Arapahoe County Retirement Plan

ACTUARIAL VALUATION REPORT AS OF

January 1, 2022

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June 8, 2022

Mr. Lew Quigley
Arapahoe County Retirement Plan Administrator
Arapahoe County
6984 S. Lima Street Suite B
Centennial, CO 80111

Re: Actuarial Valuation of the Arapahoe County Retirement Plan as of January 1, 2022

Dear Mr. Quigley:

We are pleased to present the Report on the actuarial valuation of the Arapahoe County Retirement Plan as of January 1, 2022.

This Report presents the results of the January 1, 2022 actuarial valuation of the Arapahoe County Retirement Plan. The Report describes the current actuarial condition of the Arapahoe County Retirement Plan, determines actuarially determined employer contribution rates, and analyzes changes in these actuarially determined rates. In addition, the Report provides various summaries of the data. This report should not be relied on for any purpose other than the purpose described in the primary communication. Accounting information for purposes of complying with Governmental Accounting Standards Board (GASB) Statements Nos. 67 and 68 is provided in a separate report.

We certify that the information included herein and contained in the January 1, 2022 Actuarial Valuation Report is accurate and fairly presents the actuarial position of the Arapahoe County Retirement Plan as of the valuation date.

Financing Objectives

Contribution rates are intended to remain level as a percentage of payroll over time. The employer contributions, when combined with the contributions made by members, are intended to cover the Actuarially Determined Contribution (ADC), which is the sum of the Normal Cost, plus 20-year open level percent-of-pay amortization of the Unfunded Actuarial Accrued Liability (UAAL), plus administrative expenses, as a percentage of payroll. If the contributions made are equal to the ADC, and if all actuarial assumptions are met, there will still be an unfunded accrued liability at the end of the 20-year period. This is due to “open” amortization – an amortization method that resets the payment period to 20 years with each valuation.

Progress Toward Realization of Financing Objectives

The UAAL/(surplus) and the funded ratio (ratio of the actuarial value of assets to the actuarial accrued liability) illustrate the progress toward the realization of certain financing objectives.

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Based on the actuarial valuation as of January 1, 2022, the Plan has an unfunded liability of $223.2 million and a funded ratio of 61.9%.

The increase in the funded ratio, from 60.6% to 61.9%, is due to investment gains. A funded ratio less than 100% indicates an Actuarially Determined Contribution that will require a normal cost and an amortization payment. If the contributions equal the ADC, and if all assumptions are met, the funded ratio should improve over time.

The employer Actuarially Determined Contribution, net of 9.00% of pay employee contributions, for the year beginning January 1, 2022, is 12.24% of pay. The expected County contribution is 9.00% of pay which leaves a contribution shortfall of 3.24% of pay.

The 9.00% of pay employer and employee contribution are the rates that comply with County Ordinance. Due to the many factors affecting a retirement system, users of this report should be aware that contributions made at that rate do not necessarily guarantee long-term benefit security. To enhance benefit security, consideration should be given to increasing the contributions to the Plan.

The report includes 30-year open group funding projections in Appendix I. The projections assume the active population remains stable (new hires replace any leaving active members), the 9.00% contribution level continues in future years, the actuarial or smoothed value of assets earns 7.25% each year, and all other actuarial assumptions continue to be met year after year. The projection shows a slight improvement in funded ratio over the 30 years, from 61.9% to 76.0% with much of the improvement happening in the last decade. This indicates that while the plan is expected to be sustainable at current contribution levels if all assumptions are met, the situation is still very uncertain. We know that plan experience can and will deviate from assumptions and a small amount of adverse experience could make the Plan unsustainable at current contribution levels.

The net employer Actuarially Determined Contribution in this report is determined using the actuarial assumptions and methods disclosed in Section H of this report. This report does not include a robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the plan's financial condition.

Benefit Provisions

All of the benefit provisions reflected in this valuation are those which were in effect on January 1, 2022. The benefit provisions are summarized in Section D of this Report.

Assumptions and Methods

There have been no changes to the actuarial assumptions and methods since the prior report. The assumptions were adopted by the Board of Directors of the Arapahoe County Retirement Plan based upon the actuary's analysis and recommendations from the 2020 Experience Study. These assumptions and methods are detailed in Section H of this Report. The Board has sole authority to determine the actuarial assumptions used for the Plan. The assumptions that are based upon the actuary's recommendations are internally consistent and are reasonably based on the actual past experience of the Plan.

This report was prepared using our proprietary valuation model which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

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 (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. The actuarial calculations presented in this Report are intended to provide information for rational decision making.

Data

The valuation was based upon information as of January 1, 2022, furnished by Arapahoe County staff, concerning Plan benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by Arapahoe County staff.

GASB Reporting

The Governmental Accounting Standards Board (GASB) Statement No. 67, Financial Reporting for Pension Plans (Issued 6/2012), has replaced the requirements under GASB Statement No. 25, Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans (Issued 11/1994), effective for financial statements for fiscal years beginning after June 15, 2013. GASB Statement No. 68, Accounting and Financial Reporting for Pensions (Issued 6/2012), has replaced GASB Statement No. 27, Accounting for Pensions by State and Local Governmental Employers (Issued 11/1994), effective for fiscal years beginning after June 15, 2014. A separate accounting report is issued for those purposes.

Certification

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

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

Respectfully submitted,

Gabriel, Roeder, Smith & Company

Dana Woolfrey

Dana Woolfrey, FSA, FCA, EA, MAAA
Senior Consultant

Paul T Wood

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Senior Consultant

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SECTION A

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Actuarial Valuation

Valuations are prepared annually, as of January 1 of each year, the first day of the fiscal year. The primary purposes of the valuation report are to measure the plan's liabilities, to determine the actuarially determined contribution rate and to analyze changes in the Arapahoe County Retirement Plan's actuarial position.

In addition, the report provides summaries of the member data, financial data, plan provisions, and actuarial assumptions and methods.

Financing Objectives

The Arapahoe County Retirement Plan is supported by member contributions, employer contributions, and net earnings on the investments of the fund. During fiscal year 2022, the members and the employer are scheduled to each contribute 9.00% of payroll.

The combined member and employer contributions are intended to be sufficient to pay the normal cost and to amortize the Unfunded Actuarial Accrued Liability (UAAL) over a period of 20 years from the valuation date.

Progress Toward Realization of Financing Objectives

The UAAL/(surplus) and the funded ratio (ratio of the actuarial value of assets to the actuarial accrued liability) illustrate the progress toward the realization of certain financing objectives. Based on the actuarial valuation as of January 1, 2022, the Plan has an unfunded liability of $223.2 million and a funded ratio of 61.9%. The funded ratio increased from 60.6% to 61.9% and the Net Employer Actuarially Determined Contribution (ADC) decreased, from 12.44% of pay, to 12.24% of pay.

The net employer Actuarially Determined Contribution as a percentage of pay for the year beginning January 1, 2022 is 12.24%. The expected Employer contribution is 9.00% of pay which creates a contribution shortfall of 3.24% of pay. This compares to a shortfall in the prior year of 3.44% of pay. Absent increases in contributions, the projected funded status has a slight downward trajectory over the next 30 years. Section I contains the 30-year baseline projection assuming no change in the current contribution levels.

Experience During the Year

The plan experienced a liability loss of $9.5 million during fiscal year 2021. This was primarily due to retirement experience and salary increases greater than expected. Total payroll grew by 4.50% in spite of active membership decreasing by about 1%. The plan also experienced an asset gain of $10.7 million during fiscal year 2021. Deferred asset gains of $41.5 million remain as of January 1, 2022.

Assumption and Method Changes

There were no changes to assumptions or methods since the prior valuation. The assumptions and methods are summarized in Section H of the report.

Benefit Provision Changes

There have been no benefit changes since the prior valuation. The benefit provisions are summarized in Section D of the report.

Financial Position

The funded ratio increased from January 1, 2021 to January 1, 2022 on both a market value and actuarial value basis.

Funded Status Summary ($ in millions)

Valuation Date	January 1, 2022	January 1, 2021
Accrued Liability	$585.6	$556.3
Actuarial Value of Assets (smoothed)	362.4	336.8
Unfunded Accrued Liability[1]	$223.2	$219.5
Funded Ratio	61.88%	60.55%
Market Value of Assets	$404.0	$348.6
Unfunded Accrued Liability[1]	$181.6	$207.7
Funded Ratio	68.98%	62.67%

[1]*Amounts may not add due to rounding.*

The funded ratio may not be appropriate for assessing the need for future contributions. The funded ratio is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

Investment gains decreased the Total Actuarially Determined Contribution by 0.50% of payroll. Liability losses increased the Total Actuarially Determined Contribution by 0.44% of payroll. Payroll growth reduced the Total Actuarially Determined Contribution by 0.13% of payroll. The remaining difference was from the reduced normal cost rate as new members enter the plan under the Tier 3 benefits, the resetting of the period used to amortize the unfunded accrued liability to 20 years, and actual contributions less than the actuarially determined amount.

Contribution Requirement Summary
All Numbers Reported Middle of Year, Percent of Pay

Fiscal Year Beginning	January 1, 2022	January 1, 2021
Total Actuarially Determined Contribution	21.24%	21.44%
Estimated Member Contribution	9.00%	9.00%
Net Actuarially Determined Contribution	12.24%	12.44%
Estimated County Contribution	9.00%	9.00%
Contribution Shortfall	3.24%	3.44%

EXHIBIT A.1
Executive Summary

	January 1, 2022	January 1, 2021
1. **Annual Required Contribution**		
a. Total	$ 32,996,254	$ 31,859,200
b. Net Employer Contribution	19,016,458	18,483,326
c. Net Employer %	12.24%	12.44%
2. **Funded Status**		
a. Actuarial Accrued Liability	$ 585,639,282	$ 556,258,113
b. Actuarial Value of Assets (AVA)	362,409,145	336,804,310
c. Unfunded Liability (AVA-basis)	223,230,137	219,453,803
d. Funded Ratio (AVA-basis)	61.88%	60.55%
e. Market Value of Assets (MVA)	$ 403,954,801	$ 348,603,594
f. Unfunded Liability (MVA-basis)	181,684,481	207,654,519
g. Funded Ratio (MVA-basis)	68.98%	62.67%
3. **Summary of Census Data**		
a. Actives		
i. Counts	2,098	2,121
ii. Total Annual Projected Compensation	$ 155,331,064	$ 148,620,818
iii. Average Projected Compensation	74,038	70,071
iv. Average Age	43.5	43.7
v. Average Service	8.0	8.1
b. Members with Refunds Due Counts	139	94
c. Deferred Vested Member Counts	203	195
d. Retired Member Counts	1,007	947
e. Beneficiary Counts	100	97
f. Disabled Retiree Counts	26	27
g. Total Members Included in Valuation	3,573	3,481

SECTION B

VALUATION RESULTS

EXHIBIT B.1
Actuarial Accrued Liability

	January 1, 2022	January 1, 2021
1. **Active Members**		
a. Retirement Benefits	$ 221,191,384	$ 216,892,923
b. Withdrawal Benefits	7,693,420	8,173,735
c. Disability Benefits	3,603,865	3,479,857
d. Death Benefits	2,469,751	2,387,303
e. Total	$ 234,958,420	$ 230,933,818
2. **Members with Deferred Benefits**	$ 20,080,738	$ 18,690,323
3. **Members Receiving Benefits**	$ 330,600,124	$ 306,633,972
4. **Total**	$ 585,639,282	$ 556,258,113
5. **Actuarial Value of Assets**	$ 362,409,145	$ 336,804,310
6. **Unfunded Actuarial Accrued Liability**	$ 223,230,137	$ 219,453,803

EXHIBIT B.2
Normal Cost

	January 1, 2022	January 1, 2021
1. **Dollar Normal Cost**		
a. Retirement Benefits	$ 10,407,182	$ 10,121,078
b. Withdrawal Benefits	5,265,723	4,993,659
c. Disability Benefits	434,927	416,138
d. Death Benefits	217,463	208,069
e. Total	$ 16,325,295	$ 15,738,944
2. **Normal Cost as a Percentage of Pay**	10.51%	10.59%

EXHIBIT B.3
Present Value of Projected Benefits

	January 1, 2022	January 1, 2021
1. **Active Members**		
a. Retirement Benefits	$ 288,641,018	$ 281,700,065
b. Withdrawal Benefits	46,753,224	45,036,454
c. Disability Benefits	6,580,079	6,292,144
d. Death Benefits	3,965,983	3,818,485
e. Total	$ 345,940,304	$ 336,847,148
2. **Members with Deferred Benefits**	$ 20,080,738	$ 18,690,323
3. **Members Receiving Benefits**	$ 330,600,124	$ 306,633,972
4. **Total**	$ 696,621,166	$ 662,171,443

EXHIBIT B.4
Development of the Actuarially Determined Contribution

Fiscal Year Beginning	January 1, 2022		January 1, 2021	
	Dollar	Percent of Pay	Dollar	Percent of Pay
1. Total Normal Cost	$ 16,325,295	10.51%	$ 15,738,945	10.59%
2. Amortization of Unfunded Actuarial Accrued Liability Over 20 Years	16,190,882	10.42%	15,641,941	10.53%
3. Assumed Administrative Expenses	480,077	0.31%	478,314	0.32%
4. Actuarially Determined Contribution (ADC)	32,996,254	21.24%	31,859,200	21.44%
5. Estimated Member Contribution Mid-Year	13,979,796	9.00%	13,375,874	9.00%
6. Net ADC Mid-Year	19,016,458	12.24%	18,483,326	12.44%
7. Estimated County Contribution Mid-Year	13,979,796	9.00%	13,375,874	9.00%
8. Contribution Shortfall	5,036,662	3.24%	5,107,452	3.44%
9. Annual Projected Payroll	$155,331,064		$148,620,818	

EXHIBIT B.5
Plan Experience for Fiscal Year 2021

Liabilities		
1.	Actuarial Accrued Liability at January 1, 2021	$ 556,258,113
2.	Normal Cost during Fiscal Year 2021	15,698,725
3.	Benefit Payments during Fiscal Year 2021	35,390,631
4.	Interest on Items 1-3 and 5 to End of Year	39,614,882
5.	Change in Actuarial Accrued Liability Due to Assumption Changes	-
6.	Change in Actuarial Accrued Liability Due to Provision Changes	-
7.	Expected Actuarial Accrued Liability at January 1, 2022	576,181,089
8.	Actual Actuarial Accrued Liability at January 1, 2022	585,639,282
9.	Liability Gain/(Loss)	(9,458,193)
Assets		
10.	Actuarial Value of Assets at January 1, 2021	$ 336,804,310
11.	Benefit Payments during Fiscal Year 2021	35,390,631
12.	Contributions during Fiscal Year 2021	26,665,558
13.	Administrative Expenses during Fiscal Year 2021	480,077
14.	Interest on Items 10-13 to End of Year	24,084,626
15.	Expected Actuarial Value of Assets at January 1, 2022	351,683,786
16.	Actual Actuarial Value of Assets at January 1, 2022	362,409,145
17.	Asset Gain/(Loss)	10,725,359
Total		
18.	Total Gain/(Loss)	**$ 1,267,166**

EXHIBIT B.6
Plan Experience for Fiscal Year 2021
Gain Loss by Source

1.	Asset Gain/(Loss)		$ 10,725,359
2.	Liability Gain/(Loss)		
	a.	Salary Gain/(Loss)	(5,398,514)
	b.	Withdrawal Gain/(Loss)	(886,498)
	c.	Retirement Gain/(Loss)[1]	(2,175,119)
	d.	Annuitant Mortality Gain/(Loss)	(88,550)
	e.	Other Demographic Gain/(Loss)	(909,512)
	f.	Total	(9,458,193)
3.	Total Gain/(Loss)		1,267,166

[1]Includes optional form election experience.

SECTION C

PLAN ASSETS

EXHIBIT C.1
Statement of Plan Net Assets

	December 31, 2021	December 31, 2020
Assets		
Investments, at fair value:		
Money market funds and cash equivalents	$ 7,843,148	$ 5,917,197
Private Equity	29,877,011	14,808,365
U.S. Equity Securities	117,807,122	100,800,541
Real estate investments	67,108,615	64,895,622
Fixed income securities	37,319,830	67,106,116
Hedge funds	11,128,095	16,967,965
Foreign investments	88,506,564	78,260,989
Senior Secured Loan	44,521,911	-
Total investments	404,112,296	348,756,795
Receivables:		
Dividends and Interest	-	-
Due from Arapahoe County	-	-
Total receivables	-	-
Total assets	404,112,296	348,756,795
Liabilities and net assets held in trust for benefits		
Accounts payable	157,495	153,201
Total payables	157,495	153,201
Net assets held in trust for pension benefits	$ 403,954,801	$ 348,603,594

EXHIBIT C.2
Statement of Changes in Plan Net Assets

	Year Ended December 31, 2021	Year Ended December 31, 2020
Additions to Net Assets Attributed to:		
Contributions		
Employer contributions	$ 13,341,693	$ 12,642,439
Plan members contributions	13,323,865	12,628,547
Total	26,665,558	25,270,986
Net Investment Income		
Net appreciation in fair value of investments	61,527,291	28,846,187
Interest and dividends	4,852,242	4,929,171
	66,379,533	33,775,358
Less Investment expense	(1,823,176)	(382,414)
Net investment income	64,556,357	33,392,944
Total additions	91,221,915	58,663,930
Deductions to Net Assets Attributed to:		
Benefit payments	29,561,506	28,439,622
Refunds	5,829,125	2,894,103
Administrative expenses	480,077	478,314
Total deductions	35,870,708	31,812,039
Change in net assets	55,351,207	26,851,891
Net assets held in trust for benefits:		
Beginning of year	348,603,594	321,751,703
End of year	$ 403,954,801	$ 348,603,594
Revised for final assets		N/A

EXHIBIT C.3
Development of the Actuarial Value of Assets

	Item			Year Ending December 31, 2021
1.	Actuarial value of assets, at beginning of year (prior to corridor)			$ 336,804,310
2.	Market value of assets, at beginning of year			348,603,594
3.	Net new investments			
	a. Contributions received for prior plan year			$ 26,665,558
	b. Benefits paid			(35,390,631)
	c. Administrative expenses			(480,077)
	d. Net			$ (9,205,150)
4.	Market value of assets, at end of year			$ 403,954,801
5.	Net MVA earnings [(4) - (2) - (3c)]			$ 64,556,357
6.	Assumed investment return rate			7.25%
7.	Expected return [(6)*(1)+(6)*(3d)/2]			$ 24,084,626
8.	Excess return [(5) - (7)]			$ 40,471,731
9.	Deferred amounts for fiscal year ending December 31,			
	Year	Gain/(Loss)	Percent Deferred	Amount Deferred
	a. 2021	40,471,731	80%	32,377,385
	b. 2020	10,579,506	60%	6,347,704
	c. 2019	24,051,086	40%	9,620,434
	d. 2018	(33,999,333)	20%	(6,799,867)
	e. 2017	12,523,798	0%	0
	f. Total	53,626,788		41,545,656
10.	80% of Market Value			$ 323,163,841
11.	120% of Market Value			$ 484,745,761
12.	Actuarial value of assets [(Item 4 - Item 9f), but not more than Item 11 or less than Item 10]			$ 362,409,145

EXHIBIT C.4
Average Annual Rates of Investment Return

Fiscal Year Ended December 31,	Actuarial Value		Market Value	
	Annual	Cumulative	Annual	Cumulative
1996	11.3 %	11.3 %	12.2 %	12.2 %
1997	12.4	11.8	15.0	13.6
1998	13.3	12.3	15.8	14.3
1999	14.0	12.7	10.0	13.2
2000	10.5	12.3	0.3	10.5
2001	7.3	11.4	(3.7)	8.0
2002	(2.5)	9.3	(9.8)	5.3
2003	5.4	8.8	24.7	7.5
2004	5.4	8.4	10.1	7.8
2005	7.1	8.3	10.0	8.0
2006	9.9	8.5	13.9	8.5
2007	12.7	8.8	9.3	8.6
2008	(9.9)	7.2	(29.5)	5.1
2009	16.6	7.9	19.6	6.0
2010	3.0	7.5	8.8	6.2
2011	0.3	7.1	(1.8)	5.7
2012	0.4	6.7	12.3	6.1
2013	8.8	6.8	13.2	6.5
2014	7.3	6.8	6.8	6.5
2015	5.7	6.8	(1.3)	6.1
2016	7.8	6.8	8.5	6.2
2017	7.5	6.8	12.3	6.5
2018	4.4	6.7	(3.8)	6.0
2019	5.8	6.7	16.5	6.4
2020	8.1	6.8	10.5	6.6
2021	10.5	6.9	18.8	7.0

Section D

Summary of Benefit Provisions

SUMMARY OF BENEFIT PROVISIONS

BASED ON THE PLAN ORIGINALLY EFFECTIVE JULY 1, 1968 AND AMENDED AND RESTATED EFFECTIVE JANUARY 1, 2022.

Participation

Any County Official and any person assigned to a full-time position as defined by Arapahoe County Personnel Policies and Procedures including job-sharing employees shall become a member of the Plan on the first day of the pay period coincident with or following date of employment.

Member Contributions

Effective December 21, 2011, each member contributes 7.5% of compensation on a monthly basis. Interest on contributions is credited at a rate of 4.0% per annum compounded annually after December 31, 2003 and prior to July 1, 2010. After June 30, 2010, interest on contributions is credited at a rate of 3.0% per annum, compounded annually. Effective January 1, 2014, each member contributes 8.00% of compensation on a monthly basis. Effective January 1, 2018 each member contributes 8.25% of compensation on a monthly basis. Effective January 1, 2019 each member contributes 8.50% of compensation on a monthly basis. Effective January 1, 2020 each member contributes 8.75% of compensation on a monthly basis. Effective January 1, 2021 each member contributes 9.00% of compensation on a monthly basis.

After December 31, 1983 member contributions are picked up and paid by the County as provided in Code Section 414(h).

County Contributions

The County will match member contributions.

Credited Service

All service completed during the elapsed time from the member's date of employment, excluding any breaks in service, to the member's date of termination on the basis of 1/365th year for each day of employment after July 1, 1968. Service prior to July 1, 1968 will be included (up to five years) provided the employee became a Member on the first date he was first eligible. Service is credited while a member is on long-term disability as long as no benefits are being paid from the plan. Service is adjusted for job-sharing members.

Service Purchase ("air time")

Eligible members may purchase additional years of service credit for any full-time, non-vested previous employment with any public or private employer in the United States, subject to certain restrictions.

Compensation

Compensation is the total regular compensation paid to the member, reflecting the normal regular salary or hourly wage rate, before any payroll deductions for income tax, Social Security, group insurance, or any other purpose, excluding bonuses, extra pay, overtime pay, workers' compensation, single-sum payments received in lieu of accrued vacation and sick leave upon termination of employment or during the course of employment or during the course of employment, required contributions by the County under this Plan, or for Social Security, group insurance, retainers' fees under contract, or the like, but including compensation deferred under Sections 125, 403(b), 414(h), or 457 of the Internal Revenue Code.

Two Part Formula for Benefits Accrued Before and After January 1, 2014

Several changes were made to benefits effective January 1, 2014. For purposes of determining benefit accruals, the "Part A Benefit" shall mean the benefit attributable to service credit earned prior to January 1, 2014. The "Part B Benefit" shall mean the benefit attributable to service credit earned on or after January 1, 2014.

Final Average Monthly Compensation

- *Members hired prior to July 1, 2010:*

  Part A Benefit: Average of the highest 36 consecutive calendar months of compensation during the last 120 months of employment.

  Part B Benefit: Average of the highest 60 consecutive calendar months of compensation during the last 120 months of employment.

- *Members hired on or after July 1, 2010:*

  Average of the highest 60 consecutive calendar months of compensation during the last 120 months of employment.

Accrued Benefit (Part A and Part B)

Part A Benefit:

- *Members hired prior to April 1, 2006:*

  2.5% of Final Average Monthly Compensation multiplied by Credited Service or $25 per year of Credited Service, if greater.

- *Members hired on or after April 1, 2006 and prior to July 1, 2010:*

  2.3% of Final Average Monthly Compensation multiplied by Credited Service or $25 per year of Credited Service, if greater.

- *Members hired on or after July 1, 2010:*

  2.0% of Final Average Monthly Compensation multiplied by Credited Service or $25 per year of Credited Service, if greater.

Part B Benefit:

- *All Members:*

  1.85% of Final Average Monthly Compensation multiplied by Credited Service or $25 per year of Credited Service, if greater.

Vested Accrued Benefit

- *Members hired prior to July 1, 2010 are subject to the following vesting schedule:*

Completed Years of Service	Percent Vested in Accrued Benefit
Less Than 4	0%
4	60%
5	70%
6	80%
7	90%
8 or more	100%

- *Members hired on or after July 1, 2010:*

  100% vesting with eight years of service. No partial vesting prior to meeting eight year requirement.

Normal Retirement

Eligibility:

Attainment of age 65.

Benefit:

Accrued Benefit.

Regular Early Retirement

Eligibility:

- *Members hired prior to April 1, 2006:*

  Attainment of age 52 and 4 years of Credited Service.

- *Members hired on or after April 1, 2006 and prior to July 1, 2010:*

  Attainment of age 55 and 4 years of Credited Service.

- *Members hired on or after July 1, 2010:*

  Attainment of age 55 and 8 years of Credited Service.

Benefit:

- *Members hired prior to July 1, 2010:*

  Vested Accrued Benefit determined as of his Early Retirement Date, reduced by 0.00555 for each of the first 60 months and 0.00278 for each additional month payments commence prior to the Normal Retirement Date.

- *Members hired on or after July 1, 2010:*

  Vested Accrued Benefit determined as of his Early Retirement Date, reduced by 0.00555 for each of the first 60 months and 0.00375 for each additional month payments commence prior to the Normal Retirement Date.

Special Early Retirement

Eligibility:

- *Members hired prior to April 1, 2006:*

Attainment of age 52 and age plus credited service equals 75 or more at termination.

- *Members hired on or after April 1, 2006 and prior to July 1, 2010:*

  Attainment of age 55 and age plus credited service equals 80 or more at termination.

- *Members hired on or after July 1, 2010:*

  Attainment of age 60 and age plus credited service equals 85 or more at termination.

Benefit:

Vested Accrued Benefit determined as of his Special Early Retirement Date, unreduced for early payment.

Disability Retirement

Eligibility:

Total and permanent disability. Member qualifies for disability under the County's long-term disability plan or under Title II of the Social Security Act.

Benefit:

Normal Retirement Benefit considering annual rate of compensation at disability and Credited Service he would have accumulated if employment had continued uninterrupted to the later of his Normal Retirement Date or the date that the County's long-term disability benefits end. Benefits commence at Normal Retirement Date.

Vested Termination Benefit

Eligibility:

- *Members hired prior to July 1, 2010:*

  Members who have completed at least four years of Credited Service are eligible to receive their Vested Accrued Benefit payable at Normal Retirement Date.

- *Members hired on or after July 1, 2010:*

  Members who have completed at least eight years of Credited Service are eligible to receive their Vested Accrued Benefit payable at Normal Retirement Date.

Refund of Accumulated Contributions

Upon termination prior to Normal Retirement Age, in lieu of a monthly pension benefit, the member may elect to receive a refund of a percentage of their accumulated contributions according to the following schedules:

- *Members hired prior to July 1, 2010 for Contributions Made Prior to January 1, 2014:*

Completed Years of Service	Percent of Accumulated Contributions Refunded
Less Than 5	100%
5 to 9	125%
10 to 14	150%
15 or more	200%

- *Members hired on or after July 1, 2010 and Contributions Made by All Members on or After January 1, 2014:*

  100% of Accumulated Contributions

- Notwithstanding the above, County Officials who terminate prior to Normal Retirement Age are entitled to receive 200% of their accumulated contributions.

Pre-Retirement Death Benefit

- *Member is single:*

  Beneficiary receives two times member's accumulated contributions at date of death.

- *Member is married:*

  Spouse receives two times member's accumulated contributions at date of death; or

  A monthly benefit equal to 65% of the member's vested accrued benefit, reduced by 1.5% for each year over 5 by which the spouse is younger.

Normal Form

- *Members hired prior to July 1, 2010:*

Monthly benefit paid for the life of the member, and if the member dies prior to receiving 120 monthly payments, the remainder of the 120 payments will be paid to the member's beneficiary.

- *Members hired on or after July 1, 2010:*

  Monthly benefit paid for the life of the member.

Optional Forms

- Life annuity
- 10 year certain and life
- 100% joint and survivor annuity
- 50% joint and survivor annuity
- Partial lump sum limited to the lesser of $100,000 and 36 times the monthly retirement benefit in conjunction with one of the optional forms above

Optional Form Conversion Factors

Optional annuity forms are actuarially equivalent based on 8.00% interest and the 1994 Group Annuity Mortality table blended 50% male and 50% female.

Partial lump sum actuarial equivalence is determined based on the PBGC lump sum interest rate for use in January 1st valuations of the current year and the 1994 Group Annuity Mortality table blended 50% male and 50% female.

Payment Date

Benefits are paid on the first of the month following eligibility for receipt.

SECTION E

SUMMARY OF PARTICIPANT DATA

EXHIBIT E.1
Summary of Census Data

	January 1, 2022	January 1, 2021
1. **Active Members**		
a. Counts	2,098	2,121
b. Annual Projected Compensation	$ 155,331,064	$ 148,620,818
c. Average Annual Compensation	$ 74,038	$ 70,071
d. Average Age	43.5	43.7
e. Average Service	8.0	8.1
f. Accumulated Member Contributions with Interest	$ 97,859,761	$ 95,662,500
2. **NonVested Members with Refunds Due**		
a. Counts	139	94
b. Amount of Refunds Due	$ 1,277,233	$ 781,675
3. **Deferred Vested Members***		
a. Counts	203	195
b. Annual Deferred Benefits	$ 1,881,971	$ 1,826,095
c. Average Benefit	$ 9,271	$ 9,365
4. **Retired Members****		
a. Counts	1,007	947
b. Annual Benefits	$ 29,220,591	$ 26,980,553
c. Average Benefit	$ 29,017	$ 28,491
5. **Beneficiaries**		
a. Counts	100	97
b. Annual Benefits	$ 1,776,765	$ 1,718,883
c. Average Benefit	$ 17,768	$ 17,720
6. **Disabled Retirees**		
a. Counts	26	27
b. Annual Benefits	$ 528,696	$ 540,097
c. Average Benefit	$ 20,334	$ 20,004
7. Total Members Included in Valuation	3,573	3,481

*Includes 18 deferred disableds in 2022 and 18 deferred disableds in 2021.

**Includes 10 alternate payees in pay status in 2022 and 9 alternate payees in pay status in 2021.

EXHIBIT E.2
Summary of Changes in Participant Status During Fiscal Year 2021

	Active Participants	With Deferred Benefits[1]	With Refunds Due	Retirees[2]	Disabled Retirees	Beneficiaries	Total
A. Number as of January 1, 2021	2,121	195	94	947	27	97	3,481
1. Age Retirements	(73)	(7)		80			-
2. Disability Retirements							-
3. Died With Beneficiary				(7)		7	-
4. Died Without Beneficiary	(6)			(15)	(1)	(4)	(26)
5. Terminated - Deferred	(17)	17					-
6. Terminated - Due Refund	(84)		84				-
7. Cashouts	(176)	(2)	(72)				(250)
8. Rehired as Active	1	(1)					-
9. New Hires	332		34				366
10. Expired Benefits							-
11. New Alternate Payee				1			1
12. Data Adjustments		1	(1)	1			1
B. Number as of January 1, 2022	2,098	203	139	1,007	26	100	3,573

[1]Includes 18 deferred disableds at January 1, 2021 and January 1, 2022.

[2]Includes 9 alternate payees at January 1, 2021 and 10 alternate payees at January 1, 2022.

EXHIBIT E.3
Active Member Counts by Age and Service as of January 1, 2022

Age	Service							
	0-4	5-9	10-14	15-19	20-24	25-29	Over 30	Total
Under 20	3	0	0	0	0	0	0	3
20-24	62	1	0	0	0	0	0	63
25-29	201	19	0	0	0	0	0	220
30-34	182	81	9	0	0	0	0	272
35-39	139	89	47	9	0	0	0	284
40-44	126	58	51	33	14	0	0	282
45-49	105	51	47	34	60	10	0	307
50-54	68	42	39	44	42	14	5	254
55-59	58	46	26	20	10	10	7	177
60-64	37	42	41	22	13	5	12	172
65-69	12	11	10	8	6	0	3	50
Over 70	4	5	5	0	0	0	0	14
Total	997	445	275	170	145	39	27	2,098

EXHIBIT E.4

Active Member Average Salary by Age and Service as of January 1, 2022

Age	Service							
	0-4	5-9	10-14	15-19	20-24	25-29	Over 30	Total
Under 20	*	*	*	*	*	*	*	*
20-24	$49,330	*	*	*	*	*	*	$49,596
25-29	56,208	69,331	*	*	*	*	*	57,341
30-34	61,207	73,601	81,048	*	*	*	*	65,555
35-39	62,951	78,645	90,523	78,746	*	*	*	72,933
40-44	66,693	81,479	87,515	93,189	98,572	*	*	78,183
45-49	68,081	82,284	87,523	102,014	101,538	102,694	*	84,841
50-54	61,213	85,335	86,156	81,905	95,931	107,181	117,541	81,999
55-59	68,138	73,852	75,794	91,372	78,353	88,042	89,159	75,906
60-64	69,135	74,843	84,412	71,573	69,388	123,129	109,537	78,890
65-69	66,569	84,674	64,083	63,983	91,908	*	*	73,191
Over 70	*	72,906	143,925	*	*	*	*	95,652
Total	$61,833	77,949	86,229	86,883	94,748	103,168	101,905	$74,038

**Data excluded when cell contains less than five active members.*

EXHIBIT E.5
10-Year Projected Benefit Payments (Closed Group)

Fiscal Year Ended December 31,	Actives	Inactives	Total
2022	$ 3,250,875	$ 32,157,087	$ 35,407,962
2023	5,319,080	31,946,734	37,265,814
2024	7,281,221	31,688,914	38,970,134
2025	9,403,374	31,390,820	40,794,194
2026	11,383,165	31,021,984	42,405,149
2027	13,112,575	30,611,207	43,723,782
2028	14,899,176	30,155,964	45,055,140
2029	16,512,634	29,650,917	46,163,552
2030	18,635,417	29,139,851	47,775,268
2031	20,681,850	28,587,909	49,269,759

EXHIBIT E.6
History of Refunds

Fiscal Year Ended December 31,	Refund Amount
2000	$ 1,841,735
2001	1,272,665
2002	1,608,610
2003	1,310,413
2004	3,028,690
2005	2,084,450
2006	2,592,766
2007	2,162,553
2008	2,086,744
2009	1,955,111
2010	2,083,653
2011	3,496,194
2012	3,671,939
2013	3,510,796
2014	2,367,374
2015	4,238,601
2016	3,276,820
2017	3,873,640
2018	4,060,659
2019	4,341,376
2020	2,894,103
2021	5,829,125

SECTION F

HISTORICAL SCHEDULES

EXHIBIT F.1
Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Unfunded AAL (UAAL)	Funded Ratio	Covered Payroll	UAAL as a Percentage of Covered Payroll
(1)	(2)	(3)	(4)=(3)-(2)	(5)=(2)/(3)	(6)	(7)=(4)/(6)
1/1/2006	$ 184,740,932	$ 228,029,274	$ 43,288,342	81.0%	$ 82,413,819	52.5%
1/1/2007	203,380,043	254,096,172	50,716,129	80.0%	87,793,057	57.8%
1/1/2008	229,898,148	281,233,693	51,335,545	81.7%	94,903,465	54.1%
1/1/2009	207,669,753	305,587,064	97,917,311	68.0%	98,242,489	99.7%
1/1/2010	241,589,816	319,784,777	78,194,961	75.5%	100,258,835	78.0%
1/1/2011	248,196,924	336,226,280	88,029,356	73.8%	100,055,914	88.0%
1/1/2012	244,819,165	350,428,241	105,609,075	69.9%	97,089,282	108.8%
1/1/2013	241,039,070	372,666,488	131,627,418	64.7%	98,983,554	133.0%
1/1/2014	255,998,498	376,418,240	120,419,742	68.0%	100,854,023	119.4%
1/1/2015	269,388,499	405,186,186	135,797,687	66.5%	107,204,231	126.7%
1/1/2016	276,435,867	427,063,671	150,627,804	64.7%	115,287,599	130.7%
1/1/2017	290,836,607	442,283,302	151,446,695	65.8%	120,887,355	125.3%
1/1/2018	304,107,323	482,144,798	178,037,475	63.1%	125,346,071	142.0%
1/1/2019	308,611,495	510,134,083	201,522,588	60.5%	136,875,674	147.2%
1/1/2020	317,938,637	530,126,256	212,187,619	60.0%	142,225,883	149.2%
1/1/2021	336,804,310	556,258,113	219,453,803	60.5%	148,620,818	147.7%
1/1/2022	362,409,145	585,639,282	223,230,137	61.9%	155,331,064	143.7%

EXHIBIT F.2
Schedule of Employer Contributions

Fiscal Year Ended December 31,	Actuarially Determined Contribution	Actual County Contribution	Percentage Contributed
2000	$ 2,744,917	$ 3,513,580	128.0%
2001	3,569,424	4,058,125	113.7%
2002	4,233,336	4,298,635	101.5%
2003	6,635,041	4,504,398	67.9%
2004	7,343,755	4,648,252	63.3%
2005	7,608,309	4,736,887	62.3%
2006	7,853,983	5,127,586	65.3%
2007	8,393,081	5,553,621	66.2%
2008	8,924,369	6,188,651	69.3%
2009	12,408,298	6,455,058	52.0%
2010	9,822,089	6,995,753	71.2%
2011	10,684,309	6,890,012	64.5%
2012	11,807,180	7,430,087	62.9%
2013	13,572,119	7,723,973	56.9%
2014	10,875,990	8,451,497	77.7%
2015	12,267,139	8,749,813	71.3%
2016	13,283,879	9,298,210	70.0%
2017	13,238,956	9,660,642	73.0%
2018	16,096,665	10,442,318	64.9%
2019	17,545,850	11,669,706	66.5%
2020	18,027,937	12,642,439	70.1%
2021	18,483,326	13,341,693	72.2%
2022	19,016,458	TBD	TBD

SECTION G

ASSESSMENT AND DISCLOSURE OF RISK

Assessment and Disclosure of Risk

The findings in this report are based on data and other information through the valuation date. 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 due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

However the effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

INVESTMENT RISK AND PLAN MATURITY

Risks facing a pension plan will change over time. A young plan with virtually no investments will experience little investment risk. An older plan with a large number of members in pay status and a significant trust can feel investment risk sharply. A very mature plan can experience a loss of assets and, owing to its large non-working population the solution of plan redesign or raising employee contribution rates may be a less than adequate solution to those investment losses. A closed plan, with no active members, will face the singular solution of requiring additional contributions to meet funding requirements.

Given the decreasing effectiveness of available solutions in the course of a maturing plan, it is important for plan sponsors to be aware of the status of their plans, and to monitor their investment policies and risk tolerance.

OTHER PLAN SPECIFIC RISKS

Longevity and Other Demographic Risk

The longevity risk (the risk that retirees will live longer than expected) is spread over the plan population. Some members will live much longer than others. Although longevity risk is spread over the population and likely is not a large source of near term volatility, there is still the potential for deviation from the assumption over the long term.

Contribution Risk

The contributions to this plan are set by the County and may not cover the ongoing cost of the plan if the plan suffers adverse experience. Under current state statute, the County contributions cannot be more than the member contributions. This dynamic makes it particularly difficult to address adverse experience through increased contributions.

Population Stability and Payroll Growth

Current contribution rates exceed the normal cost rate, and that excess can be used to finance the unfunded liability. A larger payroll means more dollars available for that purpose. The plan's baseline projections assume a stable active population with growing payroll. The sustainability of the plan is dependent on a growing payroll. The plan would likely not be sustainable at current contribution rates assuming a stagnant or decreasing payroll.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. One plan maturity measure which may be particularly relevant to this plan which is funded by a fixed percent of payroll is the market value of assets to total payroll.

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 2.0 times the payroll, a return on assets 5% different than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

	January 1, 2022	January 1, 2021	January 1, 2020
Ratio of the market value of assets to total payroll	2.6	2.3	2.3

INVESTMENT RISK SENSITIVITY ANALYSIS

The following shows the projected ratio of the plan over a 10-year horizon assuming actual investment returns of 6.75%, 7.25%, and 7.75% on the Actuarial Value of Assets and assume total contributions remain fixed at 18.0% of pay. The projections assume a discount rate of 7.25% in each scenario. It is only actual investment experience that is modified.

Projected Funded Ratio			
Actual Investment Return			
Year	6.75%	7.25%	7.75%
2022	61.9%	61.9%	61.9%
2023	62.3%	62.4%	62.4%
2024	62.6%	62.8%	63.0%
2025	62.8%	63.2%	63.5%
2026	62.9%	63.5%	64.1%
2027	62.9%	63.8%	64.8%
2028	62.8%	64.1%	65.4%
2029	62.7%	64.4%	66.1%
2030	62.6%	64.7%	66.8%
2031	62.5%	64.9%	67.5%
2032	62.4%	65.3%	68.2%

Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the plan's financial condition.

SECTION H

ACTUARIAL ASSUMPTIONS AND METHODS

SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS

I. Valuation Date

The valuation date is January 1st of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. Actuarial Cost Method

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

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

2. The employer contributions needed to support the benefits of the Plan on an actuarial basis are determined following a level funding approach, and consist of a normal cost contribution and an accrued liability contribution.

3. The normal contribution is determined using the Entry Age Normal method. Under this method, a calculation is made to determine the average uniform and constant percentage rate of employer contribution which, if applied to the compensation of each new participant during the entire period of his anticipated covered service, would be required in addition to the contributions of the participant to meet the cost of all benefits payable on their behalf.

4. The unfunded accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability and amortizing the result over 20 years from the valuation date as a level percentage of pay. It is assumed that payments are made throughout the year.

III. Actuarial Value of Assets

The actuarial value of assets is based on recognizing gains and losses over a five-year period where gains and losses are determined by comparing the projected actuarial value of assets (based on the prior year's actuarial value of assets before application of the corridor, cash flows during the year and expected investment returns on those amounts) to the market value of assets. The actuarial value of assets must be between 80 and 120% of market value.

IV. Actuarial Assumptions

A. Economic Assumptions

1. Investment return: 7.25% per annum, compounded annually, composed of an assumed 2.50% inflation rate and a 4.75% real rate of return. This rate represents the assumed return, net of all investment expenses.

2. Salary increase rate: Inflation rate of 2.50%, plus productivity component of 0.75%, plus step-rate/ promotional component as shown.

Sample Attained Age	Percentage Increase in Salary		
	Merit	Inflation	Total
25	4.25 %	2.50 %	6.75 %
30	3.75	2.50	6.25
35	3.00	2.50	5.50
40	2.25	2.50	4.75
45	2.00	2.50	4.50
50	1.60	2.50	4.10
55	1.30	2.50	3.80
60	1.00	2.50	3.50
65	0.75	2.50	3.25

3. Payroll growth rate: In the amortization of the unfunded actuarial accrued liability, payroll is assumed to increase 3.25% per year. This increase rate is primarily due to the effect of inflation on salaries, with no allowance for future membership growth.

B. Demographic Assumptions

1. Mortality rates (pre- retirement) – Blended Pub-2010 Amount-Weighted Employee Mortality Tables projected with the Ultimate MP-2014 Scale. The Mortality table is blended as follows; 21% Public Safety Mortality Table, 49% General Employee Above-Median Income Mortality Table, and 30% General Employee Below-Median Income Mortality Table.

2. Mortality rates (post- retirement) – Blended Pub-2010 Amount-Weighted Healthy Retiree Mortality Tables projected with the Ultimate MP-2014 Scale. The Mortality table is blended as follows; 21% Public Safety Mortality Table, 49% General Healthy Retiree Above-Median Income Mortality Table, and 30% General Healthy Retiree Below-Median Income Mortality Table. A 105% multiplier is applied to the female mortality table.

3. Mortality rates (post-disablement) – Blended Pub-2010 Amount-Weighted Disabled Retiree Mortality Tables projected with the Ultimate MP-2014 Scale. The Mortality table is blended as follows; 21% Public Safety Mortality Table, 49% General Disabled Retiree Above-Median Income Mortality Table, and 30% General Disabled Retiree Below-Median Income Mortality Table.

Sample rates for the year 2022 are shown below.

Sample Attained Ages	Probability of Death Pre-Retirement	
	Men	Women
20	0.03 %	0.01 %
25	0.03	0.01
30	0.03	0.02
35	0.04	0.02
40	0.06	0.04
45	0.09	0.05
50	0.14	0.08
55	0.20	0.11
60	0.29	0.17
65	0.43	0.26
70	0.68	0.44
75	1.10	0.76
80	1.82	1.31
85	6.72	4.90
90	13.34	10.36

Sample Attained Ages	Probability of Death Post-Retirement	
	Men	Women
20	0.03 %	0.01 %
25	0.03	0.01
30	0.03	0.02
35	0.04	0.03
40	0.06	0.04
45	0.11	0.07
50	0.34	0.24
55	0.46	0.31
60	0.62	0.41
65	0.87	0.62
70	1.45	1.06
75	2.51	1.86
80	4.43	3.28
85	7.84	5.94
90	13.34	10.88

Sample Attained Ages	Probability of Death Post-Disability	
	Men	Women
20	0.31 %	0.17 %
25	0.22	0.13
30	0.27	0.20
35	0.35	0.30
40	0.48	0.47
45	0.75	0.73
50	1.19	1.10
55	1.57	1.31
60	1.89	1.50
65	2.35	1.78
70	3.09	2.30
75	4.24	3.26
80	6.19	4.94
85	9.29	7.81
90	14.46	11.87

3. Disability rates. Sample rates shown below:

Sample Attained Ages	Probability of Disablement Next Year	
	Men	Women
25	0.04 %	0.04 %
30	0.05	0.05
35	0.06	0.06
40	0.09	0.09
45	0.13	0.13
50	0.21	0.21
55	0.36	0.36
60	0.54	0.54

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

Sample Attained Age	Probability of Termination Next Year	
	Men	Women
20	21.00 %	21.00 %
25	15.00	17.50
30	10.00	16.50
35	9.00	12.00
40	5.00	9.50
45	5.00	7.00
50	5.00	5.00
55	5.00	5.00

5. Retirement rates.

Attained Age	Before Eligible for Special Early Retirement	After Eligible for Special Early Retirement
52-54	0.0 %	25.0 %
55	5.0	25.0
56-61	5.0	10.0
62-64	12.0	25.0
65-69	25.0	50.0
70 & Over	100.0	100.0

C. <u>Other Assumptions</u>

1. Percent married: 85% of employees are assumed to be married.
2. Age difference: Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.
3. Cost of living adjustment: None.
4. Optional forms: Members are assumed to elect the normal form of benefit.
5. Vested terminating members are assumed to elect a refund or a deferred benefit, whichever is more valuable at the time of termination.
6. Current and future deferred vested participants are assumed to retire at age 52 if termination occurred on or after January 1, 2000 and hired before April 1, 2006. Age 55 otherwise. Deferred disabled participants are assumed to commence benefits at age 65.
7. Members are assumed to utilize 6% of the partial lump sum benefits available to them.
8. Administrative expenses: Prior year actual administrative expenses are included as an explicit charge on the Actuarially Determined Contribution.
9. Pay increase timing: End of (fiscal) year.
10. Decrement timing: Decrements of all types are assumed to occur mid-year.
11. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

12. Decrement relativity: Decrement rates are used directly, without adjustment for multiple decrement table effects.

13. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.

SECTION I

DETERMINISTIC PROJECTIONS

Deterministic Projections

Projections are a vital part of the annual valuation process for the Arapahoe County Retirement Plan. The Arapahoe County Retirement Plan is funded on a fixed rate basis meaning the contributions made to the plan do not automatically change as a result of experience, good or bad. As a result, long term projected outcomes can change significantly year to year due to fluctuations in investment returns.

Included in this section is a set of deterministic projections that assumes the County continues to contribute at the current contribution level.

Baseline Projections – 9.0% Employee and Employer Contributions

Valuation as of January 1,	Smoothed Asset Return for FY Beginning on Valuation Date	Contribution Rate for Fiscal Year Following Valuation Date		Projected Payroll (in Millions)	Employer Contributions (in Millions)	Actuarial Accrued Liability (AAL, in Millions)	Actuarial Value of Assets (AVA, in Millions)	Unfunded Actuarial Accrued Liability (UAAL, in Millions)	Funded Ratio	Funding Shortfall/ (Surplus)	20-Year Employer ADC	Employer Normal Cost (NC)	20-Year Amortization Payment	Assumed Expenses
		Employee	Employer											
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
2022	7.25%	9.00%	9.00%	$155	$14	$586	$362	$223	61.9%	3.34%	12.34%	1.51%	10.52%	0.31%
2023	7.25%	9.00%	9.00%	160	14	609	380	229	62.4%	3.14%	12.14%	1.41%	10.42%	0.31%
2024	7.25%	9.00%	9.00%	165	15	633	397	236	62.8%	3.03%	12.03%	1.34%	10.37%	0.31%
2025	7.25%	9.00%	9.00%	170	15	656	414	242	63.2%	2.94%	11.94%	1.29%	10.34%	0.31%
2026	7.25%	9.00%	9.00%	175	16	679	431	248	63.5%	2.85%	11.85%	1.25%	10.29%	0.31%
2027	7.25%	9.00%	9.00%	180	16	702	448	254	63.8%	2.77%	11.77%	1.22%	10.25%	0.31%
2028	7.25%	9.00%	9.00%	185	17	725	465	260	64.1%	2.68%	11.68%	1.19%	10.18%	0.31%
2029	7.25%	9.00%	9.00%	191	17	748	482	266	64.4%	2.59%	11.59%	1.17%	10.11%	0.31%
2030	7.25%	9.00%	9.00%	197	18	772	499	273	64.7%	2.49%	11.49%	1.15%	10.03%	0.31%
2031	7.25%	9.00%	9.00%	203	18	796	517	279	64.9%	2.39%	11.39%	1.13%	9.95%	0.31%
2032	7.25%	9.00%	9.00%	210	19	820	535	285	65.3%	2.28%	11.28%	1.11%	9.86%	0.31%
2033	7.25%	9.00%	9.00%	216	19	846	555	291	65.6%	2.17%	11.17%	1.10%	9.76%	0.31%
2034	7.25%	9.00%	9.00%	223	20	872	575	297	65.9%	2.06%	11.06%	1.09%	9.66%	0.31%
2035	7.25%	9.00%	9.00%	230	21	899	596	303	66.3%	1.94%	10.94%	1.07%	9.55%	0.31%
2036	7.25%	9.00%	9.00%	238	21	928	618	309	66.7%	1.81%	10.81%	1.06%	9.44%	0.31%
2037	7.25%	9.00%	9.00%	245	22	957	642	315	67.1%	1.68%	10.68%	1.05%	9.32%	0.31%
2038	7.25%	9.00%	9.00%	253	23	988	667	321	67.5%	1.55%	10.55%	1.04%	9.20%	0.31%
2039	7.25%	9.00%	9.00%	261	24	1,019	693	327	68.0%	1.41%	10.41%	1.04%	9.06%	0.31%
2040	7.25%	9.00%	9.00%	270	24	1,052	720	332	68.5%	1.27%	10.27%	1.03%	8.93%	0.31%
2041	7.25%	9.00%	9.00%	278	25	1,086	749	337	69.0%	1.13%	10.13%	1.02%	8.79%	0.31%
2042	7.25%	9.00%	9.00%	287	26	1,122	779	342	69.5%	0.97%	9.97%	1.02%	8.64%	0.31%
2043	7.25%	9.00%	9.00%	296	27	1,158	811	347	70.0%	0.82%	9.82%	1.02%	8.49%	0.31%
2044	7.25%	9.00%	9.00%	306	28	1,196	845	351	70.6%	0.66%	9.66%	1.02%	8.33%	0.31%
2045	7.25%	9.00%	9.00%	316	28	1,236	880	356	71.2%	0.50%	9.50%	1.02%	8.17%	0.31%
2046	7.25%	9.00%	9.00%	326	29	1,277	917	359	71.9%	0.33%	9.33%	1.01%	8.00%	0.31%
2047	7.25%	9.00%	9.00%	336	30	1,319	956	363	72.5%	0.16%	9.16%	1.02%	7.83%	0.31%
2048	7.25%	9.00%	9.00%	347	31	1,362	997	365	73.2%	(0.02)%	8.98%	1.02%	7.65%	0.31%
2049	7.25%	9.00%	9.00%	358	32	1,407	1,039	368	73.9%	(0.21)%	8.79%	1.02%	7.46%	0.31%
2050	7.25%	9.00%	9.00%	369	33	1,453	1,084	370	74.6%	(0.40)%	8.60%	1.02%	7.27%	0.31%
2051	7.25%	9.00%	9.00%	381	34	1,501	1,130	371	75.3%	(0.60)%	8.40%	1.02%	7.06%	0.31%
2052	7.25%	9.00%	9.00%	393	35	1,550	1,178	371	76.0%	(0.81)%	8.19%	1.03%	6.85%	0.31%