Contra Costa Water District Retirement Plan

June 30, 2022 Actuarial Funding Valuation
for Calendar Year 2023 Contributions

December 23, 2022

VanIwaarden

CONTRA COSTA WATER DISTRICT RETIREMENT PLAN

June 30, 2022 Actuarial Funding Valuation for 2023 Contributions

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Introduction and Actuarial Certification

Purposes of the valuation

This report presents the results of the June 30, 2022 actuarial funding valuation for the Contra Costa Water District Retirement Plan (the Plan). Its primary purposes are:

- to determine the Actuarially Determined Contributions for the 2023 calendar year, and
- to evaluate the funded status of the plan.

This report has been prepared solely for the Contra Costa Water District to summarize the Plan's actuarial funding considerations. Computations for other purposes, such as plan accounting or evaluating plan changes, may differ significantly from the results shown in this report.

This report may not be used for any other purpose, and Van Iwaarden Associates is not responsible for the consequences of any unauthorized use. Its content may not be modified, incorporated into or used in other material, or otherwise provided, in whole or in part, to any other person or entity, without our permission.

The Important Notices section of this report discusses several considerations for this actuarial valuation and its results. We highly recommend that anyone relying on this valuation's content read the Important Notices so they understand the limitations of actuarial results.

The language of this report includes a number of technical terms which have special meanings. The glossary at the end of the report is provided to enhance understanding of these terms; many of them are defined there.

Changes from the prior year

Changes to the plan provisions and actuarial assumptions reflected in this valuation are described at the end of each of those sections in this report. The plan and assumption changes are consistent with the MOUs and Side Letter Agreements that were recently finalized. Among these changes are automatic COLA benefits and contribution rate increases for future retirees and a long-term COLA assumption for all participants.

Summary of valuation results

Since the prior valuation, the plan's funded status decreased from 98.5% to 70.8% on a market asset value basis and from 87.0% to 77.0% on the "smoothed" actuarial asset basis. This change on a market value basis was primarily due to investment returns much lower than expected and plan provisions and assumptions related to COLA.

The total Actuarially Determined Employer Contribution (ADEC) increased from 27.10% of payroll to 43.44%. The PEPRA employee contribution rate increased to 7.00%, based on the phase-in method outlined in the recent Side Letter Agreements. Additional contribution details can be found on pages 11 to 13.

Please note that, unless otherwise noted, all liability and normal cost results in this report were calculated with the following assumptions:

- 2022 results reflect no future COLAs.
- 2023 results reflect COLA provisions and long-term COLA assumptions, as outlined in the plan provisions and actuarial assumptions sections of this report.
- Normal costs are based on the "blended" bargained and PEPRA employee contribution rates; and
- Liabilities are based on a 6.25% discount rate.

Introduction and Actuarial Certification (continued)

Actuarial certification

To the best of our knowledge, this report is complete and accurate and all Plan liabilities were determined in accordance with generally accepted actuarial principles and practices. Upon receipt of the report, the District should notify us if you disagree with any information contained in the report or if you are aware of any information that would affect the results that has not been communicated to us. The report will be deemed final and acceptable to the District unless the District promptly notifies us otherwise.

The District is responsible for selecting the funding policy, actuarial assumptions, and methods used to calculate the Actuarially Determined Contribution and other results in this report. We reviewed the assumptions and believe that they are reasonable estimates of future plan experience, both individually and in the aggregate.

All results in this report have been prepared based on our understanding of the District's pension funding policy and the Plan's benefit provisions. Additional contributions to the Plan may be required if actual plan economic and demographic experience do not match actuarial assumptions, or if contributions to the Plan are less than expected.

The undersigned credentialed actuaries are members of the American Academy of Actuaries and meet the Academy's Qualification Standards to render the actuarial opinion contained herein. We are available to answer questions on the material contained in the report or to provide explanations or further detail, as may be appropriate. We are not aware of any direct or material indirect financial interest or relationship that could create a conflict of interest or impair the objectivity of the work.

Respectfully submitted,

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December 23, 2022

Summary of Results

		June 30, 2022		June 30, 2021
A. Plan participant data				
1. Number of participants				
a. Active employees		292		297
b. Vested terminated and reciprocals		100		98
c. Retirees and beneficiaries		414		401
d. Total		806		796
2. Projected payroll for contribution year[1]	$	36,790,015	$	35,545,845
B. Benefit liabilities[2]				
1. Present value of projected benefits	$	388,711,248	$	325,351,102
2. Actuarial accrued liability (AAL)		317,588,896		267,869,604
3. Total normal cost (calendar year)		8,867,496		7,117,789
C. Value of plan assets				
1. Market value of assets (MVA)		224,904,411		263,920,593
2. Actuarial value of assets (AVA)		244,502,444		233,056,796
3. Investment return, market value basis		-14.2%		27.4%
D. Funded status				
1. Unfunded AAL, on AVA basis (B.2. - C.2.)	$	73,086,452	$	34,812,808
2. Funded status (C.2. / B.2.)		77.0%		87.0%
3. Funded status, MVA basis (C.1. / B.2.)		70.8%		98.5%

	Calendar Year	
E. Contribution rates as a percent of payroll	2023	2022
1. Normal cost		
a. Employer	15.51%	11.84%
b. Employee	8.59%	8.18%
2. Amortization of unfunded AAL (employer paid)	27.93%	15.26%
3. Employer contribution rates	43.44%	27.10%
F. Actuarially Determined Contribution (ADC)		
1. Actuarially Determined Employer Contribution (ADEC)	15,979,583	9,634,025
2. Estimated employee contributions	3,161,733	2,906,606
3. Total ADC (1. + 2.)	19,141,316	12,540,631

1 Projected pay for the calendar year following the valuation date. Payroll differs from OPEB due to application of the PEPRA pay limits ($134,974 in 2022 and $128,059 in 2021 for Social Security members) in this pension valuation.

2 The 6/30/2022 results (and 2023 contributions) reflect the District's new COLA provisions and long-term COLA assumptions. Prior to this date, the District assumed no long-term COLAs because they were not automatic.

Funded Status and Contribution Rate History

(amounts in $000s)[1]

Actuarial Valuation Date (6/30)	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Unfunded AAL (UAAL)	Funded Ratio	Covered Payroll[2]	UAAL as a Percentage of Covered Payroll	Pre-COLA District Contribution Rate	District Contribution Rate w/ COLA[4]	Discount Rate
1997	$34,217	$38,281	$4,064	89.4%	$15,822	25.7%	N/A	N/A	8.00%
1998	40,184	42,511	2,327	94.5%	17,190	13.5%	N/A	N/A	8.00%
1999	46,725	46,197	(528)	101.1%	17,462	-3.0%	N/A	N/A	8.00%
2000	53,495	50,773	(2,722)	105.4%	18,348	-14.8%	N/A	N/A	8.00%
2001	59,537	56,002	(3,535)	106.3%	19,438	-18.2%	N/A	N/A	8.00%
2002	62,724	62,183	(541)	100.9%	20,777	-2.6%	N/A	N/A	8.00%
2003	72,447	71,628	(819)	101.1%	21,308	-3.8%	N/A	N/A	8.00%
2004	75,560	77,667	2,107	97.3%	21,651	9.7%	N/A	N/A	8.00%
2005	78,950	83,194	4,244	94.9%	22,160	19.2%	7.02%	N/A	8.00%
2006	83,533	88,926	5,393	93.9%	23,034	23.4%	7.56%	N/A	8.00%
2007	93,937	95,166	1,229	98.7%	22,991	5.3%	6.24%	N/A	8.00%
2008	101,765	103,699	1,934	98.1%	24,578	7.9%	7.27%	N/A	8.00%
2009	102,581	105,933	3,352	96.8%	26,049	12.9%	8.52%	N/A	8.00%
2010	102,277	113,841	11,564	89.8%	26,769	43.2%	19.68%	N/A	8.00%
2011	105,068	122,542	17,474	85.7%	27,893	62.6%	21.84%	N/A	8.00%
2012	104,867	138,161	33,294	75.9%	27,604	120.6%	19.11%	N/A	8.00%
2013	126,095	152,849	26,754	82.5%	27,375	97.7%	21.23%	21.54%	7.75%
2014	140,843	164,326	23,483	85.7%	27,179	86.4%	19.67%	20.41%	7.50%
2015	154,251	176,013	21,762	87.6%	27,700	78.6%	19.48%	20.15%	7.50%
2016[3]	164,392	191,580	27,188	85.8%	28,847	94.2%	22.49%	22.18%	7.25%
2017	176,126	203,470	27,343	86.6%	29,850	91.6%	21.61%	22.41%	7.00%
2018	187,542	214,362	26,820	87.5%	31,297	85.7%	20.92%	22.11%	7.00%
2019	200,479	235,334	34,855	85.2%	32,771	106.4%	23.86%	24.57%	6.75%
2020	212,512	250,486	37,974	84.8%	33,863	112.1%	26.03%	26.03%	6.50%
2021	233,057	267,870	34,813	87.0%	34,982	99.5%	27.10%	27.10%	6.25%
2022	244,502	317,589	73,086	77.0%	36,206	201.9%	N/A	43.44%	6.25%

1 Amounts may not add due to rounding

2 Projected compensation for year beginning on valuation date, with PEPRA compensation limited to statutory amount

3 Includes a minor adjustment for 2017 to account for difference between 2017 funding report and COLA letter dated 12/1/2016.

4 Contribution rates prior to 2022 reflect cost of one-year ad hoc COLAs. Contribution rate for 2022 reflects cost of ongoing COLAs.

Reconciliation of Market Value of Assets

	Trust Year Ending June 30, 2022	Trust Year Ending June 30, 2021
A. Market value of assets at beginning of year[1]	$ 263,920,593	$ 209,306,542
B. Contributions		
1. Employer[2]	10,051,898	8,928,642
2. Employee[3]	2,841,291	2,711,849
3. Total	12,893,189	11,640,491
C. Investment earnings		
1. Gross investment earnings	(36,512,611)	57,339,231
2. Investment expenses (reimbursed by the District)	(632,719)	(508,747)
3. Net investment earnings	(37,145,330)	56,830,484
D. Benefit payments	(14,765,574)	(13,858,090)
E. Other adjustments[4]	1,533	1,166
F. Market value of assets at end of year (A. + B. + C.3. + D. + E.)	**224,904,411**	**263,920,593**
G. Investment return since prior valuation[5]	-14.2%	27.4%

[1] Market value of assets at beginning and end of year are adjusted for contributions made during first month of fiscal year but attributable to the prior fiscal year's final pay period ($459,262 at beginning of year and $496,076 at end of year).

[2] Includes employer reimbursement to trust for quarterly investment management fees ($508,747 in FY2021 and $632,719 in FY2022).

[3] Includes amounts paid by District and credited to member accounts ($437,982 in FY2021 and $433,715 in FY2022).

[4] Other adjustments for FY2021 and FY2022 include class action settlement receipts.

[5] These returns differ from the Fiduciary Net Position (FNP) returns shown in the GASB 67/68 reports due to the adjustments noted in footnote #1 above.

Asset Allocation - Market Value of Assets

The June 30, 2022 trust asset allocation is provided by Principal. Details are shown below.

	Market Value	Percentage
Cash & Cash Equivalents	$ 2,368,013	1.1%
Investments		
Domestic equity[1]	99,740,437	44.4%
International equity	33,378,837	14.8%
Domestic fixed income	66,328,991	29.5%
International fixed income	11,112,579	4.9%
Real Estate	11,479,478	5.1%
Total investments	222,040,322	98.7%
Total Cash & Investments	224,408,335	99.8%
Receivables		
Accrued Income	-	0.0%
Contribution due from District[2]	401,302	0.2%
Contribution due from participants	94,774	0.0%
Total receivables	496,076	0.2%
Total Assets	224,904,411	100.0%

Target Asset Allocation

Contra Costa Water District last revised the asset allocation in May 2021, as shown below.

Asset Class	Target Allocation
Cash	0.00%
Core Fixed Income	28.75%
International Developed Fixed Income	2.50%
International Emerging Fixed Income	2.50%
High Yield Fixed Income	1.25%
US Large Cap Equity	31.50%
US Mid Cap Equity	5.40%
US Small Cap Equity	8.10%
International Developed Equity	12.00%
International Emerging Equity	3.00%
US REITs	5.00%
Total	100.00%

[1] Domestic equity was adjusted to remove $65,537 in pending trades

[2] Includes employer-paid employee contributions

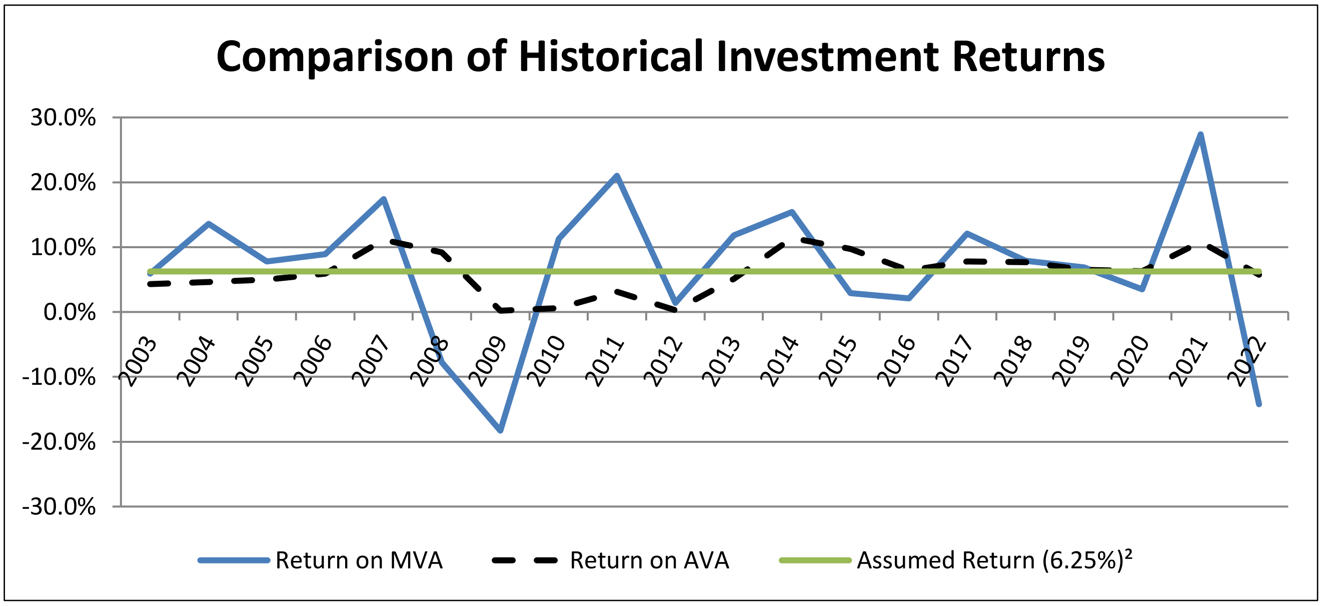
Actuarial Value of Assets

	Trust Year Ending	
	June 30, 2022	June 30, 2021
A. Market value of assets (MVA)		
1. Market value of assets at beginning of year	$ 263,920,593	$ 209,306,542
i. Contributions (employee + employer)	12,893,189	11,640,491
ii. Expected earnings	16,436,525	13,532,853
iii. Benefit payments	(14,765,574)	(13,858,090)
2. Expected market value at end of year	278,484,733	220,621,796
3. Actual market value at end of year	224,904,411	263,920,593
4. Difference between actual MVA & expected MVA	53,580,322	(43,298,797)
B. Investment (gains) and losses[1]		
1. Year ending June 30, 2022, June 30, 2021		
i. Variance from expected return: loss or (gain)	53,580,322	(43,298,797)
ii. Portion not yet recognized	80%	80%
iii. Investment return not yet recognized (i. x ii.)	42,864,258	(34,639,038)
2. Year ending June 30, 2021, June 30, 2020		
i. Variance from expected return: loss or (gain)	(43,298,797)	6,675,488
ii. Portion not yet recognized	60%	60%
iii. Investment return not yet recognized (i. x ii.)	(25,979,278)	4,005,293
3. Year ending June 30, 2020, June 30, 2019		
i. Variance from expected return: loss or (gain)	6,675,488	214,290
ii. Portion not yet recognized	40%	40%
iii. Investment return not yet recognized (i. x ii.)	2,670,195	85,716
4. Year ending June 30, 2019, June 30, 2018		
i. Variance from expected return: loss or (gain)	214,290	(1,578,838)
ii. Portion not yet recognized	20%	20%
iii. Investment return not yet recognized (i. x ii.)	42,858	(315,768)
5. Total return not yet recognized (1.iii. + 2.iii. + 3.iii. + 4.iii.)	19,598,033	(30,863,797)
C. Actuarial Value of Assets (A.3. + B.5.)	244,502,444	233,056,796

[1] The Actuarial Value of Assets is equal to the Market Value of Assets with a five year smoothing of gains and losses. This method is intended to reduce contribution rate volatility resulting from investment return fluctuations.

Historical Investment Return Information

Year Ended	CPI-W Increase[1]	Rate of Return on Market Value	Rate of Return on Actuarial Value
June 30, 2003	1.6%	5.9%	4.3%
June 30, 2004	1.7%	13.6%	4.6%
June 30, 2005	1.1%	7.8%	5.0%
June 30, 2006	3.9%	8.9%	5.9%
June 30, 2007	3.0%	17.4%	11.1%
June 30, 2008	4.7%	-7.8%	9.2%
June 30, 2009	-0.2%	-18.3%	0.2%
June 30, 2010	1.4%	11.3%	0.6%
June 30, 2011	2.9%	21.0%	3.1%
June 30, 2012	2.7%	1.4%	0.3%
June 30, 2013	2.6%	11.8%	5.1%
June 30, 2014	2.9%	15.4%	11.4%
June 30, 2015	1.9%	2.9%	9.7%
June 30, 2016	2.5%	2.1%	6.4%
June 30, 2017	3.3%	12.1%	7.8%
June 30, 2018	4.0%	7.9%	7.7%
June 30, 2019	3.0%	6.9%	6.5%
June 30, 2020	1.3%	3.5%	6.3%
June 30, 2021	4.3%	27.4%	10.8%
June 30, 2022	7.6%	-14.2%	5.7%
20-year compound average	2.8%	5.7%	6.0%



[1] Increase of Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W), San Francisco-Oakland-Hayward, for 12 month period ending June 30.

[2] The investment return assumption changed from 6.50% to 6.25% effective 6/30/2021.

Summary of Liabilities Used to Determine Contributions

	June 30, 2022	June 30, 2021
A. Actuarial present value of projected benefits[1]		
1. Active employees	$ 186,895,748	$ 151,689,912
2. Vested terminated employees and reciprocals	14,141,242	10,846,040
3. Service retirees	176,417,970	153,499,727
4. Disabled participants	446,895	412,760
5. Beneficiaries	10,809,393	8,902,663
6. Total	388,711,248	325,351,102
B. Actuarial accrued liability[2]		
1. Active employees	115,773,396	94,208,414
2. Vested terminated employees and reciprocals	14,141,242	10,846,040
3. Service retirees	176,417,970	153,499,727
4. Disabled participants	446,895	412,760
5. Beneficiaries	10,809,393	8,902,663
6. Total	317,588,896	267,869,604
C. Normal cost[3]		
1. At the valuation date		
a. Total normal cost	8,466,258	6,795,723
b. Employee normal cost	3,018,670	2,775,087
c. Net employer normal cost (a. - b.)	5,447,588	4,020,636
2. For the contribution year	2023	2022
a. Total normal cost	8,867,496	7,117,789
b. Employee normal cost	3,161,733	2,906,606
c. Net employer normal cost (a. - b.)	5,705,763	4,211,183
D. Key economic assumptions		
1. Funding interest rate	6.25%	6.25%
2. Postretirement COLA[4]	See Actuarial Assumptions section for details.	0.00%

[1] The value of all future benefits to be paid to the current group of members

[2] The cost allocated to all prior years

[3] The cost allocated to the current year

[4] Assumed annual Cost of Living Adjustment (COLA) applied to each retiree's pension benefit. In 2022, the District assumed no long-term COLAs because they were not automatic. COLA provisions and a long-term COLA assumption were introduced in 2023.

Amortization Schedule

Amortization Base	Year Established	Original Amount	Remaining Amortization Period	Outstanding Balance on June 30, 2022	Annual Contribution for 2023
UAAL Base	2008	$ 889,000	1	$ 104,696	$ 111,240
UAAL Base	2009	1,657,000	2	367,114	200,939
UAAL Base	2010	8,504,000	3	2,652,854	997,053
UAAL Base	2011	6,369,000	4	2,494,590	724,043
UAAL Base	2012	16,207,000	5	7,474,962	1,786,615
UAAL Base	2013	(5,815,000)	6	(3,035,035)	(622,069)
2014 COLA	2013	759,000	6	381,530	78,200
UAAL Base	2014	(2,546,000)	7	(1,479,054)	(267,310)
2015 COLA	2014	1,826,000	7	1,075,623	194,397
UAAL Base	2015	(1,947,000)	8	(1,270,256)	(206,586)
2016 COLA	2015	1,682,000	8	1,097,014	178,411
UAAL Base	2016	5,450,000	9	3,877,474	576,294
2017 COLA	2016	2,374,000	9	1,688,892	251,013
UAAL Base[1]	2017	(2,259,672)	10	(1,733,236)	(238,288)
2018 COLA	2017	2,204,671	10	1,691,050	232,489
UAAL Base	2018	(1,659,232)	11	(1,358,963)	(174,517)
2019 COLA	2018	3,444,201	11	2,820,909	362,259
UAAL Base	2019	8,397,365	12	7,285,988	881,001
2020 COLA[2]	2019	2,177,718	12	1,889,501	228,473
UAAL Base[2]	2020	6,060,168	13	5,537,928	634,733
UAAL Base	2021	2,281	14	2,185	239
UAAL Base[3]	2022	41,520,686	15	41,520,686	4,345,191
Total				**73,086,452**	**10,273,820**

[1] Includes an adjustment for prior rounding of earlier amortization bases.

[2] The District made a $2.18 million lump sum contribution to fully fund the 2020 COLA. This extra contribution is reflected in the 2020 UAAL base.

[3] Approximately $37M of the 2022 base is attributable to the Plan's new COLA provisions and implementation of a long-term COLA assumption. An additional $1.7M is due to the actual 2023 retiree COLA exceeding the long-term assumption.

Actuarially Determined Contribution

	Contribution Year 2023	2022
A. Actuarially Determined Contribution (ADC)		
1. Total normal cost[1]	$ 8,867,496	$ 7,117,789
2. Employee normal cost	3,161,733	2,906,606
3. Employer normal cost (1. - 2.)	5,705,763	4,211,183
4. Amortization of unfunded liability	10,273,820	5,422,842
5. Actuarially Determined Employer Contribution (ADEC) (3. + 4.)	**15,979,583**	**9,634,025**
B. Projected payroll for contribution year[2]	36,790,015	35,545,845
C. ADC as a percent of payroll		
1. Total normal cost	24.10%	20.02%
2. Employee normal cost	8.59%	8.18%
3. Employer normal cost[3] (1. - 2.)	15.51%	11.84%
4. Amortization of unfunded liability	27.93%	15.26%
5. ADEC (3. + 4.)	**43.44%**	**27.10%**

2023 Employer Contribution Rates by Bargaining Unit[3]

	Clerical/ Maintenance	Professional/ Supervisory	Unrepresented	Confidential	Directors	Total
1. Normal cost	15.06%	14.88%	19.34%	15.27%	13.91%	15.51%
2. UAAL Amortization	26.93%	25.80%	39.59%	23.59%	62.09%	27.93%
3. Total rate	41.99%	40.68%	58.93%	38.86%	76.00%	43.44%
4. Projected payroll ($000s)	$ 17,449	$ 13,368	$ 4,360	$ 1,564	$ 49	$ 36,790
5. Annual amount ($000s)	7,328	5,438	2,569	608	37	15,980

[1] The cost allocated to the contribution year. The amounts shown are adjusted to the beginning of the contribution year with interest and payroll growth.

[2] Adjusted to beginning of contribution year with assumed payroll growth.

[3] Does not include any bargained employer-paid employee contributions.

Analysis of Contribution Rate Changes

	Actuarial Accrued Liability (AAL)	Actuarial Value of Assets (AVA)	Unfunded Accrued Liability (UAAL = AAL - AVA)	Actuarially Determined Employer Contribution
A. June 30, 2021 actual value	$ 267,869,604	$ (233,056,796)	$ 34,812,808	27.10%
B. June 30, 2022 expected value[1]	276,839,575	(245,273,809)	31,565,766	29.17%
1. Demographic (gain)/loss	2,066,201	-	2,066,201	-0.83%
2. Assumption and plan changes	38,683,120	-	38,683,120	14.88%
3. Contribution more than expected	-	(500,109)	(500,109)	-0.15%
4. Investment (gain)/loss	-	1,271,474	1,271,474	0.37%
C. Total change from expected value (sum B.1. to B.4.)	40,749,321	771,365	41,520,686	14.27%
D. June 30, 2022 actual value	$ 317,588,896	$ (244,502,444)	$ 73,086,452	43.44%

[1] The contribution rate is expected to decrease as a percent of payroll because the unfunded liability is amortized as a level dollar amount but payroll is assumed to increase each year.

PEPRA Contribution Rates

PEPRA employees must contribute at least half of the total normal cost rate, rounded to the nearest 0.25%. Rates are calculated annually but only adjusted if the total normal cost rate has increased or decreased by at least 1% since the date of the last rate change.

	Total Normal Cost Rate	Half of Total Rate	Employee Normal Cost Rate
2014 PEPRA normal cost rate (first established)	12.81%	6.41%	6.50%
2015 PEPRA normal cost rate	11.54%	5.77%	5.75%
2016 PEPRA normal cost rate	11.58%	5.79%	5.75%
2017 PEPRA normal cost rate	11.90%	5.95%	5.75%
2018 PEPRA normal cost rate	12.33%	6.17%	5.75%
2019 PEPRA normal cost rate	11.90%	5.95%	5.75%
2020 PEPRA normal cost rate (current basis)[1]	13.24%	6.62%	6.50%
2021 PEPRA normal cost rate	13.85%	6.93%	6.50%
2022 PEPRA normal cost rate	14.20%	7.10%	6.50%
2023 PEPRA normal cost rate (without COLA)	14.14%	7.07%	6.50%
2023 PEPRA normal cost rate (reflecting COLA)	17.38%	8.69%	8.75%

The above rates should be applied to salary below the PEPRA compensation limit.

Based on the 2021 Memorandums of Understanding (MOUs) and related Side Letter Agreements, PEPRA contribution rate increases will be phased in over three years. The phase-in approach agreed upon by the District and Unions is outlined below:

- Calculate the annual PEPRA normal cost rate, excluding the cost of the COLA benefit;
- Take the PEPRA normal cost rate calculated above and add the following incremental increase:
  - Effective 11/6/2022: +0.50%
  - Effective 11/5/2023: +1.375%
- Effective 11/4/2024 and beyond, PEPRA employees will be expected to pay the employee portion (50%) of the PEPRA normal cost rate reflecting the cost of COLA benefits.

Since the 2023 PEPRA total normal cost rate excluding the cost of COLA benefits is less than 1% different from the prior basis of 13.24% (the last adjustment to the employee normal cost rate), the baseline employee normal cost rate remains unchanged at 6.50% for 2023.

Using the 2023 baseline contribution rate and the methodology described above, the projected PEPRA employee normal cost rates used in this valuation are as follows:

- 2023: 7.00%
- 2024: 7.875%
- 2025: 8.75%

[1] Year of most recent adjustment to employee normal cost rate

Summary of Membership Data

	June 30, 2022	June 30, 2021
A. Active employees		
1. Number	292	297
2. Average age	46.8	46.9
3. Average years of service	10.3	10.4
4. Total salary[1]	$ 36,206,366	$ 34,981,934
5. Average salary	123,994	117,784
6. Projected payroll for contribution year	36,790,015	35,545,845
B. Vested terminated and reciprocals		
1. Number	100	98
2. Average age	49.1	48.9
C. Retirees and beneficiaries		
1. Number		
a. Retired	361	349
b. Disabled	3	3
c. Beneficiaries	50	49
d. Total	414	401
2. Average age	69.6	69.4
3. Average monthly benefit	$ 3,010	$ 2,951
D. Total number of participants (A.1. + B.1. + C.1.d.)	806	796

[1] Projected compensation for year beginning on valuation date, with PEPRA compensation limited to statutory amount.

Summary of Membership Changes

	Actives	Vested Terminated	Retirees	Disabled	Beneficiaries	Total
A. Number of members on June 30, 2021	297	98	349	3	49	796
B. Changes in membership						
1. New entrants	22					22
2. Retirements	(16)	(6)	22			0
3. Vested terminations (deferred benefits)	(8)	8				0
4. Termination/refund of contributions	(3)	(1)				(4)
5. Deaths (no beneficiary)			(6)		(3)	(9)
6. Deaths (with beneficiary)			(4)		4	0
7. Data corrections		1				1
8. Rehires						0
9. QDRO						0
10. Total changes	(5)	2	12	0	1	10
C. Number of members on June 30, 2022	292	100	361	3	50	806

Age and Service Distribution of Active Members

Attained Age	Benefit Service										
	Under 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 plus	Total
Under 25		1									1
25 - 29	2	6	3								11
30 - 34	8	14	16								38
35 - 39	4	8	14	4	1						31
40 - 44	1	13	13	8	3	3					41
45 - 49	4	8	17	11	12	5					57
50 - 54	1	8	12	8	6	5	2	1			43
55 - 59	1	2	8	6	7	5	4	3			36
60 - 64		2	4	5	10	3		2		1	27
65 - 69			3	1		1		1			6
70 plus					1						1
Total	21	62	90	43	40	22	6	7	0	1	292

Age Distribution of Inactive Members

Age	Vested Terminated	Retired	Disabled	Beneficiary	Total
Under 50	51	0	0	2	53
50 - 54	21	5	0	0	26
55 - 59	19	40	1	3	63
60 - 64	6	74	0	7	87
65 - 69	3	83	1	10	97
70 - 74	0	69	1	8	78
75 - 79	0	53	0	10	63
80 - 84	0	26	0	4	30
85 - 89	0	8	0	3	11
90 - 94	0	3	0	2	5
95 - 99	0	0	0	1	1
100 & over	0	0	0	0	0
Total	100	361	3	50	514

Discussion of Pension Risks

Actuarial Standard of Practice Number 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions (ASOP 51), requires actuaries to identify and assess certain risks that may affect a plan's future financial condition. Some of the primary risks are summarized and defined in the table below.

Risk	Identification/Definition
Investment risk	The potential that investment returns will be different than expected
Asset/liability mismatch risk	The potential that changes in asset values are not matched by changes in liability values
Longevity and other demographic risks	The potential that mortality or other demographic experience will be different than expected
Contribution risk	The potential that employer or member contribution rates are different than what is ultimately required to fund plan benefits

ASOP 51 requires that actuaries qualitatively or quantitatively assess the potential effect of these risks on the plan's future financial condition. Methods to assess the risks include scenario tests, sensitivity tests, stress tests, and calculation of actuarial liabilities using a discount rate based on minimal-risk investments. Practical considerations include the usefulness, reliability, timeliness, and cost efficiency of the risk assessment measurements.

In addition to the risk assessment parameters above, ASOP 51 requires that actuaries (1) calculate various plan maturity measures and (2) disclose relevant historical information that are significant to understanding plan risks.

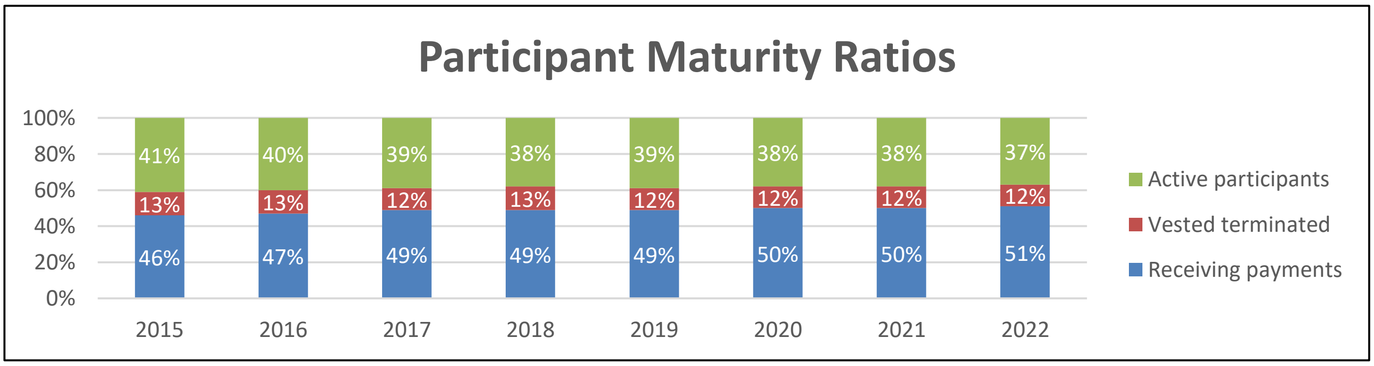
This report contains basic risk assessment information for the plan in accordance with ASOP 51. However, we recommend that employers consider additional pension risk analyses to better understand retirement plan volatility and the potential impact on the organization. We would be glad to discuss potential analyses upon request.

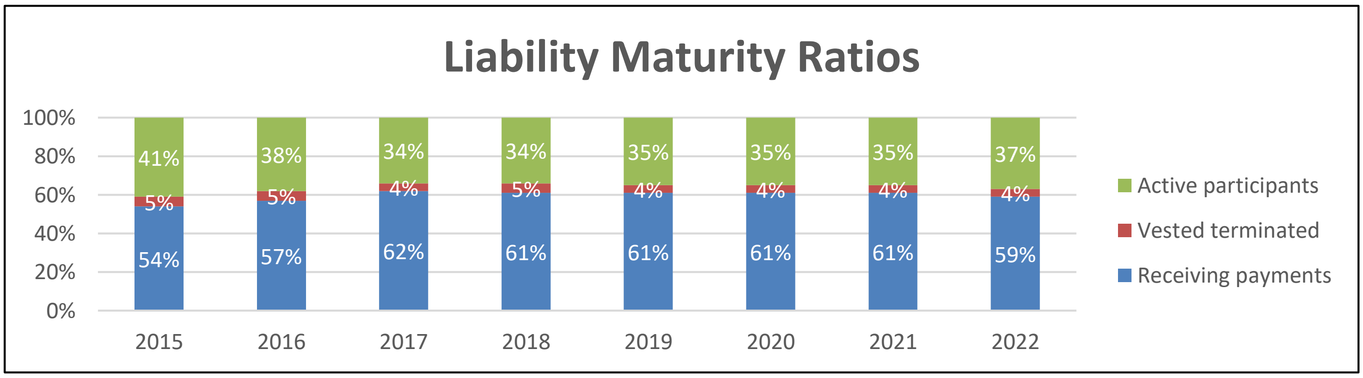
Plan Maturity Measures

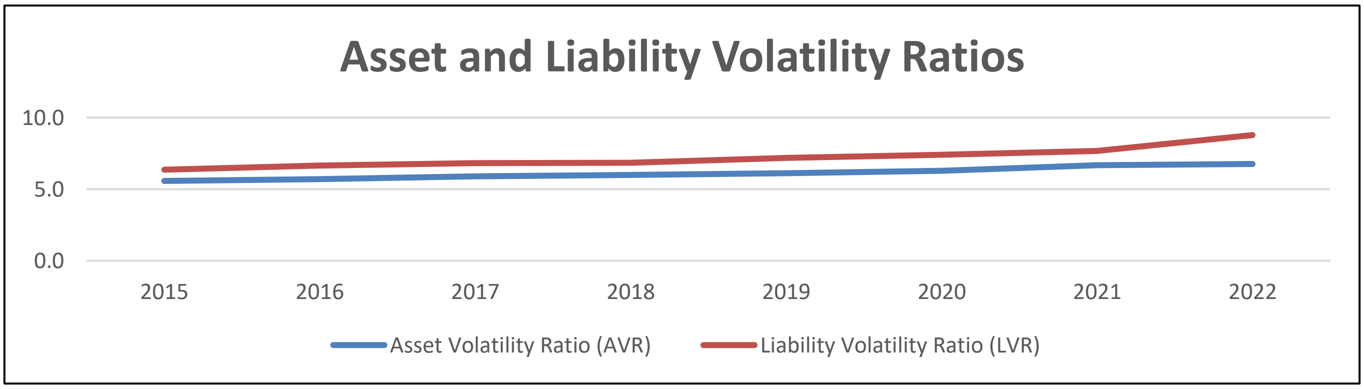
Maturity measures describe how much plan liability is attributable to current employees vs. former employees (e.g., retirees) and the size of plan assets and liabilities relative to overall payroll. These measures include:

Participant Maturity Ratio	Number of retirees divided by total participants
Liability Maturity Ratio	Retiree liability divided by total plan liability
Asset Volatility Ratio (AVR)	Measures size of plan assets relative to payroll upon which contributions are based
Liability Volatility Ratio (LVR)	Measures size of plan liabilities relative to payroll upon which contributions are based

A recent history of maturity measures is shown below.







Observations:

- The retiree liabilities are generally increasing as a percent of the plan's totals.
- The plan's AVR and LVR are increasing as the plan matures. An LVR of 8.0 means that a 1% increase in plan liability would cost 8% of payroll if funded immediately. In practice, funded status changes are amortized over several years.

Risk Analysis

The table below provides analysis of some potential plan risks. Please note that the list of risks and the risk assessments shown are not exhaustive. We would be glad to provide a more detailed risk assessment upon request.

Risk	Assessment
Investment risk	If future investment returns are higher or lower than assumed, then future contributions may need to be increased or decreased to compensate. We recommend the District regularly re-evaluate its investment return expectations and corresponding investment policy.
Asset/liability mismatch risk	Since plan assets are invested in a mix of equity and fixed income securities, there is a risk that changes in assets values are not matched by changes in liability values.
Longevity and other demographic risks	Although most of the plan demographic assumptions reflect best estimates of future plan experience, actual experience will differ from these assumptions. If participant longevity is greater than expected then this would increase plan costs. The plan's COLA provision also increases the cost of longevity risk.
Contribution risk	Plan contributions include both payroll-based employer and employee contributions, as well as additional voluntary contributions from the District. The District should continue making at least the Actuarially Determined Contribution each year in order to improve the Plan's funded status.

Summary of Plan Provisions

A. Plan Effective Date

Originally established effective February 17, 1962. The plan will be amended for the 2022 plan year to reflect a COLA provision for employees who have contributed towards COLA benefits, consistent with labor agreements previously approved by the Board.

B. Plan Year

July 1 to June 30.

C. Participation

All permanent full-time employees, all project employees, and all directors of the District.

D. Eligibility to Retire

Meet vesting requirements and:

	Classic Members	PEPRA Members
Clerical, Maintenance, Confidential, Professional/Supervisory, and Unrepresented	Age 50	Age 52
Directors	Age 55	Age 52

E. Vesting

100% vested upon first attaining one of the following:

	Classic Members	PEPRA Members
Years of service		
Clerical, Maintenance, and Directors	10 years	5 years
Confidential, Professional/Supervisory, and Unrepresented	5 years	5 years
Normal retirement age	Age 62	Age 62
Disability	Immediate	Immediate

Vesting service includes reciprocal service.

F. Final Average Compensation

Basic Compensation: Regular salary excluding overtime, shift premium, and all other irregular compensation.

Classic Members:

- Non-directors – Highest 12 consecutive months
- Directors – Highest 36 consecutive months during the last 5 years

PEPRA Members:

- Highest 36 consecutive months up to PEPRA compensation limit ($134,974 in 2022).

Summary of Plan Provisions (continued)

G. Service Retirement Benefit

Benefit factor x Final Average Compensation

Classic Members:
- Non-directors benefit factor = 2.35% at 55
- Directors benefit factor = 2.35% at 62

PEPRA Members: benefit factor = 2.00% at age 62

Inactive Participants: Benefit factor varies by bargaining groups and separation dates

Sample benefit factors are shown below:

	Age at Retirement = 55			Age at Retirement = 62		
Years of Service	2.35% at 55	2.35% at 62	2.00% at 62	2.35% at 55	2.35% at 62	2.00% at 62
10	23.50%	11.02%	13.00%	26.58%	23.50%	20.00%
15	35.25%	16.53%	19.50%	39.87%	32.25%	30.00%
20	47.00%	22.04%	26.00%	53.16%	47.00%	40.00%
25	58.75%	27.55%	32.50%	66.45%	58.75%	50.00%
30	70.50%	33.06%	39.00%	79.74%	70.50%	60.00%
35	82.25%	N/A	45.50%	93.02%	82.25%	70.00%

H. Termination Benefit

Non-vested: Return of contributions plus interest in a lump sum

Vested: Return of contributions plus interest in a lump sum, or a deferred benefit

I. Disability Benefit

Clerical and Maintenance with 10 years of service and Social Security disability:
- 30% of current Basic Compensation
- Not less than service retirement benefit

Others:
- 100% vested immediately
- Return of contributions plus interest in a lump sum, or a deferred benefit

J. Death Benefit - Before Retirement

Non-vested: Return of contributions plus interest in a lump sum

Vested:
- Non-directors – 85% of member's accrued service retirement benefit
- Directors – 50% of benefit that would have been paid under the 50% J&S option, upon retirement at the later of age 55 and death, and commencing no earlier than age 55

K. Death Benefit - After Retirement

Return of contributions plus interest less any monthly payments previously received by retiree. Remaining contribution balance is paid to a designated beneficiary if joint annuitant option not in effect.

Summary of Plan Provisions (continued)

L. Benefit Forms

Normal form of payment: Single life annuity.

Optional forms of payment (actuarial equivalent):

- Joint and survivor annuity
- Joint and survivor annuity with "pop-up"

M. Cost of Living Adjustments

In payment status (retirees, disabled retirees, beneficiaries) or terminated vested as of November 1, 2022:

Ad hoc increases granted by the Board[1]. For 2023, the Board approved an ad hoc COLA increase of 2%. For purposes of the actuarial analysis, the COLA benefit will be 2% in 2023 and has been assumed to be 1% annually thereafter. COLA is applicable to benefits up to threshold ($75,000 for year ending 12/31/2022; threshold increased annually by 2%).

Employees who have contributed towards COLA benefits:
Annual COLA equal to smaller of 2% or the San Francisco-Oakland-Hayward Consumer Price Index (CPI). COLA is applicable to benefits up to threshold ($75,000 for year ending 12/31/2022; threshold increased annually by 2%).

If CPI exceeds 2% COLA rate defined above, excess amount will be “banked” and applied to future years in which the CPI is less than the 2% COLA rate.

N. Employee Contributions

The 2021 MOUs and related Side Letter Agreements increased employee contribution rates for Classic and PEPRA employees. These increases are expected to be phased in over 3 years (2 years for Directors). The following rates will go into effect after the interim phase-in period.

Classic Members (% of Basic Compensation):

Group	Employee Paid	District Paid	Total
Professional/Supervisory	8.89%	3.00%	11.89%
Confidential	8.74%	3.00%	11.74%
Unrepresented:			
< 7 years of service	8.46%	0.00%	8.46%
7 to 9 years of service	7.46%	1.00%	8.46%
≥ 10 years of service	6.46%	2.00%	8.46%
Clerical and Maintenance	10.46%	1.00%	11.46%
Directors	1.91%	0.00%	1.91%

PEPRA Members: 50% of the normal cost rate of the Plan, rounded to the nearest quarter of 1%. The contribution rate is applied to pay up to each year’s PEPRA compensation limit. Please see the PEPRA Contribution Rates page of this report for more details.

O. Changes since prior year

Since the last valuation the following changes have been made:

- A COLA provision was added for participants who are actively employed as of November 1, 2022.
- Employee contribution rates were increased as a result of the new COLA provision.

[1] Including 2023, ad hoc increases have been granted in 13 of the last 17 years.

Actuarial Methods

A. Actuarial Cost Method

The Entry Age Normal level percent of pay cost method. Under this method, the normal cost for an individual participant is the level percentage of pay required to accumulate the funds needed to pay the participant's projected benefits by their assumed retirement age, beginning on the date of entry and ending at the last age with any future benefits. The actuarial accrued liability is the accumulated value of these annual normal costs on a given date. The plan's normal cost and accrued liability are the total of these values for all participants.

B. Funding Policy

Each year, unexpected changes in the unfunded actuarial accrued liability are amortized as a level dollar amount over a closed 15-year period beginning on the January 1st following the valuation date. These changes may be due to actuarial gains and losses, assumption changes, or plan changes.

Any ad-hoc cost of living adjustments (COLAs) other than 1% are separately amortized and funded as employer-paid contributions over a closed 15-year period beginning on the January 1st when the COLA is first effective. When an individual year's COLA is funded by an extra District lump sum contribution, the following year's amortization base reflects that additional contribution.

Contribution rates determined in this report are for the calendar year following the valuation date, and are assumed to be applied to the payroll for each pay period during the contribution year.

C. Data Methods

The Contra Costa Water District supplied data for all participants and asset information for the years ending June 30, 2021 and June 30, 2022. We have relied on this data in preparing this report. The data was reviewed for reasonableness and consistency, but we have not performed a complete audit.

D. Asset Method

The Actuarial Value of Assets is equal to the Market Value of Assets with a 5-year smoothing of investment gains and losses.

Actuarial Methods (continued)

E. Models Used

The results in this report are based on an actuarial valuation model with three components as outlined in Actuarial Standard of Practice No. 56 - Modeling (ASOP 56):

1. Information inputs including the data, assumptions, methods, and plan provisions outlined in this report,
2. Processing by ProVal® actuarial software, and
3. Our report template which translates the ProVal® output into valuation results.

The model is intended to convert the information input above to usable actuarial valuation results. We have reviewed the software's output for reasonableness, and have independently checked sample one-person output where appropriate, but have otherwise relied on it.

Other models used in this actuarial valuation include:

- Expected investment return model based on the Horizon Actuarial Services Survey of Capital Market Assumptions and the fund's asset allocation

F. Change in Actuarial Methods

None

Actuarial Assumptions

A. Economic Assumptions

Valuation Date	June 30, 2022	June 30, 2021
Discount Rate	6.25%	6.25%
General Inflation (CPI-U)[1]	2.25%	2.25%
Wage Inflation (CPI-W)	2.75%	2.75%
Payroll Growth[2]	3.25%	3.25%
Future COLAs		
- Employees who have contributed towards COLA benefits	2% Annual COLA (up to COLA pay threshold)	0.00%
- In payment status (retirees, disabled retirees, beneficiaries) or terminated vested as of November 1, 2022	2% in 2023 and 1% Annual COLA thereafter (up to COLA pay threshold)	0.00%
COLA pay threshold for 2023	$76,500	N/A
COLA threshold annual increase rate	2.00%	N/A

Salary Increases

2.75% wage inflation plus pay increase based on years of District service, employment group, and entry age with the District. Sample rates are shown below:

			Other (Entry Age)	
Service	Clerical	Directors	< 40	> 40
1	8.75%	2.75%	8.00%	7.00%
5	6.00%	2.75%	6.50%	5.50%
10	4.50%	2.75%	5.50%	4.00%
15	3.75%	2.75%	5.00%	3.50%
20	3.75%	2.75%	3.50%	3.00%

B. Demographic Assumptions

Mortality

Pre-retirement: Society of Actuaries Pub-2010 General Employees Amount-Weighted Above-Median Mortality with generational projection using scale MP-2020.

Healthy post-retirement: Society of Actuaries Pub-2010 General Retirees Amount-Weighted Above-Median Mortality with generational projection using scale MP-2020.

Disabled: Society of Actuaries Pub-2010 Disabled Retirees Amount-Weighted Mortality with generational projection using scale MP-2020.

[1] Applies to assumed future increases in pensionable compensation limit and benefit limit.

[2] Payroll growth assumption is used to project normal cost and employee payroll from valuation date to the contribution year.

Actuarial Assumptions (continued)

B. Demographic Assumptions (continued)

Termination

Rates vary based on service, as follows:

Service	Rate
0	3.0%
1	6.0%
2	6.0%
3	6.0%
4	5.0%
5	4.0%
6	4.0%
7+	3.0%

Disability

Based on assumptions for General Tier 3 and Tier 5 members used in the December 31, 2019 Contra Costa County Employees' Retirement Association (CCCERA) actuarial valuation.

Retirement

Sample rates below are for members in the Classic pension plan:

Age	Rate	Age	Rate
50	3.0%	61	20.0%
55	20.0%	62	40.0%
56	20.0%	63	30.0%
57	15.0%	64	30.0%
58	15.0%	65	40.0%
59	17.0%	70+	100.0%
60	17.0%		

Sample rates below are for members in the PEPRA pension plan:

Age	Rate	Age	Rate
50	0.0%	61	12.0%
55	5.0%	62	18.0%
56	5.0%	63	18.0%
57	6.0%	64	20.0%
58	6.0%	65	25.0%
59	8.0%	70	40.0%
60	8.0%	75+	100.0%

Percent married

Current retirees: actual spouse coverage.

Future retirees: 80% of employees are assumed to be married.

Spouse age

Based on actual spouse birth dates when available. Otherwise males are assumed to be two years older than females.

Actuarial Assumptions (continued)

B. Demographic Assumptions (continued)

Assumed payment form

	Single Employees	Married Employees
Single life annuity	100%	10%
50% Joint & Survivor	N/A	25%
100% Joint & Survivor	N/A	45%
50% Joint & Restoration	N/A	10%
100% Joint & Restoration	N/A	10%

Reciprocity and Terminations

60% of terminated vested members are assumed to be employed by reciprocal agencies and receive 3.00% annual pay increases until retirement.

Terminated vested members are assumed to retire at age 58.

Terminated vested members not meeting the early retirement service requirements are assumed to receive an immediate refund of contributions with interest.

Death Benefit - After Retirement

Total monthly payments received by retirees prior to death are assumed to exceed employee contributions with interest.

C. Changes Since Last Valuation

Since the last valuation the following changes have been made:

- A long-term COLA assumption was added to match the COLA provision recently added to the plan for active employees.
- A long-term COLA assumption for inactive participants was added based on anticipated future ad-hoc COLAs.

Selection of Economic Assumptions

The Actuarial Standards Board (ASB) provides coordinated guidance for measuring pension and retiree group benefit obligations through a series of Actuarial Standards of Practice (ASOPs). ASOP No. 27, Selection of Economic Assumptions for Measuring Pension Obligations, requires that the actuary disclose the rationale used in selecting each non-prescribed economic assumption and any changes to non-prescribed economic assumptions.

The table below summarizes the rationale for selecting the non-prescribed economic assumptions. As of the report date, there were no known changes in circumstances occuring after the measurement date that would have affected economic assumptions selected as of the measurement date.

Economic Assumptions (non-prescribed)	
Assumption	Rationale for Selecting Assumption
Discount rate / investment return	The expected investment return was selected by the District and is based on expected long-term asset class returns and the District's target asset allocation. We have verified with our own capital market assumption model that their assumption is reasonable. Our model is based on the plan's target asset allocation and a blend of expected asset class returns published in the 2022 Survey of Capital Market Assumptions produced by Horizon Actuarial Services.
General inflation (CPI-U)	Based on analysis of historical CPI-U and 30-year TIPS data, the Federal Open Market Committee target inflation rate, and the Survey of Capital Market Assumptions produced by Horizon Actuarial Services and the District's 2016 - 2020 actuarial experience study.
Wage inflation (CPI-W)	Based on historical CPI-W rates for San Francisco, Oakland, Hayward area and the District's 2016 - 2020 actuarial experience study.
Payroll growth	Based on 20-year history of District's total payroll growth and the District's 2016 - 2020 actuarial experience study.
Cost-of-living increases	The long-term COLA assumption for active employees matches the Plan's COLA provision, since we assume that the CPI is always greater than the annual COLA cap. The long-term COLA assumption for inactive participants was provided by the District based on anticipated future ad-hoc COLAs.
Salary increases	Based on the District's 2016 - 2020 actuarial experience study

Selection of Non-Economic Assumptions

The Actuarial Standards Board (ASB) provides coordinated guidance for measuring pension and retiree group benefit obligations through a series of Actuarial Standards of Practice (ASOPs). ASOP No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations, requires that the actuary disclosure the rationale used in selecting each non-prescribed non-economic assumption and any changes to the non-prescribed non-economic assumptions.

The table below summarizes the rationale for selecting the non-prescribed non-economic assumptions. As of the report date, there were no known change in circumstances occuring after the measurement date that would have affected non-economic assumptions selected as of the measurement date.

Non-Economic Assumptions (non-prescribed)	
Assumption	Rationale for Selecting Assumption
Mortality	Based on recently published table and workforce demographics, and the District's 2016 - 2020 actuarial experience study
Retirement	Based on the District's 2016 - 2020 actuarial experience study
Termination of employment	Based on the District's 2016 - 2020 actuarial experience study
Disability	Based on the December 31, 2019 CCCERA actuarial valuation due to lack of plan experience
Form of payment	Based on the District's 2016 - 2020 actuarial experience study
Percent married and spouse ages	Based on the District's 2016 - 2020 actuarial experience study
Reciprocity and terminations	Based on the District's 2016 - 2020 actuarial experience study

Important Notices

Purpose and Scope of the Valuation

This valuation has been prepared exclusively for the District and solely to provide contribution information. It is important to recognize that calculations performed for other purposes (such as benefit design, investment policy, or plan accounting) may yield significantly different results. This report may not be used for any other purpose, and Van Iwaarden Associates is not responsible for the consequences of any unauthorized use. Its content may not be modified, incorporated into or used in other material, or otherwise provided, in whole or in part, to any other person or entity, without our permission.

Assumptions and Methods

Since modeling all possible future outcomes is not possible or practical, the valuation is based on a single set of data, assumptions, methods, and plan provisions. We may also use estimates or simplifications to model future events in an efficient and cost-effective manner, so long as we believe that these simplifying techniques do not affect the reasonableness of the valuation results.

The District is responsible for the assumptions, methods, and funding policies used to prepare the valuation. The assumptions used in this report are among a wide range of possibilities (each of which may be considered reasonable), and have been chosen as a single "best estimate".

A different set of reasonable assumptions would produce different results. This report does not include analysis of the effect of alternative assumptions because that is beyond the limited scope of our engagement. If the District is interested in analyzing the effect of different assumption sets on the valuation results, then we suggest a sensitivity analysis to be performed at a later date.

Actuarial Measurement Changes

An actuarial valuation is only a snapshot of a plan's estimated financial condition at a single point in time. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: retiree group benefits program experience differing from that anticipated by the assumptions; changes in assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in retiree group benefits program provisions or applicable law. Retiree group benefits models necessarily rely on the use of approximations and estimates, and are sensitive to changes in these approximations and estimates. Small variations in these approximations and estimates may lead to significant changes in actuarial measurements.

Actuarial valuations are extremely complex and it's possible that data, computer coding, and mathematical errors could occur during the valuation process. Errors in a valuation discovered after its preparation may be corrected by revising the current valuation or in a subsequent year's valuation.

Important Notices (continued)

Accuracy of Substantive Plan Information and Census Data

For purposes of this valuation, we have assumed that the District has validated our summary of the substantive plan provisions and has provided us with any relevant information regarding interpretation of the plan provisions and changes to the plan terms since the prior valuation.

The District is solely responsible for the validity, accuracy and comprehensiveness of this information. If any data or plan provisions supplied are not accurate and complete, the valuation results may differ significantly. Moreover, different interpretations of the substantive plan may produce substantially different valuation results.

Impact of Legislative Changes

The legislative and regulatory environments have many implications for pension plans. Changes to current rules and implementation of new legislation are difficult to predict but could have a dramatic impact on the value of future plan benefits.

Glossary of Selected Terms

This section provides the definitions of applicable terminology in the actuarial valuation.

Actuarial Accrued Liability (AAL) - the portion of the actuarial present value which is not provided for by future normal costs, determined under the actuarial cost method.

Actuarial Cost Method - the method used, when determining the actuarial accrued liability, for allocating costs between past, current, and future years.

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

Discount Rate - the interest rate used to adjust liabilities and obligations for the time value of money.

Long-Term Expected Investment Return - the average expected asset return expected to be earned by the pension investments over time.

Normal Cost - the portion of the actuarial present value which is allocated to the valuation year by the actuarial cost method.

Valuation Date - the date as of which assets and liabilities are measured for this valuation.