Part A, are assumed as follows:

	Percent Electing Medicare Plan	
Medicare Plan	**Pre-Medicare Anthem Plans**	**Pre-Medicare Kaiser Plans**
Self-Funded Medicare Supplement Plans	88%	2%
Kaiser Permanente Medicare Advantage HMO	1%	92%
Rocky Mountain Health Plans Medicare HMO	6%	2%
UnitedHealthcare Medicare HMO	5%	4%

For those PERACare enrollees of the State, School, Local Government, Judicial and Denver Public Schools Divisions under the PERA benefit structure, who are assumed to be ineligible for premium-free Medicare Part A and participate in the self-funded plans, 80% are assumed to elect MS#1, 17% are assumed to elect MS#2, and 3% are assumed to elect MS#3.

PERA Benefit Structure Initial Health Care Cost Rates

In determining the additional liability for PERACare enrollees who are age sixty-five or older and who are not eligible for premium-free Medicare Part A, the following monthly costs/premiums were provided by PERA, and are assumed for 2017. All costs are subject to the Health Care Cost Trend Rates.

Medicare Plan	Cost for Members without Medicare Part A	Premium for Members without Medicare Part A
Self-Funded Medicare Supplement Plans	$736	$367
Kaiser Permanente Medicare Advantage HMO	$602	$236
Rocky Mountain Health Plans Medicare HMO	$611	$251
UnitedHealthcare Medicare HMO	$686	$213

The 2018 Medicare Part A premium is $422 per month.

PERA Benefit Structure Annual Expected Cost Age Adjusted to Age 65

In determining the additional liability for PERACare enrollees who are age sixty-five or older and who are not eligible for premium-free Medicare Part A, the following chart details the initial expected value of Medicare Part A benefits, age adjusted to age 65 for the year following the valuation date.

Medicare Plan	Cost for Members without Medicare Part A
Self-Funded Medicare Supplement Plans	$289
Kaiser Permanente Medicare Advantage HMO	$300
Rocky Mountain Health Plans Medicare HMO	$270
UnitedHealthcare Medicare HMO	$400

PERA Benefit Structure Age Related Morbidity

For PERACare enrollees who are age sixty-five or older and who are not eligible for premium-free Medicare Part A, per capita health care costs of the PERACare Medicare plans are adjusted to reflect expected health care cost changes related to age. The increase to the net incurred health care claims is assumed to be:

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%

The Medicare Part A premium is not age adjusted, as Medicare is assumed to be a pooled health plan in which there are no age-related implicit subsidies between active employees and retirees.

The service-based premium subsidy for health care does not result in annually increasing costs to the PERA benefit structure as a PERACare enrollee ages (excluding the subsidy reduction at age 65 or the costs associated with Medicare disability eligibility).

PERA Benefit Structure Health Care Cost Trend Rates

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%

The service-based premium subsidy is assumed to remain constant at its current level as of December 31, 2017.

HCTF Dual Status Members and Retirees

Some members and retirees may be represented under both the PERA benefit structure and the DPS benefit structure, and are considered as members or retirees in both benefit structures due to their dual status. In calculating the HCTF's liabilities for members with a liability under both the HCTF and the DPS HCTF, recognition is given to the choice of benefit structure, and the allocation of member contributions between the two HCTFs, as set forth in C.R.S. 24-51-1206.5. The choice of benefit structure is based upon what is assumed to be of the highest economic value to the benefit recipient. Current allocation percentages and member contribution account balances were provided by PERA for dual status members and retirees. For active members, member contribution account balances were projected assuming annual interest crediting of 3.00%, future salary increases of 3.50%, and member contributions of 8.00% of projected salary.

METHODS AND ASSUMPTIONS SPECIFIC TO THE DPS BENEFIT STRUCTURE FOR THE DPS HEALTH CARE TRUST FUND

Health Care Participation Rates—Applicable to the DPS Benefit Structure

Current PERACare enrollees of the Denver Public Schools (DPS) Division are assumed to maintain their current health care benefit elections in perpetuity. For active members retiring directly from the DPS Division, the following participation rates are assumed:

Attained Age(s)	Percent Electing Health Care Coverage
15–48	20%
49–50	25%
51–52	35%
53	40%
54–57	50%
58–60	55%
61–71	60%
72+	65%

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 the above table.

For deferred vested members of the DPS Division, 25% are assumed to elect health care coverage upon commencement of their monthly benefit.

For spousal participation, actual census data and current plan elections of current benefit recipients were used. For spouses of deferred vested members and future retirees of the DPS Division, 15% are assumed to elect coverage for their spouse. The age difference between female retirees and covered male spouses is assumed to be 1 year and the age difference between male retirees and female spouses is assumed to be 3 years.

DPS Benefit Structure Assumptions Specific to the "No Part A" Subsidy

For those retirees who are age 65 or older and are not eligible for premium-free benefits under Medicare Part A, an additional, "No Part A" premium subsidy is paid under the DPS benefit structure.

For those current retirees 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 retirees not yet age 65, 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, the following percentage of retirees are assumed to not qualify for premium-free Medicare Part A benefits; thus qualifying for the "No Part A" subsidy from the DPS benefit structure:

Hire Age	Percent Qualifying for "No Part A" Subsidy
15–24	17%
25–29	11%
30+	4%

The qualifying assumptions are based upon the experience of current, Medicare eligible, PERACare enrollees. Date of hire and hire age are estimated based upon service and date of retirement for current benefit recipients, or service and the valuation date for active members. As a result, those who are re-employed or transfer to another PERA employer may have accumulated the required quarters of Medicare-covered employment.

90% of members enrolled in PERACare as a result of disability retirement are assumed to qualify for premium-free Medicare Part A.

100% of deferred vested members receiving health care benefits 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.

DPS Benefit Structure Additional Premium Subsidy

In determining the additional liability for retirees who are age sixty-five or older and who are not eligible for premium-free Medicare Part A, the following, additional monthly costs are assumed:

Years of Service	Monthly Subsidy for Members without Medicare Part A
20+	$115.00
19	109.25
18	103.50
17	97.75
16	92.00
15	86.25
14	80.50
13	74.75
12	69.00
11	63.25
10	57.50
9	51.75
8	46.00
7	40.25
6	34.50
5	28.75
4	23.00
3	17.25
2	11.50
1	5.75

The additional premium subsidy for retirees who are age sixty-five or older and who are not eligible for premium-free Medicare Part A is assumed to remain constant at its current level as of December 31, 2017.

Schedule E – Outline of Actuarial Assumptions and Methods (continued)

DPS Benefit Structure Morbidity

The liabilities for medical and drug post-employment benefits are to be based, in most circumstances, on assumed claims costs that vary by age. This is generally accomplished using rates of morbidity, or, an aging curve, modeling the growth in assumed claims as a PERACare enrollee ages. As the service-based premium subsidies for health care do not result in annually increasing costs to the DPS benefit structure as a retiree ages (excluding the subsidy reduction at age 65 or the costs associated with Medicare disability eligibility), no morbidity assumptions are utilized in the determination of DPS benefit structure liabilities.

DPS HCTF Dual Status Members and Retirees

Some members and retirees may be represented under both the PERA benefit structure and the DPS benefit structure, and are considered as members or retirees in both structures due to their dual status. In calculating the DPS HCTF's liabilities for members with a liability under both the HCTF and the DPS HCTF, recognition is given to the choice of benefit structure, and the allocation of member contributions between the two HCTFs, as set forth in C.R.S. 24-51-1206.5. The choice of benefit structure is based upon what is assumed to be of the highest economic value to the benefit recipient. Current allocation percentages and member contribution account balances were provided by PERA for dual status members and retirees. For active members, member contribution account balances were projected assuming annual interest crediting of 3.00%, future salary increases of 3.50%, and member contributions of 8.00% of projected salary.

ACTUARIAL COST METHOD

1. The valuation is prepared on the projected benefit basis, which is used to determine the present value of each member's expected benefit payable at retirement, separation, disability or death. The calculations are based on the member's age, years of service, sex, compensation, expected future salary increases, and an assumed future investment rate of return. The calculations consider the probability of a member's death or termination of employment prior to becoming eligible for a benefit and the probability of the member terminating with a service, disability, or survivor's benefit. The present value of the expected future benefits payable to active members is added to the present value of the expected future payments to current benefit recipients to obtain the present value of all expected benefits payable to the present group of members and survivors.

2. The employer contributions required to support the benefits of PERA are determined following a level funding approach, and consist of a normal contribution and an actuarial accrued liability contribution.

3. The actuarial cost method is a procedure for allocating the actuarial present value of all expected benefits and expenses for the present group of active members to time periods. The method used for the valuation is known as the entry age normal (level percentage of pay) actuarial cost method (EAN method), and has the following characteristics:

   (i) The annual normal costs for each individual active participant are sufficient to accumulate the value of the participant's expected benefits at time of retirement.
   (ii) Each annual normal cost is a constant percentage of the participant's year-by-year projected covered compensation.

4. The EAN method allocates the actuarial present value of each active participant's projected benefits on a level basis over the participant's assumed compensation rates between the entry age of the participant and all assumed future exit ages.

5. The portion of the actuarial present value allocated to the valuation year is called the normal cost. Under the EAN method, a calculation is made to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf. The normal contribution is equal to the normal cost plus an amount for assumed administrative expenses, if any.

6. The portion of the actuarial present value of expected benefits not provided for by the actuarial present value of future normal costs is called the actuarial accrued liability.

7. The excess of the actuarial accrued liability over the actuarial value of assets is the unfunded actuarial accrued liability / (surplus) (UAAL).

Effective Date

Pension: Established in 1931, most recently amended during 2015 to "true-up" the employer contribution rate of the DPS Division. The Denver Public Schools Retirement System (DPSRS) was merged into PERA effective January 1, 2010. As of that date, all liabilities and assets of DPSRS were transferred to and became liabilities and assets of the DPS Division of PERA, including the maintenance of a separate benefit structure for existing members. Therefore, if a DPS division member terminates employment (without refund) and later is reemployed with an affiliated employer in the State Division, he or she may be building on a DPS Benefit Structure within that division. The benefit provisions of existing members of PERA on the merger date and all new hires, post-merger, are building a benefit under the PERA Benefit Structure.

Health Care Trust Fund (HCTF): On July 1, 1985, employer contributions to the HCTF commenced. Plan coverage and premium subsidy payments began July 1, 1986.

DPS Health Care Trust Fund (DPS HCTF): On January 1, 2010, as part of the merger, the liabilities and assets of the Denver Public Schools Retiree Health Benefit Trust were transferred into a newly created DPS Health Care Trust Fund and employer contributions from employers in the DPS Division commenced.

DEFINITIONS

Affiliated Employers

State agencies and institutions of higher education, political subdivisions of the state, all school districts, courts, cities and municipalities and any other public entities which affiliate with PERA.

Annual Increase Reserve

Applicable for PERA Benefit Structure members hired on or after January 1, 2007 and prior non-DPSRS members who became PERA members as of January 1, 2010, a portion of the employer contribution, currently equal to one percent of the salaries of affected members, is accumulated in the Annual Increase Reserve to be paid out in annual increases each July 1, to the extent affordable. A separate, annual actuarial valuation determines the affordability and the percentage of annual increases to the eligible members within the groups previously defined. The maximum annual increase awarded, if any, by the PERA Board is the least of:

a) One and a half percent of current benefits,
b) The average of the annual CPI-W increase determined each month published for the preceding calendar year, and
c) An increase that will exhaust ten percent of the year-end market value of the Annual Increase Reserve.

Covered Members	Employees of Affiliated Employers who work in a position subject to membership and for whom contributions are made.
Division	One of five separate divisions which include: State, School, Local Government, Judicial and Denver Public Schools (DPS). Only local government entities can voluntarily affiliate with PERA and these entities are assigned to the Local Government Division. The financial activities of each division are accounted for in separate trust funds.
Highest Average Salary	For PERA Benefit Structure members, not in the Judicial Division, who are eligible for retirement as of January 1, 2011, one-twelfth of the average of the highest annual salaries upon which contributions were made during three periods of twelve consecutive months of Service Credit; or for a member with less than three years of Service Credit, one-twelfth of the average of the annual salaries upon which contributions were made. Annual salary increases recognized in the determination of HAS are limited to 15% a year for members who began membership prior to January 1, 2007. For members who began membership on or after January 1, 2007, the annual salary increases recognized in the determination of HAS are limited to 8% a year. For Judicial Division members, one-twelfth of the highest annual salary upon which contributions were made during one period of twelve consecutive months of Service Credit. For DPS Benefit Structure members, who are eligible for retirement as of January 1, 2011, the greater of the average of the 36 months of highest annual salaries or the career average salary. For all members, who are not eligible for retirement as of January 1, 2011, one-twelfth of the average of the highest annual salaries upon which contributions were made during three periods of twelve consecutive months of Service Credit; or for a member with less than three years of Service Credit, one-twelfth of the average of the annual salaries upon which contributions were made. Annual salary increases recognized in the determination of HAS are limited to 8% a year. Effective January 1, 2020 for members in the State, School, Local Government and DPS Divisions, all members who do not have five years of service credit on December 31, 2019 and new members hired on or after January 1, 2020, the number of years used in the highest average salary calculation will be increased from three years to five years. Effective January 1, 2020 for members in the Judicial Division, all members who do not have five years of service credit on December 31, 2019 and new members hired on or after January 1, 2020, the number of years used in the highest average salary calculation will be increased from one year to three years.

Interest Credit Rate 3% per annum, on member contribution account balances.

Service Credit The total of all earned, purchased, (disability) projected, and military service credit which is used to determine benefit eligibility and amounts.

Vested DPS Benefit Structure: Members who accrue five or more years of Service Credit are vested for benefits.

PERA Benefit Structure: Members who accrue five or more years of Service Credit or attain age sixty-five are vested for benefits.

Salary PERA-includable salary redefined under SB 18-200 for all members to include payouts of unused sick leave.

For new members hired on or after July 1, 2019, PERA-includable salary redefined to include contributions to IRC Section 125 and 132 plans

CONTRIBUTIONS

Member Contributions

Member contributions, together with any purchased service credit payments and interest, are credited to individual Member Contribution Accounts.

Percentage of Salary Contributed		
Effective Date	Members (Except State Troopers)	State Troopers
Prior to 7/1/2019	8.00%	10.00%
7/1/2019	8.75%	10.75%
7/1/2020	9.50%	11.50%
On and after 7/1/2021	10.00%	12.00%

Effective January 1, 2011, retirees working for a PERA employer and not working as state legislators, as judges participating in the Senior Judge Program, or in a position covered by an Optional Retirement Plan are required to make member contributions at the same rate as an active member, however; the contributions are not credited to the member's account, do not accrue a benefit, and are non-refundable.

Employer Contributions

State Division (except State Troopers): 10.15% of salary on and after 7/1/2003

School Division: 10.15% of salary on and after 7/1/2003

State Troopers: 12.85% of salary on and after 7/1/2003

Local Government Division: 10.00% of salary on and after 1/1/2004

Judicial Division: 13.66% of salary on and after 7/1/2004

DPS Division: 10.15% of salary on and after 1/1/2015. Actual employer contributions are reduced by an amount equal to the principal payments plus interest at 8.5% necessary each year to finance the Pension Certificates of Participation (PCOPs) issued in 1997 and 2008 and refinanced thereafter. The amount of the credit for 2017 was 15.32% of salary. The net DPS Division employer contribution rate for 2017 was 2.77% when including the AED and SAED as described on the following page.

Effective July 1, 2019, all employer contribution rate will be increased by 0.25%, except for the Local Government Division

The employer contribution rates of the State, School, Local Government, and Judicial Divisions include the contribution of 1.02% allocated to the Health Care Trust Fund.

The employer contribution rate of the DPS Division includes the contribution of 1.02% allocated to the DPS Health Care Trust Fund.

For PERA Benefit Structure members, hired on or after January 1, 2007, these contribution rates also include the 1.00% of payroll contribution earmarked for the Annual Increase Reserve.

Due to legislation in 2004 through 2006, employers are required to pay the statutory contribution, including AED and SAED amounts, on the payroll of working retirees.

Effective July 1 2018 and on July 1st of each year thereafter until all divisions are 100% funded, PERA will receive an annual Direct Distribution from the state in the amount of $225 million. PERA shall allocate the distributions in a manner that is proportionate to the annual payroll of each division, except there shall be no allocation to the Local Government Division.

Employer contributions are credited to the employer reserve of each division.

Amortization Equalization Disbursement (AED)

Beginning January 1, 2006 (January 1, 2010 for DPS Division), each employer shall pay to PERA a disbursement equal to a percent of total payroll in accordance with the following schedule:

Year	State Division	Schools/DPS Division
2006	0.50%	0.50%
2007	1.00%	1.00%
2008	1.40%	1.40%
2009	1.80%	1.80%
2010	2.20%	2.20%
2011	2.60%	2.60%
2012	3.00%	3.00%
2013	3.40%	3.40%
2014	3.80%	3.80%
2015	4.20%	4.20%
2016	4.60%	4.50%
2017 & after	5.00%	4.50%

Year	Judicial Division
2006	0.50%
2007	1.00%
2008	1.40%
2009	1.80%
2010 - 2018	2.20%
2019	3.40%
2020	3.80%
2021	4.20%
2022	4.60%
2023 & after	5.00%

If, at any time, the actuarial funded ratio for a division is 103% or more, then the amount of the disbursement shall be reduced by 0.5% of pay.

Supplemental Amortization Equalization Disbursement (SAED)

Beginning January 1, 2008 (January 1, 2010 for DPS Division), each employer shall pay to PERA a supplemental disbursement equal to a percent of total payroll in accordance with the following schedule:

Year	State Division	Schools/DPS Division
2008	0.50%	0.50%
2009	1.00%	1.00%
2010	1.50%	1.50%
2011	2.00%	2.00%
2012	2.50%	2.50%
2013	3.00%	3.00%
2014	3.50%	3.50%
2015	4.00%	4.00%
2016	4.50%	4.50%
2017	5.00%	5.00%
2018 & after	5.00%	5.50%

Year	Judicial Division
2008	0.50%
2009	1.00%
2010 - 2018	1.50%
2019	3.40%
2020	3.80%
2021	4.20%
2022	4.60%
2023 & after	5.00%

If, at any time, the actuarial funded ratio for a division is 103% or more, then the amount of the disbursement shall be reduced by 0.5% of pay.

For the Local Government Division, the AED and SAED contributions are frozen at the 2010 levels. If, at any time, the actuarial funded ratio for a division is 103% or more, then the amount of the disbursement shall be reduced by 0.5% of pay.

Matching Contributions

A match applied to individual Member Contribution Accounts when a refund is made or when a money purchase benefit is calculated. The match is applied to the account balance less:

1. Any amount paid for the purchase of service credit,
2. Any payments in lieu of member contributions, and
3. Any interest accrued on 1 and 2.

For members who receive a refund and meet the requirements for a service or reduced service retirement at the time the match is applied, or for payments made to survivors or beneficiaries of members who die before retirement, the match is 100% of eligible amounts.

For PERA Benefit Structure members who receive a refund prior to meeting the requirements for a service or reduced service retirement, the match is 50% of eligible amounts. Effective January 1, 2011, members must have five years of earned service credit in order to receive the 50% match on a refund. Contributions received prior to January 1, 2011, are matched regardless if the member has five years of service credit on the refund date.

For DPS Benefit Structure members who receive a refund prior to meeting the requirements for a service or reduced service retirement, no match is provided.

ELIGIBILITY FOR BENEFITS – PERA BENEFIT STRUCTURE

Refund of Member Contributions

In the event a member leaves service for a reason other than death or retirement, member contribution accounts including interest plus matching employer contributions on eligible amounts with interest are refunded upon request.

Service Retirement

The Age and Service Credit requirements to be eligible for a full Service Retirement are listed below:

- **Members, except State Troopers, hired before 7/1/2005 who have 5 or more years of service credit as of 1/1/2011**

Age	Service Credit
50	30
55	Age and Service = 80 years or more
60	20
65	5
65	Less than 5 but 60 payroll postings

- **Members, except State Troopers, hired on and after 7/1/2005 but before 1/1/2007, and who have 5 or more years of service credit as of 1/1/2011**

Age	Service Credit
Any Age	35
55	Age and Service = 80 years or more
60	20
65	5
65	Less than 5 but 60 payroll postings

- **Members, except State Troopers, hired on and after 1/1/2007 but before 1/1/2011, or who have less than 5 years of service credit as of 1/1/2011**

Age	Service Credit
Any Age	35
55	30
55	Age and Service = 85 years or more
60	25
65	5
65	Less than 5 but 60 payroll postings

- **Members, except State Troopers, hired on and after 1/1/2011 but before 1/1/2017 and Members, except State Troopers, hired on and after 1/1/2017 but before 1/1/2020 whose last 10 years of service credit are in either the School or DPS Division**

Age	Service Credit
Any Age	35
58	Age and Service = 88 years or more
65	5
65	Less than 5 but 60 payroll postings

- **Members, except State Troopers hired on and after 1/1/2017 but before 1/1/2020 whose last 10 years of service credit are not in either the School or DPS Divisions**

Age	Service Credit
Any Age	35
60	Age and Service = 90 years or more
65	5
65	Less than 5 but 60 payroll postings

- **Members, except State Troopers hired on and after 1/1/2020**

Age	Service Credit
Any Age	35
64	30
65	5
65	Less than 5 but 60 payroll postings

- **State Troopers, hired before 1/1/2020**

Age	Service Credit
Any Age	30
50	25
55	20
65	5
65	Less than 5 but 60 payroll postings

- **State Troopers, hired on and after 1/1/2020**

Age	Service Credit
Any Age	35
55	25
65	5
65	Less than 5 but 60 payroll postings

Reduced Service Retirement

The Age and Service Credit requirements to be eligible for a Reduced Service Retirement are listed below:

- **Members, except State Troopers, hired before 1/1/2020**

Age	Service Credit
50	25
55	20
60	5

- **Members, except State Troopers, hired on and after 1/1/2020**

Age	Service Credit
55	25
60	5

- **State Troopers, hired before 1/1/2020**

Age	Service Credit
50	20
60	5

- **State Troopers, hired on or after 1/1/2020**

Age	Service Credit
55	20
60	5

Disability Retirement

Active members with five or more years of earned service credit, with at least 6 months of this time earned in the most recent period of membership are eligible to apply for disability retirement. To be eligible, the member must be found to be totally and permanently disabled (mentally or physically) from regular and gainful employment. The service credit requirement is waived for state troopers injured in the line of duty and for judges found disabled by the Colorado Supreme Court.

Survivor Benefits

The qualified survivors of members who die before retirement with at least one year of service credit are eligible for monthly survivor benefits. The service credit requirement is waived if the death was job related.

MONTHLY BENEFIT CALCULATIONS – PERA BENEFIT STRUCTURE

Service Retirement Benefit

State, including state troopers, School, Local Government, DPS Divisions and Members of the Judicial Division who were on the bench on and after July 1, 1973:

The greater of a) or b)

a) 2.5% of HAS times years of Service Credit up to 40

b) The money purchase benefit which is actuarially determined based on the value of the member contribution account and matching employer contributions on the effective date of retirement.

Members age 65 with less than 5 years and less than 60 payroll postings are eligible for the money purchase benefit only.

In all cases, the benefit is limited to 100% of HAS.

Reduced Service Retirement Benefit

For all members, except State Troopers:

The service retirement benefit calculated above reduced 4% for each year after age 60, 3% for each year from age 55 to age 60, 6% for each year prior to 55, and proportionately for fractions of a year, from the effective date of reduced service retirement to the date the member would have been eligible for a service retirement benefit.

For State Troopers:

The service retirement benefit calculated above reduced 4% for each year after age 60, 3% for each year from age 50 to age 60, and proportionately for fractions of a year, from the effective date of reduced service retirement to the date the member would have been eligible for a service retirement benefit.

Effective January 1, 2011, for all members that are not retirement eligible on January 1, 2011, the service retirement benefit calculated above shall be reduced using actuarial equivalent factors, from the effective date of reduced service retirement to the date the member would have been eligible for a service retirement benefit.

Disability Retirement Benefit

If years of Service Credit at disability are greater than 20, the disability retirement benefit is calculated based on actual Service Credit at disability; otherwise, the disability retirement benefit is calculated based on actual Service Credit at disability plus Service Credit projected to age 65, but not to exceed a total of 20 years of Service Credit.

Benefits for disability retirees with an effective disability retirement date on or after July 1, 1988 and before January 1, 1999, who work after retirement will be reduced by 1/3 of the amount, if any, by which the initial annual PERA benefit plus earned income exceeds the annualized HAS.

Disability benefits are payable for as long as the disability retiree is disabled. Benefits cease upon recovery.

Survivor Benefits

- **If the deceased was not Eligible for Reduced or Service Retirement at the time of Death**

Benefits are payable in the following order:

a) Qualified Children Under Age 23: 40% of HAS for one child, an equal share of 50% of HAS if there are two or more children.

b) Spouse: If no qualified children in (a) exist: i) less than 10 years of Service Credit, 25% of HAS, benefits begin at age 60; ii) 10 or more years of Service Credit, the greater of 25% of HAS or the benefit which would have been payable as a 100% joint and survivor option if the deceased member had been eligible for service retirement and retired on the date of death, benefits begin immediately.

c) Qualified Children Age 23 or Over: If no persons in (a) or (b) exist, 40% of HAS for one child, an equal share of 50% of HAS if there are two or more children.

d) Dependent Parents: If no persons in (a) to (c) exist, 25% of HAS for one dependent parent or 40% of HAS for two dependent parents (minimum of $100 per month for each dependent parent). Benefits begin immediately and continue until the death of the parent(s).

e) Named Beneficiary: If no persons in (a) to (d) exist, single payment equal to the member contribution account plus the appropriate matching contribution, plus interest.

f) Estate of Deceased Member: If no persons in (a) to (e) exist, single payment equal to the member contribution account plus the appropriate matching contribution, plus interest.

- **If the deceased was eligible for Reduced or Service Retirement at the time of Death**

The co-beneficiary is eligible for the amount that would have been payable had the member retired on the date of death and elected the 100% joint and survivor option. The order of payment is:

a) Co-beneficiary – If the deceased member designated a co-beneficiary prior to death, that individual takes precedence in payment of benefits.
b) Surviving Spouse
c) Qualified Children
d) Dependent Parents
e) Named beneficiary
f) Estate

Benefit Options

Retirement and disability benefits are payable for the life of the retired member. Optional reduced benefits may be elected at the time of retirement to provide for continuation of 50% or 100% of a reduced benefit amount to a designated co-beneficiary. If the member retires any time after the date on which service retirement eligibility is first met, the reduction for 50% or 100% continuation option will be actuarially determined as of the date the member first became eligible for service retirement.

Post-Retirement Benefit Increases

For members hired prior to January 1, 2007, each year on July 1, benefits which have been paid for at least twelve months preceding July 1, are increased.

There is a temporary suspension of annual increases for July 1, 2018 and July 1, 2019 for all members.

Effective for years prior to 2018, the increase is 2.0% compounded annually for each year of retirement. If the investment return for the prior year is negative, then the increase will be an amount equal to the average of the annual CPI-W increases determined monthly for the prior year with a cap of 2%. Effective for years after 2019, the increase is 1.5% compounded annually for each year of retirement. If the investment return for the prior year is negative, then the increase will be an amount equal to the average of the annual CPI-W increases determined monthly for the prior year with a cap of 1.5%.

In addition, the increase will be first paid on the July 1 that is at least 12 months after retirement for those members who retire on or after January 1, 2011. For member hired prior to January 1, 2007 and those that retired on or after July 1, 2018, the waiting period is extended from twelve (12) months to thirty-six (36) months. 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 Post-Retirement Benefit Increases.

For PERA Benefit Structure service and disability retirees who were hired on or after January 1, 2007, and for PERA Benefit Structure survivor benefit recipients of deceased members who were hired on or after January 1, 2007:

- The increase is the lower of 2.0 percent (1.5 percent after 2018) or the average of the CPI-W for each of the months during the prior calendar year. Increases to all benefit recipients in this group are limited to 10 percent of the total funds available in the Annual Increase Reserve in the division from which they retired or were a member before death.
- Members must receive benefits for a full calendar year (three years after 2018) to be eligible for the increase.
- The increase for service retirees who retire with a reduced service retirement does not begin until the retiree has been receiving benefits for a full calendar year and has on January 1 of the year the increase is paid, either reached age 60, or years of service plus age equal 85, 88, or 90, whichever is applicable.
- No minimum age or service credit requirement shall apply for disability retirees or survivor benefit recipients.

ELIGIBILITY FOR BENEFITS – DPS BENEFIT STRUCTURE

Refund of Member Contributions

In the event a member leaves service for a reason other than death or retirement, member contribution accounts including interest plus applicable matching employer contributions with interest are refunded upon request.

Service Retirement

The Age and Service Credit requirements to be eligible for a full Service Retirement are listed below:

- **Members, hired before 1/1/2010 who have 5 or more years of service credit on 1/1/2011**

Age	Service Credit
50	30
55	25 (must include 15 years of earned service)
65	5

- **Members, hired before 1/1/2010 who have less than 5 years of service credit as of 1/1/2011**

Age	Service Credit
Any Age	35
55	30 (must include 20 years of earned service)
55	Age and Service = 85 years or more
60	25
65	5
65	Less than 5 but 60 payroll postings

Reduced Service Retirement

The Age and Service Credit requirements to be eligible for a Reduced Service Retirement are listed below:

- **Members, regardless of date of hire who have 5 or more years of service credit on 1/1/2011**

Age	Service Credit
55	15
Any Age	25

- **Members, regardless of date of hire who have less than 5 years of service credit on 1/1/2011**

Age	Service Credit
50	25
55	20
60	5

Disability Retirement Active members with five or more years of earned service credit, with at least 6 months of this time earned in the most recent period of membership are eligible to apply for disability retirement. To be eligible, the member must be found to be totally and permanently disabled (mentally or physically) from regular and gainful employment.

Survivor Benefits The qualified survivors of members who die before retirement with at least five years of service credit and are active at time of death are eligible for monthly survivor benefits.

MONTHLY BENEFIT CALCULATIONS – DPS BENEFIT STRUCTURE

Service Retirement Benefit The greater of a) or b)

a) 2.5% of HAS times years of Service Credit

b) $15 times first 10 years of service credit plus $20 times service credit over 10 years plus an amount equal to annuitized member balance.*

* May include matching dollars if eligible.

Reduced Service Retirement Benefit

Age	Service	Reduction Amount
Under 50	30 years	4% for each year prior to age 50
Under 50	25 – 30 years	Greater of: • 4% for each year of service below 30 years • 4% for each year below age 50
Age 50 - 55	25 – 30 years	Lesser of: • 4% for each year under age 50 • 4% for each year of service below 30 years
Over 55	15 years	Lesser of: • 4% for each year under age 65 • 4% for each year of service below 25 years

The reduction factor in the table above equals 6% per year for those hired on or after 7/1/2005 but before 1/1/2010.

Effective 1/1/2011, for all members that are not retirement eligible on 1/1/2011, the service retirement benefit calculated above shall be reduced using actuarial equivalent factors, from the effective date of reduced service retirement to the date the member would have been eligible for a service retirement benefit.

Disability Retirement Benefit

If years of Service Credit at disability are greater than 20, the disability retirement benefit is calculated based on actual Service Credit at disability; otherwise, the disability retirement benefit is calculated based on actual Service Credit at disability plus Service Credit projected to age 65, but not to exceed a total of 20 years of Service Credit.

Disability benefits are payable for as long as the disability retiree is disabled. Benefits cease upon recovery.

Survivor Benefits

a) Child: Greater of 10% of HAS for each child up to a limit of 30%; and$160 (pro-rated) for each child up to a limit of $480.

b) Spouse with eligible children: The greater of the difference between the child benefit above and 30% (40% if 15 years of service plus 2% for each year of service beyond 25 years) of HAS, and $480.

c) Dependent Parents: The greater of 10% of HAS for each parent; and $240 per parent.

d) Spouse (less than 15 years of service): Lesser of 30% of HAS; and $480, payable at later of age 60 or when last eligible child loses eligibility.

e) Spouse (15 years of service or more): Greater of 30% of HAS, plus an additional 1% for each year of service over 15 years; and $480, payable at later of age 50 or when last eligible child loses eligibility.

Benefit Options

Option A: Single life annuity (SLA) with residual refund of member contributions.

Option B: Single life annuity with guarantee period determined based on accumulated employee contribution balance at retirement.

Option C: 100% joint and survivor with 10 years certain. – Not available to members retiring post 1/1/2010

Option D: Cash refund on annuity portion and SLA on pension portion. – Not available to members retiring post 1/1/2010

Option E: 50% joint and survivor with 10 years certain. – Not available to members retiring post 1/1/2010

Option P2: 50% joint and survivor with pop-up and residual refund of member contributions.

Option P3: 100% joint and survivor with pop-up and residual refund of member contributions.

Post-Retirement Benefit Increases

Each year on July 1, benefits which have been paid for at least twelve months preceding July 1 are increased.

The increase is 2.0% (1.5% after 2018) compounded annually for each year of retirement. If the investment return for the prior year is negative, then the increase will be an amount equal to the average of the annual CPI-W increases determined monthly for the prior year with a cap of 2.0% (1.5% after 2018).

In addition, the increase will be first paid on the July 1 that is at least 12 months (36 months after 2018) 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 Post-Retirement Benefit Increases.

OTHER PROVISIONS SPECIFIC TO THE HEALTH CARE TRUST FUNDS

Eligibility for Health Care Coverage

The Health Care Trust Fund (HCTF) includes assets for the purpose of paying premium subsidies on behalf of PERA Benefit Structure benefit recipients and DPS Benefit Structure retirees who worked for an employer in the State, School, Local Government, and Judicial Divisions within PERA who enroll in PERACare.

The DPS Health Care Trust Fund (DPS HCTF) includes assets for the purpose of paying premium subsidies on behalf of PERA Benefit Structure benefit recipients and DPS Benefit Structure retirees who worked for employers of the DPS Division and who enroll in PERACare.

The following individuals are eligible to enroll in PERACare:

- Anyone receiving a monthly PERA benefit (benefit recipient). If the benefit recipient is enrolled in PERACare, the following dependents may be enrolled: spouses (including civil union partners recognized under Colorado law), domestic partners, unmarried dependent children under age 25, certain mentally or physically incapacitated adult children, and dependent parents.
- Guardians of children receiving PERA survivor benefits, if children are receiving health care benefits.
- PERA retirees temporarily not receiving PERA benefits.
- Surviving spouses of deceased retirees who are not receiving PERA benefits but were enrolled in PERACare at the time when death occurred.
- Divorced spouses of retirees who are not receiving PERA benefits, but were receiving health care benefits when the divorce occurred.

Enrollment

Enrollment is voluntary, with eligibility within 30 days of initial pension benefit payment, upon the occurrence of certain life events, and during an annual open enrollment for coverage effective each January 1. If a surviving spouse or divorced spouse discontinues coverage, re-enrollment is not allowed.

Premium Subsidy

A monthly subsidy is allocated to each benefit recipient under the PERA Benefit Structure and each retiree under the DPS Benefit Structure electing health care coverage. Survivors of retirees under the PERA Benefit Structure are eligible to receive the subsidy. The following monthly amounts are based upon the benefit structure elected, date of retirement, Medicare eligibility, and/or credited service:

DPS Benefit Structure Retirees Who Retired Prior to July 1, 1994:

- $230 per month for retirees without Medicare Part A.
- $115 per month for retirees with Medicare Part A.

DPS Benefit Structure Retirees Who Retire On or After July 1, 1994:

- $5.75 if age 65 or older and eligible for premium-free Medicare Part A.
- $11.50 if not yet age 65, or if age 65 or older and not eligible for premium-free Medicare Part A.

  The monthly amounts above are allocated per year of credited service up to a maximum of 20 years of service.

PERA Benefit Structure Benefit Recipients:

- $5.75 if age 65 or older or eligible for Medicare Part B.
- $11.50 if not yet age 65 or not eligible for Medicare Part B.

  The monthly amounts above are allocated per year of credited service up to a maximum of 20 years of service.

This subsidy is used to determine member premiums, which are the projected full cost of coverage less the premium subsidy. The full costs for claims, administration, premiums, etc., are allocated and paid by the HCTF and the DPS HCTF.

Historically, this has resulted in net costs to the HCTF and the DPS HCTF being very close to the premium subsidy, with all costs of coverage above this subsidy paid by the member. For those benefit recipients under the PERA Benefit Structure who are age 65 or older, the full cost of coverage is considered to be based on the full cost of coverage assuming eligibility for premium-free Medicare Part A. This is independent of actual eligibility for premium-free Medicare Part A.

Members not receiving a PERA monthly benefit do not qualify for this subsidy and bear the full cost of coverage.

This premium subsidy is only available to those enrolled in PERACare and meeting the requirements defined by the benefit structure under which they retire.

Special Note on Members not qualifying for Medicare Part A:

Under the PERA Benefit Structure, an implicit subsidy is paid for those members not eligible for premium-free Medicare Part A benefits. For members in the fully-insured HMOs, this amount is the difference in premiums charged for those without Medicare Part A and for those enrolled in Medicare Part A. For the self-funded plans, this amount is the assumed difference in claims costs for services covered under Medicare Part A between members without Medicare Part A coverage and those enrolled in Medicare Part A.

The DPS Benefit Structure pays an explicit subsidy for those members eligible to receive the premium subsidy and who are not eligible for premium-free Medicare Part A coverage. For these members an additional subsidy of $5.75 per month for each year of credited service (up to a maximum of 20 years of service) is allocated.

Special Note on Premium Subsidy Funding for Members in both the HCTF and the DPS HCTF:

For members covered under both the HCTF and the DPS HCTF, the allocation of the subsidy amounts is done via an allocation method set forth in C.R.S. 24-51-1206.5.

SCHEDULE OF ACTIVE MEMBER DATA
AS OF DECEMBER 31, 2017

STATE DIVISION

Attained Age	Completed Years of Service								
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	Reported Payroll
Under 20	193	0	0	0	0	0	0	193	$ 1,145,981
20 to 24	1,668	3	0	0	0	0	0	1,671	$ 37,049,929
25 to 29	4,153	316	4	0	0	0	0	4,473	$ 159,416,191
30 to 34	4,231	1,544	335	3	0	0	0	6,113	$ 264,272,324
35 to 39	3,339	1,703	1,209	267	10	0	0	6,528	$ 319,903,478
40 to 44	2,452	1,387	1,304	951	211	9	0	6,314	$ 339,596,585
45 to 49	3,761	1,623	1,317	1,134	805	285	11	8,936	$ 476,649,154
50 to 54	1,835	1,136	1,144	1,046	806	624	187	6,778	$ 391,910,508
55 to 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 & Over	239	160	137	117	53	53	85	844	$ 33,665,024
Total	25,028	10,308	8,141	5,745	3,366	2,087	1,011	55,686	$ 2,774,207,203

Average Age (Non-Trooper):	45.56	Average Age (Trooper):	41.67
Average Service (Non-Trooper):	8.72	Average Service (Trooper):	12.39

SCHEDULE OF ACTIVE MEMBER DATA
AS OF DECEMBER 31, 2017

SCHOOL DIVISION

Attained Age	Completed Years of Service								
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	Reported Payroll
Under 20	778	0	0	0	0	0	0	778	$ 4,499,779
20 to 24	4,257	38	0	0	0	0	0	4,295	$ 73,891,248
25 to 29	9,874	1,169	42	0	0	0	0	11,085	$ 326,539,038
30 to 34	7,455	4,102	873	25	0	0	0	12,455	$ 425,597,661
35 to 39	6,867	3,425	3,781	731	11	0	0	14,815	$ 558,921,110
40 to 44	6,430	2,940	3,193	3,047	408	16	0	16,034	$ 646,296,777
45 to 49	8,107	3,127	3,017	2,764	2,138	420	16	19,589	$ 768,809,851
50 to 54	4,238	2,475	2,806	2,469	1,713	1,440	211	15,352	$ 652,565,833
55 to 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 & Over	880	402	267	131	75	51	54	1,860	$ 33,123,416
Total	56,051	21,724	18,723	14,022	7,346	3,861	1,263	122,990	$ 4,471,356,847

Average Age: 44.60
Average Service: 8.42

SCHEDULE OF ACTIVE MEMBER DATA
AS OF DECEMBER 31, 2017

LOCAL GOVERNMENT DIVISION

Attained Age	Completed Years of Service								
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	Reported Payroll
Under 20	526	0	0	0	0	0	0	526	$ 2,421,654
20 to 24	629	6	0	0	0	0	0	635	$ 10,956,799
25 to 29	985	84	8	0	0	0	0	1,077	$ 38,169,657
30 to 34	928	254	81	5	0	0	0	1,268	$ 58,694,620
35 to 39	818	289	231	62	3	0	0	1,403	$ 73,563,931
40 to 44	803	274	305	144	56	1	0	1,583	$ 86,068,998
45 to 49	557	248	348	200	117	42	6	1,518	$ 94,108,331
50 to 54	470	234	290	187	159	74	38	1,452	$ 90,246,735
55 to 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	0	59	$ 2,130,803
70 & Over	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

Average Age: 43.97
Average Service: 7.58

SCHEDULE OF ACTIVE MEMBER DATA
AS OF DECEMBER 31, 2017

JUDICIAL DIVISION

Attained Age	Completed Years of Service								
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	Reported Payroll
Under 20	0	0	0	0	0	0	0	0	$ -
20 to 24	0	0	0	0	0	0	0	0	$ -
25 to 29	0	0	0	0	0	0	0	0	$ -
30 to 34	1	2	0	0	0	0	0	3	$ 193,210
35 to 39	8	3	1	0	0	0	0	12	$ 1,310,404
40 to 44	21	3	3	1	1	0	0	29	$ 3,850,549
45 to 49	8	12	10	2	1	1	0	34	$ 5,033,332
50 to 54	12	15	24	10	6	1	0	68	$ 10,443,601
55 to 59	11	15	12	11	9	14	4	76	$ 11,653,197
60	2	2	3	3	1	2	0	13	$ 1,932,906
61	0	0	3	1	3	2	0	9	$ 1,421,927
62	4	3	0	2	1	0	1	11	$ 1,664,217
63	0	1	2	2	3	0	1	9	$ 1,291,430
64	0	3	4	1	0	2	1	11	$ 1,680,950
65	0	4	4	4	1	4	1	18	$ 2,644,956
66	0	0	2	1	1	1	1	6	$ 917,758
67	2	1	1	2	1	0	1	8	$ 1,140,386
68	0	2	2	0	0	2	1	7	$ 1,094,892
69	0	1	2	1	0	1	1	6	$ 828,474
70 & Over	1	1	2	2	3	1	2	12	$ 1,845,418
Total	70	68	75	43	31	31	14	332	$ 48,947,607

Average Age: 55.39
Average Service: 13.22

SCHEDULE OF ACTIVE MEMBER DATA
AS OF DECEMBER 31, 2017

DENVER PUBLIC SCHOOLS DIVISION

Attained Age	Completed Years of Service								
	Under 5	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30+	Total	Reported Payroll
Under 20	64	0	0	0	0	0	0	64	$ 573,921
20 to 24	808	7	0	0	0	0	0	815	$ 16,478,340
25 to 29	2,268	219	0	0	0	0	0	2,487	$ 84,497,898
30 to 34	1,790	855	77	2	0	0	0	2,724	$ 114,008,401
35 to 39	1,572	765	301	34	2	0	0	2,674	$ 112,778,220
40 to 44	729	493	306	191	29	1	0	1,749	$ 82,767,856
45 to 49	570	493	223	244	92	15	1	1,638	$ 79,541,334
50 to 54	367	339	180	191	99	78	7	1,261	$ 60,892,323
55 to 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	0	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 & Over	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

Average Age (DPS Benefit Structure): 48.99
Average Service (DPS Benefit Structure): 15.15

Average Age (PERA Benefit Structure): 38.31
Average Service (PERA Benefit Structure): 3.75

Schedule H – Schedules of Member Data (continued)

SCHEDULE OF MEMBER DATA
BROKEN DOWN BY TIER
AS OF DECEMBER 31, 2017

ACTIVES	DIVISION					
	STATE DIVISION	SCHOOL DIVISION	LOCAL GOVERNMENT DIVISION	JUDICIAL DIVISION	DENVER PUBLIC SCHOOLS DIVISION	TOTAL
Non Tier 2:						
Number	20,954	48,772	4,168	193	2,721	76,808
Annual Payroll	$1,301,733,752	$2,410,459,828	$277,238,166	$29,116,449	$165,787,483	$4,184,335,678
Tier 2:						
Number	34,732	74,218	8,602	139	13,270	130,961
Annual Payroll	$1,472,473,451	$2,060,897,019	$355,530,171	$19,831,158	$492,410,823	$4,401,142,622
Total:						
Number	55,686	122,990	12,770	332	15,991	207,769
Annual Payroll	$2,774,207,203	$4,471,356,847	$632,768,337	$48,947,607	$658,198,306	$8,585,478,300

RETIREES	DIVISION					
	STATE DIVISION	SCHOOL DIVISION	LOCAL GOVERNMENT DIVISION	JUDICIAL DIVISION	DENVER PUBLIC SCHOOLS DIVISION	TOTAL
Non Tier 2:						
Number	38,603	63,422	7,186	368	6,723	116,302
Annual Benefits	$1,584,280,924	$2,383,668,773	$278,361,295	$25,911,089	$273,638,058	$4,545,860,139
Tier 2:						
Number	761	905	183	8	321	2,178
Annual Benefits	$7,140,913	$5,158,702	$1,627,221	$177,247	$2,844,415	$16,948,498
Total:						
Number	39,364	64,327	7,369	376	7,044	118,480
Annual Benefits	$1,591,421,837	$2,388,827,475	$279,988,516	$26,088,336	$276,482,473	$4,562,808,637

SCHEDULE OF MEMBER DATA
BROKEN DOWN BY TIER
AS OF DECEMBER 31, 2017

NUMBER OF INACTIVES	DIVISION: STATE DIVISION	SCHOOL DIVISION	LOCAL GOVERNMENT DIVISION	JUDICIAL DIVISION	DENVER PUBLIC SCHOOLS DIVISION	TOTAL
Non Tier 2:	36,082	52,421	10,038	1	317	98,859
Tier 2:	39,268	67,616	13,899	4	10,602	131,389
Total:	75,350	120,037	23,937	5	10,919	230,248

NUMBER OF TERMINATED VESTED	DIVISION: STATE DIVISION	SCHOOL DIVISION	LOCAL GOVERNMENT DIVISION	JUDICIAL DIVISION	DENVER PUBLIC SCHOOLS DIVISION	TOTAL
Non Tier 2:	5,480	13,249	2,247	6	720	21,702
Tier 2:	1,308	3,190	494	3	876	5,871
Total:	6,788	16,439	2,741	9	1,596	27,573

Schedule I – Colorado PERA Defined Benefit Pension Plan Funding Policy

I. Introduction—

The Colorado Public Employees' Retirement Association (PERA) maintains five pre-funded, hybrid defined benefit pension plans [i.e., State Division Trust Fund, School Division Trust Fund, Local Government Division Trust Fund, Judicial Division Trust Fund, and Denver Public Schools (DPS) Division Trust Fund]. Each defined benefit pension plan is funded through PERA-affiliated employer contributions, member contributions, and the investment earnings resulting from those contributions. The fixed contribution rate at which each division's employers and members contribute is determined by the Colorado General Assembly and defined within the statutes governing PERA.

The purposes of this funding policy are to state the overall funding goals and annual actuarial metrics and to guide the PERA Board of Trustees (Board) when considering whether to pursue or support proposed contribution and benefit legislation. The policy also includes a brief list of governance responsibilities regarding the commissioning, collection, and review of actuarial information, as described in the Board's *Governance Manual*.

PERA also maintains two pre-funded defined benefit retiree health care subsidy plans (i.e., Health Care Trust Fund and DPS Health Care Trust Fund), classified as other postemployment benefit (OPEB) plans. On January 19, 2018, the Board approved a separate OPEB funding policy with regard to these plans recognizing the adoption and implementation of the Governmental Accounting Standards Board (GASB) Statement No. 74, applicable to OPEB.

It is the intention of the Board that this funding policy be considered a working document, reviewed periodically and, as necessary, altered in the future through formal action of the Board. The final page of this document contains the review and revision/adoption history pertaining to the funding policy of the PERA defined benefit pension plans.

II. Background—

In response to the unfavorable investment market of 2008, and in addition to the funding policy adopted in November 2007, the Board set the following guiding principles in 2009 in the development of a comprehensive package to maintain long-term sustainability of the pension plans:

- Shared responsibility among members, retirees, and employers;
- Intergenerational equity;
- Preservation of the defined benefit plan;
- Preservation of portability through the maintenance of existing benefit structures for the different divisions; and
- Development of recommendations that would have little-to-no short-term impact on member behavior.

In 2009 and 2010, these guiding principles benefited the Board and all the stakeholders associated with the pension plan as solutions to the immediate funding situation were explored. The Board constructed a series of plan provision changes, enlisting the philosophy of the guiding principles—under the umbrella of shared responsibility—and communicated their recommendations to the General Assembly. Senate Bill 10-001 was the culmination of all the provisional and contribution changes that were to set PERA's course toward sustainability. Senate Bill 10-001 also contained the following funding and annual increase requirements, which now are embedded in Colorado Statute and will be implemented regardless of the Board's pension funding policy:

- Per C.R.S. § 24-51-411(8), and § 24-51-411(9), the AED and the SAED are adjusted based on the year-end actuarial funded ratio within a particular division;
  - If a division trust fund's actuarial funded ratio;
    - Reaches 103 percent, a decrease in the AED and SAED is mandated, and,
    - Subsequently falls below 90 percent, an increase is mandated.
  - For the Local Government and Judicial Divisions, if the actuarial funded ratio reaches 90 percent and subsequently falls below 90 percent, an increase in the AED and SAED is mandated.
  - Increases in AED and SAED cannot exceed the statutory maximum allowable limitation.
- Per C.R.S. § 24-51-1009.5, if the combined pension divisions' trust fund actuarial funded ratio;
  - Reaches 103 percent, the upper limit of the annual increase shall be increased by one-quarter of one percent, and,
  - Subsequently falls below 90 percent, the upper limit of the annual increase shall be decreased by one-quarter of one percent.

These statutory elements, in addition to the current schedule of employer contribution rates, assist in the ongoing balance of shared responsibility. It is not the intention of this Board, through the development of this funding policy, to undermine or circumvent the work accomplished by Senate Bill 10-001, but rather to ensure continued fiduciary commitment through sound governance practices and recognition of these statutory funding policies.

The combined funding policy regarding PERA's pension and OPEB plans, adopted by the Board in November 2007, was in force with regard to the pension plans through December 30, 2014. On March 20, 2015, the Board approved a separate pension funding policy with regard to these plans, which reflects the guiding principles listed above. This pension funding policy is effective with the December 31, 2014 actuarial valuation, recognizes the adoption and implementation of the GASB Statement No. 67, applicable to pensions, and has been adopted and updated as indicated on the last page of the document.

III. Funding Goals—

- Preservation of the **defined benefit plan structure** of providing lifetime retirement benefits to the employees of PERA-affiliated employers, reflecting the fact that PERA members are not covered under Social Security.
- Demonstration of **transparency and accountability** through the continued maintenance of a defined benefit pension plan funding policy for the stakeholders of PERA.
- **Achievement of a combined divisions' trust fund actuarial funded ratio greater than or equal to 110%.** Once the 110% combined funded ratio is achieved, following (1) the complete discontinuance of AED and SAED contributions, and (2) the restoration of the annual increase to pre-2010 levels pursuant to C.R.S. § 24-51-1009.5, the Board will consider and/or support the following actions, as ordered, as long as the funded ratio, either combined or individual by division, does not fall below 100% after consideration of the proposed change:
  - Examination and possible action of de-risking the total trust fund, including all divisions
  - Reduction in the base contribution rate(s)
  - Adoption of a benefit enhancement, beyond restoration of the annual increase as described above.

If the 110% combined funded ratio benchmark is attained through the assistance of certain funding arrangements where assets, outside of statutory contributions, are added to the plans, and results in additional tax-payer obligation, the payment method and duration of this debt should be considered prior to any supportive action taken regarding benefit enhancements.

- Dedication to the balance between:
  - **Contribution rate stability**—keeping contributions relatively stable over time, and
  - **Intergenerational equity—**allocating costs over the members' period of active service.
- Dedication to the systematic **reduction of the unfunded actuarial accrued liabilities** (UAAL), subject to the required action by the state legislature as described in C.R.S. § 24-51-411(8), § 24-51-411(9), and § 24-51-1009.5, and as briefly summarized above in Section II.
- Recognition that within a multiple-employer cost-sharing defined benefit plan there are **beneficial elements of pooled risk**, both in the accrual of plan liabilities, recognizing actuarial gains and loss by division, rather than by employer; and in the accumulation of plan assets through the engagement of an appropriate level of asset risk management.

IV. Annual Actuarial Metrics—

Below is a list of actuarial metrics to be assessed on an **annual basis as of the actuarial valuation date**. The Board recognizes that a single year's results may not be indicative of long-term trends and projected results.

- **Funded ratios**—Calculate and review by division:
  - The actuarial funded ratio based on the actuarial value of plan assets divided by the defined benefit pension plan's actuarial accrued liability (AAL), and
  - The market value funded ratio based on the market value of plan assets divided by the defined benefit pension plan's AAL.
- **Funding period**—To be determined for each division with respect to the applicable contribution rates. A funding period is the amortization period required to pay off that division's UAAL considering the resources available. Funding periods for each division will be determined in the annual actuarial valuation in relationship to both
  - Statutory contribution rates, and
  - Actuarially determined contribution (ADC) rates.
- **Contribution rate comparison—**
  - Calculate and review by division.
- **Actuarial Projections—**
  - Perform and review, by division,
    - Actuarial projections considering appropriate benefit provisions, salary and demographic data, actuarial assumptions, membership growth, and statutory contribution rates in order to determine the sustainability of each division under their benefit provisions and statutory contribution rate structure.

- Projection modeling that allows for the testing of projection results under various economic and demographic stress conditions.

V. Funding Valuation Elements—

Schedule I – Colorado PERA Defined Benefit Pension Plan Funding Policy (continued)

Annually, the Board's actuary will perform an actuarial valuation for funding purposes, and calculate ADC rates against which to compare contribution rates mandated under State statute. The ADC will be the sum of a payment based on normal cost and a payment on the UAAL. The normal cost and the amount of payment on the UAAL are determined by the following three major components of a funding valuation:

- **Actuarial Cost Method:** This component determines the attribution method upon which the cost/liability of the retirement benefits are allocated to a given period, defining the normal cost or annual accrual rate associated with the projected benefits.
  - The Entry Age Normal Cost Method (EAN), as is used for PERA's annual actuarial valuation purposes, is to be used for the determination of the normal cost rate and the actuarial accrued liability for purposes of calculating the ADC.
  - Under this method, normal cost is calculated using benefits based on projected service and salary at retirement and is allocated over an individual's career as a level percent of payroll. Because EAN normal cost rates are level for each participant, the normal cost pattern for the entire plan under EAN is more stable in the face of demographic shifts in the workforce. It is this normal cost stability that makes the EAN method the preferred funding method for the majority of public defined benefit pension plans.
- **Asset Valuation Method:** This component dictates the method by which the asset value, used in the determination of the UAAL, is determined, which could be a market value or a smoothed actuarial value of trust assets.
  - Because investment markets are volatile and defined benefit pension plans typically have long investment horizons, application of an asset-smoothing technique can be an effective tool to manage contribution volatility and provide a more consistent measure of funding over time. Asset-smoothing methods reduce the effect of short-term market volatility on contributions, while still tracking the overall movement of the market value of plan assets, by recognizing the effects of investment gains and losses over a period of years.
  - The asset valuation method to be used shall be a four-year *smoothed* market value of assets. The difference between actual market value investment returns and the expected actuarial investment returns is recognized equally over a four-year period.
- **Amortization Method:** This component prescribes, in terms of duration and pattern, the systematic manner in which the difference between the actuarial accrued liability and the actuarial value of assets is reduced.
  - Once established for any component of the UAAL, the amortization period for that component will be closed and will decrease by one year annually.
  - The amortization payment will be determined on a level percentage of pay basis.
  - The length of the amortization periods will be as follows:
    - Existing UAAL on December 31, 2014 – 30 years.
    - Any increase (or decrease) in the UAAL existing as of December 31, 2014 – remaining period of the initial 30-year period from the date of the valuation.
    - Annual future actuarial experience gains and losses – 30 years from the date of the valuation.
    - Future assumption changes – 30 years from the date of the valuation.

- Future benefit enhancements/reductions – the number of years, as determined by the Board, to represent the anticipated duration of payment of the enhancement or, if a reduction, duration of the benefit to the plan. This determination will be based on the nature of the benefit change and the demographics of the membership group affected by the change, not to exceed 25 years from the date of the valuation.

- If any future annual 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 exceed 120%. 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% funded ratio.
- The target amortization period noted above regarding new UAAL will be applied for funding benchmark and RSI reporting purposes. Alternative ADCs will be determined by division, by applying the layered amortization methodology as described above, using 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 new UAAL. These comparatives are to appear in the Comprehensive Annual Financial Report (CAFR) as a demonstration of the transparency and accountability funding goal delineated in Section III of this document.

In conjunction with the three major components discussed above, a number of actuarial assumptions are used to develop the annual actuarial metrics, as well as the ADC rates, and are described in detail in the annual actuarial valuation report. The actuarial assumptions are derived and proposed by the Board's actuary and adopted by the PERA Board of Trustees in conformity with the *Actuarial Standards of Practice* issued by the Actuarial Standards Board. The assumptions represent the Board's best estimate of anticipated experience under the benefit provisions of PERA and are intended to be long-term in nature. In the development of actuarial assumptions, the Board considers not only past experience but also trends, external economic forces, and future demographic and economic expectations.

- **Actuarial Assumptions—**Actuarial assumptions are generally grouped into two major categories:
  - **Demographic assumptions**, which include rates of termination, retirement, disability, mortality, etc., and
  - **Economic assumptions**, which include investment return, salary increase, payroll growth, and inflation, etc.

Actuarial assumptions do not impact the total cost of the plan (benefit payments and expenses), but rather the timing of prescribed contributions. To the extent that actuarial experience deviates from the assumptions, and actual contributions deviate from projected, experience gains and losses will occur. These gains (or losses) then serve to reduce (or increase) the projected future contributions necessary to achieve or sustain a certain actuarial standard. It is in this vein that the ADC rates may help indicate if the statutory contribution rates are adequate to meet the future cost requirements of the plan, although the ADC calculated in valuation results has limitations due to changing costs over time. Considering various benefit tiers currently in effect within the Colorado PERA defined benefit pension plan, the results of the actuarial projections will be the best indication of the adequacy of the statutorily prescribed pension contribution schedule.

VI. Governance Policy/Processes—

As delineated in the **PERA *Governance Manual***, below is a list of specific actuarial and/or funding-related studies, the frequency at which they should be commissioned/requested by the Board, and additional responsibilities relating to the studies:

- **Actuarial Valuation** (perform annually)—The Board is responsible for reviewing PERA's annual actuarial valuation report; and submitting a summary report to the Legislative Audit Committee and the Joint Budget Committee of the General Assembly, together with any recommendations concerning such liabilities that have accrued. In addition, the Board, in consultation with the their retained actuary, will provide recommendations to the Colorado General Assembly regarding any necessary adjustments to the statutory employer and member contribution rates.
- **Experience Analysis** (perform periodically, historically performed approximately every four years)—The Board is responsible for ensuring that an experience analysis is performed as prescribed, for reviewing the results of that study, and for approving the actuarial assumptions and methodologies to be used for all actuarial purposes relating to the defined benefit pension and OPEB plans.
- **Actuarial Audit** (perform every five years, or the appointment of a new actuarial firm will satisfy requirement)—The Board is responsible for ensuring that an actuarial audit is performed as prescribed and for reviewing the results of that audit.
- **Asset Liability Study** (perform at least every three to five years, or more frequently if necessary)—The Board is responsible for ensuring that a study of the relationship between the defined benefit trust assets and liabilities is performed as prescribed and for reviewing the results of that study.
- Review of the **Defined Benefit Pension Plan Funding Policy and the Defined Benefit OPEB Plan Funding Policy** (perform periodically)—The Board is responsible for the periodic review of the funding policies applicable to the defined benefit pension and OPEB plans, as is deemed necessary.

VII. Glossary of Funding Policy Terms—

- **Actuarial Accrued Liability (AAL):** The AAL is the value at a particular point in time of all past normal costs. This is the amount of assets the plan would have today if the current plan provisions, actuarial assumptions, and participant data had always been in effect, contributions equal to the normal cost had been made, and all actuarial assumptions had been met. For each of the PERA defined benefit plans, the AAL includes the balance in the affiliated annual increase reserve.
- **Actuarial Cost Method:** The actuarial cost method allocates a portion of the total cost (present value of benefits) to each year of service, both past service and future service.
- **Annual Increase Reserve (AIR):** As of January 1, 2007, an AIR was created for each division trust fund for the purpose of funding annual increases for PERA benefit structure members hired on or after January 1, 2007. A portion of the employer contribution, equal to one percent of the salaries of affected members, is accumulated in the AIR to be paid out in annual increases each July 1, to the extent affordable. Although invested with the affiliated division assets, the reserve balances are accounted for separately.
- **Asset Values**: For each of the PERA defined benefit plans, the actuarial and market asset values include the balance in the affiliated AIR.
  - **Actuarial Value of Assets (AVA):** The AVA is the market value of assets less the deferred investment gains or losses not yet recognized by the asset smoothing method.

  - **Market Value of Assets (MVA):** The MVA is the fair value of assets of the plan as reported in the plan's audited financial statements.

- **Entry Age Normal Actuarial Cost Method (EAN):** The EAN actuarial cost method is a funding method that calculates the normal cost as a level percentage of pay or level dollar amount over the working lifetime of the plan's members.
- **Funded Ratio:** The funded ratio is the ratio of the plan assets to the plan's actuarial accrued liabilities.
  - **Actuarial Value Funded Ratio:** is the ratio of the AVA to the AAL.
  - **Market Value Funded Ratio:** is the ratio of the MVA to the AAL.
- **Normal Cost**: The normal cost is the cost allocated under the actuarial cost method to each year of active member service.
- **Present Value of Benefits (PVB) or total cost:** The PVB is the value at a particular point in time of all projected future benefit payments for current plan members, plus the balance in the affiliated AIR. The future benefit payments and the value of those payments are determined using actuarial assumptions regarding future events. Examples of these assumptions are estimates of retirement and termination patterns, salary increases, investment returns, etc.
- **Surplus:** A surplus refers to the positive difference, if any, between the AVA and the AAL.
- **Unfunded Actuarial Accrued Liability (UAAL):** The UAAL is the portion of the AAL that is not currently covered by the AVA. It is the positive difference between the AAL and the AVA.
- **Valuation Date:** The valuation date is the annual date upon which an actuarial valuation is performed; meaning that the trust assets and liabilities of the plan are valued as of that date. PERA's annual valuation date is December 31st.

Adopted: **March 20, 2015**

Amended: **January 19, 2018**

Schedule J – Colorado PERA Defined Benefit OPEB Plan Funding Policy

Introduction—

The Colorado Public Employees' Retirement Association (PERA) maintains two pre-funded defined benefit retiree health care subsidy plans [i.e., Health Care Trust Fund and Denver Public Schools (DPS) Health Care Trust Fund], classified as other postemployment benefit (OPEB) plans. The primary benefit provided by both OPEB plans is an insurance premium subsidy to eligible PERA retirees and benefit recipients enrolled in PERACare. Each defined benefit OPEB plan is funded through PERA-affiliated employer contributions, a portion of purchased service contributions transferred at the time of retirement, and the investment earnings resulting from those contributions. The fixed contribution rate at which each division's employers contribute is determined by the Colorado General Assembly and defined within the statutes governing PERA.

The purposes of this funding policy are to state the overall funding goals and annual actuarial metrics and to guide the PERA Board of Trustees (Board) when considering whether to pursue or support proposed contribution and benefit legislation. The policy also includes a brief list of governance responsibilities regarding the commissioning, collection, and review of actuarial information, as described in the Board's *Governance Manual*.

PERA also maintains five pre-funded, hybrid defined benefit pension plans (i.e., State Division Trust Fund, School Division Trust Fund, Local Government Division Trust Fund, Judicial Division Trust Fund, and DPS Division Trust Fund). On March 20, 2015, the Board approved a separate pension funding policy with regard to these plans recognizing the adoption and implementation of the Governmental Accounting Standards Board (GASB) Statement No. 67, applicable to pension plans.

It is the intention of the Board that this funding policy be considered a working document, reviewed periodically and, as necessary, altered in the future through formal action of the Board. The actual document contains the review and revision/adoption history pertaining to the funding policy of the PERA defined benefit OPEB plans.

II. Background—

In response to the unfavorable investment market of 2008, and in addition to the funding policy adopted in November 2007, the Board set the following guiding principles in 2009 in the development of a comprehensive package to maintain long-term sustainability of the pension plans:

- Shared responsibility among members, retirees, and employers;
- Intergenerational equity;
- Preservation of the defined benefit plan;
- Preservation of portability through the maintenance of existing benefit structures for the different divisions; and
- Development of recommendations that would have little-to-no short-term impact on member behavior.

The combined funding policy regarding PERA's pension and OPEB plans, adopted by the Board in November 2007, was in force with regard to the OPEB plans through December 30, 2017. On January 19, 2018, the Board approved a separate OPEB funding policy with regard to these plans, which reflects the guiding principles listed above, as applicable. This OPEB funding policy is effective with the December 31, 2017 actuarial valuation, recognizes the adoption and implementation of the GASB Statement No. 74, applicable to OPEB, and reflects any updates adopted by the Board since January 19, 2018.

III. Funding Goals—

- Preservation of the **defined benefit plan structure** of providing retirement health care premium subsidies and other benefits, as applicable to PERA retirees and benefit recipients.
- Demonstration of **transparency and accountability** through the continued maintenance of a defined benefit OPEB plan funding policy for the stakeholders of PERA.
- **Achievement of a combined OPEB plan actuarial funded ratio greater than or equal to 110%.** Once the 110% combined funded ratio is achieved, the Board will consider and/or support the following actions, as ordered, as long as the funded ratio, either combined or individual by fund, does not fall below 100% after consideration of the proposed change:
  - Examination and possible action of de-risking the OPEB plans, in parallel with the pension plans
  - Reduction in the portion of the base contribution rate(s), designated for funding the OPEB plans
  - Adoption of a benefit enhancement.

  If the 110% combined funded ratio benchmark is attained through the assistance of certain funding arrangements where assets, outside of statutory contributions, are added to the plans, and results in additional tax-payer obligation, the payment method and duration of this debt should be considered prior to any supportive action taken regarding benefit enhancements.
- Dedication to the balance between:
  - **Contribution rate stability**—keeping contributions relatively stable over time, and
  - **Intergenerational equity—**allocating costs over the employees' period of active service.
- Dedication to the systematic **reduction of the unfunded actuarial accrued liabilities** (UAAL).
- Recognition that within a multiple-employer cost-sharing defined benefit plan, such as the PERA HCTF, there are **beneficial elements of pooled risk**, both in the accrual of plan liabilities, recognizing actuarial gains and loss for the fund in total, rather than by each employer; and in the accumulation of plan assets through the engagement of an appropriate level of asset risk management.

IV. Annual Actuarial Metrics—

Below is a list of actuarial metrics to be assessed on an **annual basis as of the actuarial valuation date**. The Board recognizes that a single year's results may not be indicative of long-term trends and projected results.

- **Funded ratios**—Calculate and review by fund:
  - The actuarial funded ratio based on the actuarial value of plan assets divided by the defined benefit OPEB plan's actuarial accrued liability (AAL), and
  - The market value funded ratio based on the market value of plan assets divided by the defined benefit OPEB plan's AAL.
- **Funding period**—To be determined for each fund with respect to the applicable contribution rates. A funding period is the amortization period required to pay off that fund's UAAL considering the resources available. Funding periods for each fund will be determined in the annual actuarial valuation in relationship to both
  - Statutory contribution rates, and

   - Actuarially determined contribution (ADC) rates.

- **Contribution rate comparison—**
   - Calculate and review by fund.
- **Actuarial Projections—**
   - Perform and review, by fund,
      - Actuarial projections considering appropriate benefit provisions, salary and demographic data, actuarial assumptions, membership growth, and statutory contribution rates in order to determine the sustainability of each fund under their benefit provisions and statutory contribution rate structure.
      - Projection modeling that allows for the testing of projection results under various economic and demographic stress conditions.

V. Funding Valuation Elements—

Annually, the Board's actuary will perform an actuarial valuation for funding purposes, and calculate ADC rates against which to compare contribution rates mandated under State statute. The ADC will be the sum of a payment based on normal cost and a payment on the UAAL. The normal cost and the amount of payment on the UAAL are determined by the following three major components of a funding valuation:

- **Actuarial Cost Method:** This component determines the attribution method upon which the cost/liability of the retirement benefits are allocated to a given period, defining the normal cost or annual accrual rate associated with the projected benefits.
   - The Entry Age Normal Cost Method (EAN), as is used for PERA's annual actuarial valuation purposes, is to be used for the determination of the normal cost rate and the actuarial accrued liability for purposes of calculating the ADC.
   - Under this method, normal cost is calculated using benefits based on projected service and salary at retirement and is allocated over an individual's career as a level percent of payroll. Because EAN normal cost rates are level for each participant, the normal cost pattern for the entire plan under EAN is more stable in the face of demographic shifts in the workforce. It is this normal cost stability that makes the EAN method the preferred funding method for the majority of public defined benefit pension plans.
- **Asset Valuation Method:** This component dictates the method by which the asset value, used in the determination of the UAAL, is determined, which could be a market value or a smoothed actuarial value of trust assets.
   - Because investment markets are volatile and defined benefit OPEB plans typically have long investment horizons, application of an asset-smoothing technique can be an effective tool to manage contribution volatility and provide a more consistent measure of funding over time. Asset-smoothing methods reduce the effect of short-term market volatility on contributions, while still tracking the overall movement of the market value of plan assets, by recognizing the effects of investment gains and losses over a period of years.
   - The asset valuation method to be used shall be a four-year *smoothed* market value of assets. The difference between actual market value investment returns and the expected actuarial investment returns is recognized equally over a four-year period.

- **Amortization Method:** This component prescribes, in terms of duration and pattern, the systematic manner in which the difference between the actuarial accrued liability and the actuarial value of assets is reduced.
  - Once established for any component of the UAAL, the amortization period for that component will be closed and will decrease by one year annually.
  - The amortization payment will be determined on a level percentage of pay basis.
  - The length of the amortization periods will be as follows:
    - Existing UAAL on December 31, 2017 – 30 years.
    - Any increase (or decrease) in the UAAL existing as of December 31, 2017 – remaining period of the initial 30-year period from the date of the valuation.
    - Annual future actuarial experience gains and losses – 30 years from the date of the valuation.
    - Future assumption changes – 30 years from the date of the valuation.
    - Future benefit enhancements/reductions – the number of years, as determined by the Board, to represent the anticipated duration of payment of the enhancement or, if a reduction, duration of the benefit to the plan. This determination will be based on the nature of the benefit change and the demographics of the membership group affected by the change, not to exceed 25 years from the date of the valuation.
  - If any future annual 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 exceed 120%. 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% funded ratio.
  - The target amortization period noted above regarding new UAAL will be applied for funding benchmark and RSI reporting purposes. Alternative ADCs will be determined by fund, by applying the layered amortization methodology as described above, using 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 new UAAL. These comparatives are to appear in the Comprehensive Annual Financial Report (CAFR) as a demonstration of the transparency and accountability funding goal delineated in Section III of this document.

In conjunction with the three major components discussed above, a number of actuarial assumptions are used to develop the annual actuarial metrics, as well as the ADC rates, and are described in detail in the annual actuarial valuation report. The actuarial assumptions are derived and proposed by the Board's actuary and adopted by the PERA Board of Trustees in conformity with the *Actuarial Standards of Practice* issued by the Actuarial Standards Board. The assumptions represent the Board's best estimate of anticipated experience under the benefit provisions of PERA and are intended to be long-term in nature. In the development of actuarial assumptions, the Board considers not only past experience but also trends, external economic forces, and future demographic and economic expectations.

- **Actuarial Assumptions—**Actuarial assumptions are generally grouped into two major categories:
  - **Demographic assumptions**, which include rates of termination, retirement, disability, and mortality, and benefit utilization and coverage elections, etc., and
  - **Economic assumptions**, which include investment return, salary increase, payroll growth, inflation, and health care cost trend and morbidity, etc.

Actuarial assumptions do not impact the total cost of the plan (benefit payments and expenses), but rather the timing of prescribed contributions. To the extent that actuarial experience deviates from the assumptions, and actual contributions deviate from projected, experience gains and losses will occur. These gains (or losses) then serve to reduce (or increase) the projected future contributions necessary to achieve or sustain a certain actuarial standard. It is in this vein that the ADC rates may help indicate if the statutory contribution rates are adequate to meet the future cost requirements of the plan, although the ADC calculated in valuation results has limitations due to changing costs over time. Considering the extended period until the entire plan population has Medicare Part A coverage under the Health Care Trust Fund, the results of the actuarial projections will be the best indication of the adequacy of the statutorily prescribed OPEB contribution schedule.

VI. Governance Policy/Processes—

As delineated in the **PERA *Governance Manual***, below is a list of specific actuarial and/or funding-related studies, the frequency at which they should be commissioned/requested by the Board, and additional responsibilities relating to the studies:

- **Actuarial Valuation** (perform annually)—The Board is responsible for reviewing PERA's annual actuarial valuation report; and submitting a summary report to the Legislative Audit Committee and the Joint Budget Committee of the General Assembly, together with any recommendations concerning such liabilities that have accrued. In addition, the Board, in consultation with its retained actuary, will provide recommendations to the Colorado General Assembly regarding any necessary adjustments to the statutory employer contribution rates.
- **Experience Analysis** (perform periodically, historically performed approximately every four years)—The Board is responsible for ensuring that an experience analysis is performed as prescribed, for reviewing the results of that study, and for approving the actuarial assumptions and methodologies to be used for all actuarial purposes relating to the defined benefit pension and OPEB plans.
- **Actuarial Audit** (perform every five years, or the appointment of a new actuarial firm will satisfy requirement)—The Board is responsible for ensuring that an actuarial audit is performed as prescribed and for reviewing the results of that audit.
- **Asset Liability Study** (perform at least every three to five years, or more frequently if necessary)—The Board is responsible for ensuring that a study of the relationship between the defined benefit trust assets and liabilities is performed as prescribed and for reviewing the results of that study.
- Review of the **Defined Benefit Pension Plan Funding Policy and the Defined Benefit OPEB Plan Funding Policy** (perform periodically)—The Board is responsible for the periodic review of the funding policies applicable to the defined benefit pension and OPEB plans, as is deemed necessary.

VII. Glossary of Funding Policy Terms—

- **Actuarial Accrued Liability (AAL):** The AAL is the value at a particular point in time of all past normal costs. This is the amount of assets the plan would have today if the current plan provisions, actuarial assumptions, and participant data had always been in effect, contributions equal to the normal cost had been made, and all actuarial assumptions had been met. For each of the PERA defined benefit plans, the AAL includes the balance in the affiliated annual increase reserve.
- **Actuarial Cost Method:** The actuarial cost method allocates a portion of the total cost (present value of benefits) to each year of service, both past service and future service.

- **Asset Values**: For each of the PERA defined benefit plans, the actuarial and market asset values include the balance in the affiliated AIR.
  - **Actuarial Value of Assets (AVA):** The AVA is the market value of assets less the deferred investment gains or losses not yet recognized by the asset smoothing method.
  - **Market Value of Assets (MVA):** The MVA is the fair value of assets of the plan as reported in the plan's audited financial statements.
- **Entry Age Normal Actuarial Cost Method (EAN):** The EAN actuarial cost method is a funding method that calculates the normal cost as a level percentage of pay or level dollar amount over the working lifetime of the plan's members.
- **Funded Ratio:** The funded ratio is the ratio of the plan assets to the plan's actuarial accrued liabilities.
  - **Actuarial Value Funded Ratio:** is the ratio of the AVA to the AAL.
  - **Market Value Funded Ratio:** is the ratio of the MVA to the AAL.
- **Normal Cost**: The normal cost is the cost allocated under the actuarial cost method to each year of active member service.
- **Present Value of Benefits (PVB) or Total Cost:** The PVB is the value at a particular point in time of all projected future benefit payments for current plan members, plus the balance in the affiliated AIR. The future benefit payments and the value of those payments are determined using actuarial assumptions regarding future events. Examples of these assumptions are estimates of retirement and termination patterns, salary increases, investment returns, etc.
- **Surplus:** A surplus refers to the positive difference, if any, between the AVA and the AAL.
- **Unfunded Actuarial Accrued Liability (UAAL):** The UAAL is the portion of the AAL that is not currently covered by the AVA. It is the positive difference between the AAL and the AVA.
- **Valuation Date:** The valuation date is the annual date upon which an actuarial valuation is performed; meaning that the trust assets and liabilities of the plan are valued as of that date. PERA's annual valuation date is December 31st.

Adopted: January 19, 2018