

Public Employees' Retirement Association of Colorado

Actuarial Valuation and Review

As of December 31, 2019

Health Care Trust Fund
Denver Public Schools Health Care Trust Fund



This report has been prepared at the request of the Board of Trustees to assist in administering the Funds. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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June 2, 2020

The Board of Trustees
Public Employees' Retirement Association of Colorado
1301 Pennsylvania Street
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Dear Trustees:

We certify that the information contained in this report is accurate and fairly presents the actuarial position of the Health Care Trust Funds of the Public Employees' Retirement Association of Colorado (PERA) as of December 31, 2019.

All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion the results presented also comply with Colorado Statutes, and, where applicable, the Internal Revenue Code, and ERISA. The undersigned are independent actuaries. All are Fellows or Associates of the Society of Actuaries and Members of the American Academy of Actuaries, and are experienced in performing valuations for large public retirement systems. All meet the Qualification Standards of the American Academy of Actuaries.

OPEB FUNDING ACTUARIAL VALUATION – HEALTH CARE TRUST FUNDS

The primary purposes of the valuation report are to determine the adequacy of the current employer contribution rates, to describe the current financial condition of PERA, and to analyze changes in PERA's financial condition. Information required by PERA in connection with the Governmental Accounting Standards Board Statements No. 74 and 75 (GASB 74 and GASB 75) are included in a separate report. Valuations are prepared annually, as of December 31 of each year, the last day of PERA's plan and fiscal year.

OPEB FINANCING OBJECTIVES

PERA maintains two pre-funded defined benefit retiree health care subsidy plans [i.e., Health Care Trust Fund (HCTF) and the Denver Public Schools Health Care Trust Fund (DPS HCTF)], classified as other postemployment benefit (OPEB) plans. Each OPEB plan is funded through PERA-affiliated employer contributions, allocated purchase of service dollars, and the investment earnings resulting from those contributions. The fixed contribution rate at which each PERA-affiliated employer contributes is determined by the Colorado General Assembly and defined within the statutes governing PERA.

PERA's OPEB plan funding policy (OPEB funding policy), as developed and maintained by the Board of Trustees (Board), is used to gauge the adequacy of the employer contributions. The purposes of this OPEB 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 related to the Health Care Trust Funds. 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 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 Division Trust Fund). On November 16, 2018, the Board approved an amended defined benefit pension plan funding policy (pension funding policy) with regard to these plans. The results of the pension funding actuarial valuation are included in a separate report.

PERA's OPEB funding policy is provided in Section 4, Exhibit III.

PROGRESS TOWARD REALIZATION OF OPEB FINANCING OBJECTIVES

The results indicate that for both Health Care Trust Funds the allocated employer contribution rates are sufficient to fund the normal cost for all members and each Health Care Trust Fund's unfunded accrued liability. The resulting amortization periods for each fund as of December 31, 2019, are shown in the following table:

Trust Fund	Amortization Period
Health Care Trust Fund	20 years
DPS Health Care Trust Fund	6 years

REPORTING CONSEQUENCES

PERA is required to disclose certain actuarial information in its Comprehensive Annual Financial Report (CAFR), including the Net OPEB liability (NOL), the sensitivity of the NOL to changes in the discount rate, a schedule of changes in NOL, and a comparison of actual contributions to the ADC. PERA's affiliated employers are required to comply with GASB 75, which also requires disclosure of certain actuarial information in their financial statements. This information is provided in a separate report.

BENEFIT PROVISIONS

The HCTF and DPS HCTF provide a subsidy for PERACare, PERA's voluntary health benefits program. C.R.S. § 24-51-1202 *et seq.* specifies the eligibility for enrollment in the health care plans offered by PERA and the amount of the premium subsidy. The law governing a benefit recipient's eligibility for the subsidy and the amount of the subsidy differs slightly depending under which benefit structure the benefits are calculated. All benefit recipients under the PERA benefit structure and all retirees under the DPS benefit structure are eligible for a premium subsidy, if enrolled in a health care plan under PERACare. Colorado State law provisions may be amended from time to time by the Colorado General Assembly. A summary of plan provisions is provided in Section 4, Exhibit II.

ASSUMPTIONS AND METHODS

The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation resulted from the 2016 Actuarial Experience Study covering plan experience over the four-year period January 1, 2012 through December 31, 2015 and Board discussion at the November 18, 2016 Board meeting. In addition, as a result of the 2019 Asset Liability Study, concluded at the November 15, 2019 Board meeting, the Board reaffirmed the 7.25% assumed long-term rate of investment return effective as of January 1, 2020. With the exception of typical updates to health care cost and trend rate assumptions, based on professional judgment, no assumption changes are warranted at this time. A summary of the assumptions and methods applied in this valuation is provided in Exhibit I.

DATA

Member data for retired, active, and inactive participants was supplied as of December 31, 2019, by PERA. We have not subjected this data to any auditing procedures, but have examined the data for reasonableness and consistency with the prior year's data. Asset information was also supplied by PERA. That assistance is gratefully acknowledged.

Sincerely,

Segal

By:



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Vice President and Actuary



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Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal to present a funding valuation of the Health Care Trust Funds of the Public Employees' Retirement Association of Colorado (PERA) as of December 31, 2019. The funding valuation was performed to determine whether the assets and contribution rates are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of PERA's Health Care Trust Fund assets to cover the estimated cost of settling the coordinating benefit obligations of those trusts. Future actuarial measurements may differ significantly from the current measurements 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; and changes in plan provisions or applicable law.

Certain disclosure information required by GASB 74 and GASB 75 as of December 31, 2019 for PERA is provided in a separate report.

The contribution requirements presented in this report are based on:

- The health care premium subsidy provisions, as administered by the PERA Board of Trustees;
- The characteristics of covered active members, inactive members, and retirees and survivors as of December 31, 2019, provided by PERA;
- The assets of PERA's Health Care Trust Funds as of December 31, 2019, provided by PERA;
- Economic assumptions regarding health care trend rates, future salary increases and investment earnings;
- Other actuarial assumptions, regarding member terminations, retirement, death, etc.; and
- The OPEB funding policy adopted by the PERA Board of Trustees, effective January 19, 2018.

Valuation Highlights – Health Care Trust Fund

1. Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and a portion of the principal balance. The OPEB funding policy adopted by PERA meets this standard.
2. The employer statutory contribution rate for the plan year beginning January 1, 2021 is equal to 1.02% of salary for employers. After recognizing the net employer normal cost rate of 0.20% of salary, the remaining basic contribution amounts to 0.82% of salary. Contributions at this level will amortize the unfunded actuarial accrued liability of \$1,098,736,974 over 20 years, assuming the aggregate payroll increases by 3.50% per year.
3. The actuarially determined contribution for the plan year beginning January 1, 2021 is equal to 0.89% of salary for employers. The Unfunded Actuarial Accrued Liability as of December 31, 2017 is the initial legacy liability and is amortized over a remaining period of 28 years. Pursuant to the Board's OPEB funding policy, any growth (or reduction) in unfunded liabilities resulting from the initial legacy UAAL, is amortized over the same closed period. Thus, the 2019 contribution excess also is amortized over a 28 year period, but the 2019 actuarial experience gain or loss, recognized as a new layer of UAAL, is amortized over 30 years.
4. Actual employer contributions made during the plan year ending December 31, 2019 were \$92,011,162, which is 94% of the actuarially determined contribution. In the prior plan year, actual contributions were \$86,559,491, which is 92% of the prior year actuarially determined contribution.
5. The funded ratio based on the actuarial value of assets over the actuarial accrued liability as of December 31, 2019 is 24.1%, compared to 19.5% as of December 31, 2018. This ratio is a measure of funding status and its history is a measure of funded progress. These measurements are not necessarily appropriate for assessing the sufficiency of the Plan's assets to cover the estimated cost of settling the Plan's benefit obligation or the need for or the amount of future contributions.
6. For the year ended December 31, 2019, PERA's total fund annualized rate return on a market value basis was reported to be 20.3%. For the same period, Segal determined specifically for the HCTF, the asset return on a market value basis was 18.3%. After gradual recognition of investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 9.4%. This represents an experience gain when compared to the assumed rate of 7.25%. As of December 31, 2019, the actuarial value of assets of \$348.4 million represented 95.6% of the market value of \$364.5 million.
7. The portion of deferred investment gains and losses recognized during the calculation of the December 31, 2019 actuarial value of assets contributed a gain of \$6.6 million.

Valuation Highlights – Denver Public Schools Health Care Trust Fund

1. Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and a portion of the principal balance. The OPEB funding policy adopted by PERA meets this standard.
2. The employer statutory contribution rate for the plan year beginning January 1, 2021 is equal to 1.02% of salary for employers. After recognizing the net employer normal cost rate of 0.17% of salary, the remaining basic contribution amounts to 0.85% of salary. Contributions at this level will amortize the unfunded actuarial accrued liability of \$36,747,425 over 6 years, assuming the aggregate payroll of the DPS Division increases by 3.50% per year.
3. The actuarially determined contribution for the plan year beginning January 1, 2021 is equal to 0.44% of salary for employers. The Unfunded Actuarial Accrued Liability as of December 31, 2017 is the initial legacy liability and is amortized over a remaining period of 28 years. Pursuant to the Board's OPEB funding policy, any growth (or reduction) in unfunded liabilities resulting from the initial legacy UAAL, is amortized over the same closed period. Thus, the 2019 contribution excess also is amortized over a 28 year period, but the 2019 actuarial experience gain or loss, recognized as a new layer of UAAL, is amortized over 30 years.
4. Actual employer contributions made during the plan year ending December 31, 2019 were \$7,648,553, which is 173% of the actuarially determined contribution. In the prior plan year, actual contributions were \$7,417,114, which is 153% of the prior year actuarially determined contribution.
5. The funded ratio based on the actuarial value of assets over the actuarial accrued liability as of December 31, 2019 is 45.9%, compared to 36.0% as of December 31, 2018. This ratio is a measure of funding status and its history is a measure of funded progress. These measurements are not necessarily appropriate for assessing the sufficiency of the Plan's assets to cover the estimated cost of settling the Plan's benefit obligation or the need for or the amount of future contributions.
6. For the year ended December 31, 2019, PERA's total fund annualized rate return on a market value basis was reported to be 20.3%. For the same period, Segal determined specifically for the DPS HCTF, the asset return on a market value basis was 18.9%. After gradual recognition of investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 9.1%. This represents an experience gain when compared to the assumed rate of 7.25%. As of December 31, 2019, the actuarial value of assets of \$31.2 million represented 95.6% of the market value of \$32.6 million.
7. The portion of deferred investment gains and losses recognized during the calculation of the December 31, 2019 actuarial value of assets contributed a gain of \$0.5 million.

Valuation Highlights (continued)

The Coronavirus (COVID-19) pandemic is rapidly evolving and is having a significant impact on the US economy in 2020, including most pension plans, and will likely continue to have an impact in the future.

Our results do not include the impact of the following:

- Short-term increases in health plan costs related to the testing or treatment of COVID-19
- Changes in interest rates since the measurement date of December 31, 2019
- Short-term or long-term impacts on mortality of the covered population
- The potential for federal or state fiscal relief

Each of the above factors could significantly impact these results. The above factors generally won't have an impact on the December 31, 2019 valuation, since that is based on a snapshot of liabilities prior to recent events. Given the high level of uncertainty and fluidity of the current events, PERA may wish to consider updated estimates to monitor the plan's financial status. We will keep PERA updated on emerging developments.

Summary of Key Valuation Results for Health Care Trust Fund

		2019	2018
Demographic data for plan year ending December 31:	• Number of retirees and survivors	56,452	56,642
	• Number of terminated vested members	27,796	26,783
	• Number of active members	197,615	195,436
	• Total payroll supplied by PERA	\$8,834,404,580	\$8,399,834,705
	• Average payroll supplied by PERA	\$44,705	\$42,980
Actuarial accrued liability as of December 31:	• Retirees and survivors	\$1,006,001,284	\$1,043,435,880
	• Terminated vested members	42,217,963	40,877,446
	• Total	<u>\$1,447,169,421</u>	<u>\$1,478,114,208</u>
Assets as of December 31:	• Market value of assets (MVA)	\$364,509,976	\$279,191,931
	• Actuarial value of assets (AVA)	348,432,447	288,323,044
	• Actuarial value of assets as a percentage of market value of assets	95.6%	103.3%
Funded status for plan year ending December 31:	• Unfunded/(overfunded) actuarial accrued liability on market value of assets	\$1,082,659,445	\$1,198,922,277
	• Funded percentage on MVA basis	25.2%	18.9%
	• Unfunded/(overfunded) actuarial accrued liability on actuarial value of assets	\$1,098,736,974	\$1,189,791,164
	• Funded percentage on AVA basis	24.1%	19.5%
	• Effective amortization period	20 years	25 years
Gains/(losses):	• Financial experience (investments, contributions, administrative expenses)	\$4,965,509	\$(8,297,824)
	• Demographic experience	62,837,001	46,123,013
	• Plan changes	0	0
	• Assumption/method changes	<u>26,403,149</u>	<u>111,447,737</u>
	• Total gain/(loss)	\$94,205,659	\$149,272,926
Employer contribution for plan year ending December 31:		12/31/2021	12/31/2020
	• Total normal cost rate	0.20%	0.21%
	• Less member contribution rate	<u>0.00%</u>	<u>0.00%</u>
	• Employer normal cost rate	0.20%	0.21%
	• Unfunded actuarial accrued liability rate	<u>0.69%</u>	<u>0.76%</u>
	• Actuarially determined contribution rate	0.89%	0.97%

Summary of Key Valuation Results for DPS Health Care Trust Fund

		2019	2018
Demographic data for plan year ending December 31:	• Number of retirees and survivors	3,620	3,625
	• Number of terminated vested members	1,988	1,780
	• Number of active members	15,679	16,148
	• Total payroll supplied by PERA	\$736,263,798	\$722,040,073
	• Average payroll supplied by PERA	\$46,959	\$44,714
Actuarial accrued liability as of December 31:	• Retirees and survivors	\$44,932,797	\$46,903,134
	• Terminated vested members	1,465,127	1,364,786
	• Active members	<u>21,538,586</u>	<u>21,183,677</u>
	• Total	\$67,936,510	\$69,451,597
Assets as of December 31:	• Market value of assets (MVA)	\$32,636,052	\$24,028,778
	• Actuarial value of assets (AVA)	31,189,085	25,017,848
	• Actuarial value of assets as a percentage of market value of assets	95.6%	104.1%
Funded status for plan year ending December 31:	• Unfunded/(overfunded) actuarial accrued liability on market value of assets	\$35,300,458	\$45,422,819
	• Funded percentage on MVA basis	48.0%	34.6%
	• Unfunded/(overfunded) actuarial accrued liability on actuarial value of assets	\$36,747,425	\$44,433,749
	• Funded percentage on AVA basis	45.9%	36.0%
	• Effective amortization period	6 years	8 years
Gains/(losses):	• Financial experience (investments, contributions, administrative expenses)	\$3,891,300	\$2,220,052
	• Demographic experience	304,065	(298,861)
	• Plan changes	0	0
	• Assumption/method changes	<u>30,388</u>	<u>9,697</u>
	• Total gain/(loss)	\$4,225,753	\$1,930,888
Employer contribution for plan year ending December 31:		12/31/2021	12/31/2020
	• Total normal cost rate	0.17%	0.18%
	• Less member contribution rate	<u>0.00%</u>	<u>0.00%</u>
	• Employer normal cost rate	0.17%	0.18%
	• Unfunded actuarial accrued liability rate	<u>0.27%</u>	<u>0.33%</u>
	• Actuarially determined contribution rate	0.44%	0.51%

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of an OPEB plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by PERA. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	The valuation is based on the market value of assets as of the valuation date, as provided by PERA. PERA uses an “actuarial value of assets” that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments as applicable. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the PERA. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the Plans' assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the Plans.
- Actuarial results in this report are not rounded, but that does not imply precision.
- If PERA is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. PERA should look to their other advisors for expertise in these areas.

As Segal has no discretionary authority with respect to the management or assets of PERA, it is not a fiduciary in its capacity as actuaries and consultants with respect to PERA.

Section 2: Actuarial Valuation Results

A. Member Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, inactive members, retirees and beneficiaries.

This section presents a summary of significant statistical data on these member groups.

More detailed information for this valuation year and the preceding valuation can be found in *Section 3*.

HEALTH CARE TRUST FUND MEMBER POPULATION: 2010 – 2019

As of December 31	Active Members	Active Members Eligible for Medicare ¹	Terminated Vested Members	Retirees and Survivors	Total Membership	Ratio of Retirees and Survivors to Actives
2010	187,924	N/A	16,202	48,455	252,581	0.26
2011	186,170	N/A	17,450	50,217	253,837	0.27
2012	182,524	N/A	20,053	51,681	254,258	0.28
2013	185,367	N/A	21,068	53,041	259,476	0.29
2014	187,336	N/A	22,278	54,076	263,690	0.29
2015	188,040	N/A	23,777	55,092	266,909	0.29
2016	190,741	N/A	24,909	55,789	271,439	0.29
2017	191,778	8,284	25,977	56,474	274,229	0.29
2018	195,436	8,826	26,783	56,642	278,861	0.29
2019	197,615	9,035	27,796	56,452	281,863	0.29

¹ State and local government employees hired (or rehired) after March 31, 1986, are subject to mandatory Medicare coverage.

DPS HEALTH CARE TRUST FUND¹
MEMBER POPULATION: 2010 – 2019

As of December 31	Active Members	Active Members Eligible for Medicare ²	Terminated Vested Members	Retirees and Survivors	Total Membership	Ratio of Retirees and Survivors to Actives
2010	13,171	N/A	409	3,829	17,409	0.29
2011	13,571	N/A	553	3,958	18,082	0.29
2012	13,911	N/A	645	3,963	18,519	0.28
2013	14,816	N/A	759	3,995	19,570	0.27
2014	15,414	N/A	850	3,962	20,226	0.26
2015	15,929	N/A	1,109	3,930	20,968	0.25
2016	15,950	N/A	1,374	3,885	21,209	0.24
2017	15,991	498	1,596	3,816	21,403	0.24
2018	16,148	510	1,780	3,625	21,553	0.22
2019	15,679	518	1,988	3,620	21,287	0.23

¹ The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

² State and local government employees hired (or rehired) after March 31, 1986, are subject to mandatory Medicare coverage.

B. Historical Subsidy Analysis

The charts below demonstrate the health care costs and subsidy for the Health Care Trust Funds over the last 10 years.

HEALTH CARE TRUST FUND SUBSIDY ANALYSIS: 2010 – 2019

As of December 31	Costs			PERA Subsidy	
	Administrative Expenses	Claims and HMO Premiums	Total	Amount	Percentage
2010	\$9,711,601	\$273,798,971	\$283,510,572	\$77,565,425	27%
2011	11,009,812	296,318,871	307,328,683	91,816,866	30%
2012	11,238,351	320,746,116	331,984,467	109,059,949	33%
2013	11,432,638	331,655,337	343,087,975	104,492,638	30%
2014	15,039,802	282,839,340	297,879,142	110,208,226	37%
2015	17,427,167	299,491,591	316,918,758	123,969,209	39%
2016	17,191,422	308,638,003	325,829,425	122,832,804	38%
2017	16,764,561	322,724,014	339,488,575	119,429,766	35%
2018	17,932,145	287,325,519	305,257,664	79,708,653	26%
2019	6,823,546	252,853,124	259,676,670	65,044,662	25%

DPS HEALTH CARE TRUST FUND¹
SUBSIDY ANALYSIS: 2010 – 2019

As of December 31	Administrative Expenses	Costs		DPS Subsidy	
		Claims and HMO Premiums	Total	Amount	Percentage
2010	\$460,196	\$22,531,118	\$22,991,314	\$6,233,170	27%
2011	392,263	23,026,025	23,418,288	6,165,753	26%
2012	383,943	22,993,959	23,377,902	6,652,676	28%
2013	397,301	23,483,334	23,880,635	6,366,156	27%
2014	535,270	18,568,484	19,103,754	6,524,980	34%
2015	664,771	18,913,393	19,578,164	6,831,344	35%
2016	674,716	19,188,078	19,862,794	6,684,449	34%
2017	654,368	19,115,690	19,770,058	6,348,388	32%
2018	690,619	18,063,713	18,754,332	4,849,158	26%
2019	325,479	15,604,973	15,930,452	3,969,740	25%

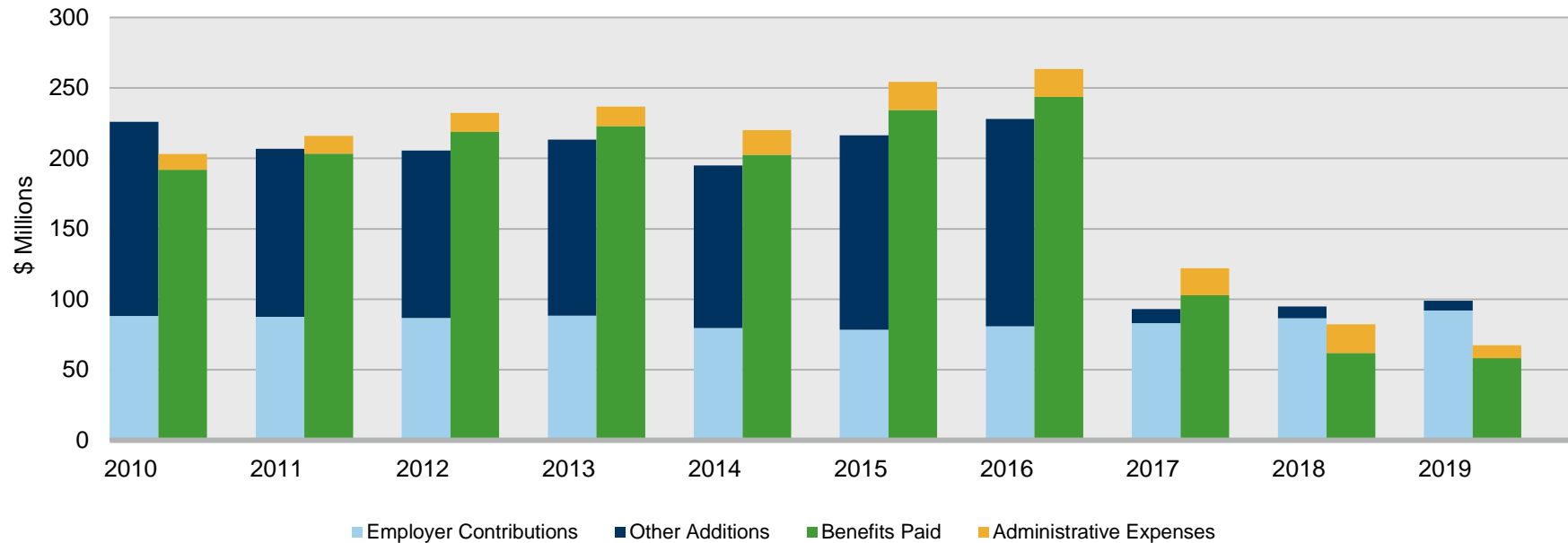
¹ The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

C. Financial Information

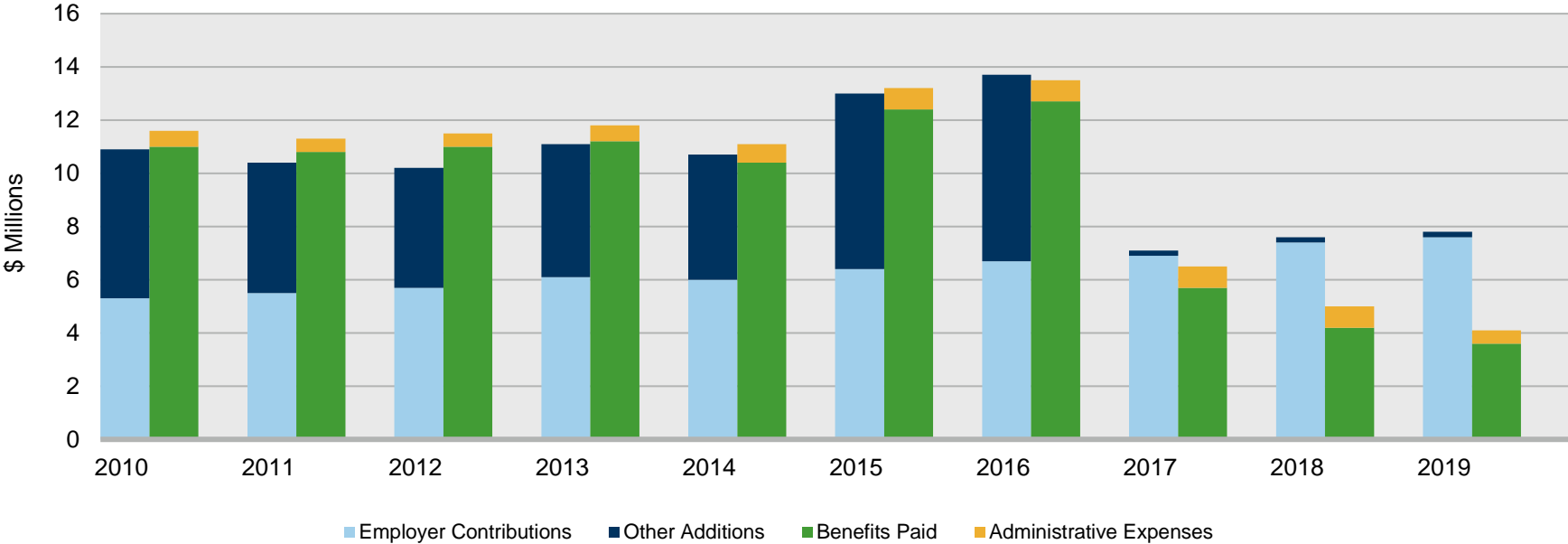
OPEB plan funding anticipates that, over the long term, both contributions (less administrative expenses) and investment earnings (less investment fees) will be needed to cover benefit payments. Plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of these transactions for the valuation year, is presented in *Section 3*.

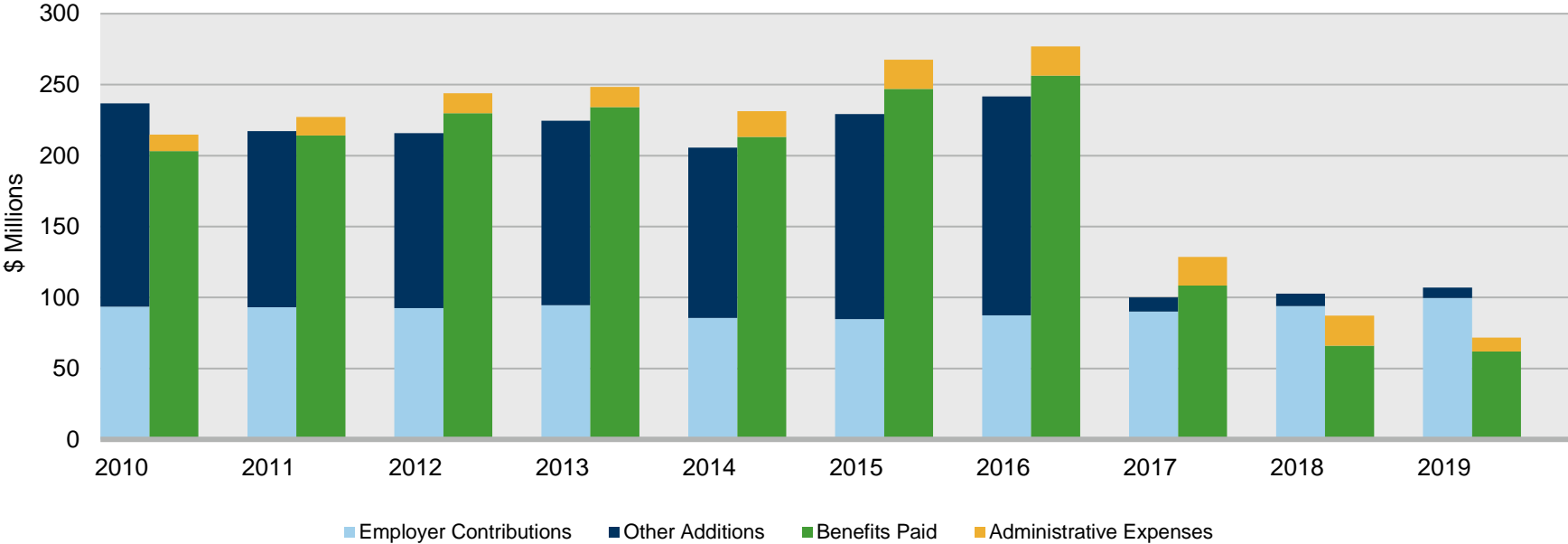
COMPARISON OF CONTRIBUTIONS WITH BENEFITS PAID FOR YEARS ENDED DECEMBER 31, 2010 – 2019 FOR HEALTH CARE TRUST FUND



**COMPARISON OF CONTRIBUTIONS WITH BENEFITS PAID
FOR YEARS ENDED DECEMBER 31, 2010 – 2019
FOR DPS HEALTH CARE TRUST FUND**



**COMPARISON OF CONTRIBUTIONS WITH BENEFITS PAID
FOR YEARS ENDED DECEMBER 31, 2010 – 2019
TOTAL FOR ALL HEALTH CARE TRUST FUNDS**



It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

**HEALTH CARE TRUST FUND
DETERMINATION OF ACTUARIAL VALUE OF ASSETS
FOR YEAR ENDED DECEMBER 31, 2019, AND DECEMBER 31, 2018**

		2019		2018	
1.	Market value of assets available for benefits	\$364,509,976		\$279,191,931	
2.	Calculation of unrecognized return*	Original Amount**	% Not Recognized	% Not Recognized	
a.	Year ended December 31, 2019	\$32,485,818	75%	\$24,364,364	
b.	Year ended December 31, 2018	(30,163,090)	50%	(15,081,545)	75% \$(22,622,18)
c.	Year ended December 31, 2017	27,178,840	25%	6,794,710	50% 13,589,420
d.	Year ended December 31, 2016	(392,858)		0	25% (98,215)
e.	Total unrecognized return			\$16,077,529	\$(9,131,113)
3.	Actuarial value of assets: 1 - 2e	\$348,432,447		\$288,323,044	
4.	Actuarial value as a percent of market value: 3 ÷ 1	95.6%		103.3%	

* Recognition at 25% per year over four years

** Total return minus expected return on a market value basis

**DPS HEALTH CARE TRUST FUND
DETERMINATION OF ACTUARIAL VALUE OF ASSETS
FOR YEAR ENDED DECEMBER 31, 2019, AND DECEMBER 31, 2018**

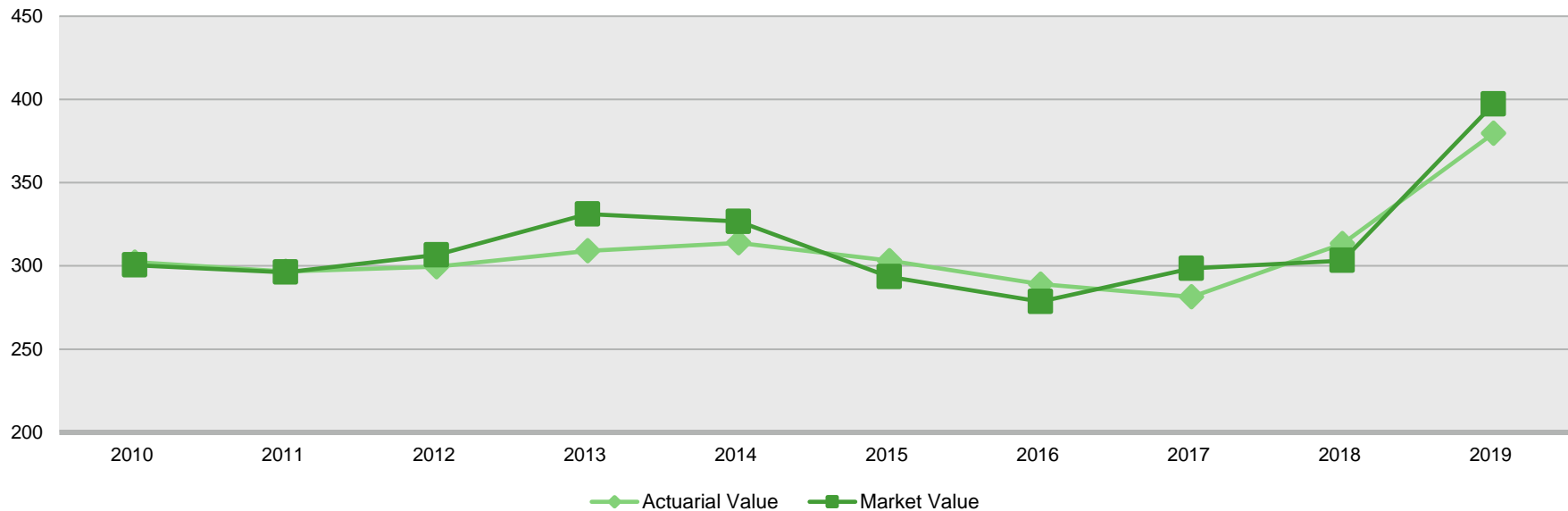
		2019		2018	
1.	Market value of assets available for benefits	\$32,636,052		\$24,028,778	
2.	Calculation of unrecognized return*	Original Amount**	% Not Recognized	% Not Recognized	
a.	Year ended December 31, 2019	\$3,016,155	75%	\$2,262,116	
b.	Year ended December 31, 2018	(2,605,986)	50%	(1,302,993)	75%
c.	Year ended December 31, 2017	1,951,375	25%	487,844	50%
d.	Year ended December 31, 2016	(41,070)		<u>0</u>	25%
e.	Total unrecognized return			\$1,446,967	\$(989,070)
3.	Actuarial value of assets: 1 - 2e	\$31,189,085		\$25,017,848	
4.	Actuarial value as a percent of market value: 3 ÷ 1	95.6%		104.1%	

* Recognition at 25% per year over four years

** Total return minus expected return on a market value basis

Both the actuarial value and market value of assets, when compared to actuarial accrued liabilities, are representations of PERA’s financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the Plan’s liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the actuarially determined contributions.

ACTUARIAL VALUE OF ASSETS VS. MARKET VALUE OF ASSETS AS OF DECEMBER 31, 2010 – 2019 TOTAL OF HEALTH CARE TRUST FUNDS



D. Actuarial Experience

To calculate any actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), any contribution requirement will decrease from the previous year. On the other hand, any contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single years' experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total gain is \$71,997,875, which includes a gain from investments of \$7,123,582 and net gains from all other sources of \$64,874,293. The net experience variation from individual sources other than investments was 4.3% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

ACTUARIAL EXPERIENCE FOR YEAR ENDED DECEMBER 31, 2019

Item		Health Care Trust Fund	DPS Health Care Trust Fund
1.	Net gain/(loss) from investments*	\$6,615,171	\$508,411
2.	Net gain/(loss) from administrative expenses	(2,616,728)	(160,239)
3.	Net gain/(loss) from demographic and other experience	62,837,001	304,065
4.	Net gain/(loss) from contribution excess/(deficiency)	<u>967,066</u>	<u>3,543,128</u>
5.	Net experience gain/(loss): 1 + 2 + 3 + 4	\$67,802,510	\$4,195,365

* Details on next page.

Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on PERA's investment policy. The market value annualized rate of return on a total fund basis was 20.3% with an 18.3% return calculated for the total Health Care Trust Fund assets for the year ended December 31, 2019.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.25%. The actual rate of return on an actuarial basis for the 2019 plan year was 9.40%. Since the actuarial return for the year was greater than the assumed return, PERA experienced an actuarial gain during the year ended December 31, 2019 with regard to its investments.

INVESTMENT EXPERIENCE – TOTAL OF HEALTH CARE TRUST FUNDS

	Year Ended December 31, 2019		Year Ended December 31, 2018	
	Market Value	Actuarial Value	Market Value	Actuarial Value
1. Value assets at the beginning of year	\$303,220,709	\$313,340,892	\$298,529,304	\$281,398,909
2. Contributions during the plan year	106,831,893	106,831,893	102,555,069	102,555,069
3. Contributions receivable	0	0	0	0
4. Benefits and expense during the plan year	71,666,784	71,666,784	87,291,275	87,291,275
5. Value of assets at end of year	397,146,028	379,621,532	303,220,709	313,340,892
6. Net investment income: $5 - 1 - 2 + 4$	58,760,210	31,115,531	(10,572,389)	16,678,189
7. Average value of assets: $1 + [2 - 4] \times \frac{1}{2}$	320,803,264	330,923,447	306,161,201	289,030,806
8. Rate of return: $6 \div 7$	18.32%	9.40%	(3.45%)	5.77%
9. Assumed rate of return	7.25%	7.25%	7.25%	7.25%
10. Expected investment income: 7×9	23,258,237	23,991,949	22,196,687	20,954,733
11. Actuarial gain/(loss): $6 - 10$	<u>\$35,501,973</u>	<u>\$7,123,582</u>	<u>\$(32,769,076)</u>	<u>\$(4,276,544)</u>

Demographic Experience and Administrative Expenses

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- Retirement experience (earlier or later than projected),
- The number of disability retirements (more or fewer than projected)
- Mortality (more or fewer deaths than projected),
- The extent of turnover among participants,
- New members,
- Pay increases (greater or smaller than projected), and
- Administrative expenses.

The net gain from this experience for the year ended December 31, 2019 amounted to \$60,364,099, which is 4.0% of the actuarial accrued liability.

GAINS/(LOSSES) DUE TO DEMOGRAPHIC EXPERIENCE AND ADMINISTRATIVE EXPENSES FOR THE YEAR ENDED DECEMBER 31, 2019 (\$ IN MILLIONS)

Item	Health Care Trust Fund	DPS Health Care Trust Fund	Total
Age and service retirements	\$8.3	\$1.3	\$9.6
Disability retirements	0.7	0.0	0.7
Deaths	0.3	0.0	0.3
Withdrawals	(1.2)	(0.1)	(1.3)
New members	(1.9)	(0.2)	(2.1)
Pay increases	0.0	0.0	0.0
Administrative expenses and other	<u>54.0</u>	<u>(0.9)</u>	<u>53.1</u>
Total gain/(loss)	\$60.2	\$0.1	\$60.3

An additional source of gain or loss that is separately identified and amortized over a period equal to the remaining years of the legacy UAAL amortization is the gain or loss due to contribution excess or deficiency.

CONTRIBUTION EXCESS OR DEFICIENCY FOR YEAR ENDED DECEMBER 31, 2019

Item	Health Care Trust Fund	DPS Health Care Trust Fund
1. Employer contribution rate for 2019:		
a. Total normal cost rate	0.23%	0.21%
b. Less member contribution rate	<u>0.00%</u>	<u>0.00%</u>
c. Employer normal cost rate	0.23%	0.21%
d. UAAL contribution rate	<u>0.88%</u>	<u>0.39%</u>
e. Actuarially Determined Contribution rate: 1c + 1d	1.11%	0.60%
2. Covered payroll for 2019	\$8,834,404,580	\$736,263,798
3. Expected contribution for 2019:		
a. Employer	\$98,061,891	\$4,417,583
b. Member	<u>0</u>	<u>0</u>
c. Total: 3a + 3b	\$98,061,891	\$4,417,583
4. Actual contribution for 2019:		
a. Employer	\$92,011,162	\$7,648,553
b. Member	6,983,965	188,213
c. Purchased service/disaffiliation payments	<u>0</u>	<u>0</u>
d. Total: 4 + 4b - 4c	\$98,995,127	\$7,836,766
5. Contribution (excess)/deficiency, adjusted for interest: (3c - 4d) * 1.03625	\$(967,066)	\$(3,543,128)

E. Changes in the Actuarial Accrued Liability

The total actuarial accrued liability for the HCTF and DPS HCTF as of December 31, 2019 is \$1,515,105,931, a decrease of \$32,459,874, or 2.1%, from the actuarial accrued liability as of the prior valuation date. The change in liability is due to interest, accumulation and payment of benefits, assumption changes, and actuarial experience (as discussed in the previous subsection).

Actuarial Assumptions

- There are no method changes reflected in this report.

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 costs for the 2020 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 thousands)	Change in ADC	Change in Amortization Period
HCTF	\$(26,403.1)	(0.02%)	1 year
DPS HCTF	\$(30.4)	0.00%	None

- Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

Plan Provisions

- There were no changes in plan provisions since the prior valuation.
- A summary of plan provisions is in *Section 4, Exhibit II*.

F. Cash Flow

Cash flow is the difference between contributions and benefit payments, refunds, and expenses. Negative cash flow indicates that the payments made from the Plan exceed contributions made to the Plan.

HEALTH CARE TRUST FUND HISTORY OF CASH FLOW: 2010 – 2019

Year Ended December 31	Disbursements or Expenditures				Net Cash Flow for the Year ²	Market Value of Assets	Net Cash Flow as Percent of Market Value
	Contributions and Other Additions ¹	Benefit Payments And Other Deductions	Administrative Expenses	Total Disbursements			
2010	\$225,991,478	\$(192,043,748)	\$(11,130,247)	\$(203,173,995)	\$22,817,483	\$285,670,700	8.0%
2011	206,855,821	(203,419,335)	(12,481,458)	(215,900,793)	(9,044,972)	281,786,418	(3.2%)
2012	205,521,357	(218,768,224)	(13,513,572)	(232,281,796)	(26,760,439)	291,737,156	(9.2%)
2013	213,400,379	(222,860,115)	(13,766,466)	(236,626,581)	(23,226,202)	314,609,446	(7.4%)
2014	194,896,210	(200,626,256)	(17,444,129)	(218,070,385)	(23,174,175)	309,637,855	(7.5%)
2015	216,327,880	(234,414,642)	(19,855,134)	(254,269,776)	(37,941,896)	276,504,907	(13.7%)
2016	228,021,437	(243,662,183)	(19,657,034)	(263,319,217)	(35,297,780)	260,228,470	(13.6%)
2017	92,931,952	(102,767,212)	(19,162,305)	(121,929,517)	(28,997,565)	276,221,671	(10.5%)
2018	94,932,491	(61,882,385)	(20,401,345)	(82,283,730)	12,648,761	279,191,931	4.5%
2019	98,995,127	(58,254,494)	(9,289,910)	(67,544,404)	31,450,723	364,509,976	8.6%

¹ Includes member and employer contributions, as well as any purchased service credits during the year

² Equal to Contributions + Total Disbursements

DPS HEALTH CARE TRUST FUND¹ HISTORY OF CASH FLOW: 2010– 2019

Disbursements or Expenditures							
Year Ended December 31	Contributions and Other Additions ²	Benefit Payments And Other Deductions	Administrative Expenses	Total Disbursements	Net Cash Flow for the Year ³	Market Value of Assets	Net Cash Flow as Percent of Market Value
2010	\$10,869,774	(\$11,012,215)	(\$569,086)	\$(11,581,301)	\$(711,527)	\$14,790,051	(4.8%)
2011	10,429,768	(10,769,798)	(501,048)	(11,270,846)	(841,078)	14,374,589	(5.9%)
2012	10,242,208	(11,026,749)	(547,095)	(11,573,844)	(1,331,636)	14,842,667	(9.0%)
2013	11,151,939	(11,222,022)	(561,483)	(11,783,505)	(631,566)	16,488,973	(3.8%)
2014	10,728,041	(10,432,420)	(699,257)	(11,131,677)	(403,636)	17,020,938	(2.4%)
2015	12,947,387	(12,441,823)	(844,687)	(13,286,510)	(339,123)	16,935,520	(2.0%)
2016	13,750,248	(12,748,161)	(835,712)	(13,583,873)	166,375	18,337,228	0.9%
2017	7,171,568	(5,697,814)	(808,296)	(6,506,110)	665,458	22,307,633	3.0%
2018	7,622,578	(4,162,411)	(845,134)	(5,007,545)	2,615,033	24,028,778	10.9%
2019	7,836,766	(3,645,385)	(476,995)	(4,122,380)	3,714,386	32,636,052	11.4%

¹ The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

² Includes member and employer contributions, as well as any purchased service credits during the year

³ Equal to Contributions + Total Disbursements

G. Development of Unfunded/(Overfunded) Actuarial Accrued Liability

DEVELOPMENT OF UNFUNDED/(OVERFUNDED) ACTUARIAL ACCRUED LIABILITY

	Health Care Trust Fund	DPS Health Care Trust Fund	Total
1. Unfunded/(overfunded) actuarial accrued liability at January 1, 2019	\$1,189,791,164	\$44,433,749	\$1,234,224,913
2. Normal cost at beginning of year	18,158,797	1,341,567	19,500,364
3. Total contributions	(98,995,127)	(7,836,766)	(106,831,893)
4. Interest on:			
a. Unfunded actuarial accrued liability and normal cost	87,576,372	3,318,711	90,895,083
b. Total contributions	<u>(3,588,573)</u>	<u>(284,083)</u>	<u>(3,872,656)</u>
c. Total interest: 4a + 4b	83,987,799	3,034,628	87,022,427
5. Expected unfunded/(overfunded) actuarial accrued liability: 1 + 2 + 3 + 4c	1,192,942,633	40,973,178	1,233,915,811
6. Changes due to:			
a. (Gain)/Loss	(67,802,510)	(4,195,365)	(71,997,875)
b. Assumptions	(26,403,149)	(30,388)	(26,433,537)
c. Funding method	0	0	0
d. Plan provisions	<u>0</u>	<u>0</u>	<u>0</u>
e. Total changes due to (gain)/loss: 6a + 6b + 6c + 6d	<u>(94,205,659)</u>	<u>(4,225,753)</u>	<u>(98,431,412)</u>
7. Unfunded/(overfunded) actuarial accrued liability at end of year: 5 + 6e	\$1,098,736,974	\$36,747,425	\$1,135,484,399

H. Statutory Employer Contributions

The statutory employer contribution rates for each Health Care Trust Fund are shown in the following table:

Health Care Trust Fund	Employer Contribution Rate
Health Care Trust Fund	1.02%
DPS Health Care Trust Fund	1.02%

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 for each Health Care Trust Fund based on the OPEB funding policy.

I. Actuarially Determined Contribution

For each Plan, the amount of the actuarially determined contribution is comprised of an employer normal cost payment and a payment on the unfunded/(overfunded) actuarial accrued liability. This total amount is divided by the projected payroll for active members to determine the actuarially determined contribution.

PERA's OPEB funding policy is included in Exhibit III. The methodology used to calculate the actuarially determined contributions for the OPEB plans is based on closed (layered) amortization periods of 30 years. The length of the amortization periods are as follows:

- The December 31, 2017 legacy UAAL is being amortized over a closed 30-year period.
- Contribution deficiencies/excesses are amortized over the remaining period of the legacy UAAL.
- Experience gains and losses are amortized over 30 years from the date of the valuation.
- Assumption changes are amortized over 30 years from the date of the valuation.
- Other changes in the UAAL are amortized over 30 years from the date of the valuation.
- Benefit changes are amortized over a period determined by the Board to represent the anticipated duration of the payment of the change, not to exceed 25 years.

The contribution requirements as of December 31, 2019 are based on the data previously described, the actuarial assumptions and Plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

Contribution rates for the year ending December 31, 2021, are derived from the results of the December 31, 2019, annual actuarial valuation.

**SCHEDULE OF COMPUTED EMPLOYER CONTRIBUTION RATES FOR THE 2021 PLAN YEAR
BASED UPON THE RESULTS OF THE DECEMBER 31, 2019 ACTUARIAL FUNDING VALUATION**

Item	Health Care Trust Fund	DPS Health Care Trust Fund
Normal Cost		
Service retirement benefits	0.17%	0.15%
Disability retirement benefits	0.00%	0.00%
Survivor benefits	0.00%	0.00%
Termination withdrawal	0.03%	0.02%
Total normal cost	0.20%	0.17%
Member contributions	0.00%	0.00%
Employer normal cost	0.20%	0.17%
Percentage available to amortize unfunded actuarial accrued liabilities	0.82%	0.85%
Equivalent single amortization period	20 years	6 years
Total employer contribution rate for actuarially funded benefits	0.89%	0.44%

Actuarially Determined Contribution by Plan

HEALTH CARE TRUST FUND ACTUARIALLY DETERMINED CONTRIBUTION¹

	12/31/2019 Valuation Date		12/31/2018 Valuation Date	
	Contribution for Plan Year 2021		Contribution for Plan Year 2020	
	Amount	% of Payroll	Amount	% of Payroll
1. Total normal cost	\$18,074,157	0.20%	\$18,158,797	0.21%
2. Expected member contributions	<u>0</u>	<u>0.00%</u>	<u>0</u>	<u>0.00%</u>
3. Employer normal cost: 1 - 2	\$18,074,157	0.20%	\$18,158,797	0.21%
4. Actuarial accrued liability	\$1,447,169,421		\$1,478,114,208	
5. Actuarial value of assets	<u>348,432,447</u>		<u>288,323,044</u>	
6. Unfunded/(overfunded) actuarial accrued liability: 4 - 5	\$1,098,736,974		\$1,189,791,164	
7. Payment on unfunded actuarial accrued liability	\$63,486,024	0.69%	\$67,085,224	0.76%
8. Actuarially determined contribution: 3+ 7	<u>\$81,560,181</u>	<u>0.89%</u>	<u>\$85,244,021</u>	<u>0.97%</u>
9. Projected payroll	\$9,268,016,568		\$8,812,000,519	

¹ The underlying calculations involve more precision than what is presented and the rounded numbers shown may not add as a result.

**HEALTH CARE TRUST FUND
UNFUNDED ACTUARIAL ACCRUED LIABILITY AMORTIZATION SCHEDULE**

Description	Original Balance	Outstanding Balance as of 12/31/2018	1/1/2019 Amortization Payment	Outstanding Balance as of 12/31/2019	1/1/2020 Amortization Payment	Amortization Period as of 12/31/2019
December 31, 2017 legacy UAAL	\$1,320,934,540	\$1,341,215,881	\$72,847,028	\$1,363,012,503	\$75,545,598	28 years
December 31, 2017 disaffiliation charge	5,399	5,114	652	4,810	679	8 years
December 31, 2018 contribution excess	(885,312)	(885,312)	(48,085)	(899,700)	(49,866)	28 years
December 31, 2018 UAAL base	(150,544,519)	(150,544,519)	(8,021,492)	(153,151,814)	(8,318,314)	29 years
December 31, 2019 contribution excess	(967,066)	N/A	N/A	(967,066)	(53,600)	28 years
December 31, 2019 UAAL base	(109,261,759)	<u>N/A</u>	<u>N/A</u>	<u>(109,261,759)</u>	<u>(5,821,815)</u>	30 years
Total		\$1,189,791,164	\$64,778,103	\$1,098,736,974	\$61,302,682	
Total with interest to middle of the year			\$67,085,224		\$63,486,024	
Projected payroll			\$8,812,000,519		\$9,268,016,568	
Total as a percentage of projected payroll			0.76%		0.69%	

**DPS HEALTH CARE TRUST
ACTUARIALLY DETERMINED CONTRIBUTION¹**

	12/31/2019 Valuation Date		12/31/2018 Valuation Date	
	Contribution for Plan Year 2021		Contribution for Plan Year 2020	
	Amount	% of Payroll	Amount	% of Payroll
1. Total normal cost	\$1,290,773	0.17%	\$1,341,567	0.18%
2. Expected member contributions	<u>0</u>	<u>0.00%</u>	<u>0</u>	<u>0.00%</u>
3. Employer normal cost: 1 - 2	\$1,290,773	0.17%	\$1,341,567	0.18%
4. Actuarial accrued liability	\$67,936,510		\$69,451,597	
5. Actuarial value of assets	<u>31,189,085</u>		<u>25,017,848</u>	
6. Unfunded/(overfunded) actuarial accrued liability: 4 – 5	\$36,747,425		\$44,433,749	
7. Payment on unfunded actuarial accrued liability	\$2,123,127	0.27%	\$2,502,125	0.33%
8. Actuarially determined contribution: 3+ 7	<u>\$3,413,900</u>	<u>0.44%</u>	<u>\$3,843,692</u>	<u>0.51%</u>
9. Projected payroll	\$776,808,581		\$762,036,167	

¹ The underlying calculations involve more precision than what is presented and the rounded numbers shown may not add as a result.

DPS HEALTH CARE TRUST FUND
UNFUNDED ACTUARIAL ACCRUED LIABILITY AMORTIZATION SCHEDULE

Description	Original Balance	Outstanding Balance as of 12/31/2018	1/1/2019 Amortization Payment	Outstanding Balance as of 12/31/2019	1/1/2020 Amortization Payment	Amortization Period as of 12/31/2019
December 31, 2017 legacy UAAL	\$49,175,286	\$49,930,313	\$2,711,924	\$50,741,749	\$2,812,385	28 years
December 31, 2018 contribution excess	(2,885,863)	(2,885,863)	(156,743)	(2,932,763)	(162,550)	28 years
December 31, 2018 UAAL base	(2,610,701)	(2,610,701)	(139,106)	(2,655,916)	(144,254)	29 years
December 31, 2019 contribution excess	(3,543,128)	N/A	N/A	(3,543,128)	(196,380)	28 years
December 31, 2019 UAAL	(4,862,517)	N/A	N/A	(4,862,517)	(259,090)	30 years
Total		\$44,433,749	\$2,416,075	\$36,747,425	\$2,050,111	
Total with interest to middle of the year			\$2,502,125		\$2,123,127	
Projected payroll			\$762,036,167		\$776,808,581	
Total as a percentage of projected payroll			0.33%		0.27%	

Reconciliation of Actuarially Determined Contribution

The charts below details the changes in the actuarially determined contributions from the prior valuation to the current year's valuation.

RECONCILIATION OF ACTUARIALLY DETERMINED CONTRIBUTION

Item	Health Care Trust Fund	Denver Public Schools Health Care Trust Fund
1. Prior valuation	0.97%	0.51%
2. Increases/(decreases) due to:		
• Effect of change in amortization period	0.00%	0.00%
• Effect of change in payroll and normal cost	(0.02%)	(0.01%)
• Effect of contributions (more)/less than actuarially determined contribution	0.01%	(0.03%)
• Effect of gains and losses on accrued liability and administrative expenses	(0.05%)	(0.03%)
• Effect of investment (gain)/loss	0.00%	0.00%
• Effect of plan changes	0.00%	0.00%
• Effect of change in actuarial assumptions and methods	(0.02%)	0.00%
• Net effect of other changes	<u>0.00%</u>	<u>0.00%</u>
Total change	(0.08%)	(0.07%)
3. Current valuation: 1 + 2	0.89%	0.44%
4. Statutory employer contribution rate	1.02%	1.02%
5. Margin available [contribution sufficiency/(deficiency)]: 4 – 3	<u>0.13%</u>	<u>0.58%</u>

J. History of Employer Contributions

Critical information to assess the funding progress is the historical comparison of the actuarially determined contribution (annual required contribution prior to 2014) to the actual contributions. A history of the most recent years of contributions is shown below.

HEALTH CARE TRUST FUND HISTORY OF EMPLOYER CONTRIBUTIONS: 2010 – 2019

Plan Year Ended December 31	Actuarially Determined Employer Contribution (ADC)		Actual Employer Contribution				Percent Contributed
	Amount	Percentage of Payroll	PERA Payroll Allocations	Retiree Drug Subsidy	Total	Percentage of Payroll	
2010	\$92,965,438	1.12%	\$74,047,581	\$14,168,745	\$88,216,326	1.25%	94.9%
2011	103,400,608	1.28%	73,448,775	14,151,366	87,600,141	1.26%	84.7%
2012	94,044,862	1.18%	72,556,763	14,197,649	86,754,412	1.28%	92.2%
2013	102,314,788	1.24%	72,785,209	15,731,044	88,516,253	1.27%	86.5%
2014	95,189,820	1.32%	79,625,680	0	79,625,680	1.10%	83.6%
2015	86,083,768	1.15%	78,462,738	0	78,462,738	1.05%	91.1%
2016	84,114,123	1.09%	80,825,145	0	80,825,145	1.05%	96.1%
2017	85,614,624	1.08%	83,172,633	0	83,172,633	1.05%	97.1%
2018	94,078,152	1.12%	86,559,491	0	86,559,491	1.03%	92.0%
2019	98,061,896	1.11%	92,011,162	0	92,011,162	1.04%	93.8%

DPS HEALTH CARE TRUST FUND¹
HISTORY OF EMPLOYER CONTRIBUTIONS: 2010 – 2019

Plan Year Ended December 31	Actuarially Determined Employer Contribution (ADC)		Actual Employer Contribution				Percent Contributed
	Amount	Percentage of Payroll	PERA Payroll Allocations	Retiree Drug Subsidy	Total	Percentage of Payroll	
2010	\$5,002,075	0.95%	\$4,761,581	\$536,814	\$5,298,395	1.13%	105.9%
2011	5,022,117	0.92%	5,029,151	498,974	5,528,125	1.12%	110.1%
2012	5,188,076	0.92%	5,243,219	488,054	5,731,273	1.12%	110.5%
2013	5,272,637	0.86%	5,557,244	562,761	6,120,005	1.12%	116.1%
2014	5,083,969	0.87%	6,003,241	394	6,003,635	1.03%	118.1%
2015	5,031,032	0.81%	6,370,903	0	6,370,903	1.03%	126.6%
2016	4,816,328	0.75%	6,722,556	0	6,722,556	1.05%	139.6%
2017	4,475,748	0.68%	6,930,014	0	6,930,014	1.05%	154.8%
2018	4,837,668	0.67%	7,417,114	0	7,417,114	1.03%	153.3%
2019	4,417,583	0.60%	7,648,553	0	7,648,553	1.04%	173.1%

¹ The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

K. Additional Information

The other critical piece of information regarding PERA’s financial status is the funded ratio. This ratio compares the actuarial value of assets to the actuarial accrued liabilities of each Health Care Trust Fund. High ratios indicate a well-funded plan with assets sufficient to cover the plan’s actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors. The chart below shows the funded ratio calculated using the actuarial value of assets.

HEALTH CARE TRUST FUND SCHEDULE OF FUNDING PROGRESS

As of December 31	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded Actuarial Liability (UAAL)	Funded Ratio	Annual Covered Payroll	UAAL as a % of Covered Payroll
2010	\$288,193,296	\$1,642,993,478	\$1,354,800,182	17.5%	\$7,035,419,174	19.3%
2011	282,228,196	1,710,789,752	1,428,561,556	16.5%	6,972,597,196	20.5%
2012	285,096,629	1,723,494,688	1,438,398,059	16.5%	6,766,713,013	21.3%
2013	293,556,476	1,557,405,815	1,263,849,339	18.8%	6,982,560,466	18.1%
2014	297,376,975	1,534,461,311	1,237,084,336	19.4%	7,211,350,491	17.2%
2015	285,588,114	1,556,268,985	1,270,680,871	18.4%	7,485,544,867	17.0%
2016	270,149,671	1,556,762,238	1,286,612,567	17.4%	7,716,892,488	16.7%
2017	260,281,736	1,581,221,675	1,320,939,939	16.5%	7,927,279,994	16.7%
2018	288,323,044	1,478,114,208	1,189,791,164	19.5%	8,399,834,705	14.2%
2019	348,432,447	1,447,169,421	1,098,736,974	24.1%	8,834,404,580	12.4%

DPS HEALTH CARE TRUST FUND¹ SCHEDULE OF FUNDING PROGRESS

As of December 31	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded Actuarial Accrued Liability (UAAL)	Funded Ratio	Annual Covered Payroll	UAAL as a % of Covered Payroll
2010	\$14,085,654	\$78,512,595	\$64,426,941	17.9%	\$470,773,746	13.7%
2011	14,447,950	77,474,590	63,026,640	18.6%	491,646,251	12.8%
2012	14,442,582	77,668,687	63,226,105	18.6%	510,872,366	12.4%
2013	15,481,663	76,636,310	61,154,647	20.2%	547,659,912	11.2%
2014	16,501,777	76,025,927	59,524,150	21.7%	584,319,269	10.2%
2015	17,557,168	74,896,817	57,339,649	23.4%	621,114,573	9.2%
2016	18,944,588	72,845,128	53,900,540	26.0%	642,177,158	8.4%
2017	21,117,173	70,292,459	49,175,286	30.0%	658,198,306	7.5%
2018	25,017,848	69,451,597	44,433,749	36.0%	722,040,073	6.2%
2019	31,189,085	67,936,510	36,747,425	45.9%	736,263,798	5.0%

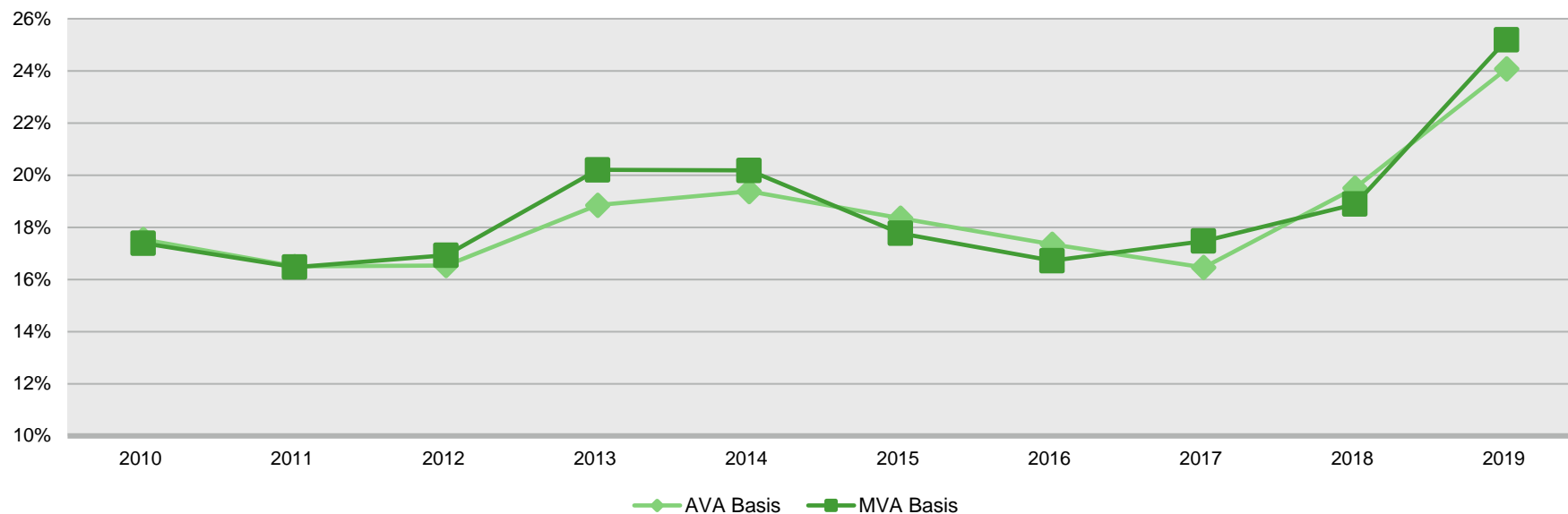
¹ The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

**TOTAL OF HEALTH CARE TRUST FUNDS
SCHEDULE OF FUNDING PROGRESS**

As of December 31	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded Actuarial Accrued Liability (UAAL)	Funded Ratio	Annual Covered Payroll	UAAL as a % of Covered Payroll
2010	\$302,278,950	\$1,721,506,073	\$1,419,227,123	17.6%	\$7,506,192,920	18.9%
2011	296,676,146	1,788,264,342	1,491,588,196	16.6%	7,464,243,447	20.0%
2012	299,539,211	1,801,163,375	1,501,624,164	16.6%	7,277,585,379	20.6%
2013	309,038,139	1,634,042,125	1,325,003,986	18.9%	7,530,220,378	17.6%
2014	313,878,752	1,610,487,238	1,296,608,486	19.5%	7,795,669,760	16.6%
2015	303,145,282	1,631,165,802	1,328,020,520	18.6%	8,106,659,440	16.4%
2016	289,094,259	1,629,607,366	1,340,513,107	17.7%	8,359,069,646	16.0%
2017	281,398,909	1,651,514,134	1,370,115,225	17.0%	8,585,478,300	16.0%
2018	313,340,892	1,547,565,805	1,234,224,913	20.2%	9,121,874,778	13.5%
2019	379,621,532	1,515,105,931	1,135,484,399	25.1%	9,570,668,378	11.9%

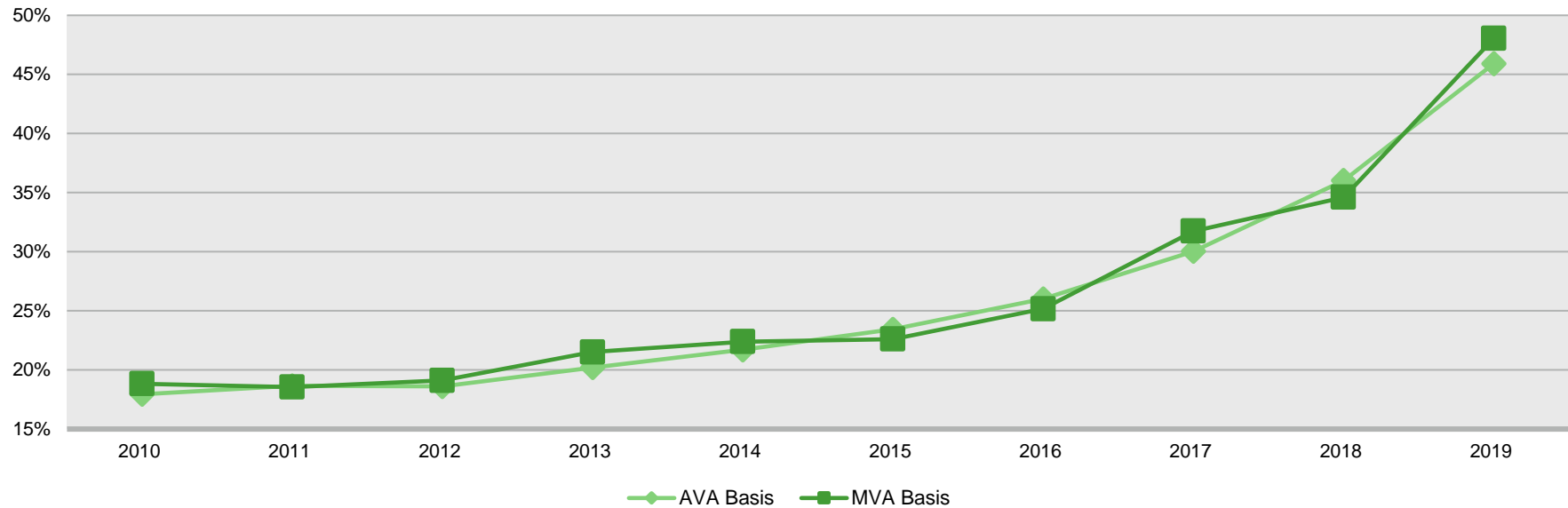
The chart below shows the funded ratio for the Health Care Trust Fund calculated using both the actuarial value of assets and the market value of assets.

HEALTH CARE TRUST FUND FUNDED RATIO, AS OF DECEMBER 31



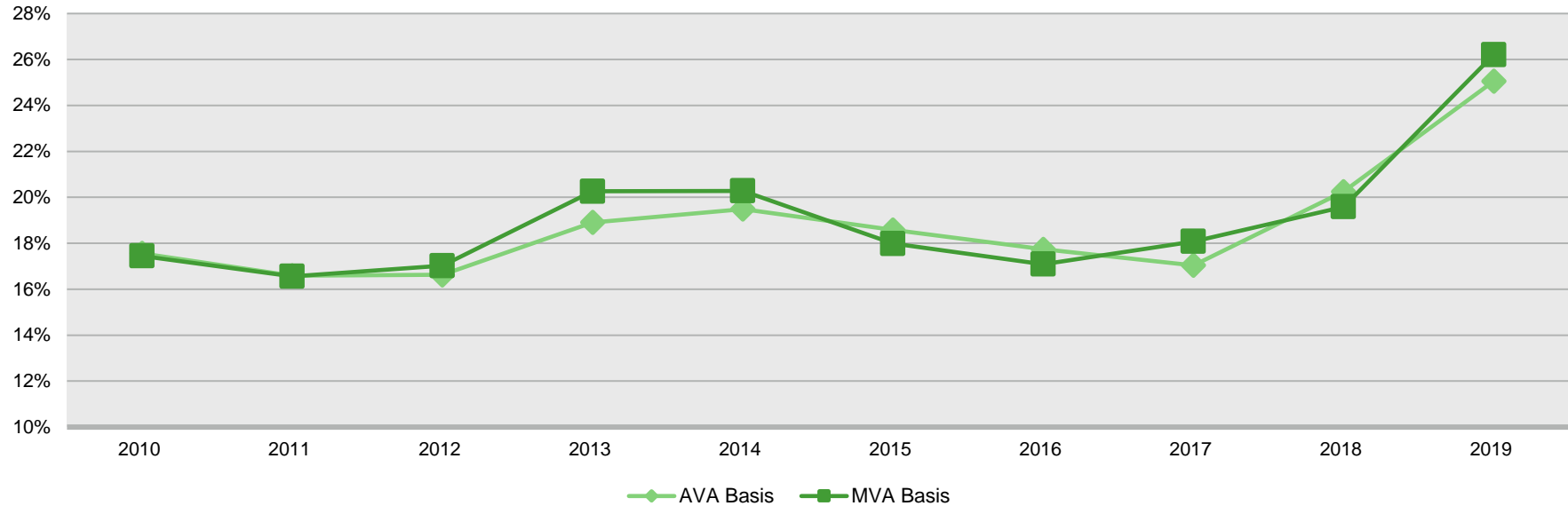
The chart below shows the funded ratio for the DPS Health Care Trust Fund calculated using both the actuarial value of assets and the market value of assets.

DPS HEALTH CARE TRUST FUND FUNDED RATIO, AS OF DECEMBER 31



The chart below shows the funded ratio for the total of the Health Care Trust Funds calculated using both the actuarial value of assets and the market value of assets.

TOTAL OF HEALTH CARE TRUST FUNDS FUNDED RATIO, AS OF DECEMBER 31



L. GFOA Solvency Test

The Actuarial Accrued Liability represents the present value of benefits earned, calculated using the Health Care Trust Funds' actuarial cost method. The Actuarial Value of Assets reflects the financial resources available to liquidate the liability. The portion of the liability covered by assets reflects the extent to which accumulated plan assets are sufficient to pay future benefits, and is shown for liabilities associated with member contributions, pensioner liabilities, and other liabilities. The Government Finance Officers Association (GFOA) recommends that the OPEB funding policy aim to achieve a funded ratio of 100 percent.

HEALTH CARE TRUST FUND SOLVENCY TEST AS OF DECEMBER 31

As of December 31	Aggregate Accrued Liabilities				Portion of Accrued Liabilities Covered by Plan Assets		
	(1) Active Member Contributions	(2) Retirees, Beneficiaries, and Inactive Members	(3) Employer- Financed Portion of Active Members	Actuarial Value of Plan Assets	(1) Liability	(2) Liability	(3) Liability
2010	N/A	\$1,179,809,147	\$463,184,331	\$288,193,296	N/A	24.4%	0.0%
2011	N/A	1,251,579,359	459,210,393	282,228,196	N/A	22.5%	0.0%
2012	N/A	1,259,557,008	463,937,680	285,096,629	N/A	22.6%	0.0%
2013	N/A	1,092,437,982	464,967,833	293,556,476	N/A	26.9%	0.0%
2014	N/A	1,085,994,673	448,466,638	297,376,975	N/A	27.4%	0.0%
2015	N/A	1,099,044,657	457,224,328	285,588,114	N/A	26.0%	0.0%
2016	N/A	1,153,014,584	403,747,654	270,149,671	N/A	23.4%	0.0%
2017	N/A	1,178,159,704	403,061,971	260,281,736	N/A	22.1%	0.0%
2018	N/A	1,084,313,326	393,800,882	288,323,044	N/A	26.6%	0.0%
2019	N/A	1,048,219,247	398,950,174	348,432,447	N/A	33.2%	0.0%

DPS HEALTH CARE TRUST FUND¹
SOLVENCY TEST AS OF DECEMBER 31

Aggregate Accrued Liabilities					Portion of Accrued Liabilities Covered by Plan Assets		
As of December 31	(1) Active Member Contributions	(2) Retirees, Beneficiaries, and Inactive Members	(3) Employer-Financed Portion of Active Members	Actuarial Value of Plan Assets	(1) Liability	(2) Liability	(3) Liability
2010	N/A	\$58,431,606	\$20,080,989	\$14,085,654	N/A	24.1%	0.0%
2011	N/A	57,092,795	20,381,795	14,447,950	N/A	25.3%	0.0%
2012	N/A	54,727,369	22,941,318	14,442,582	N/A	26.4%	0.0%
2013	N/A	52,106,219	24,530,091	15,481,663	N/A	29.7%	0.0%
2014	N/A	50,997,742	25,028,185	16,501,777	N/A	32.4%	0.0%
2015	N/A	49,891,396	25,005,421	17,557,168	N/A	35.2%	0.0%
2016	N/A	51,357,020	21,488,108	18,944,588	N/A	36.9%	0.0%
2017	N/A	50,796,277	19,496,182	21,117,173	N/A	41.6%	0.0%
2018	N/A	48,267,920	21,183,677	25,017,848	N/A	51.8%	0.0%
2019	N/A	46,397,924	21,538,586	31,189,085	N/A	67.2%	0.0%

¹The DPS HCTF was established on January 1, 2010, and received the balance of the Denver Public Schools Retiree Health Benefit Trust.

**TOTAL OF HEALTH CARE TRUST FUNDS
SOLVENCY TEST AS OF DECEMBER 31**

Aggregate Accrued Liabilities					Portion of Accrued Liabilities Covered by Plan Assets		
As of December 31	(1) Active Member Contributions	(2) Retirees, Beneficiaries, and Inactive Members	(3) Employer-Financed Portion of Active Members	Actuarial Value of Plan Assets	(1)	(2)	(3)
					Liability	Liability	Liability
2010	N/A	\$1,238,240,753	\$483,265,320	\$302,278,950	N/A	24.4%	0.0%
2011	N/A	1,308,672,154	479,592,188	296,676,146	N/A	22.7%	0.0%
2012	N/A	1,314,284,377	486,878,998	299,539,211	N/A	22.8%	0.0%
2013	N/A	1,144,544,201	489,497,924	309,038,139	N/A	27.0%	0.0%
2014	N/A	1,136,992,415	473,494,823	313,878,752	N/A	27.6%	0.0%
2015	N/A	1,148,936,053	482,229,749	303,145,282	N/A	26.4%	0.0%
2016	N/A	1,204,371,604	425,235,762	289,094,259	N/A	24.0%	0.0%
2017	N/A	1,228,955,981	422,558,153	281,398,909	N/A	22.9%	0.0%
2018	N/A	1,132,581,246	414,984,559	313,340,892	N/A	27.7%	0.0%
2019	N/A	1,094,617,171	420,488,760	379,621,532	N/A	34.7%	0.0%

M. Summary of Actuarial Valuation Results

LIABILITIES AS OF DECEMBER 31, 2019

Item	Health Care Trust Fund	DPS Health Care Trust Fund	Total
1. Present value of future benefits, active members			
a. Retirement benefits	\$460,345,345	\$27,130,927	\$487,476,272
b. Disability benefits	8,020,487	563,301	8,583,788
c. Death benefits	2,911,520	128,018	3,039,538
d. Withdrawal benefits	<u>39,804,370</u>	<u>2,666,990</u>	<u>42,471,360</u>
e. Total	\$511,081,722	\$30,489,236	\$541,570,958
2. Inactive vested members	42,217,963	1,465,127	43,683,090
3. Retirees and beneficiaries	<u>1,006,001,284</u>	<u>44,932,797</u>	<u>1,050,934,081</u>
4. Actuarial present value of projected benefits: 1e + 2 + 3	\$1,559,300,969	\$76,887,160	\$1,636,188,129
5. Actuarial present value of future normal costs, active members			
a. Retirement benefits	\$88,279,960	\$7,169,746	\$95,449,706
b. Disability benefits	2,781,734	219,060	3,000,794
c. Death benefits	821,092	57,891	878,983
d. Withdrawal benefits	<u>20,248,762</u>	<u>1,503,953</u>	<u>21,752,715</u>
e. Total	\$112,131,548	\$8,950,650	\$121,082,198
6. Actuarial accrued liability: 4 – 5e	\$1,447,169,421	\$67,936,510	\$1,515,105,931
7. Actuarial value of assets	\$348,432,447	\$31,189,085	\$379,621,532
8. Unfunded/(overfunded) actuarial accrued liability at end of year: 6 - 7	\$1,098,736,974	\$36,747,425	\$1,135,484,399

N. Actuarial Balance Sheet

An Actuarial Balance Sheet gives an overview of the Health Care Trust Funds' funding. First, the amount and timing of all future payments that will be made by the Health Care Trust Funds for current participants is determined. Then these payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value, referred to as the "liability" of the Health Care Trust Funds.

Second, this liability is compared to the assets. The "assets" for this purpose include the net amount of assets already accumulated by the Health Care Trust Funds, the present value of future employer normal cost contributions, and the present value of future employer amortization payments for the unfunded actuarial accrued liability.

ACTUARIAL BALANCE SHEET

	Health Care Trust Fund	DPS Health Care Trust Fund	Total
Liabilities:			
• Present value of benefits for retirees and beneficiaries	\$1,006,001,284	\$44,932,797	\$1,050,934,081
• Present value of benefits for inactive members	42,217,963	1,465,127	43,683,090
• Present value of benefits for active members	511,081,722	30,489,236	541,570,958
Total liabilities	\$1,559,300,969	\$76,887,160	\$1,636,188,129
Assets:			
• Total valuation value of assets	\$348,432,447	\$31,189,085	\$379,621,532
• Present value of future contributions by members	0	0	0
• Present value of future employer contributions for:			
– Entry age normal costs	\$112,131,548	\$8,950,650	\$121,082,198
– Unfunded actuarial accrued liability	1,098,736,974	36,747,425	1,135,484,399
Total of current and future assets	\$1,559,300,969	\$76,887,160	\$1,636,188,129

Section 3: Supplemental Information

Exhibit A – Membership Data

Membership data was provided on electronic files sent by PERA staff. While not verifying the correctness of the data at the source, we performed various tests to ensure the internal consistency of the data and its overall reasonableness.

HEALTH CARE TRUST FUNDS NUMBER OF MEMBERS

Item	Health Care Trust Fund	DPS Health Care Trust Fund	Total
1. Retirees and survivors (includes deferred survivors)	56,452	3,620	60,072
2. Terminated members entitled to future benefits	27,796	1,988	29,784
3. Inactive members not eligible for benefits	N/A	N/A	N/A
4. Active members	<u>197,615</u>	<u>15,679</u>	<u>213,294</u>
5. Total: 1 + 2 + 3 + 4	281,863	21,287	303,150

Exhibit B – Participation in the Health Care Plans for Retirees and Survivors Currently Receiving Retirement Benefits

**HEALTH CARE TRUST FUNDS
PARTICIPATION IN HEALTH CARE PLANS**

Item	Health Care Trust Fund	DPS Health Care Trust Fund	Total
Enrolled in PERACare:			
Under age 65	10,853	475	11,328
Age 65 and older	<u>45,599</u>	<u>3,145</u>	<u>48,744</u>
Subtotal	56,452	3,620	60,072
Not Enrolled in PERACare:			
Under age 65	14,561	588	15,149
Age 65 and older	<u>47,167</u>	<u>2,940</u>	<u>50,107</u>
Subtotal	61,728	3,528	65,256
Total:	118,180	7,148	125,328

Exhibit C – Schedule of Retirees, Beneficiaries, and Suvivors Added to and Removed from the Benefit Payroll

Trust Fund	Added to Payroll		Removed from Payroll		Payroll - End of Year		Average Annual Benefits	Increase in Average Benefits
	No.	Annual Benefit	No.	Annual Benefit	No.	Annual Benefit		
Health Care Trust Fund								
12/31/2017	3,352	\$7,255,971	2,667	\$7,153,713	56,474	\$91,669,812	\$1,623	(1.1%)
12/31/2018	3,337	\$7,068,843	3,169	\$5,498,610	56,642	\$89,984,901	\$1,589	(2.1%)
12/31/2019	3,265	\$6,495,867	3,455	\$6,074,346	56,452	\$89,033,598	\$1,577	(0.8%)
DPS Health Care Trust Fund								
12/31/2017	149	\$325,128	218	\$445,188	3,816	\$5,583,894	\$1,463	(0.3%)
12/31/2018	160	\$346,794	351	\$550,827	3,625	\$5,905,296	\$1,629	11.3%
12/31/2019	276	\$468,441	281	\$492,591	3,620	\$5,805,591	\$1,604	(1.5%)
Total of Health Care Trust Funds								
12/31/2017	3,501	\$7,581,099	2,885	\$7,598,901	60,290	\$97,253,706	\$1,613	(1.0%)
12/31/2018	3,497	\$7,415,637	3,520	\$6,049,437	60,267	\$95,890,197	\$1,591	(1.4%)
12/31/2019	3,541	\$6,964,308	3,736	\$6,566,937	60,072	\$94,839,189	\$1,579	(0.8%)

Exhibit D – Summary Statement of Income and Expenses on a Market Value Basis

Year Ended December 31, 2019	Health Care Trust Fund	DPS Health Care Trust Fund	Total
Net assets at market value at beginning of year	\$279,191,931	\$24,028,778	\$303,220,709
Employer contributions	\$92,011,162	\$7,648,553	\$99,659,715
Nonemployer contributions	0	0	0
Other Additions (including purchased service)	6,983,965	188,213	7,172,178
Employer disaffiliation	<u>0</u>	<u>0</u>	<u>0</u>
Total contributions	\$98,995,127	\$7,836,766	\$106,831,893
Net appreciation (depreciation)	\$47,979,061	\$4,354,451	\$52,333,512
Interest	1,923,312	175,872	2,099,184
Dividends	3,274,795	299,454	3,574,249
Other income	1,680,973	153,714	1,834,687
Less investment expense	<u>(990,819)</u>	<u>(90,603)</u>	<u>(1,081,422)</u>
Net income from investing activities	\$53,867,322	\$4,892,888	\$58,760,210
Total additions	\$152,862,449	\$12,729,654	\$165,592,103
Health care participants benefits	\$58,221,116	\$3,644,261	\$61,865,377
Total benefits	\$58,221,116	\$3,644,261	\$61,865,377
Administrative expenses	9,289,910	476,995	9,766,905
Other deductions	<u>33,378</u>	<u>1,124</u>	<u>34,502</u>
Total deductions	\$67,544,404	\$4,122,380	\$71,666,784
Net increase in assets	\$85,318,045	\$8,607,274	\$93,925,319
Net assets at end of year	\$364,509,976	\$32,636,052	\$397,146,028

Section 4: Actuarial Valuation Basis

Exhibit I – Actuarial Assumptions and Actuarial Cost Method

Rationale for Assumptions	The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation resulted from the 2016 Actuarial Experience Study covering plan experience over the four-year period January 1, 2012 through December 31, 2015 and Board discussion at the November 18, 2016 Board meeting. As a result of the 2019 Asset Liability Study, concluded at the November 15, 2019 Board meeting, the Board reaffirmed the 7.25% assumed long-term rate of investment return effective as of January 1, 2020. Based on professional judgment, no assumption changes are warranted at this time.
Long-Term Rate of Return	7.25%, net of investment expenses
Price Inflation Assumption	2.40%
Wage Inflation Assumption	3.50%
Real Wage Inflation	1.10%
Actuarial Cost Method	Entry Age Actuarial Cost Method. Entry Age is the age at date of employment or, if date is unknown, current age minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary, with Normal Cost determined using the plan of benefits applicable to each member.
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 exclude from, plan assets. The expected rate of return for this purpose is equal to the investment rate of return assumption at the beginning of the period. The resulting actuarial value of assets is not constrained to fall within a corridor around the market value of assets.

Spouse Coverage	<p>For current retirees under the PERA benefit structure with a Joint and Survivor pension based on data provided for each record, we have assumed that the surviving eligible beneficiary would continue to receive the explicit subsidy upon the retiree’s death. For future retirees under the PERA benefit Structure, we have assumed that 70% of retirees with an explicit subsidy will have a surviving spouse who continues the benefit.</p> <p>For current retirees, we have valued an implicit subsidy spouse liability based on data provided for each record. For future retirees with an implicit subsidy liability, we have assumed that 20% of employees of the State, School, Local Government, and Judicial Divisions and 15% of DPS Division employees (under the PERA benefit structure) have enrolled a spouse who also will have an implicit subsidy liability.</p>												
Percent Married	100% of active members (80% for members of the DPS Division Trust Fund) are assumed to be married, with the wife 2 years younger than the husband.												
Withdrawal Assumption	<p>For all but the Judicial Division, it is 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. For the Judicial Division, it is assumed that 100% of the vested members who terminate elect to leave their contribution 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, Non-Trooper/Trooper, and/or service as shown in the following table:</p> <table border="1" data-bbox="632 987 1942 1339"> <thead> <tr> <th data-bbox="632 987 835 1101">Assumed Age of Initial Benefit Receipt</th> <th data-bbox="835 987 1942 1101">Benefit Structure, Non-Trooper/Trooper, and/or Service</th> </tr> </thead> <tbody> <tr> <td data-bbox="632 1101 835 1149">50</td> <td data-bbox="835 1101 1942 1149">PERA Benefit Structure Members (excluding Troopers) with 25 or More Years of Service</td> </tr> <tr> <td data-bbox="632 1149 835 1198">50</td> <td data-bbox="835 1149 1942 1198">Troopers with 20 or More Years of Service</td> </tr> <tr> <td data-bbox="632 1198 835 1247">55</td> <td data-bbox="835 1198 1942 1247">PERA Benefit Structure Members (excluding Troopers) with 20–25 Years of Service</td> </tr> <tr> <td data-bbox="632 1247 835 1295">60</td> <td data-bbox="835 1247 1942 1295">PERA Benefit Structure Members with Less than 20 Years of Service</td> </tr> <tr> <td data-bbox="632 1295 835 1339">65</td> <td data-bbox="835 1295 1942 1339">DPS Benefit Structure Members</td> </tr> </tbody> </table>	Assumed Age of Initial Benefit Receipt	Benefit Structure, Non-Trooper/Trooper, 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
Assumed Age of Initial Benefit Receipt	Benefit Structure, Non-Trooper/Trooper, 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 is 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.
Death Before Retirement	Healthy mortality assumptions for active members are based on the RP-2014 White Collar Employee Mortality Table, a table specifically developed for actively working people. To allow for an appropriate margin of improved mortality prospectively, the mortality rates incorporate a 70 percent factor applied to male rates and a 55 percent factor applied to female rates.
Death After Retirement	<p>For State and Local Government Division Trust Funds, 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% factor applied to the rates for ages below 80 and a 108% factor applied to the rates for ages 80 and above, projected to 2018 using the MP-2015 projection scale, for males, and a 78% factor applied to the rates for ages below 80 and a 109% factor applied to the rates for ages 80 and above, projected to 2020 using the MP-2015 projection scale, for females.</p> <p>For the School, Judicial, and DPS Division Trust Funds, 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% factor applied to the rates for ages below 80 and a 113% factor applied to the rates for ages 80 and above, projected to 2018 using the MP-2015 projection scale, for males, and a 68% factor applied to the rates for ages below 80 and a 106% factor applied to the rates for ages 80 and above, projected to 2020 using the MP-2015 projection scale, for females.</p> <p>For all disabled retirees, the RP-2014 Disabled Retiree Mortality Table, incorporating a 90% factor to both male rates and female rates is used for the period after disability retirement.</p>

Salary Increases

Representative values of the assumed annual rates of future salary increases are shown in the following tables:

State Division Trust Fund (Non-Troopers)			
Age	Merit & Seniority	Inflation & Productivity	Total Increase
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

Salary Increases
(continued)

State Division Trust Fund (Troopers)			
Age	Merit & Seniority	Inflation & Productivity	Total Increase
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
School Division and DPS Division Trust Funds (PERA Benefit Structure)			
Age	Merit & Seniority	Inflation & Productivity	Total Increase
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

Salary Increases
(continued)

Local Government Division Trust Fund			
Age	Merit & Seniority	Inflation & Productivity	Total Increase
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
Judicial Division Trust Fund			
Age	Merit & Seniority	Inflation & Productivity	Total Increase
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

Salary Increases
(continued)

All Division Trust Funds (DPS Benefit Structure)			
Age	Merit & Seniority	Inflation & Productivity	Total Increase
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:

State Division Trust Fund (Non-Troopers)						
Age	Ultimate Termination		Death		Disability	
	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	4.55	5.25	0.7195	0.2988	0.30	0.30

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

State Division Trust Fund (Non-Troopers)		
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

Separations From Active Service
(continued)

State Division Trust Fund (Troopers)						
Age	Termination ⁽¹⁾		Death		Disability	
	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 State Troopers.

School Division and DPS Division Trust Funds (PERA Benefit Structure)						
Age	Ultimate Termination		Death		Disability	
	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

Separations From Active Service
(continued)

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

School Division and DPS Division Trust Funds (PERA Benefit Structure)		
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

Local Government Division Trust Fund						
Age	Ultimate Termination		Death		Disability	
	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

Separations From Active Service
(continued)

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

Local Government Division Trust Fund		
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

Judicial Division Trust Fund						
Age	Termination ⁽¹⁾		Death		Disability	
	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 members in the Judicial Division Trust Fund.

Separations From Active Service
(continued)

Age	All Divisions (DPS Benefit Structure)					
	Termination ⁽¹⁾		Death		Disability	
	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 members in the DPS Benefit Structure.

Retirement

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

State Division Trust Fund (Non-Troopers)				
Age	Eligible for Reduced Benefits		Eligible for Unreduced Benefits	
	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

Section 4: Actuarial Valuation Basis as of December 31, 2019 for the Public Employees' Retirement Association of Colorado

Retirement *(continued)*

Age	State Division Trust Fund (Troopers)			
	Eligible for Reduced Benefits		Eligible for Unreduced Benefits	
	Males	Females	Males	Females
45			40.0%	40.0%
46			40.0	40.0
47			40.0	40.0
48			40.0	40.0
49			40.0	40.0
50	10.0%	10.0%	40.0	40.0
51	10.0	10.0	32.0	32.0
52	10.0	10.0	32.0	32.0
53	10.0	10.0	32.0	32.0
54	10.0	10.0	32.0	32.0
55	5.0	5.0	32.0	32.0
56	5.0	5.0	32.0	32.0
57	5.0	5.0	32.0	32.0
58	5.0	5.0	32.0	32.0
59	5.0	5.0	32.0	32.0
60	10.0	10.0	32.0	32.0
61	10.0	10.0	32.0	32.0
62	10.0	10.0	32.0	32.0
63	10.0	10.0	32.0	32.0
64	10.0	10.0	32.0	32.0
65 & over	0.0	0.0	100.0	100.0

Retirement (continued)

School Division and DPS Division Trust Funds (PERA Benefit Structure)				
Age	Eligible for Reduced Benefits		Eligible for Unreduced Benefits	
	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

Section 4: Actuarial Valuation Basis as of December 31, 2019 for the Public Employees' Retirement Association of Colorado

Retirement (continued)

Age	Local Government Division Trust Fund			
	Eligible for Reduced Benefits		Eligible for Unreduced Benefits	
	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

Section 4: Actuarial Valuation Basis as of December 31, 2019 for the Public Employees' Retirement Association of Colorado

Retirement (continued)

Age	Judicial Division Trust Fund			
	Eligible for Reduced Benefits		Eligible for Unreduced Benefits	
	Males	Females	Males	Females
50	6.0%	6.0%	6.0%	6.0%
51	6.0	6.0	6.0	6.0
52	6.0	6.0	6.0	6.0
53	6.0	6.0	6.0	6.0
54	6.0	6.0	6.0	6.0
55	6.0	6.0	6.0	6.0
56	6.0	6.0	6.0	6.0
57	6.0	6.0	6.0	6.0
58	6.0	6.0	6.0	6.0
59	6.0	6.0	6.0	6.0
60	8.0	8.0	8.0	8.0
61	8.0	8.0	8.0	8.0
62	8.0	8.0	8.0	8.0
63	8.0	8.0	8.0	8.0
64	8.0	8.0	8.0	8.0
65	0.0	0.0	15.0	15.0
66	0.0	0.0	15.0	15.0
67	0.0	0.0	15.0	15.0
68	0.0	0.0	15.0	15.0
69	0.0	0.0	15.0	15.0
70	0.0	0.0	40.0	40.0
71	0.0	0.0	40.0	40.0
72	0.0	0.0	40.0	40.0
73	0.0	0.0	40.0	40.0
74	0.0	0.0	40.0	40.0
75 & over	0.0	0.0	100.0	100.0

Section 4: Actuarial Valuation Basis as of December 31, 2019 for the Public Employees' Retirement Association of Colorado

Retirement (continued)

Age	All Divisions (DPS Benefit Structure)			
	Eligible for Reduced Benefits		Eligible for Unreduced Benefits	
	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

**Health Care Participation Rates
(PERA Benefit Structure)**

Current PERACare participants of the State, School, Local Government, and Judicial Divisions with a PERA benefit structure are assumed to maintain their current health care benefit elections in perpetuity. For active members retiring directly from the State, School, Local Government, and Judicial Divisions with a PERA benefit structure, the following participation rates are assumed:

Attained Age(s) at Retirement	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%

For eligible inactive members of the State, School, Local Government, or Judicial Divisions with a PERA benefit structure, 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, Local Government, or Judicial Divisions with a PERA benefit structure, 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
0-24	17%
25-29	11%
30+	4%

Of those PERACare enrollees assumed to 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.

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

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 if and when the additional cost, averaged across all plans, for all PERACare enrollees, exceeds the Medicare Part A premium.

The 2019 valuation assumes this will not occur. Projected implicit subsidies are low enough such that even with trend they are not expected to exceed projected Part A premiums for this valuation.

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 with a PERA benefit structure who are not eligible for premium-free Medicare Part A, are assumed as follows:

Medicare Plan	Percent Electing Medicare Plan	
	Other Divisions	DPS Division
Medicare Advantage / Self-Funded Rx	60%	40%
Kaiser Permanente Medicare Advantage HMO	40%	60%

PERA Benefit Structure Health Care Plan Election Rates
(continued)

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

Medicare Plan	Percent Electing Medicare Plan	
	Pre-Medicare Anthem Plans	Pre-Medicare Kaiser Plans
Medicare Advantage / Self-Funded Rx	88%	2%
Kaiser Permanente Medicare Advantage HMO	12%	98%

For those PERACare enrollees of the State, School, Local Government, and Judicial Divisions with a PERA benefit structure, who are assumed to be ineligible for premium-free Medicare Part A and participate in the Medicare Advantage / self-funded Rx plans, 80% are assumed to elect MA#1 and 20% are assumed to elect MA#2.

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 2020. 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
Medicare Advantage / Self-Funded Rx	\$588	\$227
Kaiser Permanente Medicare Advantage HMO	\$621	\$232

The 2020 Medicare Part A premium is \$458 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
Medicare Advantage / Self-Funded Rx	\$550
Kaiser Permanente Medicare Advantage HMO	\$586

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 (Male)	Annual Increase (Female)
65 – 69	3.0%	1.5%
70	2.9	1.6
71	1.6	1.4
72	1.4	1.5
73	1.5	1.6
74	1.5	1.5
75	1.5	1.4
76	1.5	1.5
77	1.5	1.5
78	1.5	1.6
79	1.5	1.5
80	1.4	1.5
81 and Older	0.0	0.0

The Medicare Part A premium is not age adjusted, as Medicare is a pooled health plan in which premiums are neither age nor geography adjusted.

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
2020	8.10%	3.50%
2021	6.40	3.75
2022	6.00	3.75
2023	5.70	3.75
2024	5.50	4.00
2025	5.30	4.00
2026	5.10	4.00
2027	4.90	4.25
2028	4.70	4.25
2029+	4.50	4.50

The service-based premium subsidy is assumed to remain constant at its current level as of December 31, 2019.

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 are projected assuming annual interest crediting of 3.00%, future salary increases of 3.50%, and member contributions of 8.75% of projected salary (increasing to 10.00% effective July 1, 2020, and 10.50% effective July 1, 2021, for all Divisions other than the Local Government Division for which member contributions are projected at 8.00% of projected salary, increasing to 8.50% effective July 1, 2020).

**Health Care Participation Rates -
Applicable to the DPS Benefit
Structure**

Current PERACare enrollees of the State, School, Local Government, and Judicial Divisions with a DPS benefit structure are assumed to maintain their current health care benefit elections in perpetuity. For active members retiring directly from the State, School, Local Government, and Judicial Divisions with a DPS benefit structure, the following participation rates are assumed:

Attained Age(s) at Retirement	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%

For deferred vested members of the State, School, Local Government, and Judicial Divisions with a DPS benefit structure, 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 State, School, Local Government, and Judicial Divisions with a DPS benefit structure, 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
0-24	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	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.

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 are projected assuming annual interest crediting of 3.00%, future salary increases of 3.50%, and member contributions of 8.75% of projected salary (increasing to 10.00% effective July 1, 2020, and 10.50% effective July 1, 2021, for all Divisions other than the Local Government Division for which member contributions are projected at 8.00% of projected salary, increasing to 8.50% effective July 1, 2020).

Exhibit II – Summary of Plan Provisions

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions. Eligibility to participate in PERACare and receive health care subsidy benefits is contingent on eligibility to retire under PERA. The retirement eligibility provisions are summarized in Segal’s final December 31, 2019 pension actuarial valuation report.

Effective Date:	<p>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.</p> <p>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.</p>
DEFINITIONS	
Affiliated Employers:	State agencies and institutions of higher education, political subdivisions of the state, all school districts, courts, and any other public entities which affiliate with PERA.
Covered Members:	Employees of Affiliated Employers who work in a position subject to membership and for whom contributions are made.
Employer Contributions:	<p>The employer contribution rates of the State, School, Local Government, and Judicial Divisions include the contribution of 1.02% of PERA covered payroll allocated to the Health Care Trust Fund.</p> <p>The employer contribution rate of the DPS Division includes the contribution of 1.02% of PERA covered payroll allocated to the DPS Health Care Trust Fund.</p>
OTHER PROVISIONS SPECIFIC TO THE HEALTH CARE FUNDS	
Eligibility for Health Care Coverage:	<p>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.</p> <p>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.</p> <p>The following individuals are eligible to enroll in PERACare:</p> <ul style="list-style-type: none"> • 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

	<p>recognized under Colorado law), domestic partners, unmarried dependent children under age 25, certain mentally or physically incapacitated adult children, and dependent parents.</p> <ul style="list-style-type: none"> • Guardians of children receiving PERA survivor benefits, if children are enrolled in PERACare. • 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 enrolled in PERACare when the divorce occurred. • Members while receiving short-term disability program payments. • Members whose employers have elected to provide coverage through PERACare and dependents of such members.
Enrollment:	<p>Enrollment in PERACare 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.</p>
Premium Subsidy:	<p>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:</p> <p>DPS Benefit Structure Retirees Who Retired Prior to July 1, 1994:</p> <ul style="list-style-type: none"> • \$230 per month for retirees without Medicare Part A • \$115 per month for retirees with Medicare Part A <p>DPS Benefit Structure Retirees Who Retire On or After July 1, 1994:</p> <ul style="list-style-type: none"> • \$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. <p>The monthly amounts above are allocated per year of credited service up to a maximum of 20 years of service.</p> <p>PERA Benefit Structure Benefit Recipients:</p> <ul style="list-style-type: none"> • \$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. <p>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.</p> <p>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</p>

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 Medicare Advantage / self-funded Rx 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.

Exhibit III – Colorado PERA Defined Benefit OPEB Plan Funding Policy

I. 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 their view 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

- o 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.
- o 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

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