



## City of Cincinnati Retirement System Board of Trustees Meeting

### Agenda

June 10, 2021 / 2:00 P.M.  
City Hall, Council Chambers and via Zoom

#### Members

Tom Gamel	John Juech
Bill Moller	Betsy Sundermann
Don Stiens	Kathy Rahtz
Mark Menkhaus Jr.	Erica Winstead

#### Administration

Paula Tilsley  
Renee Kabin  
Ann Schooley

#### Call to Order

#### Approval of Minutes

- ✚ Meeting Minutes – May 6, 2021

#### Governance Committee Report

- ✚ Report from Committee, June 10, 2021

#### Unfinished Business

- ✚ Outstanding Opinions:
  - K. Rahtz Board Approved Motion, October 3, 2019
    - Item 1. Explain why City's changes to retiree healthcare are permitted under the CSA without Court approval.
    - Item 2. Explain why the Board cannot retain outside counsel on matters which the Solicitor's Office will not give counsel.
- ✚ Search for Executive Director

#### New Business

- ✚ Cheiron Presentation of Annual Valuations as of December 31, 2020
- ✚ Disability Application – K. Calloway
- ✚ Board's Annual Report to Council

#### Informational

- ✚ April 2021 Monthly Investment Report
- ✚ 115 Health Care Trust Funding Policy
- ✚ Pending Board Items: Asset/Liability Study - July Board Meeting; Fiduciary Performance Audit.

#### Adjournment

Next Meeting: July 1, 2021, 2:00 P.M., City Hall, Council Chambers



**City of Cincinnati Retirement System  
Board of Trustees Meeting  
Minutes  
May 6, 2021 / 2:00 P.M.  
City Hall – Council Chambers**

**Present**

Bill Moller, Chair  
Tom Gamel, Vice Chair  
John Juech  
Mark Menkhaus, Jr.  
Kathy Rahtz

Don Stiens  
Betsy Sundermann  
Erica Winstead

**Staff Present**

Paula Tilsley  
Renee Kabin  
Bev Nussman  
Keva Eleam  
Ann Schooley

**CALL TO ORDER**

The meeting was called to order at 2:14 p.m. and a roll call of attendance was taken.

**APPROVAL OF MINUTES**

E. Winstead made a motion to approve the minutes of the April 8, 2021 Board of Trustees meeting.

D. Stiens seconded the motion to approve. Roll call vote results were as follows:

Mr. Moller– Y  
Mr. Gamel – Y  
Mr. Juech - Y  
Mr. Menkhaus – Y  
Ms. Rahtz - Y  
Mr. Stiens – Y  
Ms. Sundermann –Y  
Ms. Winstead –Y

The motion to approve minutes of the April 8, 2021 Board meeting passed.

**NEW BUSINESS**

**Investment Committee Report**

B. Moller reported on the items discussed in the Committee meeting and certain actions needed to rebalance the portfolio. Fund manager ULLICO to present on Infrastructure, and Neuberger Berman to present on Defensive Equity at the August Committee meeting. Four motions were approved.

**Board Action**

The first motion on the floor was to rebalance the portfolio by moving a total of \$53 million from equities to core bonds, composed of \$33 million from small cap value, \$10 million from mid cap value and \$10 million from large cap value. There was no further discussion. Results of the roll call vote are as follows:

B. Moller - Y  
T. Gamel -Y  
J. Juech - Y  
M. Menkhaus, Jr. -Y  
K. Rahtz - Y  
D. Stiens - Y  
B. Sundermann - Y  
E. Winstead - Y

Motion to rebalance the portfolio by moving \$33 million from small cap value, \$10 million from mid cap value and \$10 million from large cap value, for a total of \$53 million to core bonds, passed.

A second motion was made to further rebalance the portfolio by moving \$18 million from the International ACWI Index fund to the Russell 3000 Index fund. Results of the roll call vote are as follows:

B. Moller - Y  
T. Gamel - Y  
J. Juech -Y  
M. Menkhaus, Jr. -Y  
K. Rahtz -Y  
D. Stiens -Y  
B. Sundermann -Y  
E. Winstead -Y

The motion to rebalance the portfolio by moving \$18 million from the International ACWI Index fund to the Russell 3000 Index fund passed.

The third motion was to accept the First Quarter 2021 Investment Report. Roll call vote results were as follows:

B. Moller -Y  
T. Gamel -Y  
J. Juech -Y  
M. Menkhaus, Jr. -Y  
K. Rahtz -Y  
D. Stiens - Y  
B. Sundermann - Y  
E. Winstead -Y

The motion passed to accept the First Quarter 2021 Investment Report.

A fourth motion was made to approve the commitment of \$40 million to JP Morgan Private Equity Fund X (ten). Results of the roll call vote were as follows:

- B. Moller – Y
- T. Gamel – Y
- J. Juech – Y
- M. Menkhaus, Jr. – Y
- K. Rahtz – Y
- D. Stiens – Y
- B. Sundermann – Y
- E. Winstead – Y

Commitment of \$40 million to JP Morgan Private Equity Fund X approved.

T. Gamel commented on the current funding status of the trust fund, nearly \$2.4 billion.

B. Moller reported that the Governance Committee will meet in June in place of the Benefits Committee.

### **UNFINISHED BUSINESS**

#### **✚ Outstanding Opinions:**

Rahtz Board Approved Motion, October 3, 2019

- Item 1. Explain why City's changes to retiree healthcare are permitted under the CSA without Court approval.
- Item 2. Explain why the Board cannot retain outside counsel on matters which the Solicitor's Office will not give counsel.

A. Schooley reported that there are no updates.

#### **✚ Executive Director Search**

B. Moller reported that the search is progressing and the hope is to have a candidate in place before Ms. Tilsley's departure.

### **INFORMATIONAL**

#### **✚ 1<sup>st</sup> Qtr. 2021 DROP Report**

B. Moller reported there seem to be additional costs to CRS associated with administering the DROP.  
D. Stiens asked about the ability to determine the health care cost savings to the 115 Trust of those enrolled in DROP.

#### **✚ 115 Health Care Trust Funding Policy**

P. Tilsley reported there are no updates.

B. Sundermann reported on a motion she submitted to City Council regarding the possible impact to CRS if Issue 3 had passed. Had Issue 3 passed, there could have been a negative impact of up to \$3.6 million in lost contributions due to eliminated positions.

With no other business before the Board, K. Rahtz made a motion to adjourn. E. Winstead seconded the motion to adjourn. The results of the roll call vote were as follows:

- B. Moller – Y
- T. Gamel – Y
- J. Juech – Y
- M. Menkhaus – Y
- K. Rahtz – Y
- D. Stiens – Y
- B. Sundermann - Y
- E. Winstead - Y

The motion to adjourn passed. Meeting adjourned at 2:33 P.M.

DRAFT

## Pension Actuarial Valuation as of December 31, 2020

June 10, 2021



Presented by

Kevin Woodrich, FSA, EA, MAAA

Janet Cranna, FSA, EA, MAAA



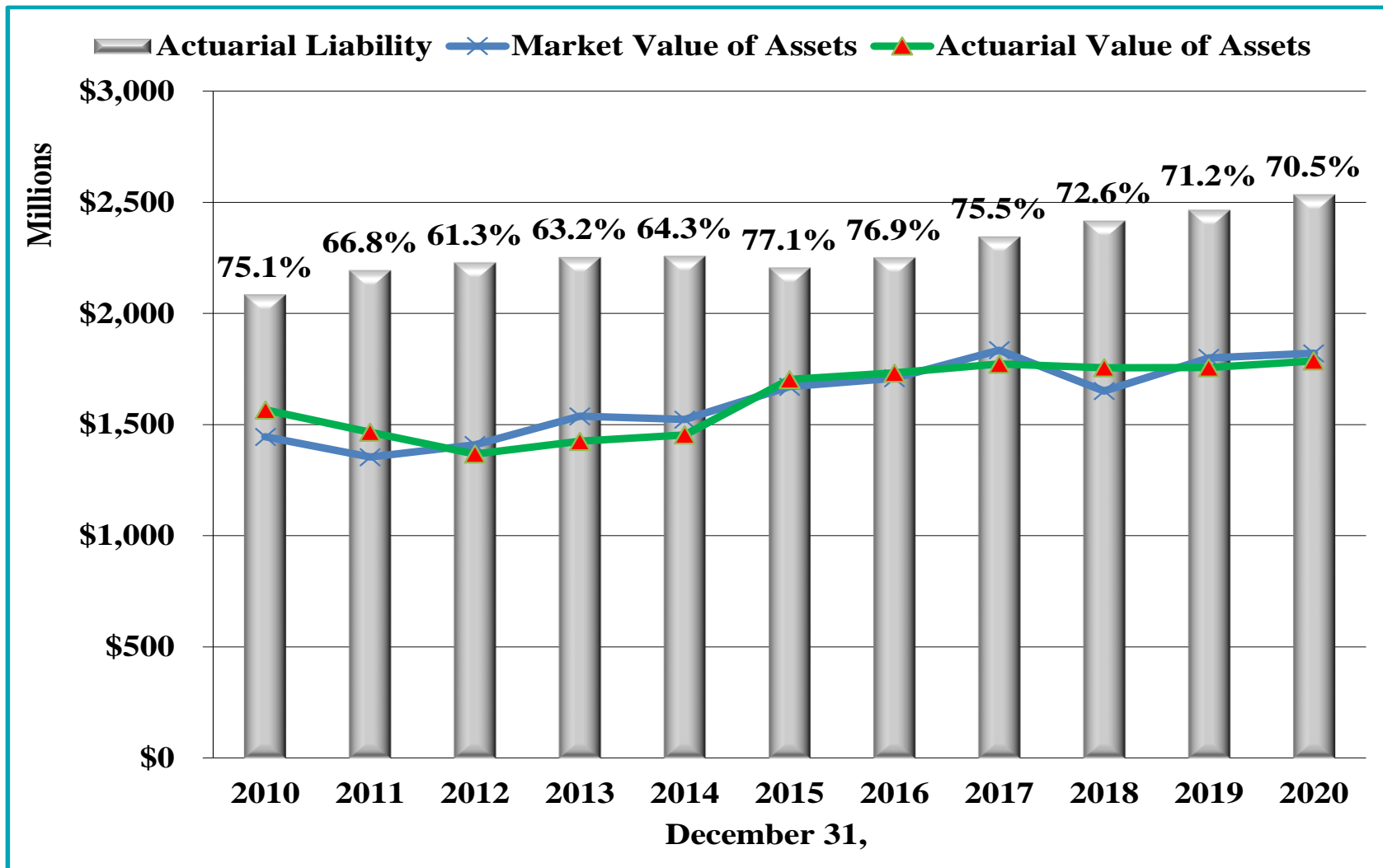
- Historical Trends
- December 31, 2020 Valuation Results
- Stress Testing



# Historical Trends

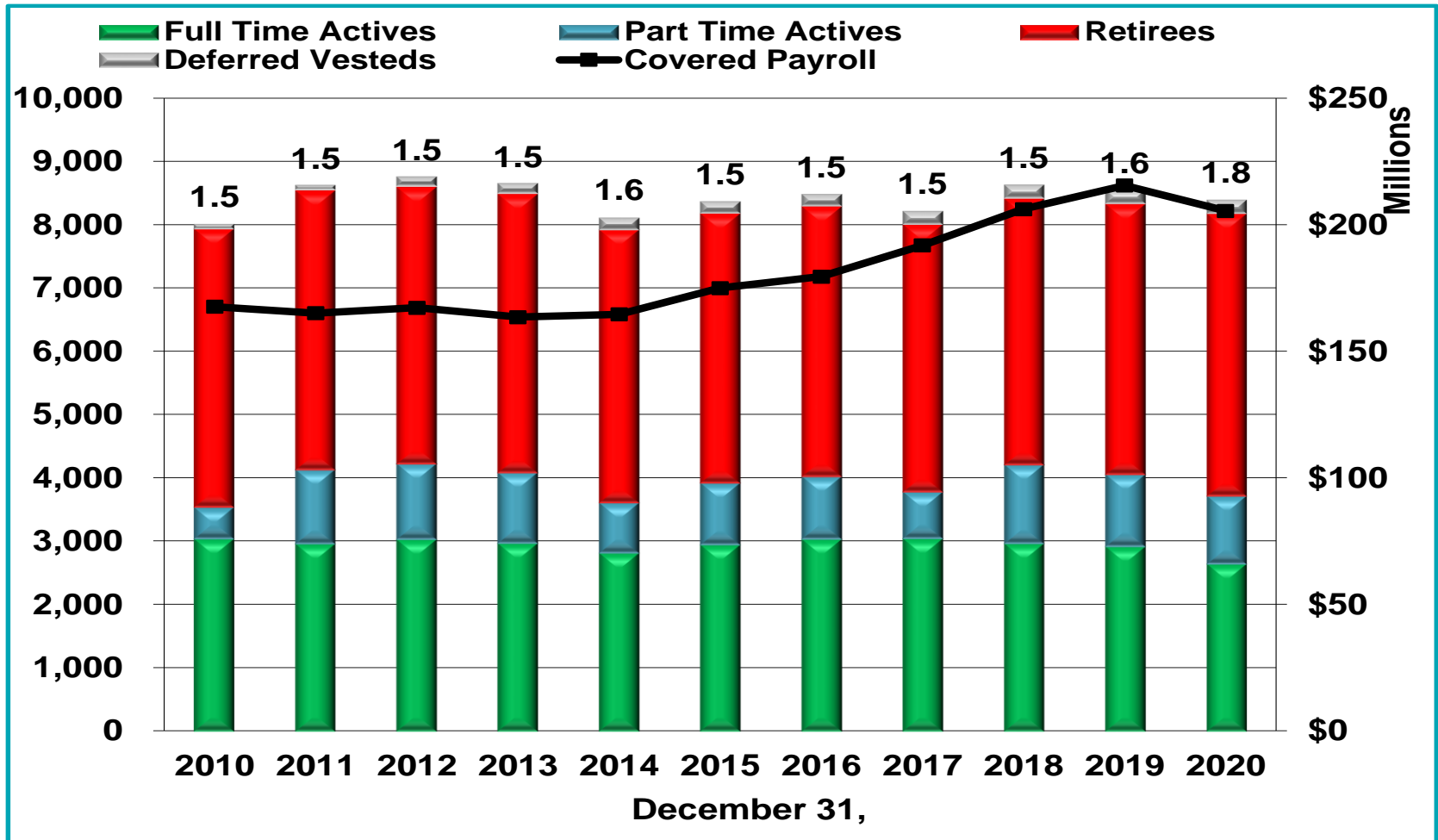


# Assets and Liabilities



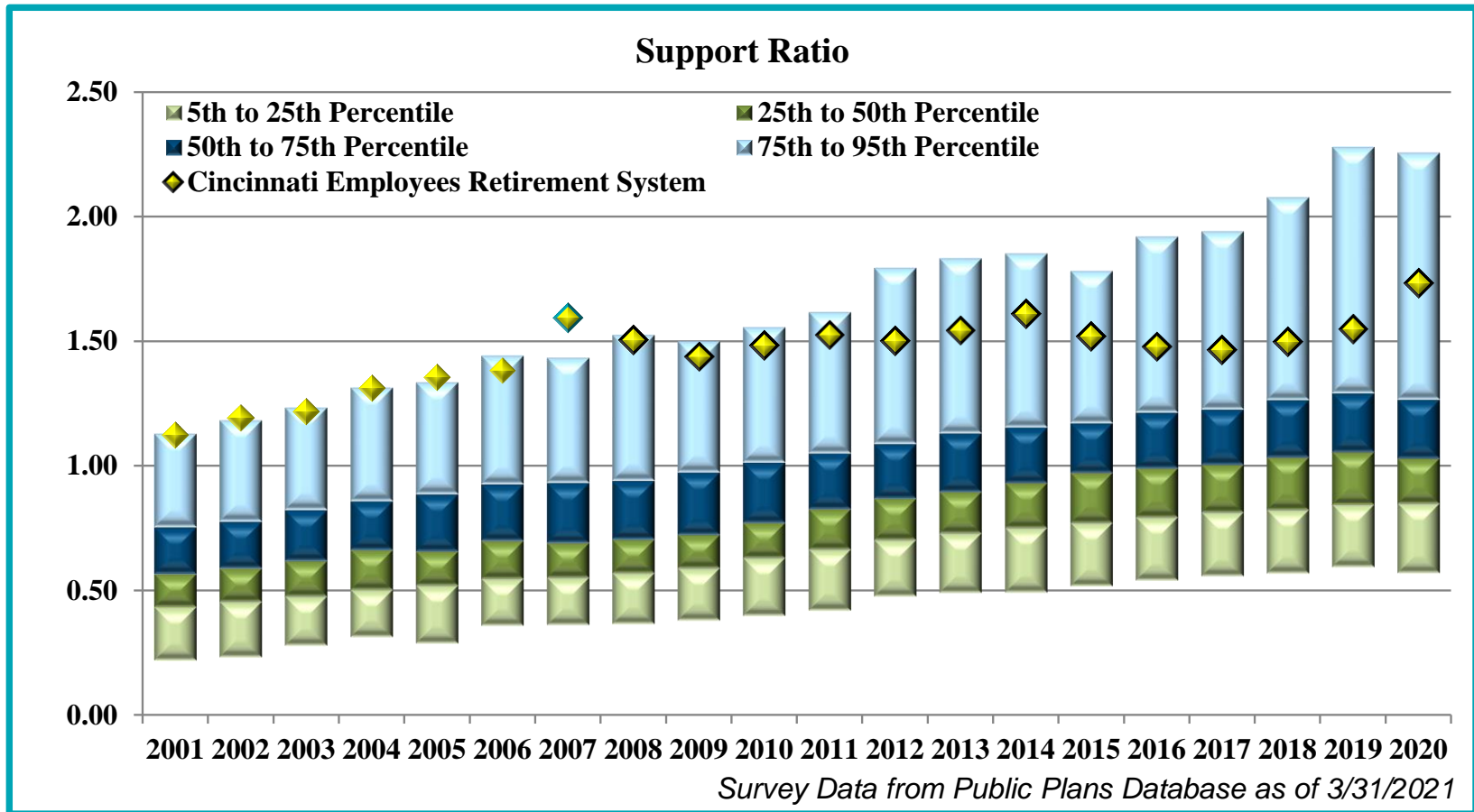
Funded status shown above bars is Actuarial Value of Assets divided by Actuarial Liability.

# Membership Trends



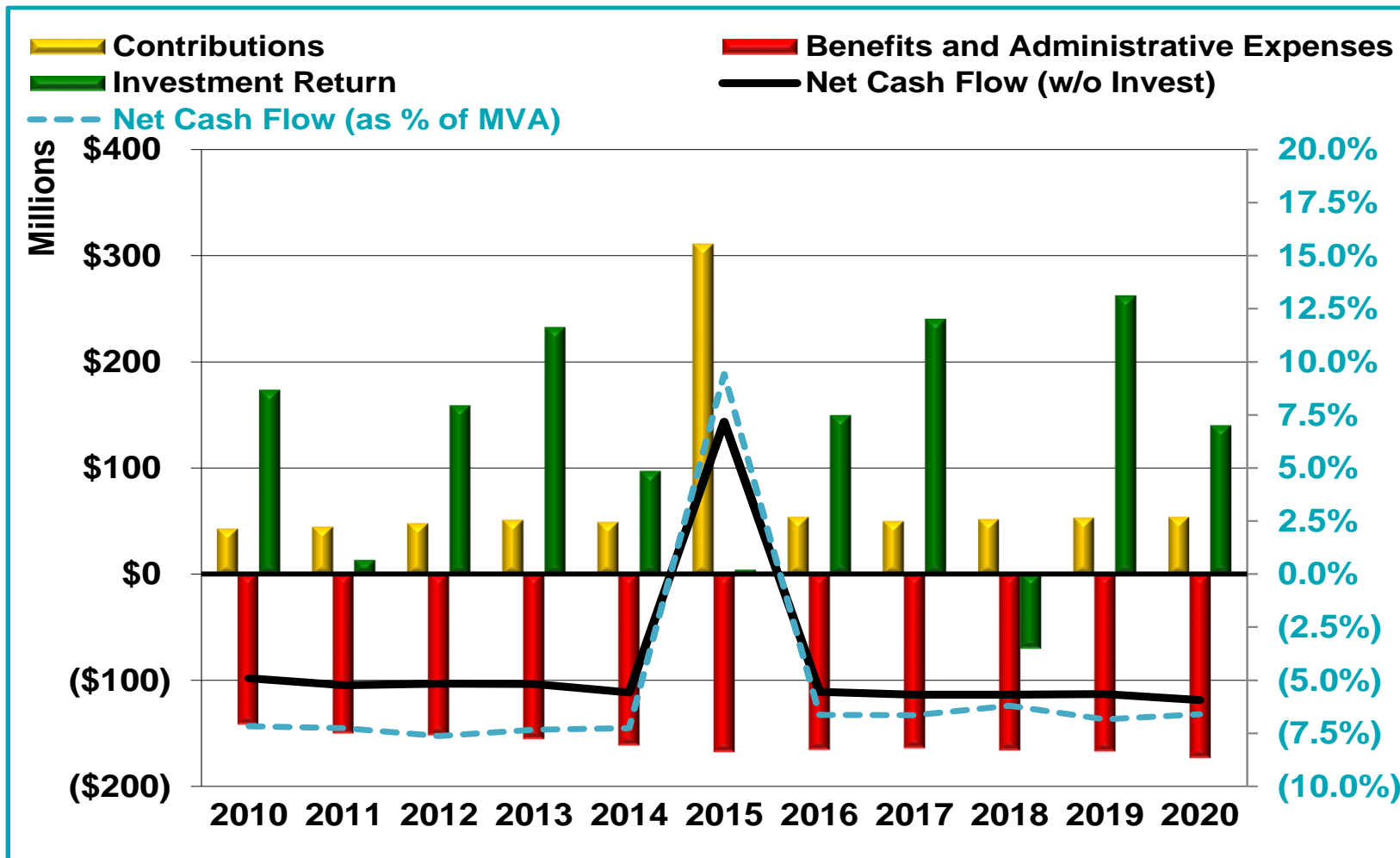
Support ratio above bars is the ratio of the number of inactive (Retirees and Deferred Vested) per active (Full-Time only). Payroll includes Full-Time and Part-Time actives for years shown. For 2018, 2019 and 2020, also includes payroll of DROP participants.

# Public Survey Comparisons



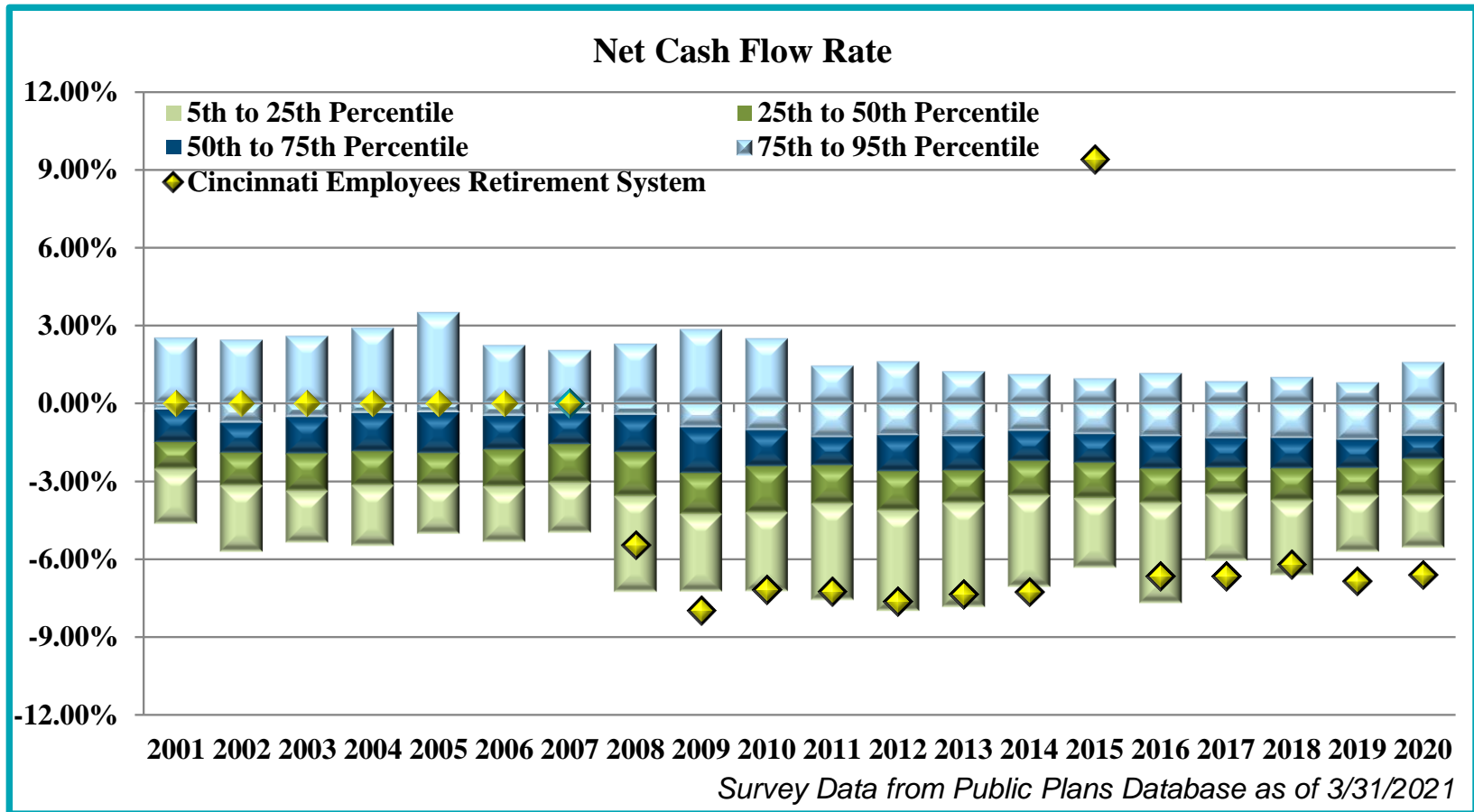
Support ratio is the ratio of the number of inactive (Retirees and Deferred Vested) per active (Full Time only).

# Cash Flows



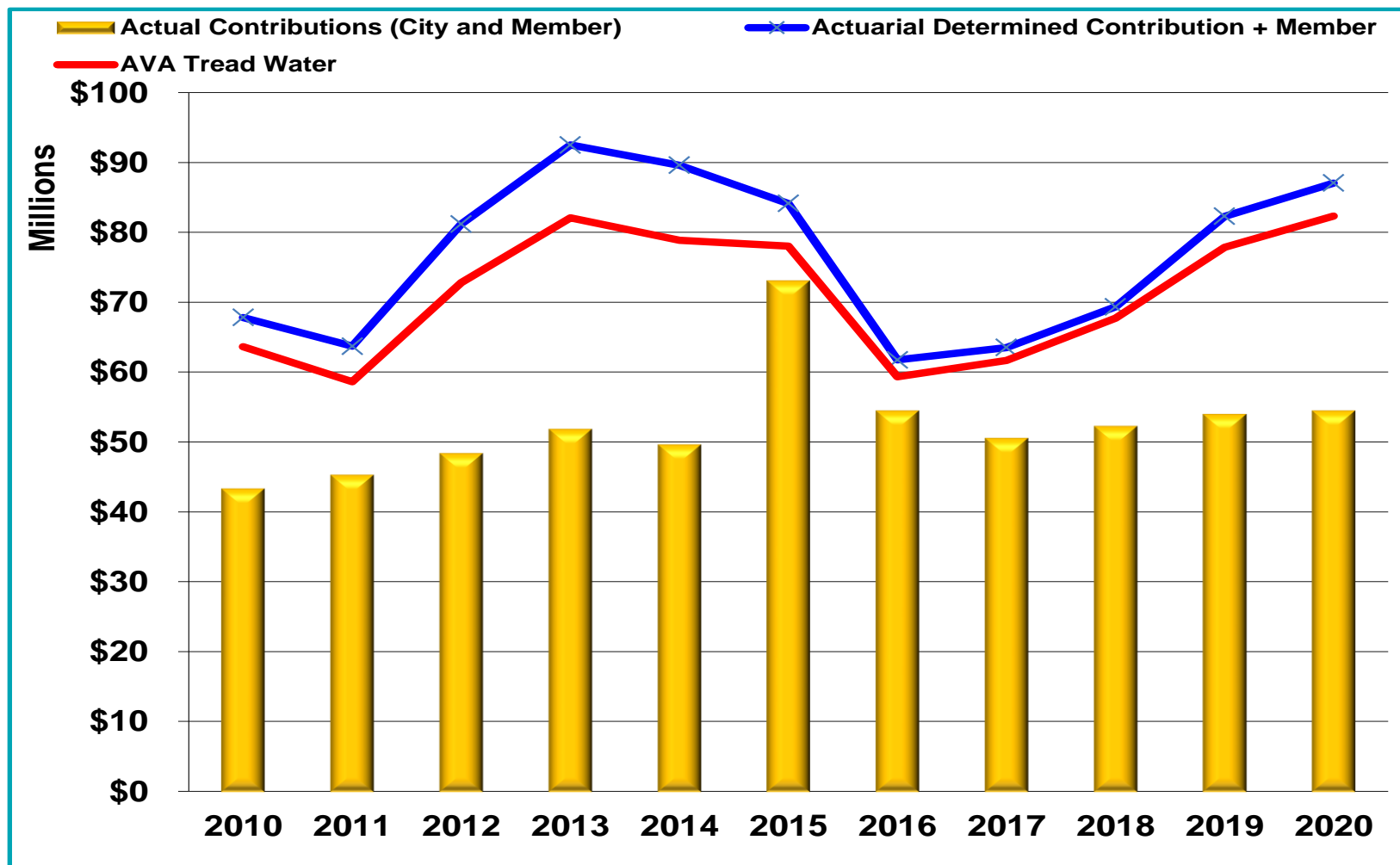
For 2015, there was an additional contribution of \$220.0 million per the CSA and \$17.9 million for transferred earnings and expenses.

# Public Survey Comparisons



For 2015, there was an additional contribution of \$220.0 million per the CSA and \$17.9 million for transferred earnings and expenses.

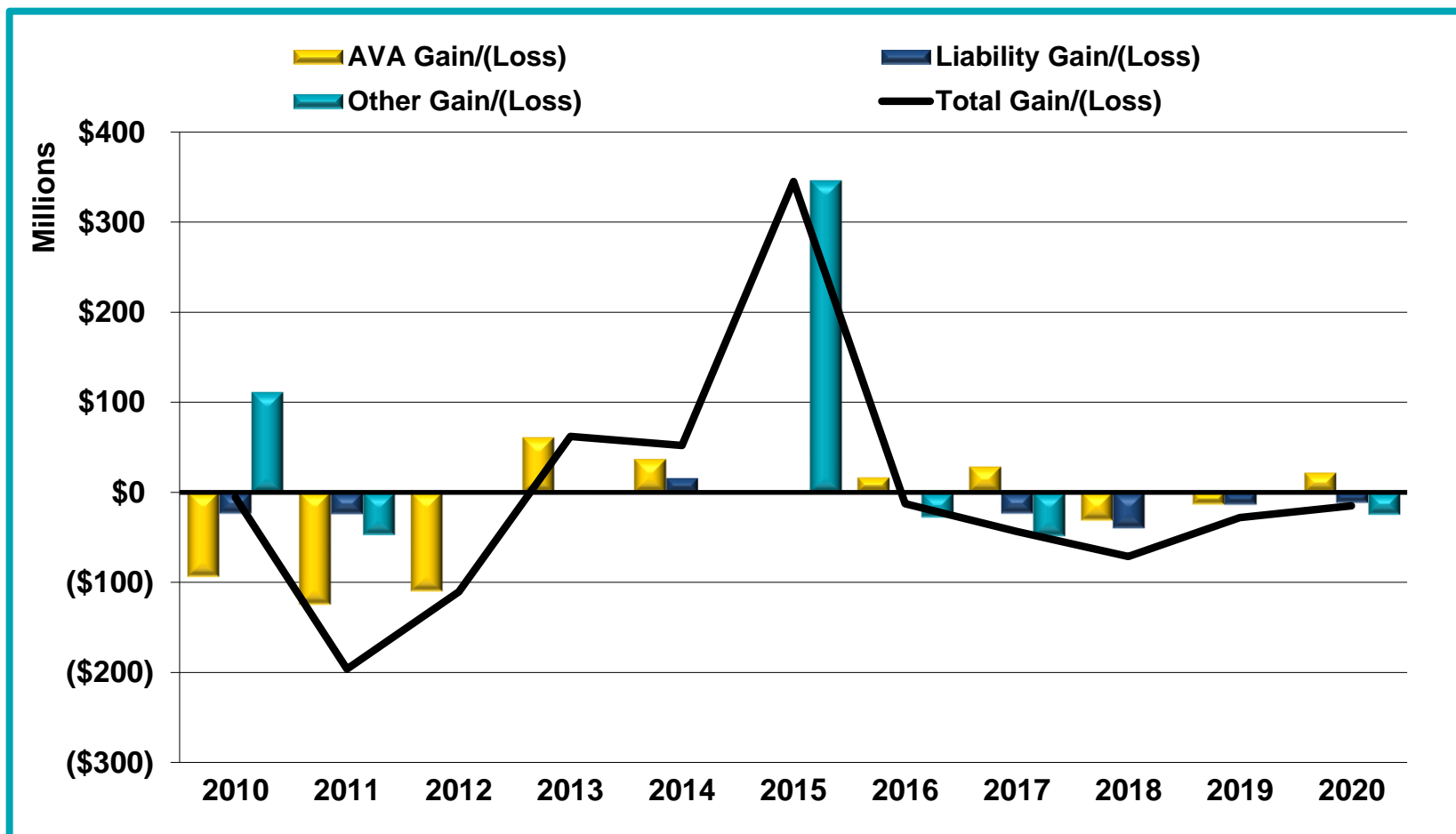
# Contributions versus ADC



Actuarial Determined Contribution (ADC) calculated as of December 31 preceding year shown.

For 2015, there was an additional contribution of \$220.0 million per the CSA and \$17.9 million for transferred earnings and expenses.

# Actuarial Gain/(Loss) History



Other Gain/(Loss) includes assumption, method or plan changes.



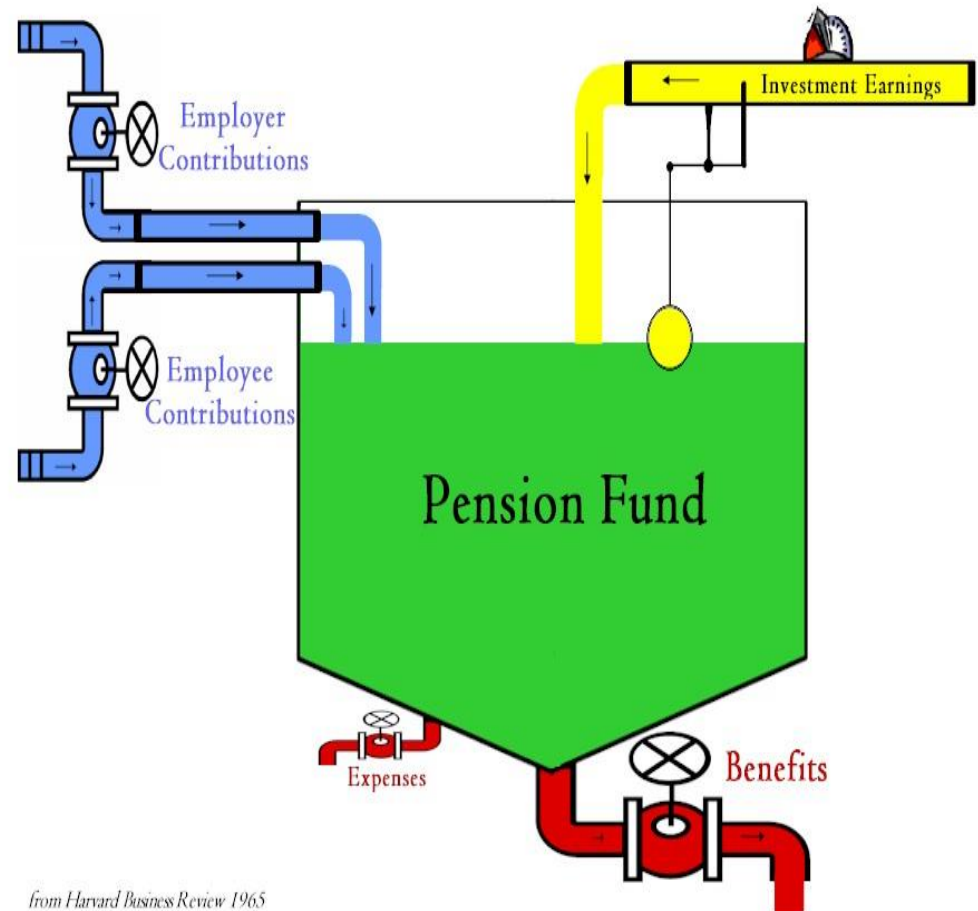
# December 31, 2020 Actuarial Valuation Results



# The Actuarial Valuation Process



1. Collect information
  - Member data
  - Plan provisions
  - Asset information
2. Apply assumptions
  - Demographic
  - Economic
3. Project all future benefit payments
4. Determine a present value of the benefits
5. Compare to assets
6. Calculate employer and employee contributions



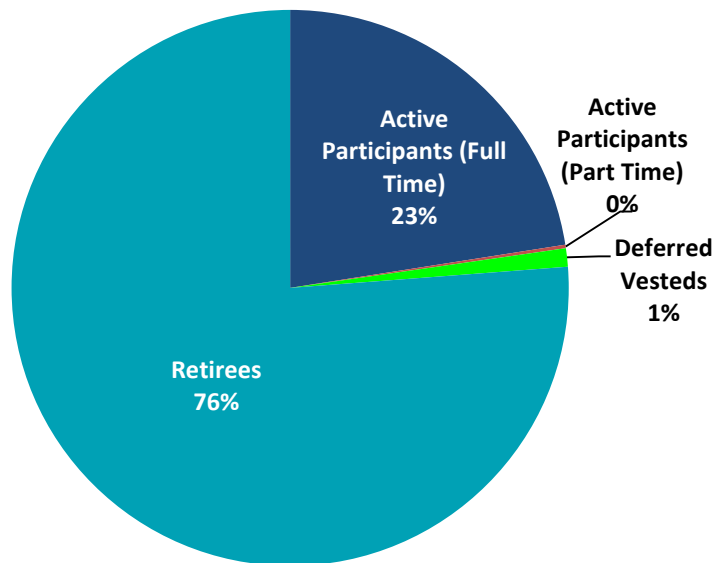
*from Harvard Business Review 1965*

# Key Results

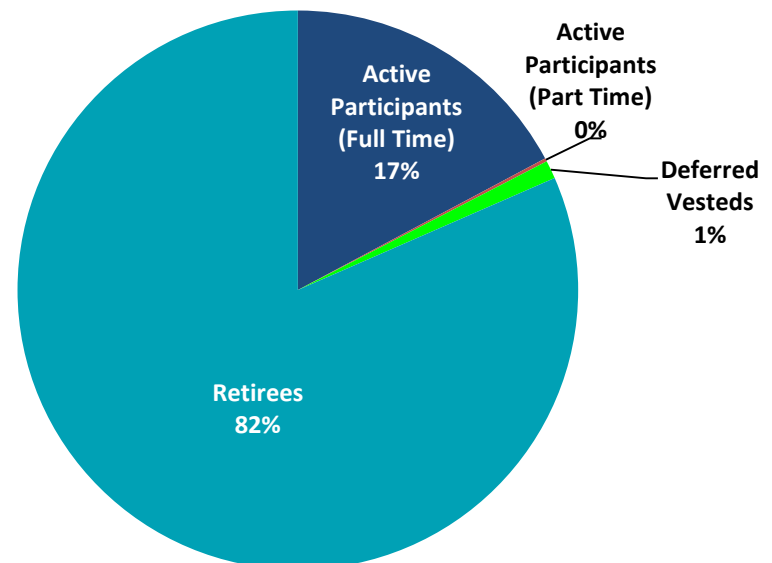


- Return on Market Value of Assets = 8.03%
- Return on Actuarial Value of Assets = 8.78%
- Actuarial Determined Contribution rate increased from 30.67% to 33.46%
  - 1.34% increase due to ERIP
- Funded Ratio (AVA/AL) decreased from 71.2% to 70.5%

**December 31, 2019 Actuarial Liability**



**December 31, 2020 Actuarial Liability**



# Valuation Results



## Key Results

Valuation as of:	December 31, 2019	December 31, 2020	% Change
<b><u>Participant Counts</u></b>			
a) Full Time Actives	2,903	2,631 <sup>1</sup>	(9.4%)
b) Part Time Actives <sup>2</sup>	1,143	1,078	(5.7%)
c) Deferred Vesteds	225	222	(1.3%)
d) Members in Pay Status <sup>3</sup>	<u>4,276</u>	<u>4,459</u>	<u>4.3%</u>
e) Total	8,547	8,390	(1.8%)
f) Annual Salaries of Full Time Active Members	\$ 198,603,201	\$ 187,328,061	(5.7%)
g) Annual Retirement Allowances	\$ 169,251,391	\$ 183,826,082	8.6%
<b><u>Assets and Liabilities</u></b>			
h) Present Value of Future Benefits	\$ 2,677,799,961	\$ 2,744,006,755	2.5%
i) Actuarial Liability	\$ 2,466,348,546	\$ 2,533,246,815	2.7%
j) Actuarial Value of Assets (AVA)	\$ 1,756,533,401	\$ 1,786,649,816	
k) Unfunded Actuarial Liability [(i) - (j)]	\$ 709,815,145	\$ 746,596,999	5.2%
l) Funded Ratio on AVA basis [(j) ÷ (i)]	71.2%	70.5%	(0.7%)
m) Market Value of Assets (MVA)	\$ 1,799,975,000	\$ 1,820,915,000	
n) Funded Ratio on MVA basis [(m) ÷ (i)]	73.0%	71.9%	(1.1%)
<b><u>City's Actuarial Determined Contribution (ADC)</u></b>			
	<u>FYE June 30, 2021</u>	<u>FYE June 30, 2022</u>	
o) Gross Normal Cost Rate	12.46%	12.15%	(0.31%)
p) Plan Changes <sup>4</sup>	0.00%	1.34%	1.34%
q) Unfunded Actuarial Liability Amortization Rate	26.41%	28.17%	1.76%
r) Administrative Expenses	0.80%	0.80%	0.00%
s) Expected Employee Contributions	<u>(9.00%)</u>	<u>(9.00%)</u>	0.00%
t) City's ADC Rate [(o) + (p) + (q) + (r) + (s)]	30.67%	33.46%	2.79%

<sup>1</sup> Excludes 123 participants who elected to participate in the ERIP but have Effective Dates of Retirement in 2021. For valuation purposes, these participants were included as Members In Pay Status.

<sup>2</sup> As of December 31, 2020, 625 of the 1,078 Part Time actives had reported last pay periods before December 2020.

<sup>3</sup> Includes 234 and 222 members as of December 31, 2020 and 2019 respectively currently participating in DROP.

<sup>4</sup> Starting January 1, 2022, City intends on paying ERIP with 15 level annual payments of \$2.8 million each January 1.

# Reconciliation of UAL



(\$ millions)	<u>Liability</u>	<u>Actuarial Assets</u>	<u>UAL</u>	<u>Funded Ratio</u>
As of December 31, 2019	\$2,466.3	\$1,756.5	\$ 709.8	71.2%
Expected Changes*			\$	
Expected Changes*	\$ (148.4)	\$ (118.8)	(29.6)	
Plan Change (ERIP)	24.7	0.0	24.7	
Expected Interest / Invest Return	<u>180.4</u>	<u>127.3</u>	<u>53.1</u>	
Total	\$ 56.7	\$ 8.5	\$ 48.2	
Expected at December 31, 2020	\$2,523.0	\$1,765.0	\$ 758.0	70.0%
Actual at December 31, 2020	\$2,533.2	\$1,786.6	\$ 746.6	70.5%
(Gain) / Loss	\$ 10.2	\$ (21.6)	\$ (11.4)	

\*Normal Cost, Expenses, Contributions, and Benefit Payments



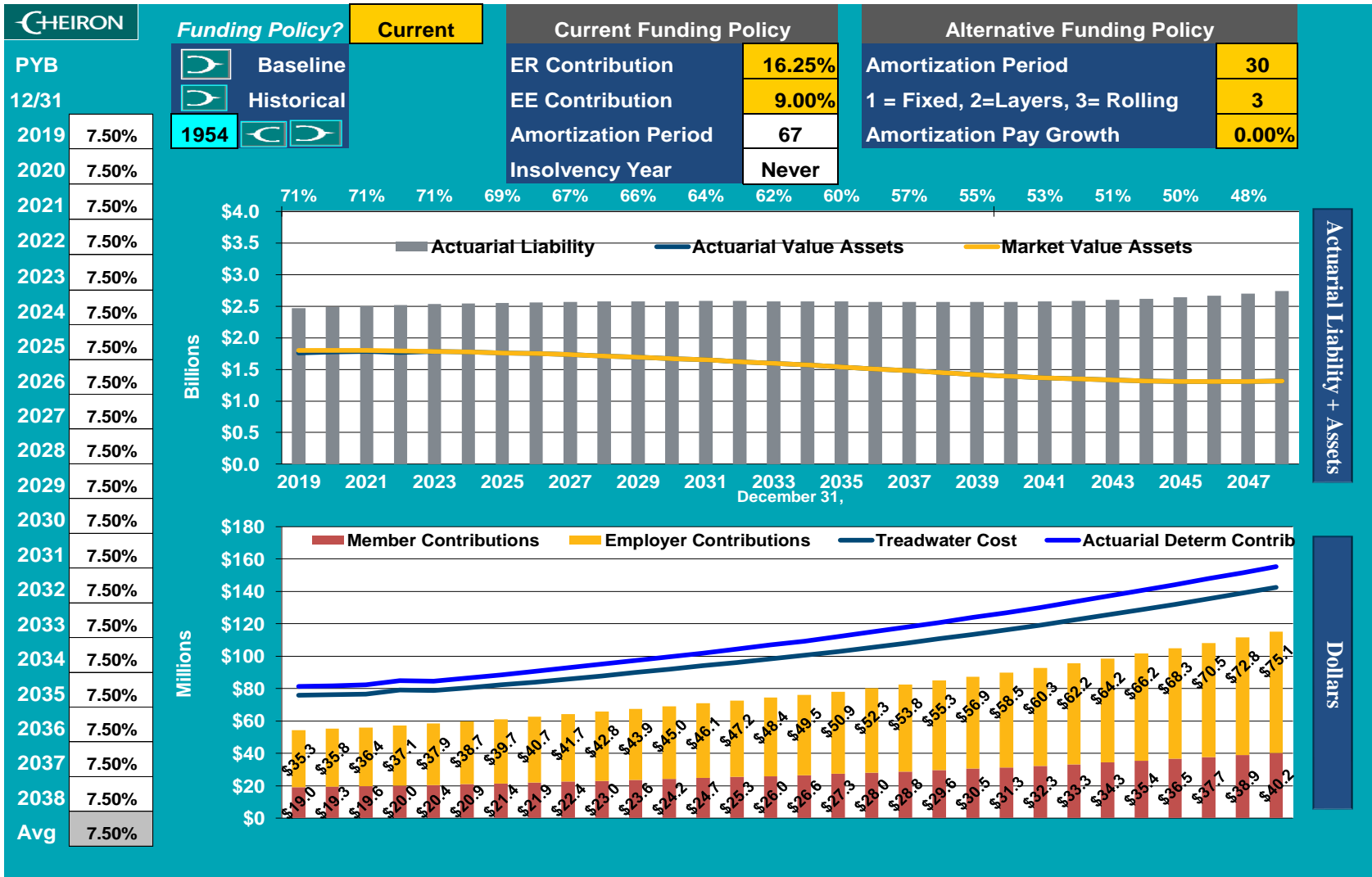
# A Look Ahead



# Projections – Before 2020 Experience



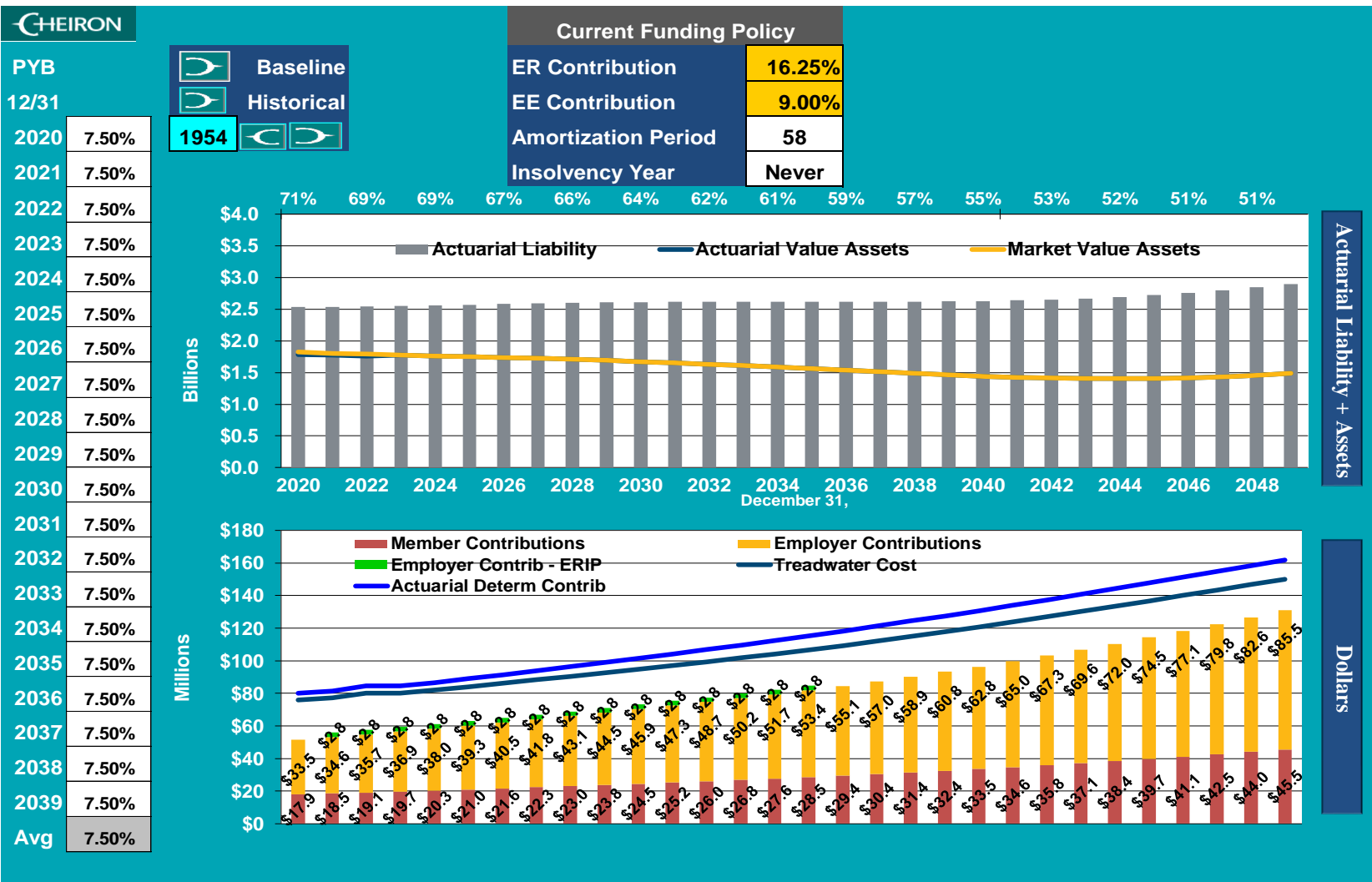
Taken from the December 31, 2019 valuation. Assumes 7.5% for PYE 2020 and every year thereafter.



# Projections – After 2020 Experience / Baseline



Reflects actual return for PYE 2020 of 8.0%, ERIP and demographic experience. Assumes 7.5% per year for PYE 2021 and every year thereafter.



# Projections – Implications of 2021



Assumed 2021 Investment Return*	Projected Insolvency Year	Projected Year to be 100% Funded
15.0%	None	2055
7.5%	None	2078
0.0%	None	>2128
(7.5%)	2045	None
(15.0%)	2040	None

\* Assumed 7.5% per year for 2022 and thereafter.

# Required Disclosures



The purpose of this presentation is to present the actuarial valuation results for the Cincinnati Retirement System (CRS or System). This presentation is for the use of the Board and System staff.

In preparing this presentation, we relied on information (some oral and some written) supplied by the Cincinnati Retirement System. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

The actuarial assumptions and methods are the same as those used in the preparation of the Actuarial Valuation Report as of December 31, 2020. The census data provided to us by CRS was as of December 31, 2020.

The assumptions reflect our understanding of the likely future experience of the System, and the assumptions as a whole represent our best estimate for the future experience of the System. The results of this presentation are dependent upon future experience conforming to these assumptions. To the extent that future experience deviates from the actuarial assumptions, the true cost of the System could vary from our results.

Cheiron utilizes ProVal, an actuarial valuation software leased from Winklevoss Technologies (WinTech) to calculate the liabilities, normal costs and projected benefit payments. We have relied on WinTech as the developer of ProVal. We have reviewed ProVal and have a basic understanding of it and have used ProVal in accordance with its original intended purpose. We have not identified any material inconsistencies in assumptions or output of ProVal that would affect this actuarial valuation.

Projections in this presentation were developed using *P-Scan*, our proprietary tool for developing deterministic projections to illustrate the impact of changes in assumptions and actual experience (particularly investment experience) on the future financial status of the Plan.

This presentation and its contents were prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this presentation. This presentation does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This presentation was prepared solely for the Cincinnati Retirement System for the purposes described herein. Other users of this presentation are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any such other users.

Kevin Woodrich, FSA, EA, MAAA  
Principal Consulting Actuary

Janet Cranna, FSA, EA, MAAA  
Principal Consulting Actuary

# Cincinnati Retirement System

**Actuarial Valuation  
as of December 31, 2020**

**Produced by Cheiron  
May 2021**

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May 27, 2021

Board of Trustees  
Cincinnati Retirement System  
801 Plum Street, Suite 328  
Cincinnati, Ohio 45202

**Re: *Cincinnati Retirement System  
Actuarial Valuation as of December 31, 2020***

Dear Members of the Board:

At your request, we have conducted our annual actuarial valuation of the Cincinnati Retirement System (CRS or System) as of December 31, 2020. The results of the valuation are contained in this report. The purpose of this report is to present the annual actuarial valuation of the Cincinnati Retirement System. This report is for the use of the Cincinnati Retirement System Board of Trustees and its auditors in preparing financial reports in accordance with applicable law and accounting requirements.

The results of this report are only applicable to the Fiscal Year Ending June 30, 2022, and rely on future plan experience conforming to the underlying assumptions. To the extent that actual plan experience deviates from the underlying assumptions, the results would vary accordingly.

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 assumptions, changes in assumptions, and changes in plan provisions or applicable law.

In preparing our report, we relied on information (some oral and some written) supplied by the Cincinnati Retirement System. This information includes, but is not limited to, plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice No. 23.

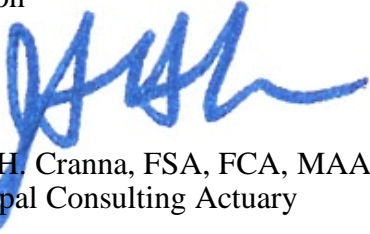
This report was prepared exclusively for the Cincinnati Retirement System for the purpose described herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to any such other users.

This report and its contents have been prepared in accordance with generally-recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the

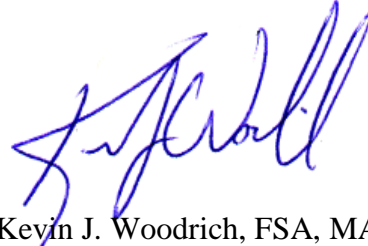
Board of Trustees  
Cincinnati Retirement System  
May 27, 2021  
Page 2

Qualification Standards of the American Academy of Actuaries to render the opinions contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

Sincerely,  
Cheiron



Janet H. Cranna, FSA, FCA, MAAA, EA  
Principal Consulting Actuary



Kevin J. Woodrich, FSA, MAAA, EA  
Principal Consulting Actuary

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION I – BOARD SUMMARY**

Cheiron has performed the actuarial valuation of the Cincinnati Retirement System as of December 31, 2020. The purpose of this report is to disclose the following as of the valuation date:

- 1) The financial condition of the System;
- 2) Past trends in the financial progress of the System;
- 3) Compare the City’s current contribution rate of 16.25% of payroll to the Actuarially Determined Contribution (ADC) rate based on this valuation for Fiscal Year Ending June 30, 2022;
- 4) Identify and assess the risks to the System; and
- 5) Provide specific information and documentation required for the System’s financial reporting.

An actuarial valuation establishes and analyzes the System’s assets and liabilities on a consistent basis and traces the progress of both from one year to the next. It includes measurement of the System’s investment performance as well as an analysis of actuarial liability gains and losses.

This report does not include calculations under GASB Statements Nos. 67 and 68 which are provided in separate reports.

Results shown in this report for years prior to December 31, 2018 were provided by the prior actuary.

**Valuation Basis**

The December 31, 2020 actuarial valuation results were based on the same actuarial methods and assumptions as used in the December 31, 2019 actuarial valuation. The demographic assumptions were based on the January 1, 2012 to December 31, 2016 Experience Study prepared by the prior actuary, which were subsequently approved by the Board of Trustees. An investment return assumption of 7.50% was used as prescribed by item 29 of the Collaborative Settlement Agreement (CSA) signed October 5, 2015. Cheiron has reviewed the demographic and economic assumptions. While we consider these assumptions to be generally reasonable, we have not yet performed our own actuarial experience study.

Whereas there remains a lot of uncertainty, we continue to monitor developments regarding the COVID-19 pandemic and the impact it may have on the System. Actual experience, both demographic and economic, will be reflected in subsequent valuations as experience emerges.

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION I – BOARD SUMMARY**

**Key Results**

The following Table I-1 summarizes the key results of the valuation with respect to the System’s membership, assets and liabilities, and contributions. The results are presented and compared for both the current and prior year.

<b>Table I-1 Key Results</b>			
<b>Valuation as of:</b>	<b>December 31, 2019</b>	<b>December 31, 2020</b>	<b>% Change</b>
<b><u>Membership Counts</u></b>			
a) Full Time Actives	2,903	2,631 <sup>1</sup>	(9.4%)
b) Part Time Actives <sup>2</sup>	1,143	1,078	(5.7%)
c) Terminated Vesteds	225	222	(1.3%)
d) Members in Pay Status <sup>3</sup>	<u>4,276</u>	<u>4,459</u>	<u>4.3%</u>
e) Total	8,547	8,390	(1.8%)
f) Annual Salaries of Full Time Actives	\$ 198,603,201	\$ 187,328,061	(5.7%)
g) Annual Salaries of DROP Members <sup>3</sup>	\$ 16,857,013	\$ 18,111,116	7.4%
h) Annual Retirement Allowances	\$ 169,251,391	\$ 183,826,082	8.6%
<b><u>Assets and Liabilities</u></b>			
i) Present Value of Future Benefits	\$ 2,677,799,961	\$ 2,744,006,755	2.5%
j) Actuarial Liability	\$ 2,466,348,546	\$ 2,533,246,815	2.7%
k) Actuarial Value of Assets (AVA)	\$ 1,756,533,401	\$ 1,786,649,816	
l) Unfunded Actuarial Liability (UAL) [(j) - (k)]	\$ 709,815,145	\$ 746,596,999	5.2%
m) Funded Ratio on AVA basis [(k) ÷ (j)]	71.2%	70.5%	(0.7%)
n) Market Value of Assets (MVA)	\$ 1,799,975,000	\$ 1,820,915,000	
o) Funded Ratio on MVA basis [(j) ÷ (n)]	73.0%	71.9%	(1.1%)
<b><u>City's Actuarially Determined Contribution (ADC)</u></b>			
	<u>FYE June 30, 2021</u>	<u>FYE June 30, 2022</u>	
p) Gross Normal Cost Rate	12.46%	12.15%	(0.31%)
q) Plan Changes - ERIP <sup>4</sup>	0.00%	1.34%	1.34%
r) UAL Amortization Rate (excluding ERIP)	26.41%	28.17%	1.76%
s) Administrative Expenses	0.80%	0.80%	0.00%
t) Expected Employee Contributions	<u>(9.00%)</u>	<u>(9.00%)</u>	0.00%
u) City's ADC as % of Payroll	30.67%	33.46%	2.79%
	[(p) + (q) + (r) + (s) + (t)]		

<sup>1</sup> Excludes 123 participants who elected to participate in the ERIP but have Effective Dates of Retirement in 2021. For valuation purposes, these participants were included as Members In Pay Status.

<sup>2</sup> As of December 31, 2020, 625 of the 1,078 Part Time actives had reported last pay periods before December 2020.

<sup>3</sup> Includes 234 and 222 members as of December 31, 2020 and 2019 respectively currently participating in DROP.

<sup>4</sup> Starting January 1, 2022, City intends on paying ERIP with 15 level annual payments of \$2.8 million each January 1.

**CINCINNATI RETIREMENT SYSTEM  
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**SECTION I – BOARD SUMMARY**

Below we highlight significant results of this valuation.

- The return on the Market Value of Assets was 8.03% for the year ended December 31, 2020 which was higher than the assumed rate of return of 7.50%. The return on the Actuarial Value of Assets was 8.78%.
- The Actuarial Liability increased from \$2,466.3 million as of December 31, 2019 to \$2,533.2 million as of December 31, 2020.
- The funded ratio based on the Actuarial Value of Assets decreased from 71.2% to 70.5% and the Unfunded Actuarial Liability (UAL) increased from \$709.8 million to \$746.6 million. Based on the Market Value of Assets, the funded ratio decreased from 73.0% to 71.9%.
- Since the last valuation, 253 members elected to participate in the Early Retirement Incentive Program (ERIP) offered by the City. This increased liabilities by \$24.7 million. To fund this increase, the City needs to contribute \$2.8 million per year for the next 15 years beginning January 1, 2022. We have reflected this as part of this valuation.
- In accordance with the Collaborative Settlement Agreement, the City contributes 16.25% of payroll on behalf of full-time active members and members participating in the Deferred Retirement Option Program (DROP). The City contributes 3% of payroll for part-time active members. Based on these fixed contribution rates, the UAL would be paid off in 58 years if assets achieve the assumed rate of return of 7.50%, including Fiscal Year ending 2021. By comparison, the Actuarially Determined Contribution rate, which pays off the UAL in 30 years, was calculated to be 33.46% of payroll for Fiscal Year ending June 30, 2022. Detailed projections of the System’s funded status and contributions are presented later in this section.
- During the year, there was a total actuarial gain of \$11.4 million, consisting of an actuarial asset gain of \$21.6 million, and a liability experience loss of \$10.2 million (0.4% of liabilities).

## **Recent Trends**

Although most of the attention given to the valuation reflects the most recently computed unfunded actuarial liability, funded ratio, and contribution amounts, each valuation is merely a snapshot of the long-term progress of a pension fund. It is important to take a step back from the current year results and view them in the context of the System’s recent history as well as trends expected into the future. Below, we present a series of graphs that display historical trends for key factors in the valuations of the last 11 years.

In reviewing the historic trends over the 11 year period, the declining funded status coupled with significant negative net cash flow highlights the potential risk of running out of assets to pay benefits unless the City increases its current contribution rate.

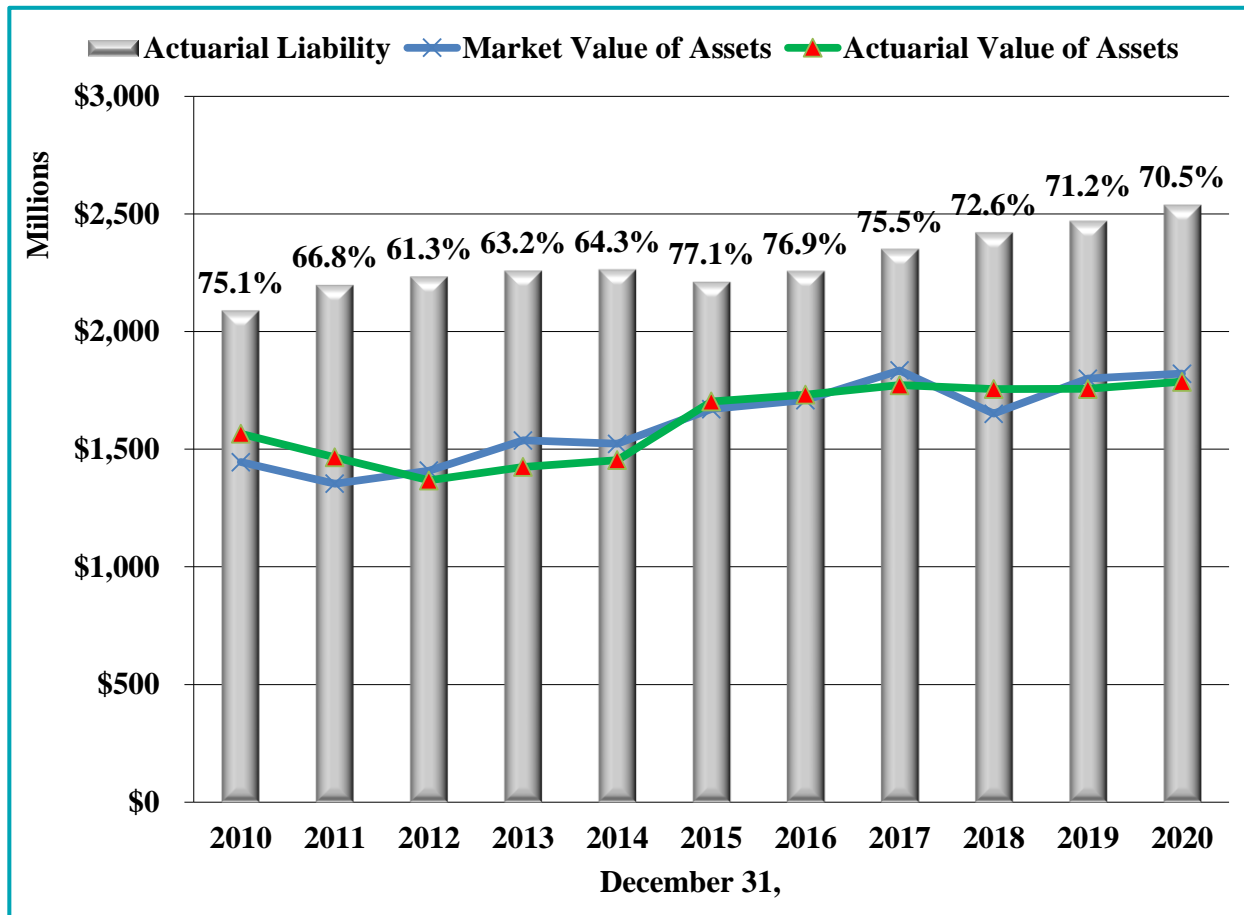
**CINCINNATI RETIREMENT SYSTEM  
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Assets and Liabilities

The gray bars represent the Actuarial Liability (AL). The blue line is the Market Value of Assets (MVA) and the green line is the Actuarial Value of Assets (AVA). The System’s funded ratio (ratio of actuarial assets to actuarial liability) is shown along the top of the bars.

The sharp increase in the funded ratio from December 31, 2014 to December 31, 2015 was due primarily to \$220 million in additional monies transferred from the healthcare assets to the pension assets as a result of the Collaborative Settlement Agreement. Since December 31, 2015, the funded ratio has been decreasing due to the System’s experience as well as the City not making contributions sufficient to pay off the UAL. As shown later in this report, the City’s current contribution rate of 16.25% is less than the amount necessary to cover the additional benefits being earned by active members (i.e. normal cost) and the interest on the unfunded actuarial liability. This amount is commonly referred to as the Tread Water Cost.



**CINCINNATI RETIREMENT SYSTEM  
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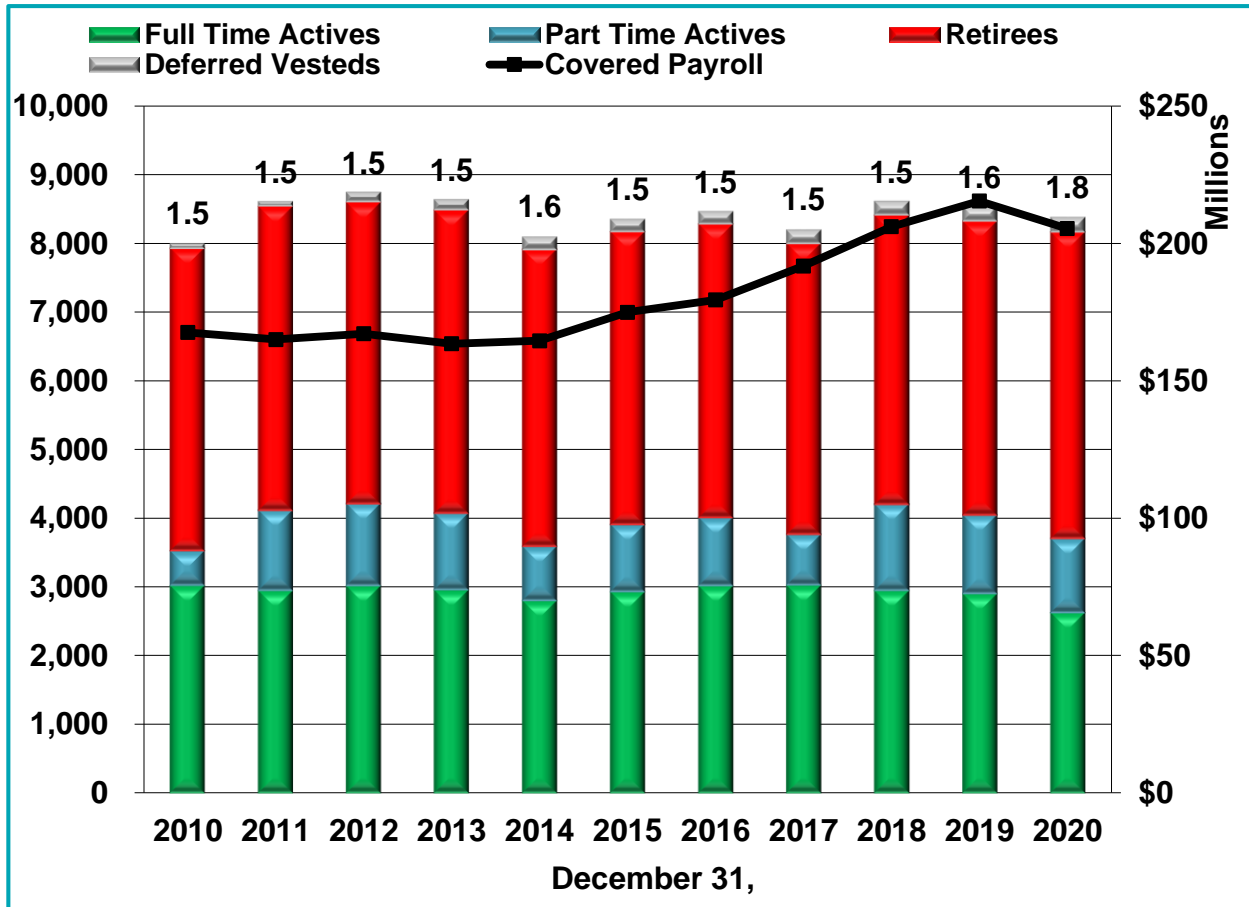
**SECTION I – BOARD SUMMARY**

Membership Trends

The graph below shows the membership counts of the System for the last eleven valuations. The numbers which appear at the top of each bar (the “support ratio”) represent the ratio of the number of inactive members, including DROP members, to full time active contributing members at each valuation date, and provide a measure of the maturity of the System. The inactive-to-active ratio has remained stable over the period. As more of the liability moves from actives to inactive, the System matures and is subject to higher risk exposure from market volatility. This is because the impact of investment losses will have to be offset by future contributions. These contributions, in turn, will only be made on behalf of proportionately fewer active members compared to the total number of members.

The black line represents the payroll for active members over the period, and it corresponds with the scale on the right. The payroll for the 1,078 part-time actives of \$7.5 million was not included since the City does not contribute the full 16.25% of payroll for part-time actives.

The decrease in both active count and payroll from last year was due to the ERIP offered by the City, some furloughed employees not choosing to come back to work and other implications due to the global pandemic in 2020. This led to a corresponding growth in the number of Retirees.



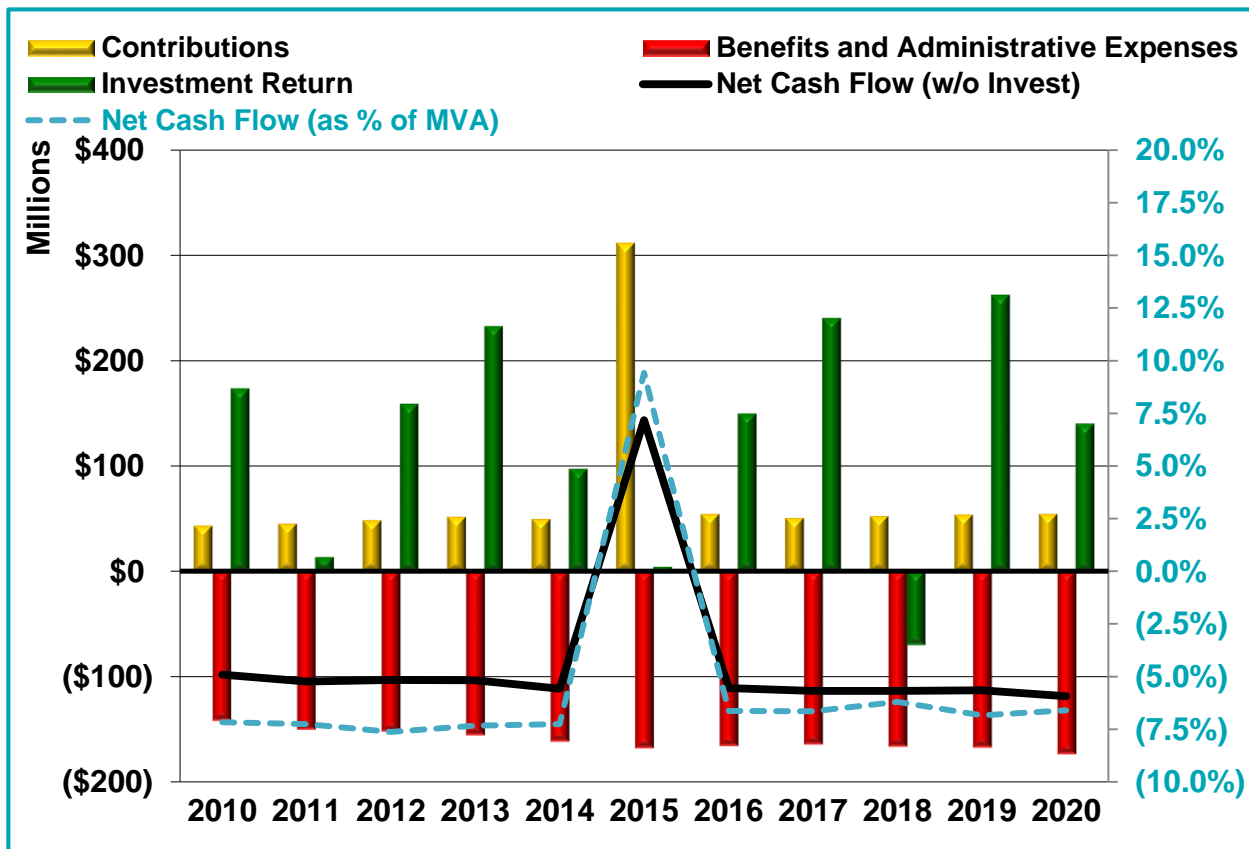
**CINCINNATI RETIREMENT SYSTEM  
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**SECTION I – BOARD SUMMARY**

Cash Flows

The following graph shows the System’s net cash flow (contributions less benefit payments and expenses) at the end of each plan year. For the entire period shown, the net cash flow excluding investments has been negative except for 2015 when \$220 million was transferred into the System pursuant to the Collaborative Settlement Agreement. This illustrates that contributions have not been sufficient to cover benefits and expenses in any years over the past decade. A major implication of negative cash flow is that the difference each year must be met first from cash generated by investments and then paid out of the principal assets, representing additional risk for the System if investments need to be sold in a down market to cover benefit payments.

The dotted line shows the net cash flow as a percent of the market assets and goes with the axis on the right. For the 11 year period shown (ignoring 2015) the net cash flow as a percent of assets has ranged between -8% and -6%. This indicates that a plan is expected to defund with an increased risk of insolvency if the contributions do not catch up to cover a higher portion of the benefit payments and expenses.



CINCINNATI RETIREMENT SYSTEM  
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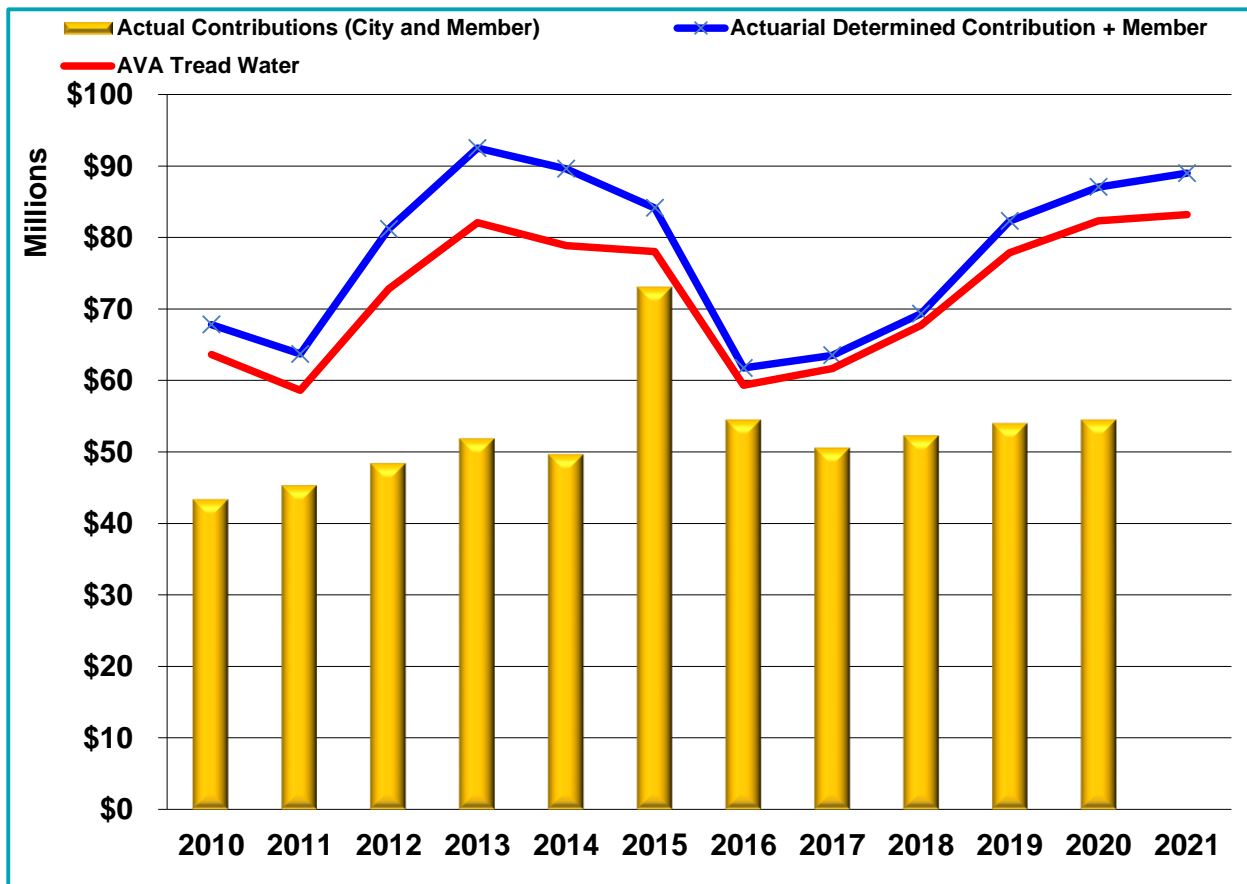
SECTION I – BOARD SUMMARY

Contributions

This graph shows the historical trends for the actual contribution amounts made by both the City and members (yellow bars). The blue line shows the actuarially determined contributions over the period. The actuarially determined contribution is comprised of three components: normal cost which represents the value of the benefits expected to be earned for the upcoming year assumed administrative expenses and an open 30-year level dollar amortization of any unfunded actuarial liability.

The red line is the **Tread Water** line, which is the normal cost plus the interest on the UAL. The tread water line shows the minimum contributions needed to avoid an increase in the UAL.

The graph shows that not only has the City been making contributions less than the actuarially determined contribution, but that the contributions are significantly below the tread water line. When contributions are lower than the normal cost plus interest on the UAL, the unfunded actuarial liability is expected to grow from one year to the next.



**CINCINNATI RETIREMENT SYSTEM  
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**SECTION I – BOARD SUMMARY**

**Projected Future Outlook**

The analysis of the projected financial trends is perhaps the most important component of the valuation. The graphs presented in this section show the expected progress of the System’s funded status over the next 30 years, measured in terms of the expected funded ratios, and the projected contributions made by the members (9% of payroll) and by the City (16.25% of payroll for full-time active members and DROP members; 3.0% for part-time members). In addition, we have assumed that the City makes the \$2.8 million each year for the next 15 years to pay for the increase in liabilities due to the ERIP beginning January 1, 2022.

While the experience will not conform exactly to the assumptions every year, the trends reflect reasonable expectations. As a result, in addition to the baseline projection, we provided additional **stress testing** based on varying investment returns in the future. These scenarios are shown in Section II.

The projections assume a constant active population. As members retire, terminate and die based on the current valuation assumptions, it is assumed that new members will replace them based on characteristics (age/gender/salary) similar to recent new members.

**CINCINNATI RETIREMENT SYSTEM  
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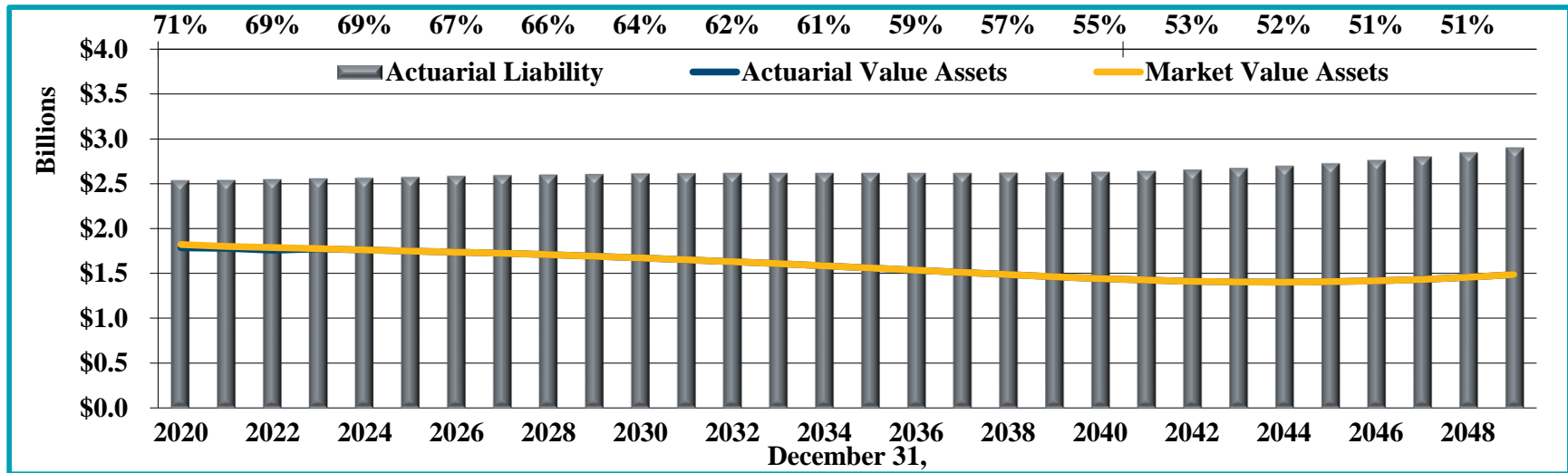
**SECTION I – BOARD SUMMARY**

Baseline Scenario

The baseline projection shows the outcome if all actuarial assumptions, including the long-term rate of return assumption of 7.50%, are exactly met.

The first graph compares the Market Value of Assets (gold line) and the Actuarial or smoothed Value of Assets (blue line) to the System’s Actuarial Liabilities (gray bars). In addition, at the top of the graph, we show the System’s funded ratio on an Actuarial Value of Assets basis (ratio of Actuarial Value of Assets to Actuarial Liabilities). The years shown in the graph signify the valuation date as of December 31 of the labeled year.

The System’s funded ratio on an Actuarial Value of Assets basis is projected to continue to drop over the next 30 years as contributions continue to lag the Tread Water cost.

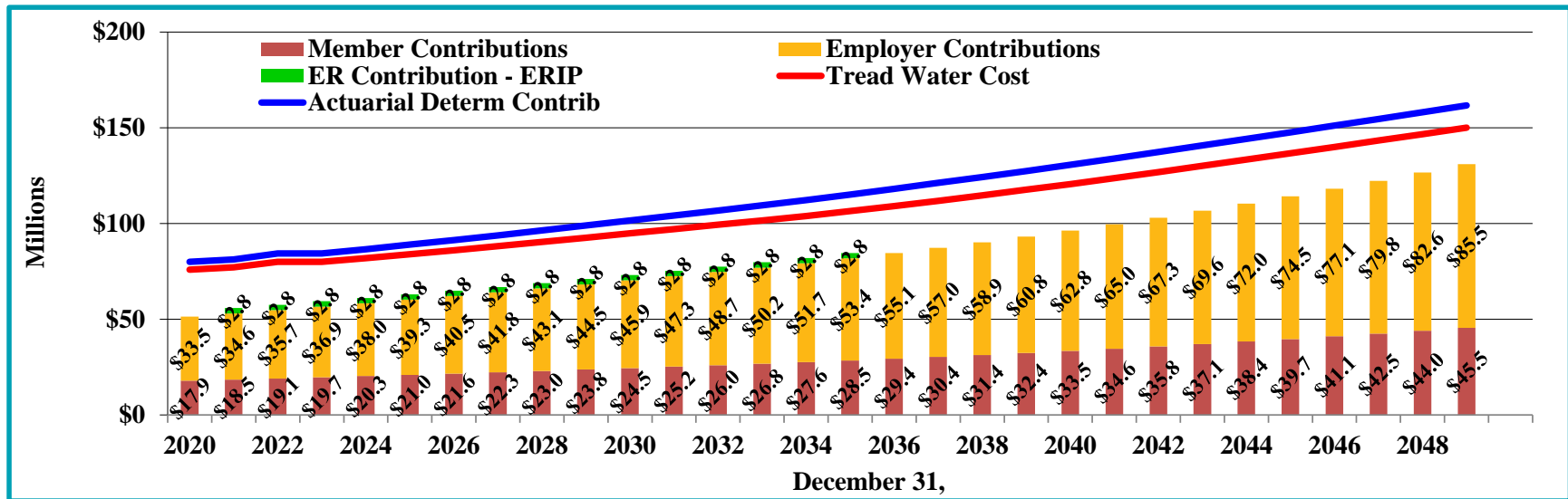


**CINCINNATI RETIREMENT SYSTEM  
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The second graph below shows the projected contributions compared to the actuarially determined contributions shown in dollars. The member contributions are in maroon and the City’s contributions are in gold. Similar to the historical graph before, the red line represents the Tread Water cost necessary to avoid decreasing funded status.

As shown, the total contributions into the System are projected to continue to significantly lag both the actuarially determined contribution amount as well as the Tread Water cost during the projection period. This results in the funded status expecting to deteriorate during this period. For purposes of the projection, we assumed that the active population will remain constant. Projected payroll is based on the number of members valued as actives for this valuation and assumes that their positions are filled upon leaving employment with a new hire with an average starting salary of \$52,000 (indexed by wage inflation for years beyond 2021).



Please see Section II for additional scenarios illustrating the sensitivity of these projections under various economic scenarios.

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**SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK**

Actuarial valuations are based on a set of assumptions about future economic and demographic experience. These assumptions represent a reasonable estimate of future experience, but the actual future experience will undoubtedly be different and may be significantly different. This section of the report is intended to identify the primary risks to the System, provide some background information about those risks, and provide an assessment of those risks.

**Identification of Risks**

As we have discussed with the Board, the fundamental risk to the System is that the contributions needed to pay the benefits become unaffordable. While there are a number of factors that could lead to contribution amounts becoming unaffordable, we believe the primary risks are:

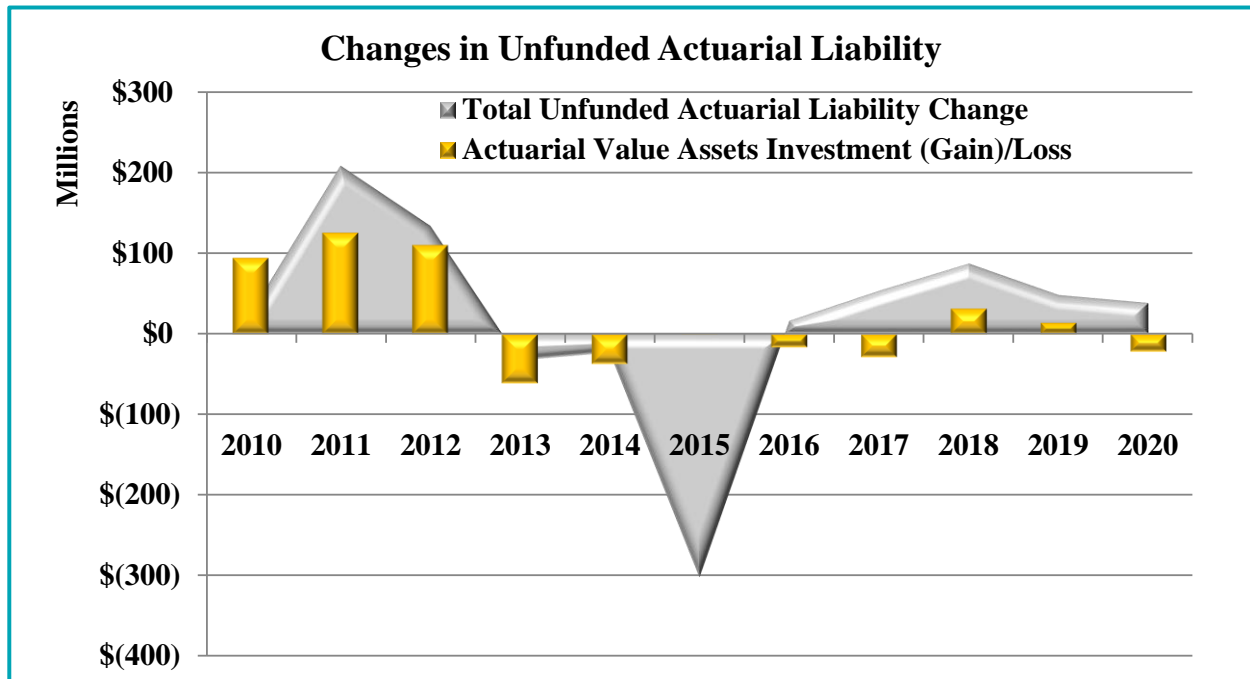
- Investment risk,
- Interest rate risk,
- Longevity and other demographic risks,
- Contribution risk; and
- Assumption change risk.

Other risks that we have not identified may also turn out to be important.

**CINCINNATI RETIREMENT SYSTEM  
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*Investment Risk* is the potential for investment returns to be different than expected. Lower investment returns than anticipated will increase the Unfunded Actuarial Liability necessitating higher contributions in the future unless there are other gains that offset these investment losses. The potential volatility of future investment returns is determined by the System’s asset allocation and the affordability of the investment risk is determined by the amount of assets invested relative to the size of the plan sponsor or other contribution base.

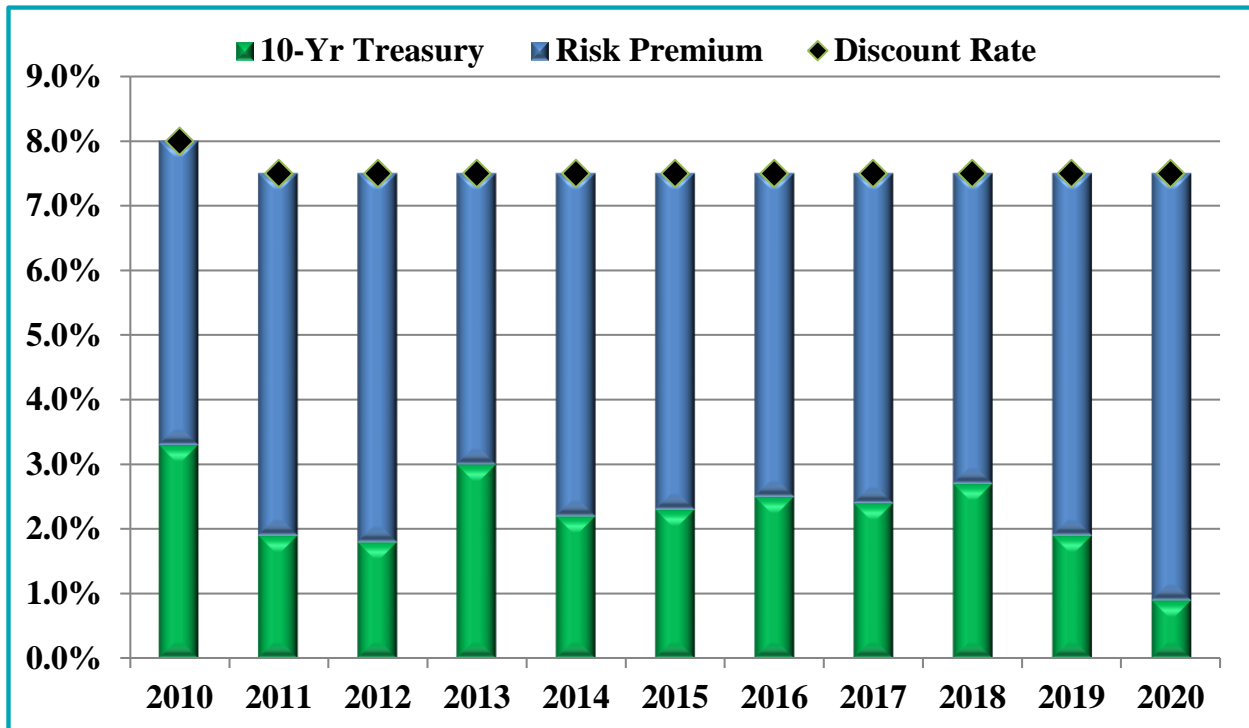


The graph above shows the impact of investment gains and losses on the smoothed Actuarial Value of Assets over the last 11 years compared to the System’s total change in Unfunded Actuarial Liability. There was a small actuarial investment gain this year due to the favorable return and continued recognition of a net investment gain for prior years.

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SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

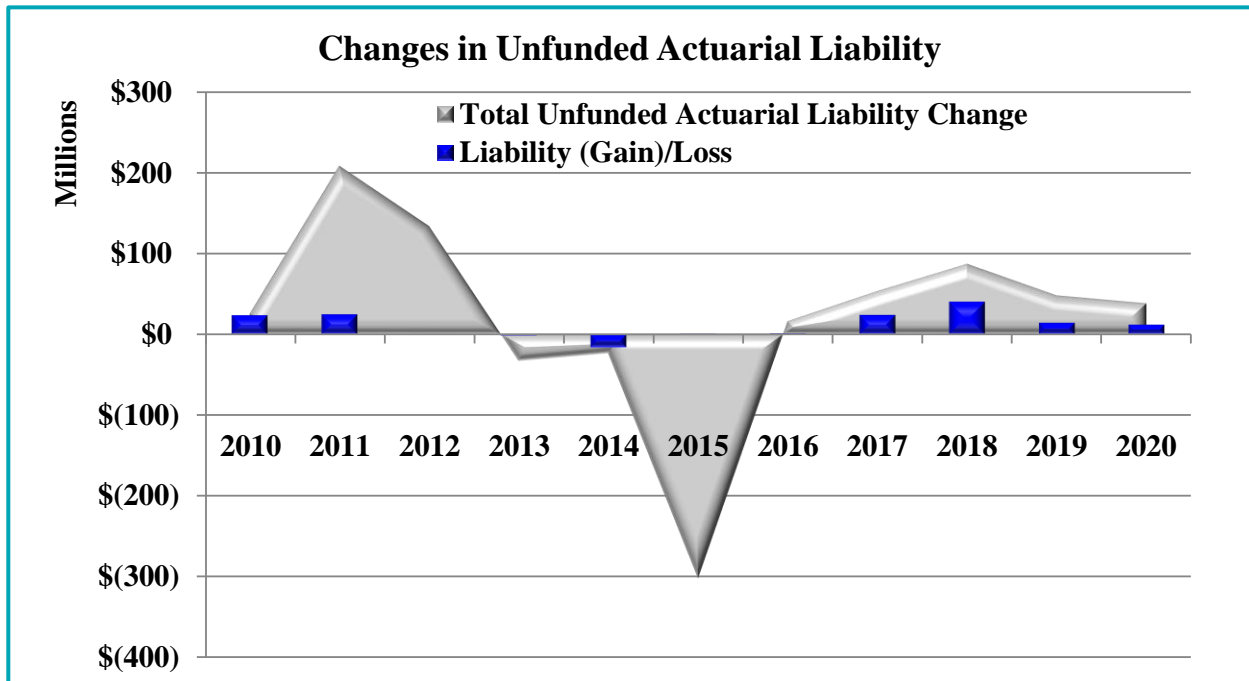
*Interest rate risk* is the potential for interest rates to be different than expected. For public plans, short term fluctuations in interest rates have little or no effect as the Plan’s liability is usually measured based on the expected return on assets. Longer-term trends in interest rates however can have a powerful effect. The chart below shows the yield on a 10-year Treasury security compared to the System’s assumed rate of return. The difference is a simple measure of the amount of investment risk taken. As interest rates have declined, plans faced a choice: maintain the same level of risk and reduce the expected rate of return; maintain the same expected rate of return and take on more investment risk; or some combination of the two strategies. As illustrated below, the yield on a 10-year Treasury security was the lowest in 2020.



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*Longevity and other demographic risks* are the potential for mortality or other demographic experience to be different than expected. Generally, longevity and other demographic risks emerge slowly over time and are often dwarfed by other changes, particularly those due to investment returns. The following graph shows the demographic gains and losses over the last 11 years compared to the total change in the UAL for each year. There was a small liability loss for the 2020 experience.



*Contribution risk* is the potential for actual future contributions to deviate from expected future contributions. There are different sources of contribution risk ranging from the sponsor choosing to not make contributions in accordance with the funding policy to material changes in the contribution base (e.g., covered employees, covered payroll, sponsor revenue) that affect the amount of contributions the Plan can collect.

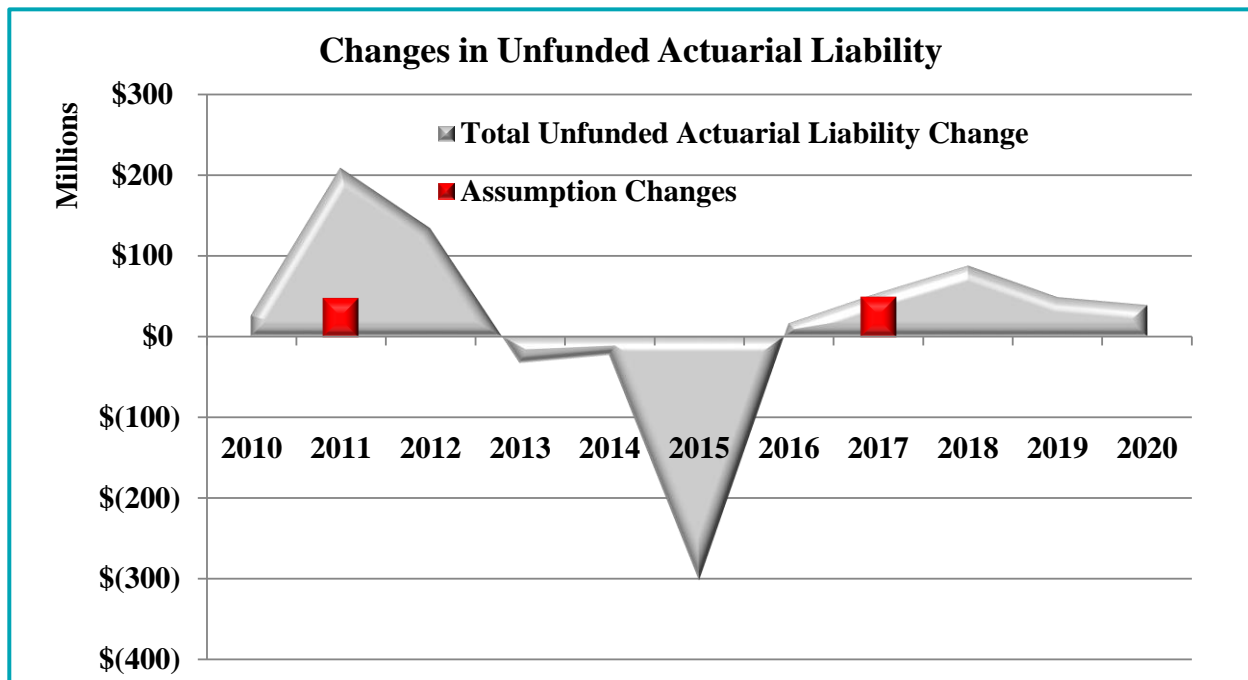
The normal cost plus the interest on the Unfunded Actuarial Liability is referred to as the “Tread Water Cost” because if contributions are less than the Tread Water Cost, the UAL is expected to grow; and if contributions are greater than the Tread Water Cost, the UAL is expected to decline. For this System, the City has consistently contributed less than the Tread Water Cost which has added to the growing UAL. The graph on page 7 in the Board Summary illustrates this.

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**SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK**

*Assumption change risk* is the potential for the environment to change such that future valuation assumptions are different than the current assumptions. For example, declines in interest rates over the last three decades resulted in higher investment returns for fixed-income investments but lower expected future returns necessitating either a change in investment policy, a reduction in discount rate, or some combination of the two. Assumption change risk is an extension of the other risks identified, but rather than capturing the risk as it is experienced, it captures the cost of recognizing a change in environment when the current assumption is no longer reasonable.

As shown in the following graph, the assumption changes in 2011 and 2017 had a significant impact on the measure of the UAL. It is important to note that these changes include a downward revision to the estimate of future investment earnings and ultimately costs will be determined by actual investment earnings. With the continued low-interest-rate environment, we are continuing to see investment consultants reduce their capital market assumptions. As a result, future expectations of investment returns may continue to decline necessitating further reductions in the discount rate. There were no assumption changes made with this year's December 31, 2020 actuarial valuation.



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**SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK**

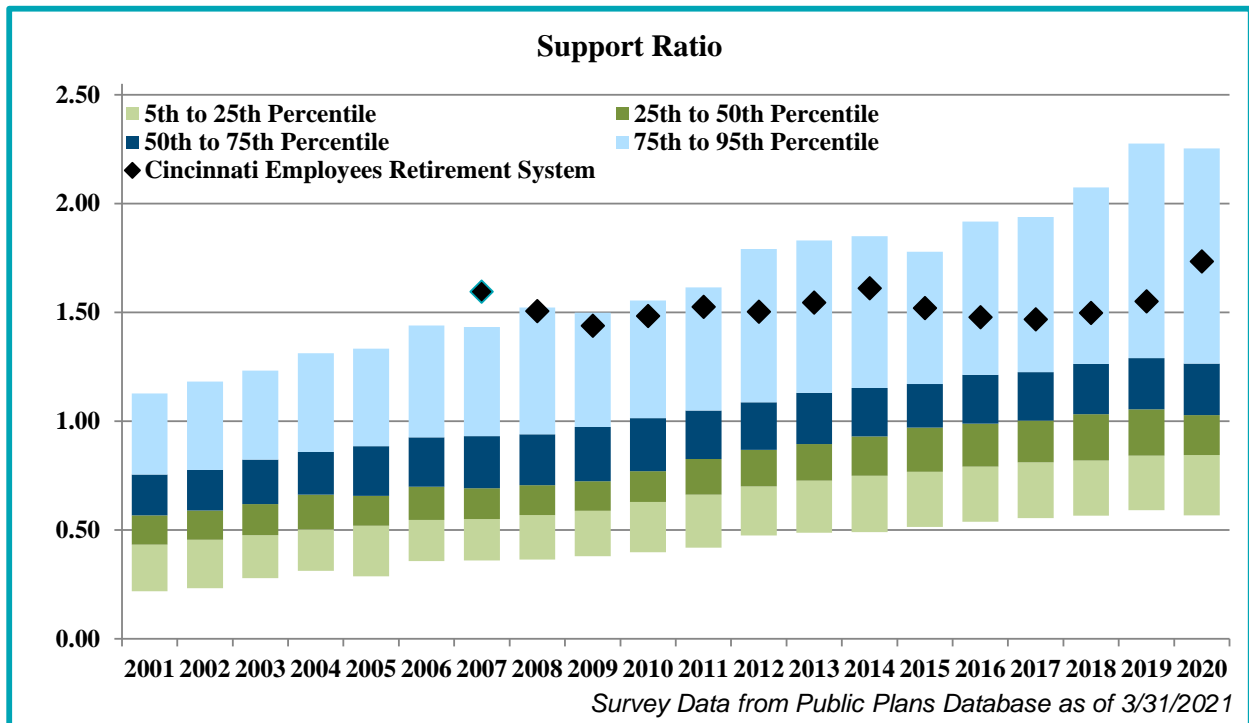
**Plan Maturity Measures**

The future financial condition of a mature pension plan is more sensitive to each of the risks identified above than a less mature plan. Before assessing each of these risks, it is important to understand the maturity of this System compared to other plans and how the maturity has changed over time.

Plan maturity can be measured in a variety of ways, but they all get at one basic dynamic - the larger the plan is compared to the contribution or revenue base that supports it; the more sensitive the plan will be to risk. The measures below have been selected as the most important in understanding the primary risks identified for this System.

**Inactives per Active (Support Ratio)**

One simple measure of plan maturity is the ratio of the number of inactive members (those receiving benefits or entitled to a deferred benefit) to the number of active members. The revenue base supporting the plan is usually proportional to the number of active members, so a relatively high number of inactives compared to actives indicate a larger plan relative to its revenue base as well.



The graph above shows the distribution from the 5<sup>th</sup> to 95<sup>th</sup> percentile of support ratios for the plans in the Public Plans Database. The black diamonds show how the Cincinnati Retirement System compares to the other plans. Whereas the support ratios for the plans as a whole have increased over the period as they mature, Cincinnati’s support ratio has remained relatively

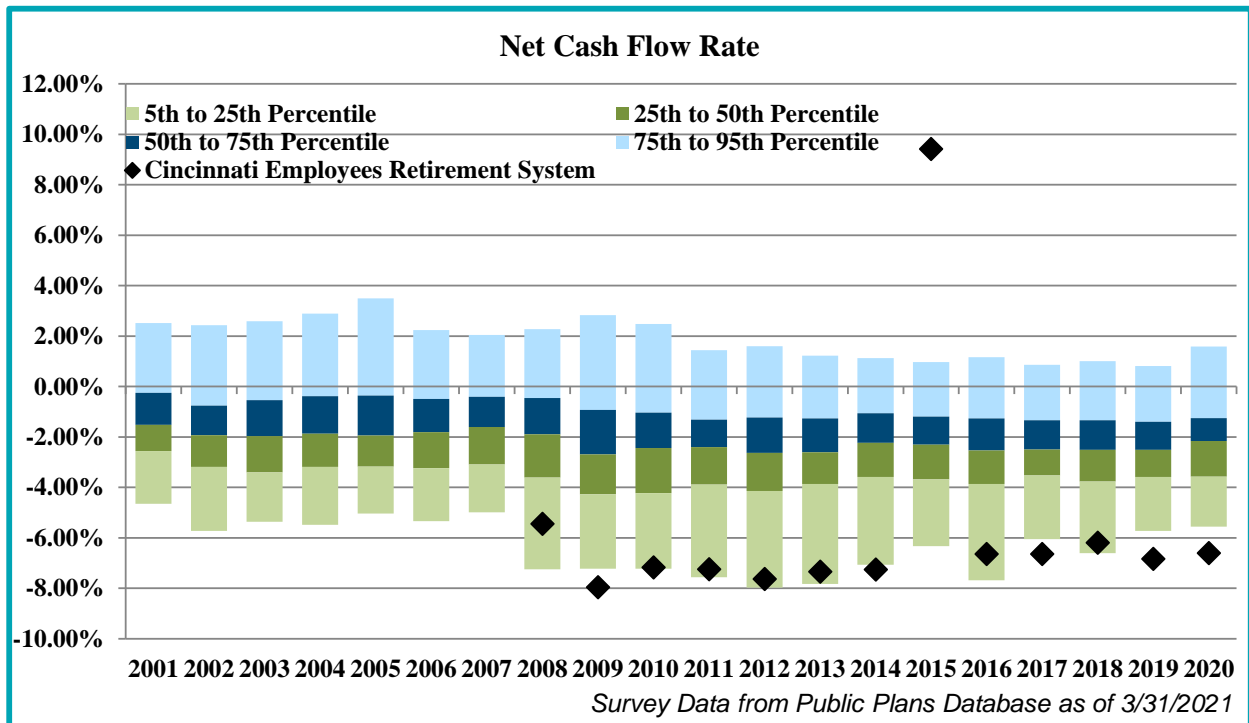
**CINCINNATI RETIREMENT SYSTEM  
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**SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK**

stable over the last decade prior to this year. The sharp increase in the support ratio from last year to this year was partly attributable to the decrease in actives due to eligible employees electing to participate in the ERIP. The System’s support ratio continues to be in the upper quartile.

**Net Cash Flow**

The net cash flow of the plan as a percentage of the beginning of year assets indicates the sensitivity of the plan to short-term investment returns. Net cash flow is equal to contributions less benefit payments and administrative expenses. Mature plans can have large amounts of benefit payments compared to contributions, particularly if they are well funded. Investment losses in the short-term are compounded by the net withdrawal from the plan leaving a smaller asset base to try to recover from the investment losses. Large negative cash flows can also create liquidity issues.



The graph above shows how the Cincinnati Retirement System’s negative net cash flow as a percent of assets has compared to the other public plans in the database. With the exception of 2015, which reflects the large amount of monies transferred pursuant to the Collaborative Settlement Agreement, the System has been amongst the top 5 percentile in having the largest negative cash flow. This higher negative cash flow subjects the System to a higher amount of investment risk since assets must earn more to avoid the System’s assets from decreasing from one year to the next.

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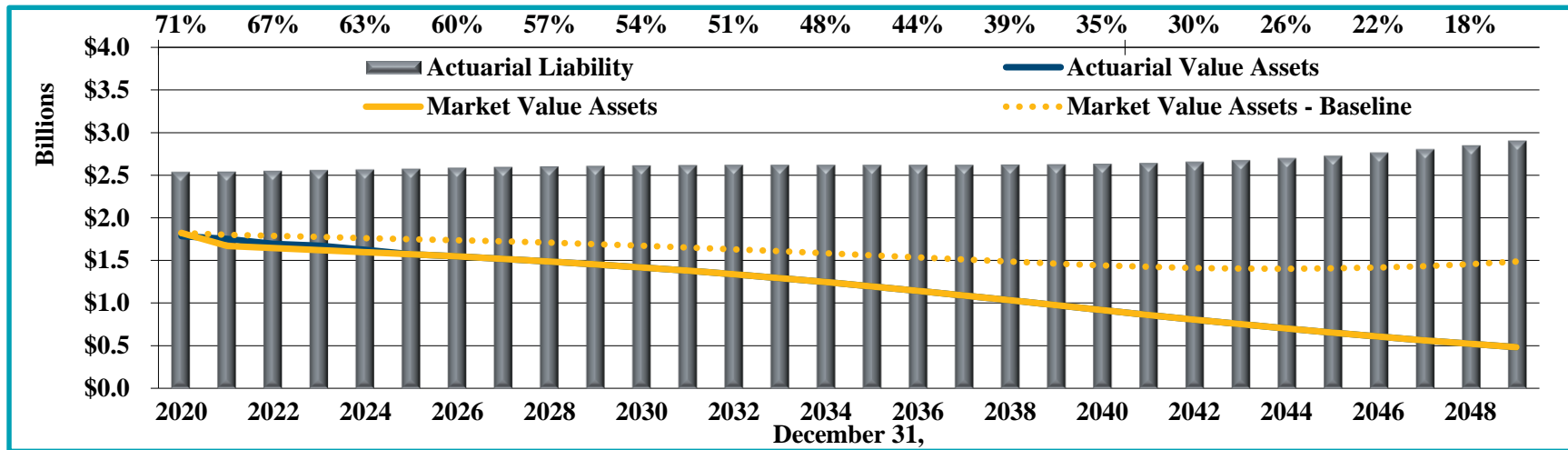
**SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK**

**Deterministic Scenarios/Stress Testing**

We developed several hypothetical scenarios to illustrate the impact actual investment returns may have on future funded status and contribution rates. The scenarios are balanced between positive and negative scenarios and are intended to illustrate the importance of both the return itself as well as the timing of such returns.

The graphs on the following pages show the projections under each of these theoretical scenarios. The asset/liability graphs include a gold dotted line representing the baseline market value of assets and the contribution graphs include a blue dotted line representing the baseline ADC projections to facilitate the comparison between the particular scenario and the projections assuming all assumptions are met. The baseline projections are shown in the Board Summary.

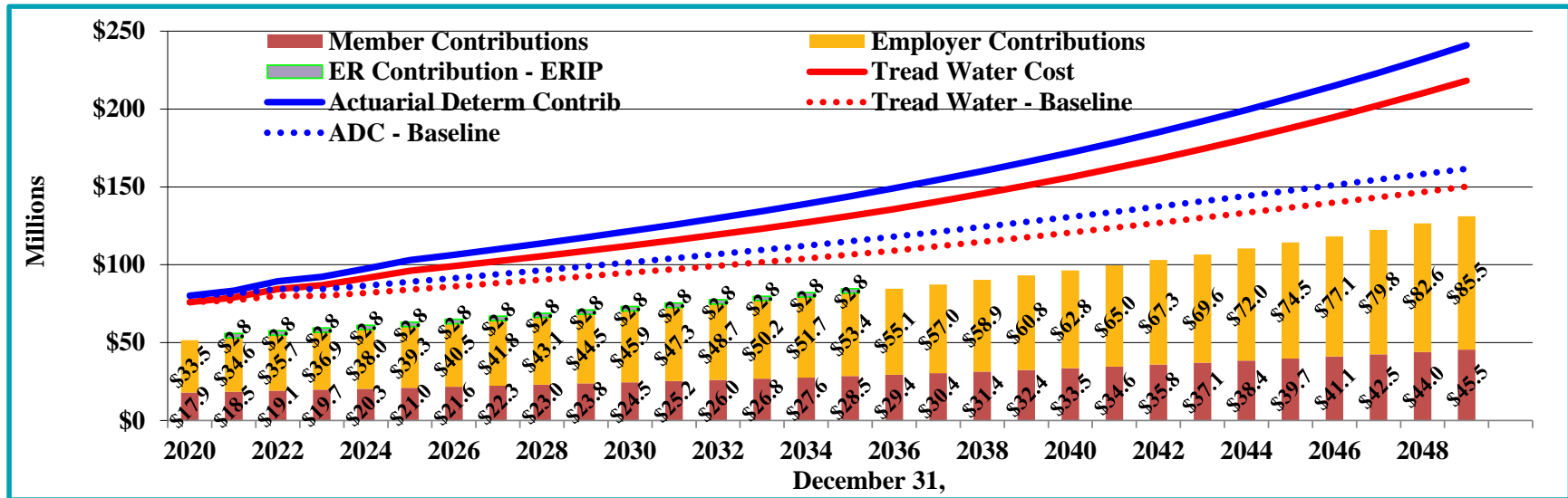
**Investment Return of 0% for 2021 followed by 7.5% per year thereafter**



As illustrated above, one year of a flat return (0%) for the Plan year ending December 31, 2021 followed by a 7.5% return per year thereafter has a significant impact on the solvency projection of the System. Under this projection, the System is not projected to become insolvent but is expected to hit a low of 3% funded by the 2068 Plan Year.

CINCINNATI RETIREMENT SYSTEM  
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SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK



Similarly, both the Actuarial Determined Contribution and Tread Water Cost increase significantly over the next 30 years for just this one year of unfavorable return. The contributions (bars) are the same as the baseline since the City’s contributions are made based on a fixed rate.

**CINCINNATI RETIREMENT SYSTEM  
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**SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK**

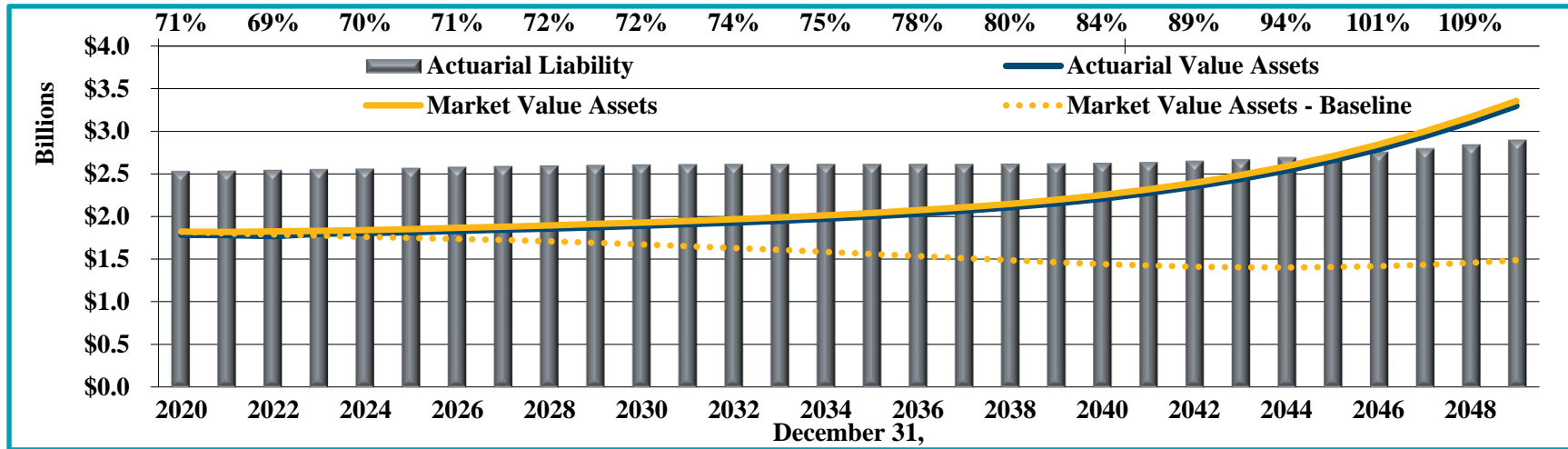
The table below further illustrates the impact that an unfavorable investment return for the year ending December 31, 2021 would have on the projected insolvency of the System’s assets assuming no changes to benefits or contribution rates and all assumptions are realized. All future years beyond 2021 were assumed to have an investment return of 7.5%.

Assumed 2021 Investment Return	Projected Insolvency Year	Projected to be 100% Funded
15.0%	None	2055
7.5%	None	2078
0.0%	None	>2128
(7.5%)	2045	None
(15.0%)	2040	None

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**SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK**

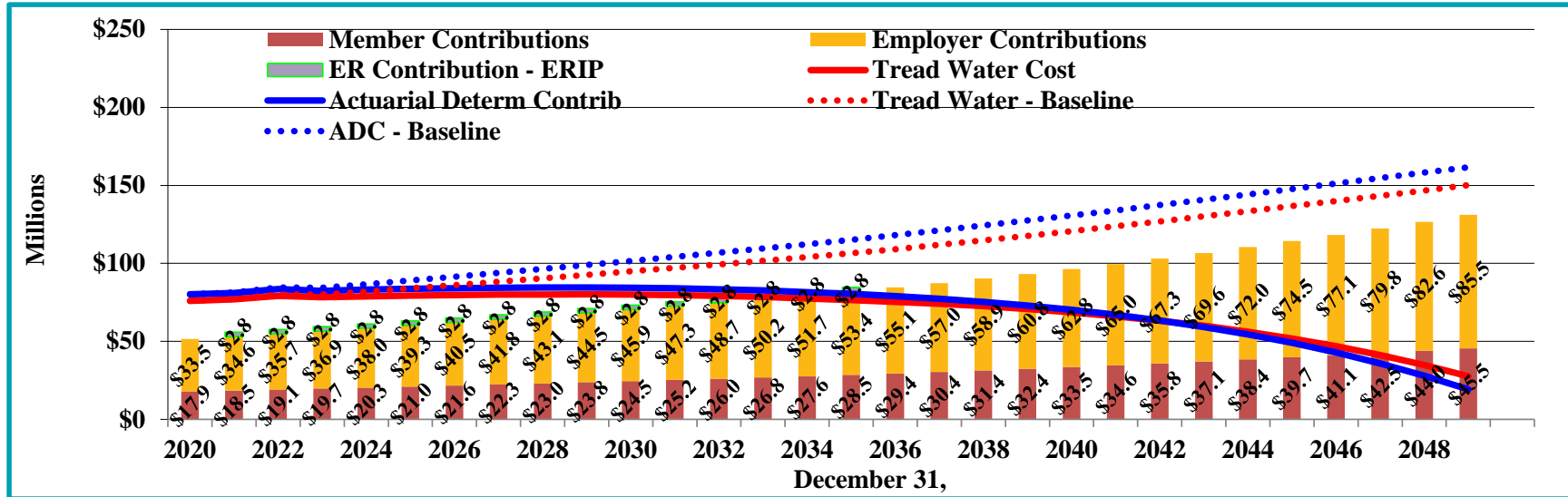
**Investment Return of 8.5% per year**



Conversely, the chart above shows the impact on the System’s projected assets if all future years’ investment returns are 8.5% per year. As shown above, the assets would grow over the period rather than depreciate if the assets were to just return the assumed 7.5% per year.

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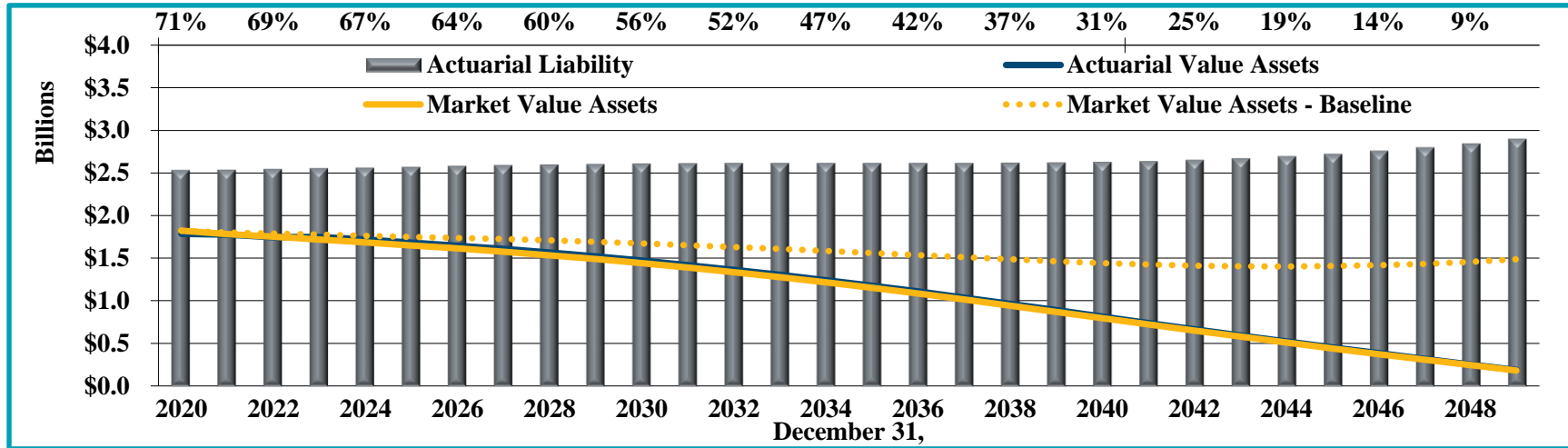


As anticipated, both the Actuarial Determined Contribution and Tread Water Cost are materially lower than if the assets were to return the assumed 7.5% per year.

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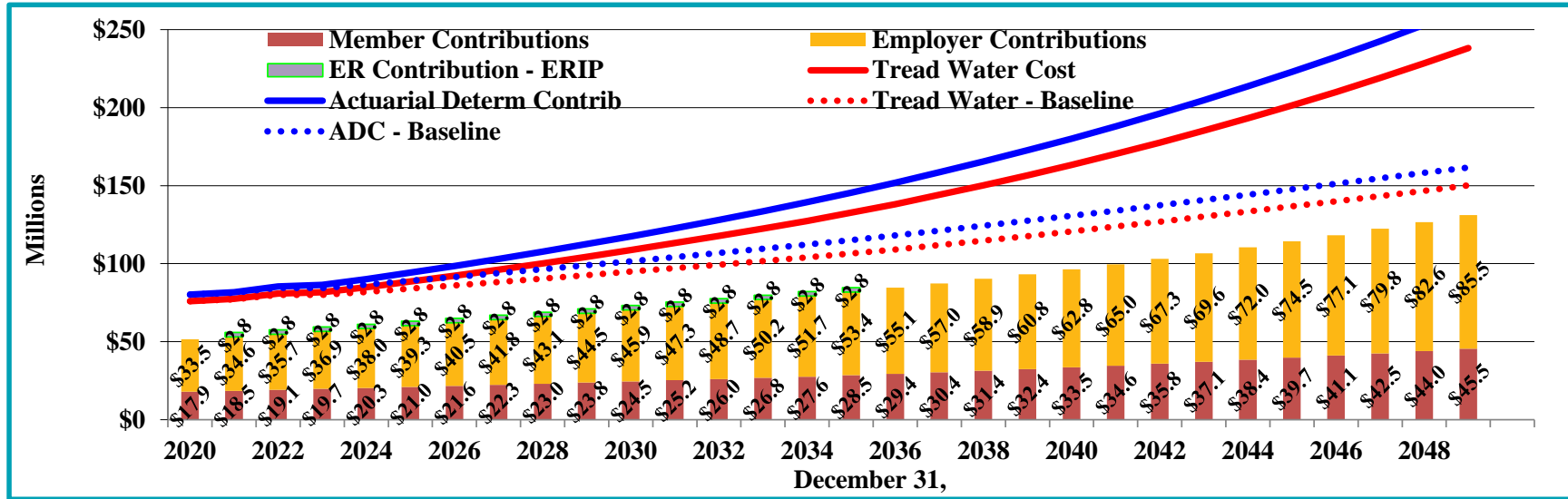
**Investment Return of 6.5% per year**



If the assets were to return 6.5% per year (1% less than the assumed 7.5%), the System’s assets are expected to be depleted by the 2052 Plan year.

**CINCINNATI RETIREMENT SYSTEM  
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As anticipated, both the Actuarial Determined Contribution and Tread Water Cost are materially higher than if the assets were to return the assumed 7.5% per year.

The scenarios shown above represent deterministic projections. These types of projections show the financial impact on the System under a set of fixed returns. Alternatively, stochastic projections graph the probability of the key metrics such as funded status based on a large number of scenarios (e.g. 1,000) based on the expected long-term return and risk characteristics of the portfolio. Whereas we have not included a stochastic analysis in this report, we would be happy to share this analysis if requested.

**More Detailed Assessment**

A more detailed assessment is always valuable to enhance the understanding of the risks identified above. While more detail would provide some additional value, we do not believe it is necessary to perform an in-depth analysis every year. We recommend the Board review the analysis provided above annually and consider a more detailed analysis periodically and when there is a substantial change in the financial position or maturity of the System.



**CINCINNATI RETIREMENT SYSTEM  
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**SECTION III – ASSETS**

The System uses and discloses two different asset measurements which are presented in this section of the report: market value and actuarial value of assets. The market value represents the value of the assets if they were liquidated on the valuation date. The actuarial value of assets is a value that smooths annual investment returns to reduce annual investment volatility and is used in determining the actuarial determined contribution.

In this section, we present detailed information on the System’s assets including:

- Statement of the cash flow during the year,
- Disclosure of investment performance for the year, and
- Development of the actuarial value of assets.

**Changes in Market Value**

The components of asset change from one year to the next include contributions (both City and Member), benefit payments, expenses, and investment income (realized and unrealized.)

The specific changes during 2020 are presented on the next page.

**CINCINNATI RETIREMENT SYSTEM  
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**SECTION III – ASSETS**

**Table III-1  
Reconciliation of the Market Value of Assets**

<b>Market Value of Assets - December 31, 2019</b>	<b>\$ 1,799,975,000</b>
<b><u>Additions</u></b>	
Contributions	
Employer	\$ 34,517,000
Member	19,973,000
Total Contributions	<u>\$ 54,490,000</u>
Investment Income	
Net Appreciation (Depreciation) in Fair Value of Investments	\$ 117,831,000
Interest	4,552,000
Dividends	13,425,000
Partnership Income	7,801,000
Other	31,000
Total Investment Income	<u>\$ 143,640,000</u>
Investment Expenses	\$ (3,879,000)
Total Additions	<u>\$ 194,251,000</u>
<b><u>Deductions</u></b>	
Benefits Paid	\$ 171,608,000
Net Transfers	(6,000)
Administrative Expenses	1,709,000
Total Deductions	<u>\$ 173,311,000</u>
Net Increase(Decrease)	\$ 20,940,000
<b>Market Value of Assets - December 31, 2020</b>	<b>\$ 1,820,915,000</b>

**CINCINNATI RETIREMENT SYSTEM  
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**SECTION III – ASSETS**

**Investment Performance**

The following table calculates the investment gain/loss and the return for the plan year on a Market Value basis. The return is an appropriate measure for comparing the actual asset performance to the long-term 7.50% assumption.

<b>Table III-2 Market Value Investment Gains/(Losses)</b>	
<b>Market Value of Assets - December 31, 2019</b>	\$ 1,799,975,000
Contributions	\$ 54,490,000
Benefits Paid	(171,608,000)
Net Transfers	6,000
Administrative Expenses	(1,709,000)
Expected Investment Earnings (7.50%)	130,622,890
<b>Expected Market Value of Assets - December 31, 2020</b>	<b>\$ 1,811,776,890</b>
<b>Investment Gain / (Loss)</b>	<b>\$ 9,138,110</b>
<b>Market Value of Assets - December 31, 2020</b>	<b>\$ 1,820,915,000</b>
<b>Return</b>	<b>8.03%</b>

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION III – ASSETS**

**Actuarial Value of Assets**

To determine on-going funding requirements, most pension systems utilize an actuarial value of assets that differs from the market value of assets. The actuarial value of assets represents an asset value based on averaging or smoothing year-to-year market value returns for purposes of reducing contribution volatility. For this System, the actuarial value of assets recognizes a portion of the difference between the actual market value of assets and the expected market value of assets. The amount recognized each year is 20% of the difference between actual market value and expected market value. The expected market value is determined using the System’s actual cash flows and assumed actuarial rate of return. The actuarial value of assets is constrained so that it cannot exceed 120% of the market value and cannot be less than 80% of the market value. The asset valuation method is described more fully in Appendix B.

The following table illustrates the calculation of the actuarial value of assets for the December 31, 2020 valuation.

<b>Table III-3 Development of December 31, 2020 Actuarial Value of Assets</b>					
a)	Market Value of Assets - December 31, 2020				\$ 1,820,915,000
b)	Deferred Gains or (Losses)				
	Plan Year	Market Value Gain or (Loss)	Percent Recognized	Percent Deferred	Amount Deferred
	2020	\$ 9,138,110	20%	80%	\$ 7,310,488
	2019	141,908,946	40%	60%	85,145,368
	2018	(203,374,909)	60%	40%	(81,349,964)
	2017	115,796,462	80%	20%	23,159,292
	2016	28,104,012	100%	0%	0
				Total Deferred:	\$ 34,265,184
c)	Preliminary Actuarial Value of Assets - December 31, 2020 [(a) - (b)]				\$ 1,786,649,816
d)	Corridor for Actuarial Value of Assets				
				80% of Market Value of Assets	\$ 1,456,732,000
				120% of Market Value of Assets	\$ 2,185,098,000
e)	Actuarial Value of Assets - December 31, 2020				\$ 1,786,649,816
f)	Actuarial Value of Assets as a % of Market Value of Assets [(e) ÷ (a)]				98%

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION III – ASSETS**

**Asset Gains / (Losses) on Actuarial Value Basis**

The following table calculates the actuarial investment gain/loss and the return for the plan year on an Actuarial Value basis. This actuarial gain/loss is one component of the System’s overall actuarial experience gain/loss.

The Actuarial Value of Assets returned 8.78% for the year primarily due to the continued recognition of the net investment gains attributable to prior years, including the 16.40% market value return for 2019. This resulted in a \$21.6 million actuarial investment gain when compared to the 7.50% expected return as shown below. Since the Market Value of Assets currently exceeds the Actuarial Value of Assets by \$34.3 million, this represents a net deferred investment gain that will help mitigate the impact of any unfavorable returns in the future.

<b>Table III-4 Actuarial Value Investment Gains/(Losses)</b>	
<b>Actuarial Value of Assets - December 31, 2019</b>	\$ 1,756,533,401
Contributions	\$ 54,490,000
Benefits Paid	(171,608,000)
Net Transfers	6,000
Administrative Expenses	(1,709,000)
Expected Investment Earnings (7.50%)	127,364,770
<b>Expected Actuarial Value of Assets - December 31, 2020</b>	<b>\$ 1,765,077,171</b>
<b>Investment Gain / (Loss)</b>	<b>\$ 21,572,645</b>
<b>Actuarial Value of Assets - December 31, 2020</b>	<b>\$ 1,786,649,816</b>
<b>Return</b>	<b>8.78%</b>

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION III – ASSETS**

**Investment Performance**

The market value of assets (MVA) returned 8.03% during 2020, which is slightly more than the assumed 7.50% return. A return of 8.78% on the actuarial value of assets (AVA) is primarily the result of the asset smoothing method being utilized for the calculation of the actuarial value of assets. Since only 20% of this year’s gain from the performance of the System is recognized in a given year, in periods of very favorable performance, the AVA will not increase as rapidly as the MVA. In a period of unfavorable returns, the AVA will not decrease as fast as the MVA.

**Table III-5  
Annual Rates of Return**

<u>Plan Year</u>	<u>Investment Return Assumption</u>	<u>Market Value</u>	<u>Actuarial Value</u>
2011	7.50%	0.88%	0.24%
2012	7.50%	12.06%	0.25%
2013	7.50%	16.99%	12.11%
2014	7.50%	6.46%	10.18%
2015	7.50%	(0.11%)	7.51%
2016	7.50%	9.24%	8.50%
2017	7.50%	14.51%	9.19%
2018	7.50%	(3.93%)	5.66%
2019	7.50%	16.40%	6.69%
2020	7.50%	8.03%	8.78%
<b>10-Year Compound Average</b>		<b>7.83%</b>	<b>6.84%</b>
<b>5-Year Compound Average</b>		<b>8.61%</b>	<b>7.75%</b>

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION IV – LIABILITIES**

In this section, we present detailed information on System liabilities including:

- **Disclosure** of System liabilities at December 31, 2019 and December 31, 2020, and
- Statement of **changes** in these liabilities during the year.

**Disclosure**

Two types of liabilities are calculated and presented in this report. Each type is distinguished by the people ultimately using the figures and the purpose for which they are using them.

- **Present Value of Benefits:** Used for analyzing the financial outlook of the System. This represents the amount of money needed today to fund all future benefits and expenses of the System, assuming members continue to accrue benefits and all assumptions are met.
- **Actuarial Liability:** Used for funding calculations. This liability is calculated taking the present value of benefits above and subtracting the present value of future member contributions and future employer normal costs under an acceptable actuarial funding method. This method is referred to as the **Entry Age Normal** funding method.

None of the liability figures disclosed in this report is meant to be a measure of the System's settlement liability.

The following table discloses each of these liabilities for the current and prior valuations. With respect to each disclosure, a subtraction of the appropriate value of the System's assets yields, for each respective type, a **net surplus** or an **unfunded liability**.

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION IV – LIABILITIES**

<b>Table IV-1</b>		
<b>Liabilities/Net (Surplus)/Unfunded</b>		
	<b>December 31, 2019</b>	<b>December 31, 2020</b>
<b>Present Value of Benefits</b>		
Active Participants (Full Time)	\$ 766,724,160	\$ 646,829,434
Active Participants (Part Time)	5,056,477	4,785,102
Deferred Vesteds	26,347,372	26,667,625
Retirees	1,879,671,952	2,065,724,594
<b>Present Value of Benefits (PVB)</b>	<b>\$ 2,677,799,961</b>	<b>\$ 2,744,006,755</b>
 City's Normal Cost*	 \$ 8,460,000	 \$ 7,399,000
 <b>Actuarial Liability</b>		
Active Participants (Full Time)	\$ 555,272,745	\$ 436,069,494
Active Participants (Part Time)	5,056,477	4,785,102
Deferred Vesteds	26,347,372	26,667,625
Retirees	1,879,671,952	2,065,724,594
<b>Actuarial Liability (AL)</b>	<b>\$ 2,466,348,546</b>	<b>\$ 2,533,246,815</b>
Actuarial Value of Assets (AVA)	1,756,533,401	1,786,649,816
<b>Net (Surplus)/Unfunded (AL – AVA)</b>	<b>\$ 709,815,145</b>	<b>\$ 746,596,999</b>
<b>Funded Status (AVA basis)</b>	<b>71.2%</b>	<b>70.5%</b>

\* Includes administrative expense and net of Employee Contributions

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION IV – LIABILITIES**

**Changes in Liabilities**

Each of the liabilities disclosed in the prior table is expected to change at each valuation. The components of that change, depending upon which liability is analyzed, can include:

- New hires since the last valuation
- Benefits accrued since the last valuation
- Plan amendments changing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Members retiring, terminating, or dying at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method

Unfunded liabilities will change because of all of the above and due to changes in the System’s assets resulting from the following:

- Employer contributions less than the full actuarial contribution
- Investment earnings different than expected
- A change in the method used to measure system assets

In each valuation, we report on those elements of change that are of particular significance, potentially affecting the long-term financial outlook of the System. Below we present key changes in liabilities since the last valuation.

<b>Table IV-2 Change in Liabilities</b>		
	<b>Present Value of Benefits</b>	<b>Actuarial Liability</b>
Liabilities as of 12/31/2019	\$ 2,677,799,961	\$ 2,466,348,546
Liabilities as of 12/31/2020	\$ 2,744,006,755	\$ 2,533,246,815
Liability Increase (Decrease)	\$ 66,206,794	\$ 66,898,269
Change Due to:		
Assumption Change	\$ 0	\$ 0
Plan Changes	24,670,647	24,670,647
Actuarial (Gain)/Loss	NC	10,191,363
Benefits Accumulated and Other Sources	41,536,147	32,036,259

NC = not calculated

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION IV – LIABILITIES**

Table IV-3 shows the components of the actuarial liability experience (gain)/loss.

<b>Table IV-3 Sources of Actuarial Liability (Gain)/Loss (\$ in Thousands)</b>		
<b>Source</b>	<b>(Gain) / Loss Amount</b>	<b>% of Liability</b>
1. Salary	\$ 1,749.1	0.1%
2. Active experience (retirements, termination, etc.)	(8,344.2)	(0.3%)
3. New entrants	4,694.9	0.2%
4. Inactive experience	11,455.4	0.4%
5. Rehired inactives	(101.9)	0.0%
6. Benefit payments different than expected	(853.5)	0.0%
7. Miscellaneous / Change in Account Balances	1,591.6	0.0%
8. Total Liability (Gain) / Loss	\$ 10,191.4	0.4%

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION V – CONTRIBUTIONS**

In the process of evaluating the financial condition of any pension system, the actuary analyzes the assets and liabilities to determine what level (if any) of contributions is needed to properly maintain the funding status of the system. Typically, the actuarial process will use a funding technique that will result in a pattern of contributions that is both stable and predictable.

For this system, the funding method employed is the **Entry Age Actuarial Cost Method**. Under this method, there are three key components to calculating the Actuarially Determined Contribution (ADC): the **normal cost rate**, the **unfunded actuarial liability rate** (UAL rate), and the **administrative expense rate**. The normal cost rate represents the value of benefits being earned by the active members, as a percent of pay, for the upcoming year. The City's normal cost rate is calculated by taking the total normal cost rate less the member contribution rate of 9%. Based on the Board's funding benchmark, the unfunded actuarial liability rate represents the amount necessary, as a level dollar amount, to pay off the unfunded liability over an open 30-year period. The final piece of the ADC is the administrative expense rate of 0.80% of pay.

However, the City does not contribute based on the Actuarially Determined Contribution rate, nor should the ADC rate be construed as a recommended contribution rate. If the City were to contribute based on the ADC, the unfunded liability would not be expected to be fully paid off based on the open 30-year amortization period. In accordance with the Collaborative Settlement Agreement, the City currently contributes 16.25% of pay for full-time active and DROP members. A contribution totaling 3.00% of pay is made on behalf of part-time actives.

Lastly, we have assumed that the City will contribute \$2.8 million each year for the next 15 years to pay for the increase in liabilities due to the Early Retirement Incentive Program (ERIP) beginning January 1, 2022.

CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020

SECTION VI – ACCOUNTING STATEMENT INFORMATION

**Table V-1  
Development of Actuarially Determined Contribution Rate**

	December 31, 2019 (for Fiscal Year ending June 30, 2021)	December 31, 2020 (for Fiscal Year ending June 30, 2022)
<b>1. Actuarial Liability</b>		
a. Active Employees (Full Time)	\$ 555,272,745	\$ 436,069,494
b. Active Employees (Part Time)	5,056,477	4,785,102
c. Vested Terminated Members	26,347,372	26,667,625
d. Retired Members and Inactive Members	1,879,671,952	2,065,724,594
e. Total Present Value	<u>\$ 2,466,348,546</u>	<u>\$ 2,533,246,815</u>
<b>2. Actuarial Value of Assets</b>	<u>\$ 1,756,533,401</u>	<u>\$ 1,786,649,816</u>
<b>3. Unfunded Actuarial Liability (UAL) (1) - (2)</b>	<u>\$ 709,815,145</u>	<u>\$ 746,596,999</u>
<b>4. Gross Normal Cost Rate</b>	12.46%	12.15%
<b>5. Plan Change Amortization Payment</b>		
a. Increase in Liabilities due to Plan Changes	\$ 0	\$ 24,670,647
b. 15-Year Plan Change Amortization Payment <sup>1</sup>	0	2,794,870
c. Total Active Payroll <sup>2</sup>	219,462,913	209,255,710
d. Total Amortization Payment (as % of Payroll) [5b. ÷ 5c.]	0.00%	1.34%
<b>6. UAL Amortization Payment</b>		
a. UAL not due to Plan Changes	\$ 709,815,145	\$ 721,926,352
b. 30-Year UAL Amortization Payment <sup>3</sup>	57,966,480	58,955,532
c. Total Active Payroll <sup>2</sup>	219,462,913	209,255,710
d. Total Amortization Payment (as % of Payroll) [6b. ÷ 6c.]	26.41%	28.17%
<b>7. Administrative Expenses</b>	0.80%	0.80%
<b>8. Expected Employee Contributions</b>	(9.00%)	(9.00%)
<b>9. City's Actuarial Determined Contribution Rate     [4. + 5d. + 6d. + 7. + 8.]</b>	30.67%	33.46%
<b>10. City's Estimated ADC in Dollars [5c. x 9.]</b>	<u>\$ 67,309,000</u>	<u>\$ 70,017,000</u>

<sup>1</sup> Adjusted with interest to following January 1.

<sup>2</sup> Adjusted with interest to mid-year based on General Wage Inflation of 3.75%.

<sup>3</sup> Adjusted with interest to mid-year.

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION VI – ACCOUNTING STATEMENT INFORMATION**

Table VI-1 shows the history of gains and losses and Table VI-2 shows the Schedule of Funding Progress.

<b>Table VI - 1 Gain or (Loss) for Year Ending December 31, (\$ in Thousands)</b>									
<b>Type of Activity</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
Investment Income	\$ (109,967)	\$ 60,722	\$ 36,688	\$ 413	\$ 16,400	\$ 28,361	\$ (31,660)	\$ (13,917)	\$ 21,573
Combined Liability Experience	(493)	1,134	15,199	(777)	(1,424)	(23,609)	31,318	(14,043)	(10,191)
Total Gain (Loss)	\$ (110,460)	\$ 61,856	\$ 51,887	\$ (364)	\$ 14,976	\$ 4,752	\$ (342)	\$ (27,960)	\$ 11,382
Non-Recurring Items	0	0	0	345,573	(27,754)	(48,308)	(39,236)	0	(24,671)
Composite Gain (Loss) during Year	\$ (110,460)	\$ 61,856	\$ 51,887	\$ 345,209	\$ (12,778)	\$ (43,556)	\$ (39,578)	\$ (27,960)	\$ (13,289)

<b>Table VI - 2 Schedule of Funding Progress (\$ in Thousands)</b>						
<b>Actuarial Valuation Date</b>	<b>(a) Actuarial Value of Assets</b>	<b>(b) Entry Age Actuarial Liability</b>	<b>(b) - (a) Unfunded Actuarial Liability</b>	<b>(a) ÷ (b) Funded Ratio</b>	<b>(c) Covered Payroll</b>	<b>[(b) - (a)] ÷ (c) UAL as a % of Covered Payroll</b>
12/31/2012	\$ 1,367,695	\$ 2,229,818	\$ 862,123	61.3%	\$ 167,148	515.8%
12/31/2013	1,424,933	2,254,121	829,188	63.2%	163,477	507.2%
12/31/2014	1,453,922	2,259,822	805,900	64.3%	164,575	489.7%
12/31/2015	1,703,002	2,207,484	504,482	77.1%	174,963	288.3%
12/31/2016	1,732,053	2,252,875	520,822	76.9%	179,463	290.2%
12/31/2017	1,772,494	2,346,906	574,412	75.5%	191,806	299.5%
12/31/2018	1,755,861	2,417,515	661,654	72.6%	206,122	321.0%
12/31/2019	1,756,533	2,466,349	709,816	71.2%	215,460	329.4%
12/31/2020	1,786,650	2,533,247	746,597	70.5%	205,439	363.4%

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION VI – ACCOUNTING STATEMENT INFORMATION**

Additional information as of December 31, 2020:

Valuation Date	December 31, 2020
Actuarial Cost Method	Entry Age
Amortization Method	Level Dollar Open
Amortization Period	30 Years
Asset Valuation Method	Five Year Smoothed Market Value
Actuarial Assumptions	
Investment Return (includes inflation)	7.50%
Projected Salary Increases (includes inflation)	3.75% - 7.50%
Inflation	2.75%
Cost-of-Living Adjustments	3.00%

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX A – MEMBERSHIP INFORMATION**

The data for this valuation was provided electronically by the Cincinnati Retirement System staff. Cheiron did not perform a formal audit of the data. However, we did perform checks of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice No. 23 – Data Quality.

Data reported in this Appendix is as of December 31, 2020.

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX A – MEMBERSHIP INFORMATION**

Status Reconciliation of Participating Members							
	Active Full-Time	Active Part-Time	Terminated Vested	Retired	Disabled	Beneficiary	Total
As of December 31, 2019	2,903	1,143	225	3,507	153	616	8,547
New Hires	146	291					437
To Active Part-Time	(26)	26					0
To Active Full-Time	40	(40)					0
Terminated Vested	(14)	(6)	20				0
Terminated Non-Vested	(74)	(336)					(410)
Refund of Contributions							0
Retired	(337)		(9)	346			0
Disabled	(1)				1		0
Deceased with Beneficiary				(22)	(1)	23	0
Deceased without Beneficiary			(17)	(150)	(12)	(62)	(241)
Miscellaneous Changes	(6)		3	33	1	26	57
As of December 31, 2020	2,631	1,078	222	3,714	142	603	8,390

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX A – MEMBERSHIP INFORMATION**

Active Member Count by Age and Service as of December 31, 2020										
Age	Years of Service									Total Count
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Over	
Under 25	31	8	0	0	0	0	0	0	0	39
25-29	141	34	8	0	0	0	0	0	0	183
30-34	171	82	39	5	0	0	0	0	0	297
35-39	130	106	73	57	10	0	0	0	0	376
40-44	121	81	58	54	40	5	0	0	0	359
45-49	98	58	72	71	72	18	0	0	0	389
50-54	57	68	67	81	82	54	8	0	0	417
55-59	47	50	39	59	68	55	27	4	0	349
60-64	24	29	28	29	26	17	13	1	1	168
65-69	9	9	5	6	8	1	4	1	0	43
70 & Over	0	1	0	3	1	2	1	0	3	11
<b>Total Count</b>	<b>829</b>	<b>526</b>	<b>389</b>	<b>365</b>	<b>307</b>	<b>152</b>	<b>53</b>	<b>6</b>	<b>4</b>	<b>2,631</b>

Average Service: 11.6

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX A – MEMBERSHIP INFORMATION**

Average Compensation of Active Members by Age and Service as of December 31, 2020											
Age	Years of Service									Avg. Comp.	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & Over		
Under 25	\$52,737	\$48,883	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$51,947
25-29	61,759	58,011	57,709	0	0	0	0	0	0	0	60,886
30-34	68,152	65,508	68,211	62,260	0	0	0	0	0	0	67,331
35-39	71,578	69,636	74,892	62,945	69,412	0	0	0	0	0	70,308
40-44	65,383	71,036	69,672	75,280	77,348	71,340	0	0	0	0	70,256
45-49	69,782	71,430	81,949	77,538	75,228	79,241	0	0	0	0	75,141
50-54	72,038	68,682	76,601	71,842	78,046	81,982	81,210	0	0	0	74,831
55-59	74,159	74,151	72,651	71,012	72,151	77,232	73,931	79,985	0	0	73,599
60-64	82,475	68,527	73,611	70,202	64,534	80,030	78,676	53,398	110,048	0	73,144
65-69	66,070	71,408	67,363	78,357	63,361	99,049	54,134	126,229	0	0	69,604
70 & Over	0	51,311	0	55,950	75,407	71,509	69,394	0	89,676	0	70,546
Average	67,814	68,579	74,277	71,650	74,172	79,345	74,614	83,261	94,769	0	71,200

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX A – MEMBERSHIP INFORMATION**

Summary of Inactive Membership Data as of December 31, 2020				
Group	Count	Total Annual Benefit	Average Annual Benefit	
Retirees	3,714	\$ 165,608,427	\$ 44,590	
Disableds	142	\$ 2,706,901	\$ 19,063	
Survivor	<u>603</u>	<u>\$ 15,510,754</u>	<u>\$ 25,723</u>	
<b>Total</b>	<b>4,459</b>	<b>\$ 183,826,082</b>	<b>\$ 41,226</b>	

Annual Benefits by Age as of December 31, 2020				
Attained Age	Number of Members	Total Annual Benefits	Average Annual Benefit	
< 40	4	\$ 116,347	\$ 29,087	
40 - 44	1	22,682	22,682	
45 - 49	20	698,062	34,903	
50 - 54	148	6,511,689	43,998	
55 - 59	386	17,084,865	44,261	
60 - 64	759	31,914,669	42,048	
65 - 69	956	41,365,217	43,269	
70 - 74	872	37,667,017	43,196	
75 - 79	501	20,159,719	40,239	
80 - 84	404	15,521,818	38,420	
85 - 89	243	7,990,288	32,882	
90 - 94	127	3,901,054	30,717	
95 - 99	32	799,518	24,985	
100+	6	73,137	12,190	
<b>Total</b>	<b>4,459</b>	<b>\$ 183,826,082</b>	<b>\$ 41,226</b>	

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**A. Actuarial Assumptions**

*Rationale for Economic and Demographic Assumptions*

The actuarial assumptions were adopted by the Board of Trustees on March 1, 2018 upon the recommendation of the prior actuary, based on an experience study performed for the period January 1, 2012 to December 31, 2016. The results of this study were presented in a report dated February 27, 2018 and are incorporated into this report by reference. An investment return assumption of 7.50% was used as prescribed by item 29 of the Collaborative Settlement Agreement (CSA) signed October 5, 2015.

Cheiron has reviewed the assumptions. While we consider these assumptions to be generally reasonable, we have not yet performed our own actuarial experience study.

**1. Investment Rate of Return**

7.50% per year, net of investment *expenses*

**2. Inflation Assumption**

2.75% per annum

**3. Expenses**

Estimated budgeted administrative expenses of 0.80% of payroll are added to the normal cost rate

**4. Salary Increases**

Salary increases are assumed to vary by service. Representative rates are as follows:

Service	Annual Increase
0	7.50%
5	5.00
10	4.50
15	4.00
21+	3.75

**5. Mortality Rates**

Active Members: RP-2014 Employees Mortality Table with generational projections using scale MP-2017.

Healthy Inactive Members: RP-2014 Mortality Table with generational projections using Scale MP-2017, set forward 2 years for both males and females.

Disabled Inactive Members: RP-2014 Disabled Retiree Mortality Table with generational projections using scale MP-2017.

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**6. Retirement Rates including DROP**

Age	Annual Rates of Retirement Groups C, E, and F <sup>1</sup>				
	5 Years of Service	6 – 24 Years of Service	25 – 29 Years of Service	30 Years of Service	31+ Years of Service
50-54				55.0%	30.0%
55			6.0%	55.0	30.0
56			8.0	55.0	30.0
57			10.0	55.0	30.0
58			10.0	55.0	30.0
59			10.0	55.0	30.0
60	25.0%	25.0%	25.0	55.0	25.0
61	25.0	18.0	18.0	55.0	25.0
62	25.0	18.0	18.0	55.0	25.0
63	25.0	18.0	18.0	55.0	25.0
64	25.0	18.0	18.0	55.0	25.0
65	25.0	18.0	18.0	55.0	25.0
70	100.0	100.0	100.0	100.0	100.0

<sup>1</sup> For purposes of valuing CSA Employee members eligible for DROP benefits, an additional 10% is added to rates for 30 years of service and an additional 5% is added to rates for 31+ years of service

Age	Annual Rates of Retirement Group G				
	5 Years of Service	6 – 14 Years of Service	15 – 29 Years of Service	30 Years of Service	31+ Years of Service
57			6.0%	6.0%	6.0%
58			6.0	6.0	6.0
59			8.0	8.0	8.0
60			8.0	8.0	8.0
61			10.0	10.0	10.0
62			10.0	25.0	25.0
63			10.0	25.0	18.0
64			10.0	25.0	18.0
65			10.0	25.0	18.0
66			10.0	25.0	18.0
67	25.0%	25.0%	25.0	25.0	18.0
68	25.0	18.0	18.0	18.0	18.0
69	25.0	18.0	18.0	18.0	18.0
70	100.0	100.0	100.0	100.0	100.0

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**7. Termination Rates**

Sample termination rates are as follows:

Age	Annual Rates of Termination			
	<1 Year of Service	1 – 2 Years of Service	3 – 4 Years of Service	5+ Years of Service
20	22.00%	10.00%	8.00%	4.00%
25	22.00	10.00	8.00	4.00
30	22.00	10.00	8.00	4.00
35	22.00	10.00	4.00	4.00
40	22.00	10.00	4.00	2.75
45	22.00	10.00	4.00	1.25
50	22.00	10.00	4.00	1.25
55	22.00	10.00	4.00	1.25
60	22.00	10.00	4.00	1.25
65	22.00	10.00	4.00	1.25
70	22.00	10.00	4.00	1.25

60% of vested members who terminate elect to leave their contributions in the Plan in order to be eligible for a benefit at their normal retirement; 40% of members elect to withdraw their contributions

**8. Disability Rates**

Sample disability rates are as follows:

Age	Annual Rates of Disability <sup>1</sup>
20	0.005%
25	0.010%
30	0.015%
35	0.025%
40	0.045%
45	0.075%
50	0.135%
55	0.210%
60	0.250%
65	0.250%

<sup>1</sup> Rates are 0% when member is eligible for normal retirement

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**9. Part-time Active Members**

All part-time active members are assumed to receive a refund of their employee contributions with interest upon leaving the System

**10. DROP Participation**

60% of eligible CSA Employee members eligible for DROP benefits are assumed to decline participation and 40% are assumed to elect participation. Those electing to participate are assumed to remain in DROP for three years

**11. DROP Crediting Rate**

3.25% per annum

**12. Percent Married**

80% of members are assumed to be married for the purpose of valuing pre-retirement survivor benefits

**13. Spouse Age Difference**

Unless otherwise reported in the data, the male spouse is assumed to be three years older than the female spouse

**14. Changes Since Last Valuation**

None

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**B. Methods**

**1. Actuarial Funding Method**

The funding method for the valuation of liabilities used for this valuation is the Entry Age Normal (EAN) method. Under this funding method, a normal cost rate is determined as a level percentage of pay for each active member. The normal cost rate multiplied by payroll equals the total normal cost for each member. The normal cost contributions (Employer and Member) will pay for projected benefits at retirement for each active member.

The actuarial liability is the difference between the present value of future benefits and the present value of future normal costs. The difference between this actuarial liability and the actuarial value of assets is the unfunded actuarial liability (UAL).

The portion of the actuarial liability in excess of plan assets, the UAL, is amortized to develop an additional cost that is added to each year's employer's normal cost. Under this funding method, actuarial gains and losses are directly reflected in the size of the unfunded actuarial liability. The amortization method is described below.

**2. Amortization Method**

The actuarially determined contribution (ADC) is determined as the sum of (a) the employer's normal cost rate, (b) the administrative expense rate, and (c) the UAL rate. Based on the Board's funding benchmark, the UAL rate represents the amount necessary to amortize the UAL (excluding liabilities due to the ERIP) over a 30 year open period as a level dollar amount. If the City were to contribute based on the ADC, the unfunded liability would not be expected to be fully paid off based on the open 30-year amortization period.

In addition, the City is paying for the Early Retirement Incentive Program in 15 level annual amounts beginning January 1, 2022.

**3. Actuarial Value of Assets**

The actuarial value of assets recognizes a portion of the difference between the actual market value of assets and the expected market value of assets, based on the assumed valuation rate of return. The amount recognized each year is 20% of the difference between actual market value and expected market value. In addition, the actuarial value of assets cannot be less than 80%, or more than 120%, of the market value of assets.

**4. Valuation Software**

Cheiron utilizes ProVal, an actuarial valuation software leased from Winklevoss Technologies (WinTech) to calculate the liabilities, normal costs and projected benefit payments. We have relied on WinTech as the developer of ProVal. We have reviewed

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

ProVal and have a basic understanding of it and have used ProVal in accordance with its original intended purpose. We have not identified any material inconsistencies in assumptions or output of ProVal that would affect this actuarial valuation.

**5. Projection Model**

This report includes deterministic projections of future contributions, assets, and funded status for the purpose of assisting the Board and CRS staff with the management of the System. We have used Cheiron's *P-Scan* model to develop these projections. The model is also used to stress test the impact of volatile asset returns over the projection period.

The *P-Scan* projection uses standard roll-forward techniques that implicitly assume a stable active population. Changes in the demographic characteristics of the active population will lead to different results.

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**1. Membership**

All employees of the City of Cincinnati shall be members of the System except for the following:

- Members of the Police and Fireman’s Disability and Pension Fund of Ohio,
- Elected City officials,
- Employees for whom the City contributes to the Ohio Public Employees Retirement System,
- Members of the faculties, teaching staffs, research staffs, and administrative staff of the University of Cincinnati appointed to positions covered by the Teachers Insurance and Annuity Association Social Security Plan,
- Persons becoming employees after June 1, 1961, who are employed in any of the following employment classifications: bricklayer, carpenter, carpenter foreman, cement finisher, electrician, electrician foreman, painter, painter foreman, plasterer, plumber, sign painter, steamfitter and pipefitter, tinsmith, or composition roofer,
- Persons hired as police recruits who are not currently enrolled as a member of the System prior to their date of hire, and
- Current contributing members of the Ohio School Employees Retirement System (SERS) or the Ohio State Teachers Retirement System (STRS) who are hired by the City on a seasonal, temporary, or part-time basis.

Members of the System are divided into the following groups:

Group	Criteria
A, B	Any member who has retired prior to 7/1/2011
C	Any member who, as of June 30, 2011, was an active or deferred vested member and had either: a) Completed at least 30 years of service, or b) Reached age 60 and completed at least 5 years of service
D	Any active member who, between July 1, 2011 and December 31, 2013: 1) Either a) Completed at least 30 years of service, or b) Reached age 60 and completed at least 5 years of service; and 2) Retired prior to January 1, 2014
E	Any active member who: 1) Between July 1, 2011 and December 31, 2013 either: a) Completed at least 30 years of service, or b) Reached age 60 and completed at least 5 years of service; and 2) Retires on or after January 1, 2014

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

F	<p>Any active member whose most recent membership enrollment date was prior to January 1, 2010 and who is not in groups A through E</p> <p>Any deferred vested member whose most recent membership enrollment date was prior to January 1, 2010, is not in groups A through E, and has at least five years of service prior to the date separated from employment</p>
G	<p>Any member whose most recent membership enrollment date is on or after January 1, 2010, or</p> <p>Any member rehired on or after January 1, 2010, who has fewer than five years of service as of June 30, 2011, or</p> <p>Any retiree of the System who is receiving service retirement allowance and is re-employed on or after April 1, 2013</p>

Members in the System are further classified as follows:

Class	Criteria
CSA Retiree (CSA participants corresponding to Retirees Class)	Group A and B members and their designated optionees
CSA Employee (CSA participants corresponding to Current Employees Class)	Group C, D, E and F members (and their designated optionees) that were vested and employed on July 1, 2011
CMC Employee (Non-CSA participants)	Group E and F members (and their designated optionees) that were either vested or employed on July 1, 2011 and no break in employment service since January 1, 2010 and prior to becoming vested
Non-CSA	Group G members and their designated optionees

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**2. Service Retirement Benefit**

***Groups A, B, C and D***

Normal Retirement Eligibility	Age 60 with 5 years of service or 30 years of service
Early Retirement Eligibility	Age 55 with 25 years of service
Benefit Formula Multiplier	Members hired prior to July 12, 1998 were given a one-time irrevocable option to choose either the benefit formula using a 2.22% multiplier or the benefit formula using a 2.50% multiplier. For members hired on or after July 12, 1998, benefits are calculated using a 2.50% multiplier
Average Highest Compensation	Average of the highest three consecutive years of compensation
Years of Service	Years or fractional years of full-time service rendered to the plan sponsor
Benefit	a) An annuity which is actuarially equivalent to the accumulated contributions of the member at the time of retirement b) A pension which together with the annuity produces a total annual retirement allowance equal to the product of the applicable benefit formula multiplier, the member's average highest compensation and the number of years of service  Early Retirement Benefit is actuarially reduced from normal retirement age

***Group E***

Normal Retirement Eligibility	Age 60 with 5 years of service or 30 years of service
Early Retirement Eligibility	Age 55 with 25 years of service

Retirement benefit is composed of as many as three components:

*Part A Benefit*

For service earned through December 31, 2013

*Part B Benefit*

For service earned on and after January 1, 2014 up to a combined (Part A and Part B) 20 years of service

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

	<p><i>Part C Benefit</i> For service earned on and after January 1, 2014 in excess of a combined (Part A and Part B) 20 years of service</p>
Benefit Formula Multiplier	<p><i>Part A Benefit</i> Members hired prior to July 12, 1998 were given a one-time irrevocable option to choose either the benefit formula using a 2.22% multiplier or the benefit formula using a 2.50% multiplier. For members hired on or after July 12, 1998, benefits are calculated using a 2.50% multiplier</p> <p><i>Part B Benefit</i> Members hired prior to July 12, 1998 were given a one-time irrevocable option to choose either the benefit formula using a 2.22% multiplier or the benefit formula using a 2.50% multiplier. For members hired on or after July 12, 1998, benefits are calculated using a 2.50% multiplier</p> <p><i>Part C Benefit</i> 2.20% multiplier</p>
Average Highest Compensation	<p><i>Part A Benefit</i> Average of the highest three consecutive years of compensation</p> <p><i>Part B Benefit</i> Average of the highest five consecutive years of compensation</p> <p><i>Part C Benefit</i> Average of the highest five consecutive years of compensation</p>
Years of Service	Years or fractional years of full-time service rendered to the plan sponsor

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

Benefit

a) An annuity which is actuarially equivalent to the accumulated contributions of the member at the time of retirement

b) A pension which together with the annuity produces a total annual retirement allowance equal to the sum of Part A, Part B, and Part C benefits each of which is the product of the applicable benefit formula multiplier, the applicable average highest compensation and the applicable number of years of service

Early Retirement Benefit is actuarially reduced from normal retirement age

***Group F***

Normal Retirement Eligibility    Age 60 with 5 years of service or 30 years of service

Early Retirement Eligibility      Age 55 with 25 years of service

Retirement benefit is composed of as many as three components:

*Part A Benefit*

For service earned through June 30, 2011

*Part B Benefit*

For service earned on and after July 1, 2011 up to a combined (Part A and Part B) 20 years of service

*Part C Benefit*

For service earned on and after July 1, 2011 in excess of a combined (Part A and Part B) 20 years of service

Benefit Formula Multiplier

*Part A Benefit*

Members hired prior to July 12, 1998 were given a one-time irrevocable option to choose either the benefit formula using a 2.22% multiplier or the benefit formula using a 2.50% multiplier. For members hired on or after July 12, 1998, benefits are calculated using a 2.50% multiplier

*Part B Benefit*

Members hired prior to July 12, 1998 were given a one-

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

time irrevocable option to choose either the benefit formula using a 2.22% multiplier or the benefit formula using a 2.50% multiplier. For members hired on or after July 12, 1998, benefits are calculated using a 2.50% multiplier

*Part C Benefit*  
2.20% multiplier

Average Highest  
Compensation

*Part A Benefit*  
Average of the highest three consecutive years of compensation

*Part B Benefit*  
Average of the highest five consecutive years of compensation

*Part C Benefit*  
Average of the highest five consecutive years of compensation

Years of Service

Years or fractional years of full-time service rendered to the plan sponsor

Benefit

a) An annuity which is actuarially equivalent to the accumulated contributions of the member at the time of retirement  
b) A pension which together with the annuity produces a total annual retirement allowance equal to the sum of Part A, Part B, and Part C benefits each of which is the product of the applicable benefit formula multiplier, the applicable average highest compensation and the applicable number of years of service

Early Retirement Benefit is actuarially reduced from normal retirement age

***Group G***

Normal Retirement Eligibility

Age 67 with 5 years of service or age 62 with 30 years of service

Early Retirement Eligibility

Age 57 with 15 years of service

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

Benefit Formula Multiplier	Benefit is calculated using a 2.20% multiplier for all years of service up to 30 years and a 2.00% multiplier for all service in excess of 30 years
Average Highest Compensation	Average of the highest five consecutive years of compensation
Years of Service	Years or fractional years of full-time service rendered to the plan sponsor
Benefit	<p>a) An annuity which is actuarially equivalent to the accumulated contributions of the member at the time of retirement</p> <p>b) A pension which together with the annuity produces a total annual retirement allowance equal to the product of the applicable benefit formula multiplier, the member's average highest compensation and the number of years of service</p> <p>Early Retirement Benefit is actuarially reduced from normal retirement age</p>

***All Groups***

In no event shall the retirement allowance be greater than 90% of a member's average highest compensation.

In no event shall the retirement allowance be greater than that permitted by Section 415 of the Internal Revenue Code.

The average highest compensation used in the calculation of benefits depends on which benefit formula applies to the member. The formula that uses the 2.22% multiplier includes overtime compensation and the lump sum payment for unused vacation and sick-pay. The formulas that use all other multipliers do not include overtime or the lump sum payment.

**3. Disability Retirement Benefit**

Eligibility	5 years of service
Benefit	<p>90% of normal retirement benefit at disability date but not less than the smaller of:</p> <p>a) 25% of the average highest compensation</p> <p>b) 90% of the retirement benefit the member would have become entitled to had he continued in service to normal retirement age without further change in average highest compensation</p>

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**4. Deferred Vested Retirement Benefit**

Eligibility	5 years of service
Benefit	Normal retirement benefit beginning at normal retirement age

**5. Pre-retirement Death Benefit**

- 1) Contributions with interest
- 2) Survivor Benefits according to the type of survivors if the member has at least 18 months of service

**6. Post-retirement Death Benefit**

- 1) \$5,000 lump sum for Groups A and B
- 2) If no Joint and Survivor Option is selected, the balance of member contributions not received back in retirement benefit payments prior to death

**7. Optional Forms of Benefit**

- 1) Joint and 100% Survivor Payment
- 2) Joint and 50% Survivor Payment
- 3) 66 2/3% Joint and Survivor Payment
- 4) 80% Joint and Survivor Payment

**8. Cost-of-Living Adjustments (COLA)**

Groups A and B	3% simple COLA based on the member's benefit on January 1, 2016 including all previously granted COLAs. Effective January 1, 2016, the COLA will be suspended for a 3-year period
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In the 3<sup>rd</sup> year of the COLA suspension (calendar year 2018), members will receive a one-time payment that is the lesser of 3% of their base pension benefit or \$1,000. This payment will be made on January 1, or the anniversary date of the member's retirement according to when the member normally receives a COLA

Groups C, D, E, F and G	3% simple COLA based on the initial gross monthly benefit with a 3-year delay following each member's date of retirement
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Poverty Exception	Any member of the Retirees Class or Current Employees Class who retired or retires with at least 5 years of service
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**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

and whose household income is below 150% of federal poverty guidelines will receive a 3% compounding COLA until such time income exceeds 150% of federal poverty guidelines, at which time the member will receive a 3% simple COLA

**9. Contributions**

Members

Each member, commencing January 1, 1978, contributes at a rate of 7.0% of the salary used to compute retirement benefits until retirement. Beginning January 1, 2010, the employee contribution rate was increased 0.5% per year over 4 years to reach 9.0% of pay. The CSA establishes that the contribution rate for members shall not exceed 9.0% of pay for the term of the agreement

Employers

The sponsoring employer makes annual contributions based on members' salaries so that, when members become eligible for benefits, reserves will have been accumulated to provide the pension and other benefits payable by the plan on account of creditable service

**10. Deferred Retirement Option Plan (DROP)**

Eligibility

Current Employees Class members with at least 30 years of service

Maximum Participation Period 5 years

Minimum Participation Period Participation in DROP for less than 2 years results in forfeiture of all interest earnings credited to the member's DROP account

Benefit

Monthly pension benefit calculated as if the eligible member actually retired on their DROP effective date, including any adjustments for an assigned optionee. The monthly pension benefit will be contributed to the member's DROP account in the CRS Pension Trust and paid out as a lump sum upon termination from the DROP

Employee Contributions

Members continue to contribute 9.0% of pay while participating in DROP. 75% of the contribution is credited to the member's DROP account and the remaining 25% of the contribution is paid to the CRS Pension Trust to offset the costs of administering the DROP

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

Employer Contributions	Employer contributions to the CRS Pension Trust continue to apply in the same manner as for other actively employed members who are not participating in the DROP. Employer contributions are not credited to the member’s DROP account
Interest	DROP account balances are credited each month at a rate equal to the 10-year U.S. Treasury Note Business Day Series adjusted quarterly with a cap of 5% but not less than 0%

**11. Changes Since Last Valuation**

The City offered an Early Retirement Incentive Program to employees who met the following criteria prior to January 1, 2021: Employees in Groups C, E or F who had at least 28 years of creditable service or, who had at least 5 years of creditable service and reached at least age 60; and employees in Group G who had at least 28 years of creditable service and reached at least age 62 or, who had 5 years of creditable service and reached at least age 67. Part-time employees, rehired retirees and members in DROP were not eligible to participate. Of those eligible, 253 employees elected to participate. The City is funding the increase in liabilities of this program through level annual dollar amounts over 15 years effective January 1, 2022.

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX D – GLOSSARY OF TERMS**

**1. Actuarial Assumptions**

Assumptions as to the occurrence of future events affecting pension costs, such as mortality, withdrawal, disability, and retirement; changes in compensation; inflation; rates of investment earnings, and asset appreciation or depreciation; and other relevant items.

**2. Actuarial Cost Method**

A procedure for determining the Actuarial Present Value of pension plan benefits and expenses and for developing an allocation of such value to each year of service, usually in the form of a Normal Cost and an Actuarial Liability.

**3. Actuarial Gain/(Loss)**

A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with a particular Actuarial Cost Method.

**4. Actuarial Liability**

The portion of the Actuarial Present Value of Projected Benefits will not be paid by future Normal Costs. It represents the value of the past Normal Costs with interest to the valuation date.

**5. Actuarial Present Value (Present Value)**

The value as of a given date of a future amount or series of payments. The Actuarial Present Value discounts the payments to the given date at the assumed investment return and includes the probability of the payment being made. As a simple example: assume you owe \$100 to a friend one year from now. Also, assume there is a 1% probability of your friend dying over the next year, in which case you won't be obligated to pay him. If the assumed investment return is 10%, the actuarial present value is:

$$\begin{array}{ccccccc} \frac{\text{Amount}}{\text{Payment}} & & \frac{\text{Probability of}}{\text{Payment}} & & \frac{1}{(1+\text{Investment Return})} & & \\ \$100 & \times & (1 - .01) & \times & 1/(1+.1) & = & \$90 \end{array}$$

**6. Actuarial Valuation**

The determination, as of a specified date, of the Normal Cost, Actuarial Liability, Actuarial Value of Assets, and related Actuarial Present Values for a pension plan.

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX D – GLOSSARY OF TERMS**

**7. Actuarial Value of Assets**

The value of cash, investments, and other property belonging to a pension plan as used by the actuary for the purpose of an Actuarial Valuation. The purpose of an Actuarial Value of Assets is to smooth out fluctuations in market values. This way long-term costs are not distorted by short-term fluctuations in the market.

**8. Actuarially Equivalent**

Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.

**9. Amortization Payment**

The portion of the pension plan contribution which is designed to pay interest and principal on the Unfunded Actuarial Liability in order to pay for that liability in a given number of years.

**10. Entry Age Normal Cost Method**

A method under which the Actuarial Liability is calculated as the Actuarial Present Value of the Projected Benefits allocated to periods prior to the valuation year.

**11. Funded Ratio**

The ratio of the Actuarial Value of Assets to the Actuarial Liabilities.

**12. Investment Return Assumption**

The assumed interest rate used for projecting dollar related values in the future.

**13. Mortality Table**

A set of percentages which estimate the probability of death at a particular point in time. Typically, the rates are annual and based on age and sex.

**14. Normal Cost**

That portion of the Actuarial Present Value of pension plan benefits and expenses, which is allocated to a valuation year by the Actuarial Cost Method.

**CINCINNATI RETIREMENT SYSTEM  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX D – GLOSSARY OF TERMS**

**15. Projected Benefits**

Those pension plan benefit amounts which are expected to be paid in the future under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and increases in future compensation and service credits.

**16. Unfunded Actuarial Liability**

The excess of the Actuarial Liability over the Actuarial Value of Assets.



*Classic Values, Innovative Advice*

# City of Cincinnati Retirement System (CRS)



## 12/31/2020 Actuarial Valuation CRS OPEB Trust



June 10, 2021

Gaelle Gravot, FSA, MAAA  
Margaret Tempkin, FSA, EA, MAAA

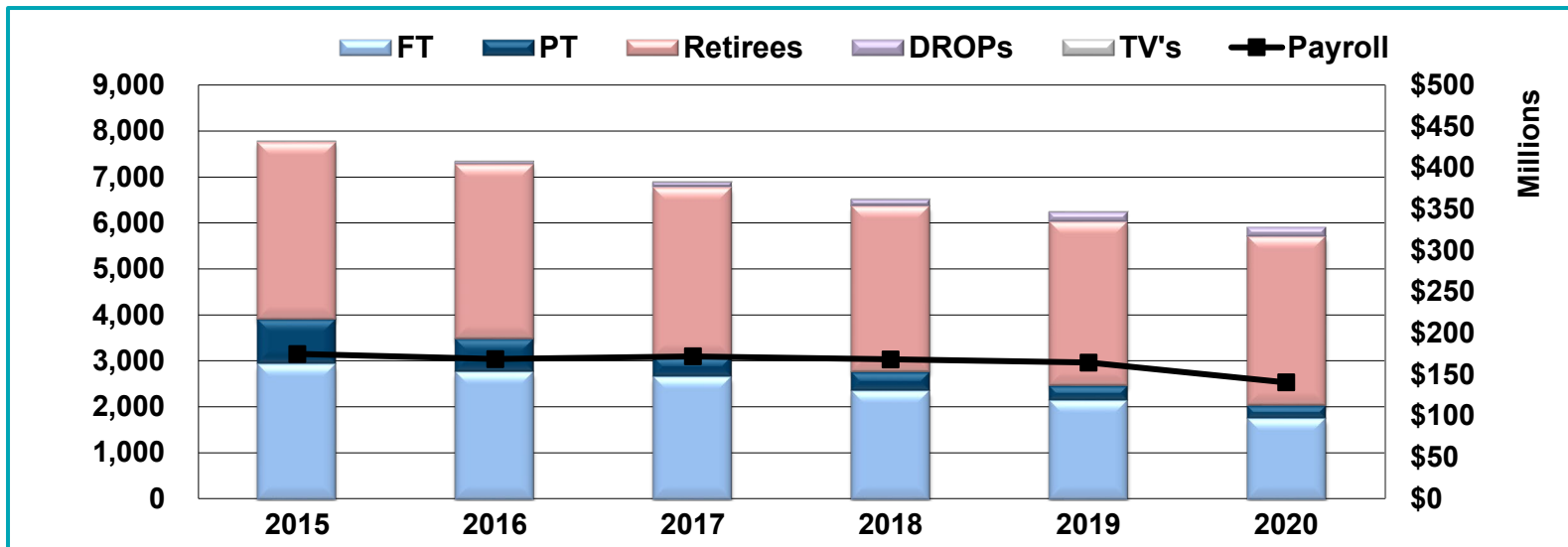


- Review of 12/31/2020 Actuarial Valuation
- Projections
- Next steps



- Roll Forward methodology with update to census
  - All assumptions are the same as last year
  - Census to which assumptions are applied is updated to this year (12/31/2020 census)
- ERIP participants recognized with additional incentives

# Historical Participant Information

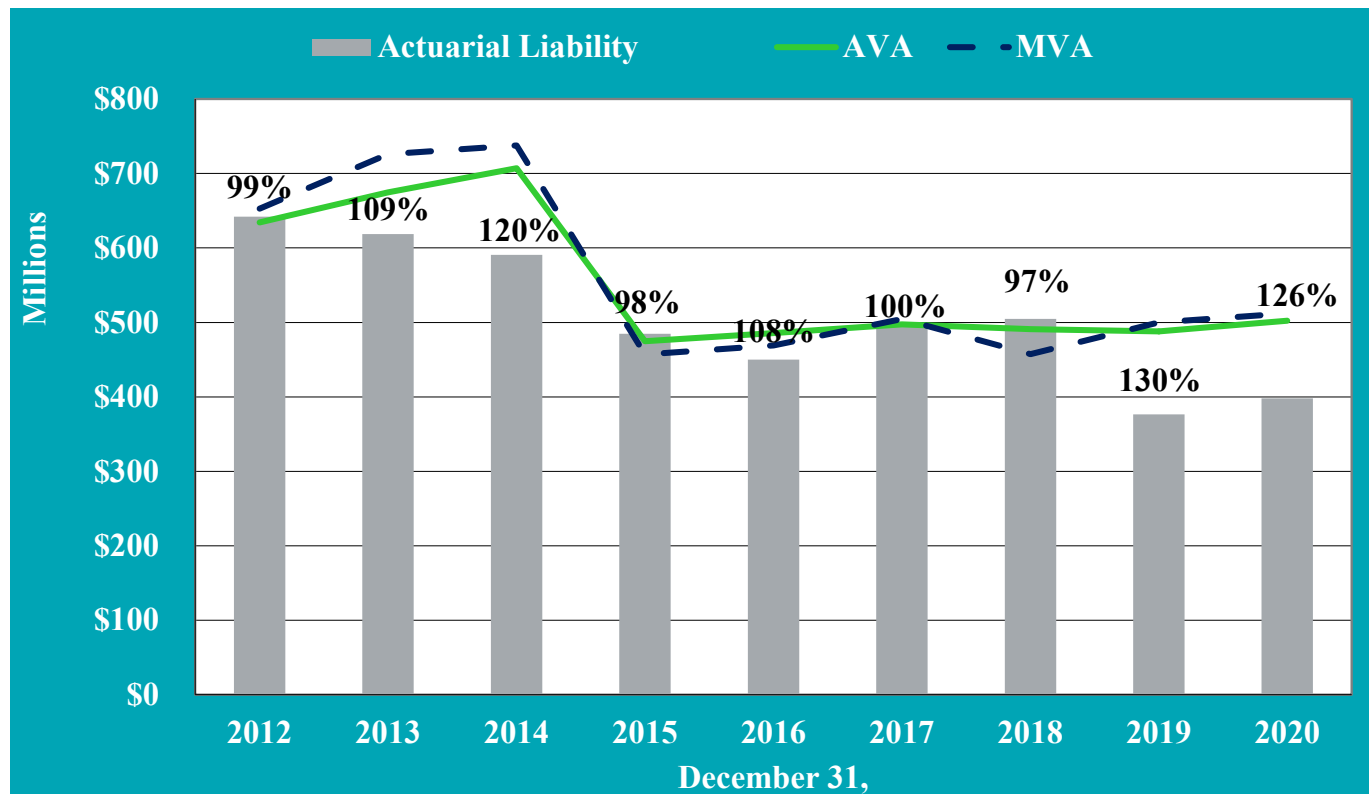


- Plan was closed December 31, 2015
- In 2017 – Part Time participants included

Year	FT	PT	Retirees	DROP	TV's	Spouses*
2015	2,931	979	3,847	0	23	1,482
2016	2,769	719	3,792	49	23	1,461
2017	2,664	437	3,684	108	26	1,419
2018	2,357	421	3,602	145	27	1,366
2019	2,151	330	3,565	217	26	1,361
2020	1,767	279	3,683	209	25	1,427

\* Spouses not shown above in graph

# Historical Information (AL vs Assets)



- Plan was closed December 31, 2015
- Drop in liability in 2016 due to lower anticipated drug costs, contribution rate changes, and the asset drop was due to transfer of assets to the pension
- Move to MA plan effective January 1, 2020 reduced 2019 liabilities by over \$127 million
- In 2020, the fund is 126% funded on an AVA basis, and 129% on MVA basis

# 12/31/2020 Valuation Participant Data



Group	December 31, 2019	December 31, 2020
<b>Active Participants</b>		
Active Full Time Employees	2,151	1,767
Active Part Time Employees	330	279
Active DROP Employees	<u>217</u>	<u>209</u>
Total	2,698	2,255
Covered Payroll	\$164,683,982	\$140,670,666
Total Compensation	\$208,511,970	\$192,988,736
Active Full Time Employees - ineligible for retiree health benefits	769	883
Active Part Time Employees - ineligible for retiree health benefits	<u>469</u>	<u>327</u>
Total - ineligible for retiree health benefits	1,238	1,210
<b>Inactive Participants</b>		
Number of retirees and surviving spouses currently receiving retiree health benefits	3,565	3,683
Spouses currently receiving retiree health benefits	<u>1,361</u>	<u>1,427</u>
Total	4,926	5,110
Retired members and surviving spouses not currently receiving retiree health benefits but may elect coverage in the future	<u>221</u>	<u>224</u>
Total	5,147	5,334
Terminated vested members eligible for retiree health benefits	26	25
Terminated vested members not eligible for retiree health benefits	<u>194</u>	<u>200</u>
Total	5,367	5,559

- Active participants decreased more than expected due to the ERIP program and are expected to decrease over time due to closed plan
- Inactive participants increased more than expected due to the ERIP program

# 12/31/2020 Valuation Results



- The results below are used for the funding of the OPEB Trust and are not applicable for the financial statements
- The results are used to determine the Actuarially Determined Contribution (ADC), which is \$0

Summary of Valuation Results		
Valuation Date	December 31, 2019	December 31, 2020
Discount Rate	7.50%	7.50%
Actuarial Liability (AL)	\$ 376,560,845	\$ 397,835,569
Actuarial Value of Assets	488,000,142	502,357,775
<b>Unfunded actuarial liability (UAL)</b>	<b>\$ (111,439,297)</b>	<b>\$ (104,522,206)</b>
Funded Ratio (AVA/AL)	129.59%	126.27%
Market Value of Assets	\$ 500,123,000	\$ 511,981,000
Funded Ratio (MVA/AL)	132.81%	128.69%
<b>Fiscal Year Ending</b>	<b>June 30, 2021</b>	<b>June 30, 2022</b>
Actuarially Determined Contribution	\$ -	\$ -
Expected Net Benefit Payments	26,731,000	30,699,244

# 12/31/2020 Valuation Detail



- The valuation remains over funded for 2020 with a shift from active liabilities to retired liabilities dues to the ERIP

Actuarial Liability		
Valuation Date	December 31, 2019	December 31, 2020
Discount Rate	7.50%	7.50%
<b>Actuarial Liability</b>		
Current active members	\$ 118,500,667	\$ 94,654,820
Current retirees, beneficiaries, and dependents	258,060,178	303,180,749
<b>Total Actuarial Liability (AL)</b>	<b>\$ 376,560,845</b>	<b>\$ 397,835,569</b>
Actuarial Value of Assets (AVA)	488,000,142	502,357,775
<b>Unfunded Actuarial Liability (UAL)</b>	<b>\$ (111,439,297)</b>	<b>\$ (104,522,206)</b>
Funded Ratio (AVA/AL)	129.59%	126.27%
Market Value of Assets (MVA)	\$ 500,123,000	\$ 511,981,000
<b>Unfunded Actuarial Liability (UAL)</b>	<b>\$ (123,562,155)</b>	<b>\$ (114,145,431)</b>
Funded Ratio (MVA/AL)	132.81%	128.69%
<b>Normal Cost</b>	<b>\$ 2,982,272</b>	<b>\$ 2,529,317</b>

# 12/31/2020 Valuation Reconciliation



## Reconciliation of Actuarial Liability

<b>Actuarial Liability at December, 31, 2019</b>	<b>\$</b>	<b>376,560,845</b>
Normal Cost		2,982,272
Expected Benefits paid throughout the year		(26,592,477)
Interest		27,468,516
		<hr/>
Expected Actuarial Liability at December, 31, 2020	<b>\$</b>	<b>380,419,156</b>
<b>Actuarial Liability at December, 31, 2020</b>		<b>397,835,569</b>
Gain or (Loss)	<b>\$</b>	<b>(17,416,413)</b>
Gain or (Loss) due to:		
Benefit changes	<b>\$</b>	-
Census changes		(17,416,413)
Demographic changes		-
Health Care Claims and Trend changes		-
Total changes	<b>\$</b>	<b>(17,416,413)</b>

- Census change - \$17.4 million loss
  - was primarily the increase in retirements over that expected due to the ERIP program

# 12/31/2020 Valuation Projections – 7.5%



H-scann **OPEB**

CHEIRON  
Classic Values, Innovative Advice.

Increase in trends

0.00%

Health Trends

Pre-Med

Post-Med

Starting Trend	2nd Year	3rd Year	Ultimate Trend	Years to Ultimate
7.47%	7.20%	6.93%	4.00%	13
8.18%	7.86%	7.53%	4.00%	13

Active Population Change

0.00%

Average Salary Increases

3.25%

Valuation Year

Discount Rate

PAYGo continues until

Then change to

% of pay above PAYGo

Actuarial Amort. Years

Expected Return on Assets

Gasb 45->

2020

7.50%

Gasb 74->

7.50%

2020

Budgeted

0.00%

30

7.50%

Total or Closed Payr

Open or Closed

2021 Return

Total

Open

7.50%

Valuation Method

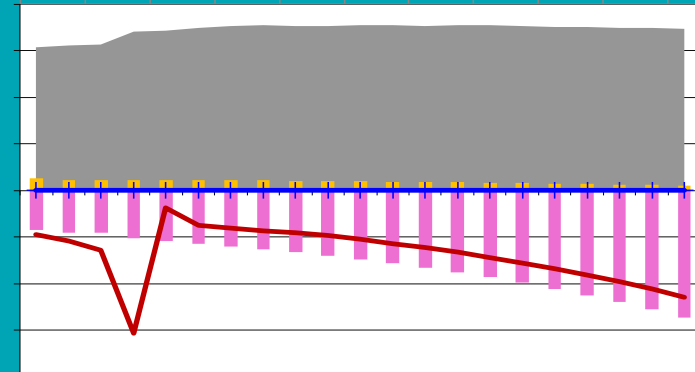
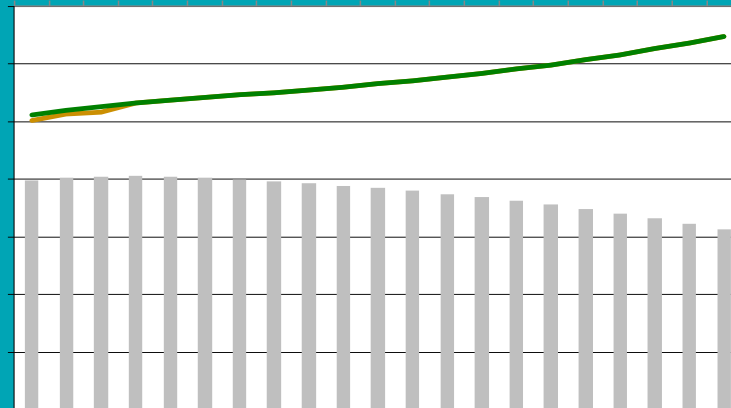
EAN

Investment Return

7.50%

Group To Show:

Total



# 12/31/2020 Valuation Projections – 7.5% 10% Market Downturn in 2021



H-scan **OPEB**

CHEIRON  
Classic Values, Innovative Advice.

Increase in trends

0.00%

Health Trends

Pre-Med

Post-Med

Starting Trend	2nd Year	3rd Year	Ultimate Trend	Years to Ultimate
7.47%	7.20%	6.93%	4.00%	13
8.18%	7.86%	7.53%	4.00%	13

Active Population Change

0.00%

Average Salary Increases

3.25%

Valuation Year

Discount Rate

PAYGo continues until

Then change to

% of pay above PAYGo

Actuarial Amort. Years

Expected Return on Assets

Gasb 45->

2020

7.50%

Gasb 74->

7.50%

2020

Budgeted

0.00%

Total or Closed Payr

Total

Open or Closed

Open

2021 Return

-10.00%

Valuation Method

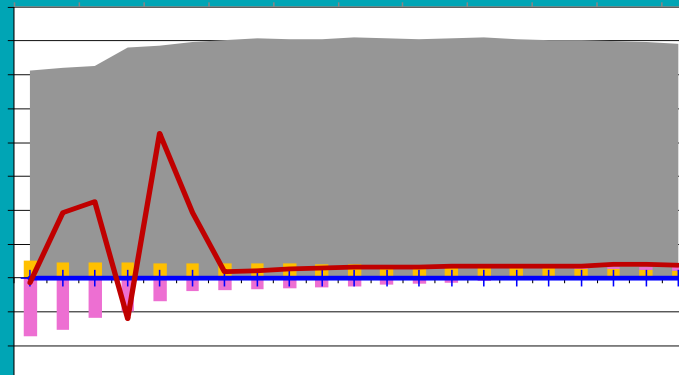
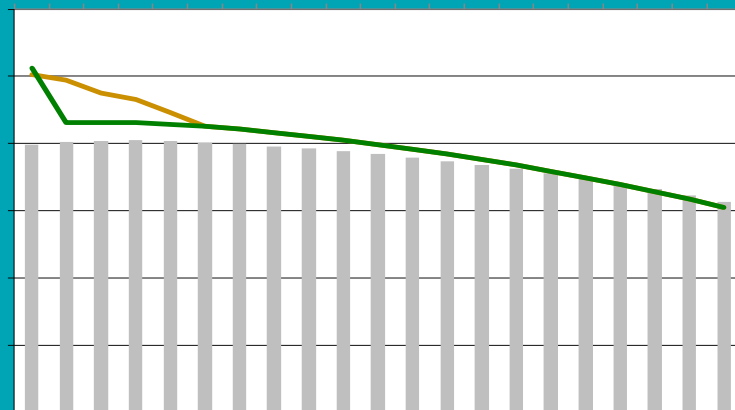
EAN

Investment Return

7.50%

Group To Show:

Total





- GASB 74/75
  - Determine the blended discount rate
    - Preliminarily, the fund should pass the depletion testing if assets return at least -2.75%
    - If pass test, will use 7.5% for 6/30/2021
    - If not pass, the discount rate will be blended
    - Highly dependent on investment returns
  - Draft GASB 75 report and provide in July 2021
- Develop contribution rates for the three plans as of January 1, 2022
  - Provide results by September 2021



The purpose of this presentation is to present the results from the December 31, 2020 Retiree Health Benefits Plan for the City of Cincinnati OPEB Plan. Other users of this presentation are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other user.

In preparing this presentation, we relied on information, some oral and some written, supplied by the Cincinnati's staff, its vendors. This information includes, but is not limited to, the plan provisions, member data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

The analysis was based on financial data through December 31, 2020 and the January 1, 2021 membership data. Unless otherwise noted, the assumptions and methods are outlined in the December 31, 2020 Actuarial Valuation Report. Future results may differ significantly from this presentation due to such factors as the following: plan experience differing from that anticipated by the assumptions; changes in assumptions; and changes in plan provisions or applicable law.

Cheiron utilizes ProVal, an actuarial valuation software leased from Winklevoss Technologies (WinTech) to calculate the liabilities, normal costs and projected benefit payments. We have relied on WinTech as the developer of ProVal. We have reviewed ProVal and have a basic understanding of it and have used ProVal in accordance with its original intended purpose. We have not identified any material inconsistencies in assumptions or output of ProVal that would affect this actuarial valuation.

This report includes projections of future contributions, claims, assets, reserves, funded status for the purpose of assisting the Board of Trustees with the management of the Fund. We have used Cheiron's H-Scan model to develop these projections. The model is also used to stress test the impact of volatile asset returns over the projection period.

This presentation and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this presentation. This presentation does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

Gaëlle Gravot, FSA, MAAA  
Principal Consulting Actuary

Margaret Tempkin, FSA, EA, MAAA  
Principal Consulting Actuary



# Appendices



## *Eligibility*

Per Ordinance 336-2016 adopted by the City Council on October 26, 2016, employees hired after December 31, 2015 **are not** eligible to receive retiree health benefits.

### Eligibility requirements:

- Age 60 with 20 years of service (yos) (15 years of service for Group C) or 30 years of service at any age
- At least 20 years of service must be CRS membership service



## *Benefits offered*

- Medical, Prescription Drugs, Dental and Vision
- Eligible retirees, beneficiaries, and their dependents Pre and Post Medicare eligibility
- Three Retiree Medical Plans:

<b>Secure*</b>	<b>Select</b>	<b>Model</b>
Retired prior to 9/1/07 with income <\$30K	Group C, or retired between 9/1/07 and 1/1/16	Not Group C and retired after 1/1/16

\* Participants not meeting the income requirement can elect either the Select or Model plan.



## Contribution Rules

	Secure	Select	Model
<b>Group 1 (hired before 1/9/97)</b>	\$0	5% of full cost adjusted for Medicare eligibility	10% of full cost adjusted for Medicare eligibility
<b>Group 2 (hired after 1/9/97)</b>	\$0	Varies - See sliding scale below	Varies - See Sliding scale below

### Sliding Scale

Points:	Select	Model
90+	5%	10%
80-89	25%	25%
70-79	50%	50%



## Plan Benefit Comparison

Non-Medicare	Secure	Select	Model
Deductible (Ind / Fam) <sup>1</sup>	\$0/\$0	\$300/\$600	\$500/\$1,000
Coinsurance (INN / OON) <sup>2</sup>	20% / 50%	20% / 50%	20% / 50%
Out-of-Pocket Max (OOP Max)	\$500 / \$1,000	\$1,500 / \$3,000	\$2,000 / \$4,000
OON Deductible / OOP Max	2 x INN	2 x INN	2 x INN
Prescription Drug Mail Order	\$5 / \$15 / \$30 \$10 / \$30 / \$60	\$10 / \$20 / \$30 \$20 / \$40 / \$60	\$10 / \$20 / \$30 \$20 / \$40 / \$60
Medicare	Secure	Select	Model
Deductible (Ind) <sup>1</sup>	\$0	\$300	\$500
Coinsurance (INN / OON) <sup>2</sup>	4% / 10%	4% / 10%	4% / 10%
Out-of-Pocket Max (OOP Max)	\$500	\$1,500	\$2,000
OON Deductible / OOP Max	Combined INN	Combined INN	Combined INN
Prescription Drug Mail Order	\$5 / \$15 / \$30 \$10 / \$30 / \$60	\$10 / \$20 / \$30 \$20 / \$40 / \$60	\$10 / \$20 / \$30 \$20 / \$40 / \$60

<sup>1</sup> Ind / Fam: Individual / Family

<sup>2</sup> INN / OON: In-Network / Out-of-Network

# App B. Actuarial Valuation Assumptions



- Demographic assumptions
  - No changes from prior year
  - based on the City's prior actuary's experience study adopted March 1, 2018
  - determined to be reasonable for this valuation
- Economic assumptions:
  - Based on claims experience through December 2019
  - Claim curves were trended from the prior valuation
  - Trends reflect future information in drug cost, plan design and general inflation



## *Claims Development*

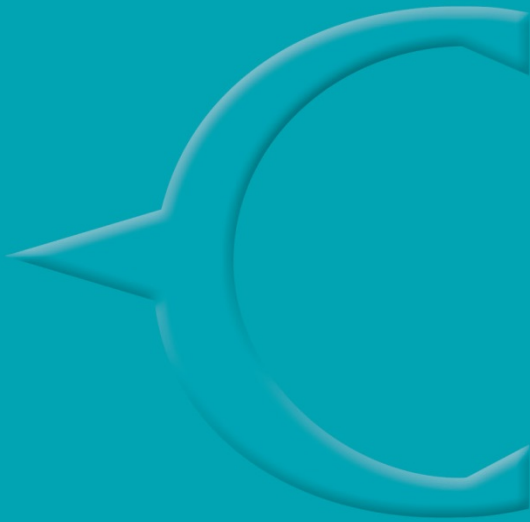
- The 2019 claims curves were trended to 2020
- 2019 claims were developed based on the calendar year (CY) 2018 and 2019 claims broken down by the three plans and four population subsets (Medicare Eligible Part A&B (ME part AB), Medicare Eligible Part B Only (ME part B), Medicare Eligible Part A Only (ME part A) and Non-Medicare Eligible (NME))
- Retirees are enrolled in:
  - The fully insured Medicare Advantage medical plans if Part A and Part B eligible, or Part B only eligible
  - The self-insured medical plans otherwise
- All participants age 65+ are assumed to be eligible for Part D



## Trends

- Trends were developed during the 2019 valuation by determining the expected increase in trends for each type of coverage, medical vs pharmacy, Non-Medicare and Medicare
- No changes from prior year

Year	Medical NME	Medical ME	Drug NME	Drug ME
2021	7.73%	13.45%	7.73%	6.80%
2022	7.47%	11.63%	7.47%	6.60%
2035 (Ultimate)	4.00%	4.00%	4.00%	4.00%



## **City of Cincinnati**

# **Other Postemployment Benefits Actuarial Valuation Report as of December 31, 2020**

**Produced by Cheiron  
May 2021**

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June 6, 2021

Board of Trustees  
Cincinnati Retirement System  
801 Plum Street, Suite 328  
Cincinnati, OH 45202

Dear Members of the Board:

As requested, we have performed an actuarial valuation of the post-employment benefits provided by the Retirement System for Employees of the City of Cincinnati (CRS) as of December 31, 2020. The following report contains our findings and disclosures required by the Governmental Accounting Standards Board (GASB) standards. This is the third valuation of the Plan performed by Cheiron. Valuation results shown for valuations prior to 2018 were derived from the prior actuary's report.

The purpose of this report is to present the annual actuarial valuation of the City of Cincinnati Postemployment Benefit Plan. This report is for the use of the City and its auditors in preparing financial reports in accordance with applicable law and accounting requirements. Any other user of this report is not an intended user and is considered a third party.

The results of this valuation rely on future plan experience conforming to the underlying assumptions and methods outlined in this report. Future results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the assumptions, changes in assumptions, and changes in plan provisions or applicable law. Actuarial computations are calculated based on our understanding of GASB 74/75 and are for purposes of fulfilling employer financial accounting requirements. Determinations for purposes other than meeting employer financial accounting requirements may be significantly different from the results in this report. Additional accounting disclosures for the fiscal year ending June 30, 2021 related to GASB Statements 74 and 75 will be provided in a separate report.

Appendix A describes the Participant Data. Appendix B outlines Assumptions, and Methods used in calculating the figures throughout the report. Appendix C contains our understanding of the substantive plan provisions based on the information provided by the City.

In preparing our report, we relied without audit, on information (some oral and some written) supplied by Plan Administrators. This information includes, but is not limited to, the plan provisions, employee data, and financial information. The demographic assumptions used in this report were based on the City's actuary's experience study adopted March 1, 2018. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

Board of Trustees

June 6, 2021

Page ii

This actuarial valuation reflects a roll-forward valuation in which claims and premiums were trended from the prior year and applied to the updated census.

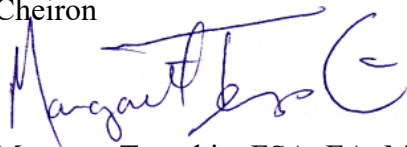
This report does not reflect future changes in benefits, penalties, or administrative costs that may be required as a result of the Patient Protection and Affordable Care Act of 2010, related legislation, or regulations.

This report does not contain any adjustment for the future potential impact of COVID-19. We anticipate the virus may impact both mortality and claims in the short term, as well as potentially other demographic experiences. However, the net impact is not determinable at this time.

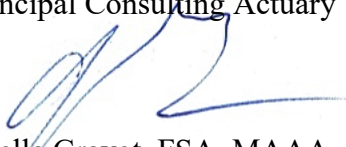
This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we collectively meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This actuarial valuation report was prepared for the City of Cincinnati for the purposes described herein and for the use by the Plan Auditor in completing an audit related to the matters herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

Sincerely,  
Cheiron



Margaret Tempkin, FSA, EA, MAAA  
Principal Consulting Actuary



Gaelle Gravot, FSA, MAAA  
Principal Consulting Actuary

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION I – VALUATION SUMMARY**

The City of Cincinnati has engaged Cheiron to provide an analysis of its post-employment benefit liabilities as of December 31, 2020. The primary purposes of performing this actuarial valuation are to:

- Estimate the Actuarially Determined Contribution (ADC) and the Actuarial Liability (AL) of the retiree health benefits using GASB 74 and 75 methodology,
- Provide disclosures for financial statements, and
- Provide projections for the ADC, Net OPEB Liability (NOL), and actuarial liabilities.

We have determined costs, liabilities, and trends for the substantive plan using actuarial assumptions and methods that we consider reasonable.

### **GASB’s OPEB Requirements**

GASB’s Statement 74 refers to the financial reporting for post-employment benefit plans other than pension plans, and Statement 75 refers to the employer accounting for these plans. Statement 74 is generally applicable where an entity has a separate trust or fund for OPEB benefits. We understand that the City of Cincinnati has a trust used to fund future OPEB obligations. The GASB No. 74 Statements are effective for the fiscal year ending June 30, 2020. The GASB 74 and 75 valuation sections are provided in a separate report.

Statement 75, which was adopted in the fiscal year ending (FYE) June 30, 2018, requires the employer to book the actuarial cost (net of employee, retiree, and their dependents’ contributions) of the Plan as an expense on its financial statements. Additional disclosures required by GASB 74 and 75 include a description of the substantive plan, summary of significant accounting policies (which we have not included in this report), contributions, and a statement of funding progress, along with the methods and assumptions used for these disclosures.

### **Funding Policy**

For the purpose of this valuation, the ADC is calculated as the normal cost determined under the Entry Age Normal Actuarial Cost Method, plus an open 30-year, level dollar amortization of the unfunded actuarial liability, plus 0.25% of total payroll for administrative expenses. This report determines the ADC for the FYE June 30, 2022.

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION I – VALUATION SUMMARY**

Table I-1 below summarizes the December 31, 2020 and December 31, 2019 actuarial valuation results.

<b>Table I-1 Summary of Valuation Results</b>		
<b>Valuation Date</b>	<b>December 31, 2019</b>	<b>December 31, 2020</b>
Discount Rate	7.50%	7.50%
Actuarial Liability (AL)	\$ 376,560,845	\$ 397,835,569
Actuarial Value of Assets	<u>488,000,142</u>	<u>502,357,775</u>
<b>Unfunded actuarial liability (UAL)</b>	<b>\$ (111,439,297)</b>	<b>\$ (104,522,206)</b>
Funded Ratio (AVA/AL)	129.59%	126.27%
Market Value of Assets	\$ 500,123,000	\$ 511,981,000
Funded Ratio (MVA/AL)	132.81%	128.69%
<b>Fiscal Year Ending</b>	<b>June 30, 2021</b>	<b>June 30, 2022</b>
Actuarially Determined Contribution	\$ -	\$ -
Expected Net Benefit Payments	26,731,000	30,699,244

The Actuarial Liability increased from \$376.6 million to \$397.8 million this year. In addition to the expected increase in liability of \$3.9 million due to normal cost, benefit payments, and interest, the Plan experienced other changes in liability attributable to a \$17.4 million increase due to the population changes. There were no changes in benefit plans or changes in claim costs and health care trends since the prior valuation.

During the year ending December 31, 2020, the Plan's assets gained \$2.6 million on a market value basis. The Plan's asset smoothing technique recognizes only a portion of the gains and losses for each year, and the return on the actuarial asset value was 8.76%. This return was above the assumed rate of return of 7.50% and resulted in an actuarial gain on investments for the Plan.

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

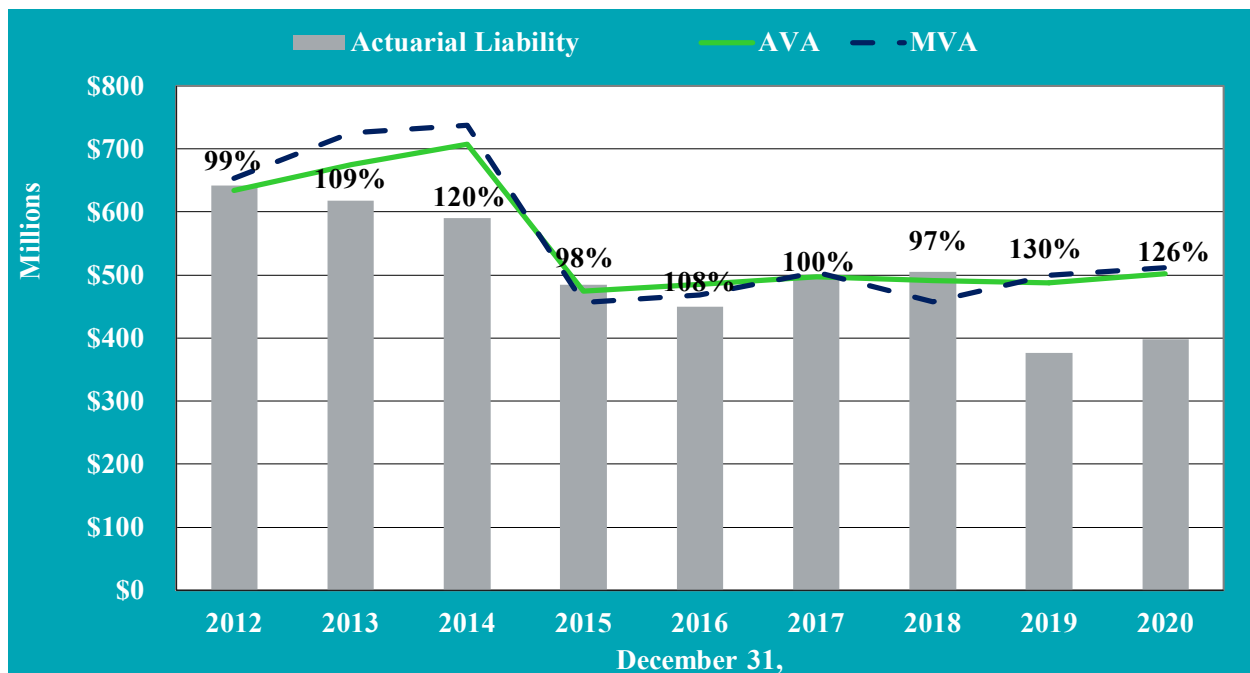
**SECTION I – VALUATION SUMMARY**

**Historical Trends**

This chart shows the historical trend of assets and the actuarial liability for the City’s OPEB Plan. The historical actuarial liabilities shown below are based on the funding valuation report for the plan and not the actuarial liabilities developed under GASB 74/75. Cheiron performed valuations starting with 2018.

The grey bars represent the actuarial liability used to determine the Actuarially Determined Contribution (ADC). The liabilities prior to 2018 were based on actuarial reports produced by the prior actuary. As you can see, over time, the liability decreased in 2015 and has remained fairly level. In 2016, the Plan was closed to members hired after December 31, 2015. In 2019, the Plan adopted a fully insured Medicare Advantage Plan as of January 1, 2020, dropping the liability by \$127 million.

The Market Value of Assets is represented by the dark blue dotted line and the Actuarial Value of Assets is represented by the green solid line. The Actuarial Value of Assets is developed by smoothing five years of investment returns, as seen on page 5. The percentages above the bars represent the funded ratio based on the AVA. The funded percentage increased to 130% due to the benefit changes adopted on January 1, 2020, then decreased to 126% in the following year.



**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION II – ASSETS**

**Assets**

The Plan’s last valuation of liabilities was performed as of December 31, 2019. Table II-1 below shows the reconciliation of assets for the current and prior fiscal years. This section reconciles the assets of December 31, 2020 that were used to develop the FYE 2022 ADC.

<b>Table II-1 Changes in Market Value of Assets</b>		
	December 31, 2019	December 31, 2020
<b>Market Value of Assets - as of beginning of Fiscal Year</b>	<b>\$ 457,249,000</b>	<b>\$ 500,123,000</b>
<b><u>Additions</u></b>		
Employer Contributions	\$ 0	\$ 0
Participant Contributions	0	0
Total contributions	\$ 0	\$ 0
<b>Investment Return</b>		
Net Realized Appreciation and Unrealized Appreciation	66,302,000	32,936,000
Interest and Dividends	7,642,000	5,025,000
Partnership Income	-	2,181,000
Other Income	8,000	9,000
Total income from investment activities	\$ 73,952,000	\$ 40,151,000
Investment Expenses	(1,385,000)	(1,084,000)
Total Investment Return	\$ 72,567,000	\$ 39,067,000
<b><u>Deductions</u></b>		
Benefit Payments Made	\$ 29,253,000	\$ 26,731,000
Administrative Expenses	440,000	478,000
Total Deductions	\$ 29,693,000	\$ 27,209,000
<b><u>Total</u></b>		
Net Increase (Decrease)	\$ 42,874,000	\$ 11,858,000
<b>Market Value of Assets - as of end of Fiscal Year</b>	<b>\$ 500,123,000</b>	<b>\$ 511,981,000</b>
Market Return for Period	16.40%	8.03%

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**SECTION II – ASSETS**

**Actuarial Value of Assets**

The actuarial value of assets is the current market value, adjusted by a five-year smoothing of gains and losses on a market value basis. Each year's gain or loss is determined as the difference between the actual market return and the expected market return using the assumed rate of investment return. The actuarial value is adjusted to remain within 20% of the market value. Table II-2 below illustrates the calculation of the market value gains and losses.

<b>Table II-2 Development of Unrecognized Gain/(Loss) on Investments as of December 31, FYE</b>					
	Fiscal Year Ending 12/31/2016	Fiscal Year Ending 12/31/2017	Fiscal Year Ending 12/31/2018	Fiscal Year Ending 12/31/2019	Fiscal Year Ending 12/31/2020
<b>1. Market Value of Assets as of December 31, Beginning of Fiscal Year</b>	<b>\$ 456,918,000</b>	<b>\$ 468,973,000</b>	<b>\$ 504,394,000</b>	<b>\$ 457,249,000</b>	<b>\$ 500,123,000</b>
<b>Fiscal Year Cash Flow</b>					
2. Employer Contributions for the Plan Year Ending December 31, FYE	\$ 602,000	\$ 0	\$ 0	\$ 0	\$ 0
3. Participant Contributions for the Plan Year Ending December 31, FYE	0	0	0	0	0
4. Benefit Payments through December 31, FYE	(28,988,000)	(30,021,000)	(27,450,000)	(29,253,000)	(26,731,000)
5. Administrative Expenses through December 31, FYE	(446,000)	(396,000)	(399,000)	(440,000)	(478,000)
6. Net Cash Flow	\$ (28,832,000)	\$ (30,417,000)	\$ (27,849,000)	\$ (29,693,000)	\$ (27,209,000)
<b>Investment Performance</b>					
7. Interest of 7.50% on Market Value of Assets to December 31, FYE	\$ 34,268,850	\$ 35,172,976	\$ 37,829,550	\$ 34,293,675	\$ 37,509,225
8. Interest on employer contributions assuming received at the end year to December 31, FYE	22,575	0	0	0	0
9. Interest on participant contributions assuming received uniformly throughout the year to December 31, FYE	0	0	0	0	0
10. Interest on benefit payments assuming payments made uniformly throughout the year to December 31, FYE	(1,087,050)	(1,125,788)	(1,029,375)	(1,096,988)	(1,002,413)
11. Interest on administrative expenses assuming payments made uniformly throughout the year to December 31, FYE	(16,725)	(14,850)	(14,963)	(16,500)	(17,925)
12. Expected Investment Performance (7 + 8 + 9 + 10 + 11)	\$ 33,187,650	\$ 34,032,338	\$ 36,785,212	\$ 33,180,187	\$ 36,488,887
13. Expected Market Value of Assets as of December 31, FYE (1 + 6 + 12)	\$ 461,273,650	\$ 472,588,338	\$ 513,330,212	\$ 460,736,187	\$ 509,402,887
<b>14. Market Value of Assets as of December 31, FYE</b>	<b>\$ 468,973,000</b>	<b>\$ 504,394,000</b>	<b>\$ 457,249,000</b>	<b>\$ 500,123,000</b>	<b>\$ 511,981,000</b>
15. Market Value of Assets Investment Gain/(Loss) (14 - 13)	\$ 7,699,350	\$ 31,805,662	\$ (56,081,212)	\$ 39,386,813	\$ 2,578,113

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**SECTION II – ASSETS**

Table II-3 illustrates the calculation of actuarial value of assets for the December 31, 2020 valuation.

<b>Table II-3 Development of Actuarial Value of Assets as of December 31, 2020</b>		
<b>1. Actuarial Value of Assets as of December 31, 2019</b>	<b>\$</b>	<b>488,000,142</b>
2. Net Cash Flow (Contributions - Benefit Payments - Expenses)	\$	(27,209,000)
3. Expected Investment Performance	\$	36,488,887
	Initial Unrecognized	
<u>Recognition of gain/(loss)</u>	<u>Gain/(Loss)</u>	<u>Recognition</u>
4. 20% of gain/(loss) as of December 31, 2016	\$ 7,699,350	\$ 1,539,870
5. 20% of gain/(loss) as of December 31, 2017	\$ 31,805,662	\$ 6,361,132
6. 20% of gain/(loss) as of December 31, 2018	\$ (56,081,212)	\$ (11,216,242)
7. 20% of gain/(loss) as of December 31, 2019	\$ 39,386,813	\$ 7,877,363
8. 20% of gain/(loss) as of December 31, 2020	\$ 2,578,113	\$ 515,623
9. Recognized gain/(loss) as of December 31, 2020 (sum of 4 - 8)	\$	5,077,746
<b>10. Actuarial Value of Assets as of December 31, 2020 (1 + 2 + 3 + 9)</b>	<b>\$</b>	<b>502,357,775</b>
Market Value of Assets as of December 31, 2020	\$	511,981,000
<b>Corridor for Actuarial Value of Assets</b>		
80% of Market Value	\$	409,584,800
120% of Market Value	\$	614,377,200
Actuarial Value of Assets as of December 31, 2020	\$	502,357,775
Actuarial Value as a percent of Market Value		98.1%
Return on Actuarial Value of Asset		8.76%

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**SECTION III – VALUATION RESULTS**

This section of the report calculates the current and expected future contribution requirements under the City’s funding policy. This valuation calculates the contribution for the fiscal year 2021-22.

The liabilities presented in this section are based on the assumption of an ongoing plan and would not be appropriate for measuring the settlement value of Plan obligations.

Information about the actuarial liabilities of the Plan as of December 31, 2020 and December 31, 2019 is shown in Table III-1 below.

<b>Table III-1 Actuarial Liability</b>		
<b>Valuation Date</b>	<b>December 31, 2019</b>	<b>December 31, 2020</b>
Discount Rate	7.50%	7.50%
<b>Actuarial Liability</b>		
Current active members	\$ 118,500,667	\$ 94,654,820
Current retirees, beneficiaries, and dependents	<u>258,060,178</u>	<u>303,180,749</u>
<b>Total Actuarial Liability (AL)</b>	<b>\$ 376,560,845</b>	<b>\$ 397,835,569</b>
Actuarial Value of Assets (AVA)	<u>488,000,142</u>	<u>502,357,775</u>
<b>Unfunded Actuarial Liability (UAL)</b>	<b>\$ (111,439,297)</b>	<b>\$ (104,522,206)</b>
Funded Ratio (AVA/AL)	129.59%	126.27%
Market Value of Assets (MVA)	\$ 500,123,000	\$ 511,981,000
<b>Unfunded Actuarial Liability (UAL)</b>	<b>\$ (123,562,155)</b>	<b>\$ (114,145,431)</b>
Funded Ratio (MVA/AL)	132.81%	128.69%
<b>Normal Cost</b>	<b>\$ 2,982,272</b>	<b>\$ 2,529,317</b>

Please note that, prior to June 30, 2017, the City reported its actuarial liability under GASB 43 and 45. Under GASB 43 and 45 requirements, the disclosure of the above actuarial liability was provided in the notes to financial statements and was not immediately recorded on the balance sheet. Starting June 30, 2017, the City’s GASB reporting requirements fall under GASB 74 and 75, and the entire liability is booked on the balance sheet. The above liability is shown for funding purposes only; the GASB 74 and 75 liability will be a roll-forward of this liability to the fiscal year ending June 30, 2021 and will be provided in a separate report.

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**SECTION III – VALUATION RESULTS**

Table III-2 below shows the Actuarial Liability for actives and retirees, the normal cost, the Actuarial Asset Value, and the resulting unfunded actuarial liability (UAL) as of December 31, 2020 and December 31, 2019 at a 7.5% discount rate. Note that this development of the AL and UAL are based on the measurement date of December 31, 2020, and will be used in the determination of the Actuarially Determined Contribution for the 2021-22 fiscal year.

<b>Table III-2</b>		
<b>Actuarial Liability, Normal Cost &amp; Actuarial Asset Value as of</b>		
	<b>December 31, 2019</b>	<b>December 31, 2020</b>
<b>Actuarial Liability</b>		
Active Liability		
-Active Employees	\$ 99,068,553	\$ 74,901,798
-DROP Participants	<u>19,432,114</u>	<u>19,753,022</u>
<b>Total Active Liability</b>	<b>\$ 118,500,667</b>	<b>\$ 94,654,820</b>
Inactive Liability		
-Retired Employees	\$ 228,852,824	\$ 273,413,330
-Beneficiary	17,890,807	18,130,226
-Disabled	5,848,977	5,262,696
-Deferred Beneficiaries	2,428,890	3,097,453
-Deferred Members	<u>3,038,680</u>	<u>3,277,044</u>
<b>Total Inactive Liability</b>	<b>\$ 258,060,178</b>	<b>\$ 303,180,749</b>
<b>Total Liability</b>	<b>\$ 376,560,845</b>	<b>\$ 397,835,569</b>
Actuarial Value of Assets	<u>488,000,142</u>	<u>502,357,775</u>
<b>Unfunded Actuarial Liability (UAL)</b>	<b>\$ (111,439,297)</b>	<b>\$ (104,522,206)</b>
<b>Normal Cost</b>	<b>\$ 2,982,272</b>	<b>\$ 2,529,317</b>

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**SECTION III – VALUATION RESULTS**

**Reconciliation**

Table III-3 provides an estimate of the major factors contributing to the change in liability since the last actuarial valuation report (AVR).

<b>Table III-3 Reconciliation of Actuarial Liability</b>	
<b>Actuarial Liability at December, 31, 2019</b>	<b>\$ 376,560,845</b>
Normal Cost	2,982,272
Expected Benefits paid throughout the year	(26,592,477)
Interest	27,468,516
Expected Actuarial Liability at December, 31, 2020	<b>\$ 380,419,156</b>
<b>Actuarial Liability at December, 31, 2020</b>	<b>397,835,569</b>
Gain or (Loss)	<b>\$ (17,416,413)</b>
Gain or (Loss) due to:	
Benefit changes	\$ -
Census changes	(17,416,413)
Demographic changes	-
Health Care Claims and Trend changes	-
Total changes	<b>\$ (17,416,413)</b>

Below is a brief description of each of the above components:

- *Benefits Changes* refers to changes in the Plan or eligibilities. There were no benefit changes since the prior valuation.
- *Census Changes* refers to differences in the valuation census due to members terminating, retiring, dying, and becoming disabled at rates different than expected.
- *Demographic assumption changes* refer to the changes in demographic assumptions. There were no demographic assumption changes this year.
- *Healthcare Claims and Trend changes* refer to the change in projected healthcare cost vs. actual healthcare cost redeveloped at 2020. The claims and trends were last developed in 2019 and trended to 2020.

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**SECTION III – VALUATION RESULTS**

**Actuarially Determined Contribution (ADC)**

The ADC consists of three parts: (1) the *normal cost*, which represents the annual cost attributable to service earned in a given year, (2) the assumed administrative expense, and (3) the amortization of the UAL. In Table III-4 below, we show the computed FYE 2021 and FYE 2022 ADC based on a 7.5% assumed discount rate (based on a long-term view of returns on the asset allocation).

<b>Table III-4 Calculation of Actuarially Determined Contribution (ADC)</b>		
<b>For Fiscal Year Ending</b>	<b>6/30/2021</b>	<b>6/30/2022</b>
Normal Cost	\$ 2,982,000	\$ 2,529,000
Administrative Expenses <sup>1</sup>	412,000	482,000
Amortization of UAL	<u>(9,101,000)</u>	<u>(8,536,000)</u>
<b>Total ADC (not less than \$0)</b>	<b>\$ -</b>	<b>\$ -</b>
Covered Payroll	\$ 164,683,982	\$ 140,670,666
ADC as a percentage of pay	0.00%	0.00%
Total Compensation	\$ 208,511,970	\$ 192,988,736
ADC as a percentage of compensation	0.00%	0.00%
Actual/Expected Net Benefit Payments	\$ 26,731,000	\$ 30,699,244

<sup>1</sup> Administrative Expense of 0.25% of payroll for FYE 2021 & 0.25% of total compensation for FYE 2022

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**SECTION III – VALUATION RESULTS**

**Projected Cash Flow**

The following table presents a 30-year payout projection of employer payments for the City’s OPEB Plan.

Table III-5 Projected Cash Flow Assuming 7.5% Discount Rate					
Fiscal Year Ending December 31,	Expected Market Value Assets	Expected Employer Benefit Payments	Expected Actuarial Liability	Fiscal Year Ending June 30,	Expected Actuarial Determined Contribution
2021	\$ 518,550,000	\$ 30,699,000	\$ 401,992,000	2021	\$ 0
2022	525,220,000	31,077,000	403,753,000	2022	0
2023	532,183,000	31,276,000	405,119,000	2023	0
2024	536,814,000	34,029,000	403,704,000	2024	0
2025	541,544,000	34,269,000	401,911,000	2025	0
2026	546,008,000	34,868,000	399,330,000	2026	0
2027	550,467,000	35,196,000	396,186,000	2027	0
2028	554,990,000	35,458,000	392,486,000	2028	0
2029	560,062,000	35,255,000	388,657,000	2029	0
2030	565,484,000	35,284,000	384,433,000	2030	0
2031	571,103,000	35,486,000	379,596,000	2031	0
2032	577,236,000	35,398,000	374,400,000	2032	0
2033	583,959,000	35,271,000	368,833,000	2033	0
2034	590,986,000	35,464,000	362,541,000	2034	0
2035	598,501,000	35,503,000	355,621,000	2035	0
2036	606,839,000	35,251,000	348,308,000	2036	0
2037	615,984,000	35,077,000	340,513,000	2037	0
2038	625,806,000	35,085,000	332,014,000	2038	0
2039	636,470,000	34,983,000	322,870,000	2039	0
2040	647,996,000	34,924,000	312,975,000	2040	0
2041	660,694,000	34,628,000	302,503,000	2041	0
2042	674,867,000	34,123,000	291,641,000	2042	0
2043	690,598,000	33,646,000	280,355,000	2043	0
2044	708,000,000	33,171,000	268,619,000	2044	0
2045	727,426,000	32,479,000	256,621,000	2045	0

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**SECTION IV – SENSITIVITY OF RESULTS**

The liabilities produced in this report are sensitive to the assumptions used. Table IV-1 shows liabilities under the actuarial funding scenario using a 1% increase and a decrease in healthcare trend rates to provide some measure of sensitivity. In all cases, we are using the full actuarial funding assumption of 7.50% for the discount rate.

<b>Table IV-1 Health Care Trend Rate Sensitivity</b>			
<b>Health Care Trend Rates</b>	<b>-1%</b>	<b>Base</b>	<b>+1%</b>
<b>Actuarial Liability</b>			
Current active members	\$ 80,929,747	\$ 94,654,820	\$ 111,606,453
Current retirees, beneficiaries, and dependents	<u>278,179,554</u>	<u>303,180,749</u>	<u>331,910,618</u>
Total Actuarial Liability (AL)	\$ 359,109,301	\$ 397,835,569	\$ 443,517,071
Actuarial Value of Assets	<u>502,357,775</u>	<u>502,357,775</u>	<u>502,357,775</u>
Unfunded Actuarial Liability (UAL)	\$ (143,248,474)	\$ (104,522,206)	\$ (58,840,704)
Normal Cost	\$ 2,066,039	\$ 2,529,318	\$ 3,132,321

Table IV-2 shows liabilities under the actuarial funding scenario using a 1% increase and a decrease in discount rates to provide some measure of sensitivity.

<b>Table IV-2 Discount Rate Sensitivity</b>			
<b>Discount Rate</b>	<b>6.50%</b>	<b>7.50%</b>	<b>8.50%</b>
<b>Actuarial Liability</b>			
Current active members	\$ 108,860,344	\$ 94,654,820	\$ 82,833,057
Current retirees, beneficiaries, and dependents	<u>331,822,432</u>	<u>303,180,749</u>	<u>278,647,774</u>
Total Actuarial Liability (AL)	\$ 440,682,776	\$ 397,835,569	\$ 361,480,831
Actuarial Value of Assets	<u>502,357,775</u>	<u>502,357,775</u>	<u>502,357,775</u>
Unfunded Actuarial Liability (UAL)	\$ (61,674,999)	\$ (104,522,206)	\$ (140,876,944)
Normal Cost	\$ 3,262,407	\$ 2,529,318	\$ 1,969,727

**CITY OF CINCINNATI  
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**SECTION V – ACCOUNTING DISCLOSURES**

The Government Finance Officers Association (GFOA) maintains a checklist of items to be included in the Comprehensive Annual Financial Report (CAFR) in order to receive recognition for excellence in financial reporting. In accordance with those statements, we have prepared the following disclosures.

**Schedule of Funding Progress**

The schedule of funding progress compares the assets used for funding purposes to the comparable liabilities to determine how well the Plan is funded, and how this status has changed over the past several years. The actuarial liability is compared to the actuarial value of assets to determine the funding ratio. The actuarial liability under GASB is determined assuming that the Plan is ongoing and participants continue to terminate employment, retire, etc., in accordance with the actuarial assumptions.

Years prior to 2018 were taken from the prior actuary’s report.

Table V-1 Schedule of Funding Progress for Fiscal Year Ending December 31, (\$ in Thousands)						
Valuation Year	Actuarial Asset Value (a)	Actuarial Liability (b)	Unfunded Actuarial Liability (c)=(b-a)	Funded Ratio (d)=(a)/(b)	Covered Payroll* (e)	UAL as a Percentage of Covered Payroll (f) = (c)/(e)
2012	634,173	641,876	7,703	98.8%	167,148	4.6%
2013	674,709	618,508	(56,201)	109.1%	163,477	(34.4)%
2014	706,959	590,902	(116,057)	119.6%	164,575	(70.5)%
2015	474,746	484,833	10,087	97.9%	174,963	5.8%
2016	485,845	450,026	(35,819)	108.0%	168,785	(21.2)%
2017	497,233	496,188	(1,045)	100.2%	172,156	(0.6)%
2018	490,887	504,757	13,870	97.3%	168,420	8.2%
2019	488,000	376,561	(111,439)	129.6%	164,684	(67.7)%
2020	502,358	397,836	(104,522)	126.3%	140,671	(74.3)%

\* Covered Payroll represents the payroll of those members eligible for postretirement healthcare benefits. The plan was closed December 31, 2015.

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**SECTION V – ACCOUNTING DISCLOSURES**

**Historical Asset Information**

The historical asset information, Table V-2, shows the dollar-weighted rate of return for each of the actuarial value of assets and the market value of assets.

Years prior to 2018 were taken from the prior actuary’s report.

<b>Table V-2 Historical Asset Information (\$ in Thousands)</b>				
<b>Valuation Year</b>	<b>Actuarial Value of Assets</b>		<b>Market Value of Assets</b>	
	<b>Amount</b>	<b>Dollar-weighted Rate of Return</b>	<b>Amount</b>	<b>Dollar-weighted Rate of Return</b>
2009	\$746,029	0.40%	\$621,691	19.13%
2010	726,412	2.43%	657,319	13.10%
2011	668,392	-1.65%	616,464	0.87%
2012	634,173	0.15%	652,864	11.95%
2013	674,709	12.02%	726,098	16.81%
2014	706,959	10.01%	737,722	6.38%
2015	474,746	7.39%	456,918	-0.11%
2016	485,845	8.67%	468,973	9.24%
2017	497,233	8.88%	504,394	14.51%
2018	490,887	4.45%	457,249	-3.93%
2019	488,000	5.63%	500,123	16.40%
2020	502,358	8.76%	511,981	8.03%

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**APPENDIX A – MEMBERSHIP INFORMATION**

The census data used to develop the Actuarial Liability (AL) as of December 31, 2020 and December 31, 2019 was provided by the City.

Group	December 31, 2019	December 31, 2020
<b>Active Participants</b>		
Active Full Time Employees	2,151	1,767
Active Part Time Employees	330	279
Active DROP Employees	<u>217</u>	<u>209</u>
Total	2,698	2,255
Covered Payroll	\$164,683,982	\$140,670,666
Total Compensation	\$208,511,970	\$192,988,736
Active Full Time Employees - ineligible for retiree health benefits	769	883
Active Part Time Employees - ineligible for retiree health benefits	<u>469</u>	<u>327</u>
Total - ineligible for retiree health benefits	1,238	1,210
<b>Inactive Participants</b>		
Number of retirees and surviving spouses currently receiving retiree health benefits	3,565	3,683
Spouses currently receiving retiree health benefits	<u>1,361</u>	<u>1,427</u>
Total	4,926	5,110
Retired members and surviving spouses not currently receiving retiree health benefits but may elect coverage in the future	<u>221</u>	<u>224</u>
Total	5,147	5,334
Terminated vested members eligible for retiree health benefits	26	25
Terminated vested members not eligible for retiree health benefits	<u>194</u>	<u>200</u>
Total	5,367	5,559

Note: In addition, there are 7,412 inactive participants hired before December 31, 2015 who are former employees with an employee account balance in the pension plan, but are assumed not to be vested. No retiree health benefit liability is assumed for these individuals.

**CITY OF CINCINNATI  
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**APPENDIX A – MEMBERSHIP INFORMATION**

**Active Member Data as of December 31, 2020**

COUNTS BY AGE/SERVICE										
Age	Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	
Under 25	47	4	0	0	0	0	0	0	0	51
25 to 29	28	33	1	0	0	0	0	0	0	62
30 to 34	16	92	35	0	0	0	0	0	0	143
35 to 39	21	121	82	41	1	0	0	0	0	266
40 to 44	9	88	69	46	37	3	0	0	0	252
45 to 49	11	73	69	77	56	22	0	0	0	308
50 to 54	6	74	69	74	79	59	8	0	0	369
55 to 59	12	65	33	61	69	65	21	4	0	330
60 to 64	11	39	30	27	27	20	13	1	1	169
65 to 69	14	13	7	10	8	2	2	1	0	57
70 & up	19	10	0	2	2	2	1	0	3	39
<b>Total</b>	<b>194</b>	<b>612</b>	<b>395</b>	<b>338</b>	<b>279</b>	<b>173</b>	<b>45</b>	<b>6</b>	<b>4</b>	<b>2,046</b>

AVERAGE SALARY BY AGE/SERVICE										
Age	Service									Total
	0 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	
Under 25	9,863	*								12,656
25 to 29	14,324	54,504	*							36,395
30 to 34	*	55,178	65,432	*						54,696
35 to 39	21,416	61,039	72,047	61,856	*					61,464
40 to 44	*	61,609	63,292	67,952	79,025	*				63,923
45 to 49	*	62,531	75,744	72,627	71,708	82,307				69,523
50 to 54	*	59,876	67,904	66,649	74,761	81,317	*			69,308
55 to 59	*	57,308	66,542	67,226	67,522	73,516	72,131	*	*	64,907
60 to 64	*	50,889	70,116	64,137	60,292	75,556	*	*	*	60,369
65 to 69	*	*	*	*	*	*	*	*	*	43,282
70 & up	*	*	*	*	*	*	*	*	*	22,302
<b>Total</b>	<b>\$ 13,010</b>	<b>\$ 57,728</b>	<b>\$ 68,791</b>	<b>\$ 67,140</b>	<b>\$ 71,139</b>	<b>\$ 77,465</b>	<b>\$ 73,536</b>	<b>\$ 83,315</b>	<b>\$ 87,533</b>	<b>\$ 61,157</b>

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**APPENDIX A – MEMBERSHIP INFORMATION**

**Inactive Member Data as of December 31, 2020**

Health Care Plan	Under 65	Over 65	Total
Secure Plan	4	80	84
Select Plan	610	3,663	4,273
Model Plan	<u>633</u>	<u>120</u>	<u>753</u>
Total	1,247	3,863	5,110

Attained Age	Number of Retirees/ Surviving Spouses	Number of Covered Spouses
< 40	0	1
40 - 44	0	2
45 - 49	8	11
50 - 54	60	50
55 - 59	202	145
60 - 64	523	246
65 - 69	755	382
70 - 74	800	298
75 - 79	504	164
80 - 84	375	93
85 - 89	268	26
90 - 94	137	5
95 - 99	41	4
100+	10	0
Total	<b>3,683</b>	<b>1,427</b>

Reconciliation of Members with Medical Coverage								
	Active	DROP	Disabled	Survivors	Beneficiaries	Retired	Term Vested	Total
<b>December 31, 2019</b>	<b>2,481</b>	<b>217</b>	<b>140</b>	<b>42</b>	<b>485</b>	<b>2,898</b>	<b>26</b>	<b>6,289</b>
Retirement those that Elect Medical Coverage	(243)	(60)				304	(1)	0
DROP	(54)	54						0
Termination, Eligible Medical Coverage	(2)	0					2	0
Termination/Retirement, No Medical Coverage	(154)	(1)						(155)
Deaths / Drop Coverage	(1)	(1)	(17)	(3)	(71)	(165)	0	(258)
Data Changes	19	0	1	17	38	14	(2)	87
<b>December 31, 2020</b>	<b>2,046</b>	<b>209</b>	<b>124</b>	<b>56</b>	<b>452</b>	<b>3,051</b>	<b>25</b>	<b>5,963</b>

Please note that the above data was used to project the figures in this report.

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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

The assumptions for this valuation were selected based on recent experience and expectations for the future. The current year’s assumptions were detailed in the prior actuary’s experience study adopted March 1, 2018. We have not performed our own experience study but reviewed the reports and letters of the prior actuary and believe the assumptions to be reasonable. The 7.50% discount rate used for valuation purposes as of December 31, 2020, is prescribed under paragraph 29 of the CSA. The actuarial cost method, the asset valuation method, and the amortization method used for funding purposes were selected by CRS during prior periods.

**Economic Assumptions**

- 1. Discount Rate** 7.50% per year
- 2. Expected Return on Assets** 7.50% per year, net of investment expenses
- 3. Administrative Expenses** 0.25% of payroll for FYE 2021,  
0.25% of total payroll for FYE 2022
- 4. Inflation Assumption** CPI: 2.75% per year  
Medical CPI: 3.25% per year
- 5. Salary Increase Rate** Salary increases are assumed to vary by service.  
Representative rates are shown as follows:

Service	Annual Increase
0	7.50%
5	5.00
10	4.50
15	4.00
21+	3.75

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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**6. Per Person Health Care Cost Trends**

Annual per capita health care claims costs are expected to increase in future years as a result of medical inflation, utilization, demographic changes, leverage in the plan design, and improvements in technology adjusted for any implicit and/or explicit cost containment features. Initial health care cost trend rates were selected based on an analysis of national average health trend surveys specific to similarly structured plans for both Medicare ineligible and Medicare-eligible participants. The assumed rates of increases in expected retiree health care claims costs and contributions vary by year, retiree health plan, and payment age, as shown in the table below:

Trends for current actives, non-Medicare retirees, and Part A only Medicare retirees:

Calendar Year	All Plans	Non-Model Plans	Model Plans
	Payment Age < 65	Payment Age 65+	Payment Age 65+
2020	7.73%	8.73%	8.80%
2021	7.47%	8.12%	8.18%
2022	7.20%	7.86%	7.92%
2023	6.93%	7.60%	7.65%
2024	6.67%	7.32%	7.37%
2025	6.40%	7.04%	7.08%
2026	6.13%	6.74%	6.78%
2027	5.87%	6.45%	6.48%
2028	5.60%	6.14%	6.17%
2029	5.33%	5.83%	5.86%
2030	5.07%	5.51%	5.54%
2031	4.80%	5.19%	5.21%
2032	4.53%	4.87%	4.88%
2033	4.27%	4.54%	4.55%
2034	4.00%	4.00%	4.00%
2035+	4.00%	4.00%	4.00%

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Trends for current Medicare retirees:

<b>Calendar Year</b>	<b>Non-Model Plans Payment Age 65+</b>	<b>Model Payment Age 65+</b>	<b>Medicare A Only Payment Age 65+</b>
2020	8.10%	8.05%	7.59%
2021	7.63%	7.59%	7.33%
2022	7.39%	7.36%	7.08%
2023	7.15%	7.12%	6.82%
2024	6.90%	6.87%	6.57%
2025	6.65%	6.62%	6.31%
2026	6.39%	6.36%	6.05%
2027	6.12%	6.10%	5.80%
2028	5.85%	5.83%	5.54%
2029	5.58%	5.56%	5.28%
2030	5.30%	5.28%	5.03%
2031	5.01%	5.00%	4.77%
2032	4.73%	4.72%	4.51%
2033	4.44%	4.43%	4.26%
2034	4.00%	4.00%	4.00%
2035+	4.00%	4.00%	4.00%

Trends for retiree contributions:

<b>Calendar Year</b>	<b>All Plans Payment Age &lt; 65</b>	<b>Non-Model Plans Payment Age 65+</b>	<b>Model Plans Payment Age 65+</b>
2020	7.73%	8.80%	8.65%
2021	7.47%	8.18%	8.06%
2022	7.20%	7.92%	7.81%
2023	6.93%	7.65%	7.54%
2024	6.67%	7.37%	7.27%
2025	6.40%	7.08%	6.99%
2026	6.13%	6.78%	6.70%
2027	5.87%	6.48%	6.41%
2028	5.60%	6.17%	6.11%
2029	5.33%	5.86%	5.80%
2030	5.07%	5.54%	5.49%
2031	4.80%	5.21%	5.17%
2032	4.53%	4.88%	4.85%
2033	4.27%	4.55%	4.53%
2034	4.00%	4.00%	4.00%
2035+	4.00%	4.00%	4.00%

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**7. Changes Since the Last Valuation**

None

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**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**Demographic Assumptions**

**1. Retirement Rates**

Retirement rates for each group vary by age and service with the City. Sample rates are shown in the tables below:

Annual Rate of Retirement Groups C, D, E, and F*					
Age	5 Years of Service	6-24 Years of Service	25-29 Years of Service	30 Years of Service	31+ Years of Service
50-54				55.0%	30.0%
55			6.0%	55.0	30.0
56			8.0	55.0	30.0
57-59			10.0	55.0	30.0
60	25.0%	25.0%	25.0	55.0	25.0
61-69	25.0	18.0	18.0	55.0	25.0
70	100.0	100.0	100.0	100.0	100.0

*\*For purposes of valuing CSA Employee members eligible for DROP benefits, an additional 10% is added to rates for 30 years of service and an additional 5% is added to rates for 31+ years of service.*

Annual Rate of Retirement Group G					
Age	5 Years of Service	6-14 Years of Service	15-29 Years of Service	30 Years of Service	31+ Years of Service
57-58			6.0%	6.0%	6.0%
59-60			8.0	8.0	8.0
61			10.0	10.0	10.0
62			10.0	25.0	25.0
63-66			10.0	25.0	18.0
67	25.0%	25.0%	25.0	25.0	18.0
68-69	25.0	18.0	18.0	18.0	18.0
70	100.0	100.0	100.0	100.0	100.0

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**2. Rates of Withdrawal**

Withdrawal rates for each group vary by age and service with the City. Sample rates are shown in the tables below:

<b>Annual Rate of Withdrawal</b>				
Age	Less than One Year of Service	Between One and Three Years of Service	Between Three and Five Years of Service	Five or More Years of Service
20	22.00%	10.00%	8.00%	4.00%
25	22.00	10.00	8.00	4.00
30	22.00	10.00	8.00	4.00
35	22.00	10.00	4.00	4.00
40	22.00	10.00	4.00	2.75
45	22.00	10.00	4.00	1.25
50	22.00	10.00	4.00	1.25
55	22.00	10.00	4.00	1.25
60	22.00	10.00	4.00	1.25
65	22.00	10.00	4.00	1.25
70	22.00	10.00	4.00	1.25

**3. Rates of Disability**

Disability rates for each group vary by age. Sample rates are shown in the table below:

Age	Annual Rate of Disability*
20	0.005%
25	0.010
30	0.015
35	0.025
40	0.045
45	0.075
50	0.135
55	0.210
60	0.250
65	0.250

*\*Rates are 0% when a member is eligible for normal retirement*

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**4. Rates of Mortality**

*Preretirement Mortality:* RP-2014 Healthy Dataset Mortality table set forward two years for males and females with fully generational projected mortality improvements using MP-2017.

*Postretirement Mortality:* RP-2014 Total Dataset Mortality table set forward two years for males and females with fully generational projected mortality improvements using MP-2017.

*Disabled Mortality:* RP-2014 Disabled Mortality table with fully generational projected mortality improvements using MP-2017.

**5. DROP Participation**

60% of eligible CSA Employee members eligible for DROP benefits are assumed to decline participation and 40% are assumed to elect participation. Those electing to participate are assumed to remain in the DROP for 3 years.

**6. Vested Withdrawal**

60% of vested members who terminate elect to leave their contributions in the Plan in order to be eligible for a benefit at their normal retirement date while the remaining 40% elect to withdraw their contributions.

**7. Percent of Members Electing Coverage**

Actual census data and current Plan elections provided by CRS were used for those currently receiving retiree health benefits. Group 1 members who retired prior to September 1, 2007, and currently qualify for the Secure Plan, are assumed to re-qualify in all future years. All current participants not qualifying for the Secure Plan are covered either by the Select Plan or the Model Plan. Current participants are assumed to maintain their current retiree health benefits coverage until they are no longer eligible. The active members of Group C with at least 15 years of creditable service shall be entitled to retiree health benefits under the Select Plan as Group 1 members. All other eligible future retirees electing retiree health benefits are assumed to be covered by the Model Plan. 95% of eligible future retirees in Group 1 are assumed to elect retiree health benefits. Eligible future retirees in Group 2 are required to pay the portion of their cost as determined by the point system, so retiree health benefit election rates are assumed to reduce as the level of cost-sharing increases. The point system is based upon the sum of the member's full years of service and the member's age at separation from service. The assumed contribution rates and rates of participation for Group 1 and Group 2 members are as follows:

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Group	Assumed Rate of Participation		Retiree Contribution as a Percentage of Cost	
	Pre-65 Retirement	Post-64 Retirement	Select Plan	Model Plan
Group 1	95%	95%	5%	10%
Group 2 with 90+ Points	90% grading to 45% over 20 years	45%	5%	10%
Group 2 with 80 – 89 Points	90% grading to 45% over 20 years	45%	25%	25%
Group 2 with 70 – 79 Points	40% grading to 0% over 20 years	0%	50%	50%

It is assumed that 100% of eligible future disabled retirees will elect retiree health benefits.

**8. Spousal Coverage**

Actual census data, payment form elections, and current health care plan elections for spouses of current retirees were used. For spouses of eligible future retirees, a 100% spouse coverage election rate is assumed for those members choosing a joint & survivor payment form, and a 15% spouse coverage election rate is assumed for those members selecting a single-life annuity payment form. Under a joint & survivor payment form, retiree health benefits are available until the death of the last annuitant.

**9. Dependent Age**

For current retirees, the actual spouse date of birth was used when available. For future retirees, husbands are assumed to be 3-years older than wives.

**10. Health Plan Administrative Expenses**

Health plan administrative expenses are included in the per capita claims costs.

**11. Percent Electing Medical Expense Reimbursement Program (MERP)**

Based upon current participation in the MERP, 0% of current and future retiree health benefits participants are assumed to elect the MERP. As credible experience for MERP participation is not yet available, the assumed rate of participation is an estimate and actual results may be materially different. As such, this assumption will need to be reviewed as credible experience evolves.

**12. New Retiree Listing**

Members who have newly retired but have not been completely processed for benefits were assumed to elected post-retirement medical. For those in Pension Group C, we have assumed they elect the Select Plan while all others elect the Model Plan.

**13. Changes Since the Last Valuation**

None

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## **Claim and Expense Assumptions**

The claims costs are developed based on actual premiums in effect for 2020. Contractual administrative expenses for 2020 are included. The resulting per person per month (PPPM) cost is then adjusted using age curves.

### **1. Average Annual Claims and Expense Assumptions & Methodology**

The Calendar Year (CY) 2020 claims costs were developed using actual CY 2018 and CY 2019 Medical and Rx claim experience. Claims were divided by benefit type (i.e., medical vs. Rx) and population category (i.e., non-Medicare eligible (NME) vs Medicare Eligible (ME)) for each plan, and standardized to the Select Plan design for the 2019 enrollment. Rx claim costs were defined as Plan paid amounts minus pharmacy rebates. Large claims above \$100,000 for Medical were removed from the experience prior to calculating the experience Per Adult Per Month (PAPM) cost.

We calculated the benefit relativity factors of the Select, Model, and Secure plan using the OptumInsight Comprehensive Pricing Tool for NME and OptumInsight Comprehensive Medicare Coordination Model for ME participants. Using the same model, we calculated the change in demographics between the 2018 and 2019 enrollments.

Using the benefit relativity and demographic factors, the experience PMPM costs of each plan and year were adjusted to the Select plan design for the 2019 population. The adjusted experience PMPM costs were then blended using 50% of CY 2018 and 50% of CY 2019 experience for the four sets of rates (Medical NME, Medical ME, Rx NME, Rx ME). Rates were trended to CY 2020 using an 8% annual trend. Large claims were trended separately assuming a 5% annual trend and added to the projected PMPM costs. To convert paid claims into incurred claims, we applied an extra 2.5 months of trend to medical and ½ month of trend to Rx. The CY 2020 projected Rx cost for ME was further adjusted to reflect the expected receivable payments from CMS (Part D Direct subsidy, Federal Reinsurance, Low Income Cost Share subsidy, Low Income Premium subsidy) and PhrMa (Gap Discount). These receivables were projected using CY 2018 and CY 2019 experience with payments through April 2020, adjusted for changes in the program (e.g., increase of Gap Discount from 50% to 70% effective 2019), and expected reconciliation payments for CY 2019.

Finally, we applied the benefit relativity factors the Select projected costs PMPM to derive the Model and Secure projected costs PMPM.

Claims curves were developed using the resulting 12 projected PAPM claims costs (3 plans x 2 benefits x 2 population categories), the 6 premium rates for the fully insured MA plans (3 plans x 2 population types based on Medicare eligibility), and our proprietary age curves. For retirees over 65 who are eligible for Medicare Part A and didn't sign up for Part B, we created blended curves where we removed the expected cost of Inpatient services from the ME curve and add the expected cost of Inpatient services from the NME curve.

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No child load was added to the NME pre-65 claims since the associated cost is assumed to be implicitly reflected in the Per Adult Per Month costs.

Expenses were projected for NME vs ME, based on actual CY 2019 expenses provided by CRS, trended to CY 2020 using a 4% trend.

<b>Calendar Year 2020 Average Claim and Expense Assumptions (Future Retirees and Current NME Inactives)</b>						
<b>Age</b>	<b>Select Medicare Eligible</b>		<b>Model Medicare Eligible</b>		<b>Secure Medicare Eligible</b>	
	<b>Male</b>	<b>Female</b>	<b>Male</b>	<b>Female</b>	<b>Male</b>	<b>Female</b>
40	\$5,193	\$8,275	\$5,136	\$8,172	\$5,404	\$8,605
45	6,811	8,962	6,736	8,855	7,088	9,321
50	8,823	10,406	8,725	10,283	9,181	10,824
55	11,229	12,553	11,102	12,402	11,683	13,056
60	14,028	14,710	13,868	14,532	14,594	15,299
64	16,550	15,433	16,360	15,253	17,218	16,054
65	\$2,900	\$2,776	\$2,927	\$2,800	\$2,196	\$2,136
70	3,335	2,975	3,369	3,004	2,478	2,243
75	3,511	3,115	3,556	3,152	2,441	2,221
80	3,545	3,194	3,603	3,241	2,246	2,120
85	3,523	3,219	3,593	3,274	2,014	1,984

<b>Calendar Year 2020 Average Claim and Expense Assumptions (Current Inactives Medicare A &amp; B Eligible)</b>						
<b>Age</b>	<b>Select Non Medicare Eligible</b>		<b>Model Non Medicare Eligible</b>		<b>Secure Non Medicare Eligible</b>	
	<b>Male</b>	<b>Female</b>	<b>Male</b>	<b>Female</b>	<b>Male</b>	<b>Female</b>
40	\$2,640	\$2,498	\$2,598	\$2,460	\$2,916	\$2,753
45	3,801	3,597	3,741	3,542	4,199	3,964
50	4,825	4,566	4,748	4,495	5,329	5,031
55	5,287	5,003	5,204	4,926	5,841	5,513
60	4,985	4,717	4,906	4,645	5,507	5,198
64	4,193	3,968	4,127	3,907	4,632	4,373
65	\$2,540	\$2,446	\$2,500	\$2,409	\$2,806	\$2,696
70	2,901	2,602	2,854	2,561	3,214	2,877
75	2,983	2,670	2,929	2,623	3,338	2,977
80	2,918	2,671	2,858	2,619	3,311	3,009
85	2,807	2,626	2,742	2,570	3,230	2,990

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Calendar Year 2020 Average Claim and Expense Assumptions (Current Inactives Medicare B Only Eligible)						
Age	Select		Model		Secure	
	Non Medicare Eligible Male	Non Medicare Eligible Female	Non Medicare Eligible Male	Non Medicare Eligible Female	Non Medicare Eligible Male	Non Medicare Eligible Female
40	\$6,375	\$5,860	\$7,035	\$6,454	\$6,062	\$5,584
45	9,180	8,439	10,131	9,294	8,729	8,042
50	11,651	10,711	12,857	11,795	11,078	10,206
55	12,768	11,738	14,090	12,926	12,141	11,185
60	12,038	11,067	13,284	12,187	11,446	10,545
64	10,127	9,310	11,175	10,252	9,629	8,871
65	\$6,135	\$5,739	\$6,770	\$6,320	\$5,834	\$5,469
70	7,235	6,334	8,002	6,993	6,864	6,019
75	8,266	7,121	9,204	7,910	7,787	6,725
80	9,188	7,906	10,306	8,838	8,591	7,418
85	9,968	8,554	11,249	9,612	9,261	7,983

Calendar Year 2020 Average Claim and Expense Assumptions (Current Inactives Medicare A Only Eligible)						
Age	Select		Model		Secure	
	Non Medicare Eligible Male	Non Medicare Eligible Female	Non Medicare Eligible Male	Non Medicare Eligible Female	Non Medicare Eligible Male	Non Medicare Eligible Female
40	\$5,291	\$7,806	\$5,219	\$7,687	\$5,509	\$8,116
45	7,238	8,896	7,141	8,767	7,537	9,255
50	9,360	10,581	9,233	10,430	9,746	11,010
55	11,322	12,481	11,164	12,300	11,785	12,985
60	12,963	13,752	12,772	13,545	13,484	14,300
64	14,045	13,305	13,827	13,099	14,600	13,831
65	\$12,931	\$12,292	\$12,719	\$12,091	\$13,431	\$12,768
70	14,237	13,507	14,004	13,284	14,789	14,029
75	15,334	14,715	15,080	14,470	15,926	15,282
80	16,391	15,982	16,116	15,713	17,020	16,595
85	17,538	17,367	17,238	17,071	18,207	18,030

**2. Retiree Health Care Plan Contributions**

Assumed adult per capita health care contribution rates were developed for those participants in the Select and Model Plans who are required to contribute a portion of retiree health benefit costs as defined in Schedule C. Contributions were determined to fully-fund retiree health benefit costs in 2020 based upon Medicare eligibility status. Rates are based on retiree cost experience, enrollment, and trended based on the assumptions. The following chart details the full (100%) adult per capita contribution assumptions. Note these contribution assumptions were set prior to the finalization of the agreement with Anthem re the MA plans and do not reflect the actual MA premiums. These amounts include medical, drug, and third-party administrative costs.

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Health Plan	Retiree		Spouse	
	Payment Age		Payment Age	
	< 65	Payment Age 65+	< 65	Payment Age 65+
Secure Plan	\$0	\$0	\$0	\$0
Select Plan	\$17,387	\$4,078	\$17,387	\$4,078
Model Plan	\$16,229	\$3,882	\$15,970	\$3,882

As members hired after December 31, 2015 are ineligible to receive retiree health benefits, the contributions assumed for years beyond 2019 are based upon the projected retiree health care costs associated with each projection year’s closed group of participants, reflecting the impact of aging and health care inflation.

**3. Medicare Part D Subsidy**

The City offers an EGWP Part D plan to its Medicare retirees; it, therefore, does not participate in the Retiree Drug Subsidy program.

**4. Medicare Part B Premium Subsidy**

Assumed that Medicare eligible retirees pay the Medicare Part B premiums.

**5. Medicare Coverage and Eligibility**

Retiree health benefit participants age 65 and older who are eligible for premium-free Medicare Part A benefits are assumed to be enrolled in Medicare Part A. For those retiree health benefit participants who are not eligible for premium-free Medicare Part A coverage, CRS is assumed to remain the primary payer. For a portion of the Medicare-eligible group, the premium-free Medicare Part A eligibility status is provided by CRS. As the premium-free Medicare Part A eligibility status is determined from a wide range of sources with varying and, at times, limited content, the premium-free Medicare Part A eligibility status data is incomplete. Adjustments have been made to account for this incompleteness. As the true status of those who are, or will be eligible for premium-free Medicare Part A is uncertain, actual results may be materially different. For all unidentified current retirees, hired prior to April 1, 1986, and not assumed eligible for premium-free Medicare Part A coverage through their spouse, as well as those active employees hired prior to April 1, 1986, 10% are assumed to not qualify for premium-free Medicare Part A coverage. The assumption of 10% is based upon estimates from the current retiree population. 100% of deferred vested members are assumed to obtain the 40 or more quarters of Medicare-covered employment required for premium-free Medicare Part A coverage as a result of their subsequent employment. Retiree health benefit participants age 65 and older are assumed to be enrolled in Medicare Part B.

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**6. Marital and Spouse Assumptions**

For participants who are not receiving benefits, 100% of participants are assumed to be married to a spouse of the opposite gender. Husbands are assumed to be three-years-older than their wives. For participants who are receiving benefits, the actual spouse age is used where available. If relevant spouse information is not available, husbands are assumed to be three- years-older than their wives.

**7. Part-Time Employees**

On July 1, 1991, the plan was amended to include part-time employees. Part-time employees hired on or before December 31, 2015, have been included in the valuation.

**8. Geography**

Implicitly assumed to remain the same as current retirees.

**9. Changes Since the Last Valuation**

None

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS**

**Methodology**

The Entry Age Normal Actuarial Cost method is used to determine costs. Under this funding method, a normal cost rate is determined as a level percent of pay for each active Plan member and then summed to produce the total normal cost for the City.

The Actuarial Accrued Liability is that portion of the present value of projected benefits that will not be paid by future employer normal costs or member contributions. It represents the value of the past normal costs with interest to the valuation date. The difference between this liability and funds accumulated as of the same date is referred to as the unfunded actuarial liability.

The portion of the Actuarial Liability in excess of OPEB Trust's assets is amortized to develop additional costs or savings which is added to each year's employer normal cost to produce the Actuarial Defined Contribution (ADC). Under this cost method, actuarial gains and losses are directly reflected in the size of the ADC.

The unfunded actuarial liability is amortized over an open 30-year period. The amortization is a level dollar amortization. CY 2020 claims and expenses were developed as described in Appendix B, Claims and Expenses Assumptions section above.

**Actuarial Value of Assets**

For purposes of determining the contribution rate to the Plan, we use an actuarial value of assets. The asset adjustment method dampens the volatility in asset values that could occur because of fluctuations in market conditions. Use of an asset smoothing method is consistent with the long-term nature of the actuarial valuation process.

The actuarial value of assets is the current market value, adjusted by a five-year smoothing of gains and losses on a market value basis. Each year's gain or loss is determined as the difference between the actual market return and the expected market return using the assumed rate of investment return. The actuarial value is adjusted to remain within 20% of the market value.

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**Summary of Key Substantive Plan Provisions**

**Pension Benefit Eligibility**

All active employees of the City except for the following:

- Members of the Police and Firemen’s Disability and Pension Fund of Ohio.
- Elected City officials.
- Employees for whom the City contributes to PERS.
- Persons hired as police recruits who are not currently enrolled as a member of the System prior to their date of hire.
- Current contributing members of the School Employees Retirement System (SERS) or the State Teachers Retirement System (STRS) who are hired by the City on a seasonal, temporary, or part-time basis.

Members of the System are divided into the following groups:

Group	Criteria
<b>A, B</b>	Any member who has retired prior to 7/1/2011
<b>C</b>	Any member who, as of June 30, 2011, was an active or deferred vested member and had either: a) Completed at least 30 years of service, or b) Reached age 60 and completed at least 5 years of service.
<b>D</b>	Any active member who, between July 1, 2011 and December 31, 2013: 1) Either a) Completed at least 30 years of service, or b) Reached age 60 and completed at least 5 years of service; and 2) Retired prior to January 1, 2014.
<b>E</b>	Any active member who: 1) Between July 1, 2011 and December 31, 2013, either: a) Completed at least 30 years of service, or b) Reached age 60 and completed at least 5 years of service; and 2) Retires on or after January 1, 2014.
<b>F</b>	Any active member whose most recent membership enrollment date was prior to January 1, 2010 and who is not in groups A through E.  Any deferred vested member whose most recent membership enrollment date was prior to January 1, 2010, is not in groups A through E, and has at least five years of service prior to the date they separate from employment.
<b>G</b>	Any member whose most recent membership enrollment date is on or after January 1, 2010, or  Any member rehired on or after January 1, 2010, who has fewer than 5 years of service as of June 30, 2011, or  Any retiree of the System who is receiving a service retirement allowance and is re-employed on or after April 1, 2013.

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

Members of the System are further classified as:

<b>Class</b>	<b>Criteria</b>
<p><b>CSA Retiree</b></p> <p>(CSA participants corresponding to Retirees Class)</p>	Group A and B members and their designated optionees.
<p><b>CSA Employee</b></p> <p>(CSA participants corresponding to Current Employees Class)</p>	Group C, D, E, and F members (and their designated optionees) that were vested and employed on 7/1/2011.
<p><b>CMC Employee</b></p> <p>(Non-CSA participants)</p>	Group E and F members (and their designated optionees) that were either vested or employed on 7/1/2011 and no break in employment service since 1/1/2010 and prior to becoming vested.
<p><b>Non-CSA</b></p>	Group G members and their designated optionees.

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**Years of Service:** Years or fractional years of full-time service rendered to the Plan Sponsor.

**Normal Retirement:**

Groups A, B, C, D, E, and F:  
Age 60 with 5 years of service or 30 years of service.

Group G:  
Age 67 with 5 years of service or age 62 with 30 years of service.

**Early Retirement:**

Groups A, B, C, D, E, and F:  
Age 55 with 25 years of service.

Group G:  
Age 57 with 15 years of service.

**Deferred Retirement Option Plan (DROP):**

Current Employees Class members with at least 30 years of service may participate in the DROP.

**Disability Retirement Eligibility:**

5 years of service.

**Deferred Vested Retirement Eligibility:**

5 years of service.

**Retiree Health Benefits Eligibility:**

Per Ordinance 336-2016 adopted by the City Council on October 26, 2016, employees hired after December 31, 2015, are not eligible to receive retiree health benefits.

Group 1: Those members of Group C or those members hired before January 9, 1997. For those members of Group C or those members who retire under the System prior to January 1, 2016 (including their survivors receiving pension benefits), a minimum of 15 years of service is required. For those members who retire under the System after December 31, 2015 (including their survivors receiving pension benefits), a minimum attained the age of 60 with 20 years of service or 30 years of service regardless of age is required.

Group 2: Those participants hired on or after January 9, 1997. For those members who retire under the System prior to January 1, 2016 (including their survivors receiving pension benefits), a minimum of 15 years of service is required. For those members who retire under the System after December 31, 2015 (including their survivors receiving pension benefits), a minimum attained the age of 60 with 20 years of service or 30 years of service regardless of age is required. Group 2 participants entitled to a deferred retirement allowance are eligible for health benefits upon attainment of the Medicare eligibility age.

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

Deferred Retirement Option Plan (DROP): Eligible Current Employees Class members may effectively retire and freeze their accrual of years of service with the System and defer receipt of retirement benefits, including retiree health benefits, for a period not to exceed five years while continuing City employment. For valuation purposes, current DROP participants are assumed to be active members, receiving health care benefits as an active employee. Service does not accrue while participating in the DROP and retiree health benefits are assumed to begin upon exit from active employment.

Members and Beneficiaries Assumed to be Eligible for Deferred Retiree Health Benefits as of December 31, 2016: Per Ordinance 336-2016 adopted by the City Council on October 26, 2016, members of Group C and their associated beneficiaries are eligible for retiree health benefits under the Select Plan based upon a minimum of 15 years of service. All other eligible members and their associated beneficiaries are eligible for retiree health benefits under the Model Plan based upon a minimum attained age of 60 with 20 years of service or 30 years of service regardless of age.

Dependents: A retiree may elect to cover an eligible spouse and/or eligible dependent children by paying the applicable retiree contribution rate for the specified enrollment tier.

**Retiree Health Benefits**

The System offers health care benefits (medical, prescription drugs, dental, and vision coverage) to eligible retirees, beneficiaries, and their dependents before and during Medicare eligibility.

Under the provisions of Ordinance 85-2011, beginning January 1, 2012, members who retired prior to September 1, 2007, and who establish their annual household income to be less than \$30,000, are eligible to receive medical and prescription drug coverage under the Secure Plan. Those members who retired prior to September 1, 2007, who do not qualify for coverage under the Secure Plan may elect medical and prescription drug coverage through either the Select Plan or Model Plan based upon eligibility.

Those members of Group C or those members who retired on or after September 1, 2007 (including those employees who retired under a special incentive plan in 2007) but prior to January 1, 2016, may elect medical and prescription drug coverage through the Select Plan. Those members not eligible for the Secure Plan or the Select Plan may elect coverage under the Model Plan.

**Active Service Death Benefits**

A surviving spouse, eligible dependent child, and orphan receiving survivor pension benefits as a result of death during employment of an eligible active member is eligible to receive retiree health benefits based upon the eligibility and terms applicable to the associated member.

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
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**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**Medicare Part B Premium Reimbursement**

Under the provisions of Ordinance 85-2011, beginning January 1, 2012, CRS no longer reimburses the Medicare Part B premiums for retirees and spouses.

**Retiree Contributions**

Participants covered by the Secure Plan do not contribute towards the cost of medical and prescription drug coverage. Group 1 participants covered by the Select Plan contribute an amount equal to five percent of the full cost of medical and prescription drug benefits of the retiree group with costs adjusted based upon the Medicare eligibility age (age 65). Group 1 participants covered by the Model Plan contribute an amount equal to ten percent of the full cost of medical and prescription drug benefits of the retiree group with costs adjusted based upon the Medicare eligibility age (age 65). Group 2 participants will pay the portion of the full cost of medical and prescription drug benefits of the coverage option for which they are eligible as determined by the point system.

Retiree Contribution as a Percentage of Cost		
Points	Select Plan	Model Plan
90+	5%	10%
80-89	25%	
70-79	50%	

**Dental Benefits**

Under the provisions of Ordinance 85-2011, beginning January 1, 2012, all members electing to participate in the dental plan will be required to pay the full cost of dental coverage. As such, it is assumed CRS has no liability under GASB 74 and 75 for dental benefits.

**Vision Benefits**

Under the provisions of Ordinance 85-2011, beginning January 1, 2012, all members electing to participate in the vision plan will be required to pay the full cost of vision coverage. As such, it is assumed CRS has no liability under GASB 74 and 75 for vision benefits.

**Changes Since Prior Valuation**

None

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**Summary of 2021 Benefit Plans**

Currently, the City of Cincinnati Postretirement Health Fund offers three plans for retired employees. Benefits are payable under the Plan for medical care obtained from the City’s health care vendors. Medicare Part A eligible retirees who didn’t buy into Part B get the same medical benefits as the non-Medicare retirees.

**City of Cincinnati Non-Medicare Retirees**

Provider Network:	Anthem BCBS	Anthem BCBS	Anthem BCBS
<b><u>In-Network (INN) Benefits</u></b>	<b>Select Plan</b>	<b>Model Plan</b>	<b>Secure Plan</b>
Deductible (Individual / Family)	\$300 / 600	\$500 / 1,000	\$0 / 0
Coinsurance	20%	20%	20%
Copays			
Office Visit (OV)-Primary Care (PCP)	DC	DC	DC
OV - Specialist Care Provider (SCP)	DC	DC	DC
Urgent Care (UC)	DC	DC	DC
Hospital Emergency Room (ER)	DC	DC	DC
Outpatient Surgery	DC	DC	DC
Hospital Inpatient	DC	DC	DC
Out-of-Pocket Max (Individual / Family)	\$1,500 / 3,000	\$2,000 / 4,000	\$500 / 1,000
<b><u>Out-of-Network (OON) Benefits</u></b>			
Deductible (Individual / Family)	\$600 / 1,200	\$1,000 / 2,000	\$0 / 0
Coinsurance	50%	50%	50%
Hospital Emergency Room (ER)	INN DC	INN DC	INN DC
Out-of-Pocket (OOP) Max (Individ / Family)	\$3,000 / 6,000	\$4,000 / 8,000	\$1,000 / 2,000
<b>Lifetime Maximum</b>	Unlimited	Unlimited	Unlimited
<b>Annual Maximum</b>	Unlimited	Unlimited	Unlimited
<b><u>Prescription Drugs</u></b>	Non Medicare Coverage Only	Non Medicare Coverage Only	Non Medicare Coverage Only
Retail (30 Days) - Generic/Formulary /Non-Form. Copay	\$10 / 20 / 30	\$10 / 20 / 30	\$5 / 15 / 30
Mail Order (90 Days) - Generic/Formulary /Non-Form. Copay	\$20 / 40 / 60	\$20 / 40 / 60	\$10 / 30 / 60
Out-of-Pocket Max (Individual / Family)	None	None	\$500
<b><u>Detail Benefits</u></b>			
Mental Health (MH) / Substance Abuse (SA):			
- SA Lifetime Visit Limit (Inpatient / Outpatient)	Unlimited	Unlimited	Unlimited
- SA Lifetime OOP Maximum	Unlimited	Unlimited	Unlimited
- MH Per Year Visit Limit (Inpatient / Outpatient)	Unlimited	Unlimited	Unlimited
Home Health (INN / OON):	DC / DC up to 30 visits	DC / DC up to 30 visits	DC / DC up to 30 visits
Allergy Care:	DC	DC	DC
Rehabilitation (i.e., speech, occup. physical):	DC up to 60 visits	DC up to 60 visits	DC up to 60 visits
Chiropractors:	DC	DC	DC
Medical Supplies and Equipment:	DC	DC	DC
Maternity Care:	DC	DC	DC
Skilled Nursing Facility	DC	DC	DC
Hearing Aids:	DC	DC	DC
Preventive Care:	DC	DC	DC
<b>Medicare Integration:</b>	Exclusion <sup>2</sup>	Exclusion <sup>2</sup>	Exclusion <sup>2</sup>

<sup>1</sup> DC=Deductible and coinsurance applies.

<sup>2</sup> Medicare Pays first then the Plan applies the Plan’s rules for non-Medicare covered benefits. Only Medicare Eligibles who have not bought into Medicare Part B are covered under the NME plan

**Vendors**

Medical Claims Administrator:	Anthem BCBS
Medical Network:	Anthem BCBS
Pharmacy Benefit Manager:	CVS / CareMark
Stop-Loss Insurer:	N/A

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX C – SUMMARY OF PLAN PROVISIONS**

**City of Cincinnati Medicare Advantage Plans - For Medicare Part A&B and Part B only eligibles**

Provider Network:	Anthem BCBS	Anthem BCBS	Anthem BCBS
<b><u>In-Network (INN) Benefits</u></b>	<b>Select Plan</b>	<b>Model Plan</b>	<b>Secure Plan</b>
Deductible (Individual)	\$300	\$500	\$0
Coinsurance	4%	4%	4%
Copays			
Office Visit (OV)-Primary Care (PCP)	DC	DC	DC
OV - Specialist Care Provider (SCP)	DC	DC	DC
Preventive Care:	\$0 / C	\$0 / C	\$0 / C
Urgent Care (UC)	DC	DC	DC
Hospital Emergency Room (ER)	\$50	\$50	\$50
Skilled Nursing Facility (SNF)	\$5/day for days 1-20, DC for days 21-100	\$5/day for days 1-20, DC for days 21-100	\$5/day for days 1-20, DC for days 21-100
Outpatient Surgery	DC	DC	DC
Hospital Inpatient	DC	DC	DC
Home Health (INN / OON):	\$0 / DC	\$0 / DC	\$0 / DC
Mental Health (MH) / Substance Abuse (SA):	DC	DC	DC
Out-of-Pocket Max (Individual / Family)	\$1,500	\$2,000	\$500
<b><u>Out-of-Network (OON) Benefits</u></b>			
Deductible (Individual)	Combined with INN	Combined with INN	Combined with INN
Coinsurance	10%	10%	10%
Hospital Emergency Room (ER)	INN DC	INN DC	INN DC
Out-of-Pocket (OOP) Max (Individual)	\$3,000	\$4,000	\$1,000
<b>Lifetime Maximum</b>	Unlimited	Unlimited	Unlimited
<b>Annual Maximum</b>	Unlimited	Unlimited	Unlimited
<b><u>Prescription Drugs</u></b>	Medicare Coverage Only	Medicare Coverage Only	Medicare Coverage Only
Retail (30 Days) - Generic/Formulary /Non-Form. Copay	\$10 / 20 / 30	\$10 / 20 / 30	\$5 / 15 / 30
Mail Order (90 Days) - Generic/Formulary /Non-Form. Copay	\$20 / 40 / 60	\$20 / 40 / 60	\$10 / 30 / 60
Out-of-Pocket Max (Individual)	None	None	\$500

<sup>1</sup> DC=Deductible and coinsurance applies.

<sup>2</sup> C=Coinsurance applies.

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX D – GLOSSARY OF TERMS**

**1. Actuarial Assumptions**

Assumptions as to the occurrence of future events affecting OPEB costs, such as mortality, withdrawal, and retirement; changes in compensation; rates of investment earnings and asset appreciation or depreciation; procedures used to determine the actuarial value of assets; and other relevant items.

**2. Actuarial Cost Method**

A procedure for determining the actuarial present value of OPEB plan benefits and expenses and for developing an allocation of such value to each year of service, usually in the form of a normal cost and an actuarial liability.

**3. Actuarially Determined Contribution**

A target or recommended contribution for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.

**4. Actuarial Gain (Loss)**

A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, as determined in accordance with a particular actuarial cost method.

**5. Actuarial Liability**

The portion of the actuarial present value of projected benefits will not be paid by future normal costs. It represents the value of the past normal costs with interest to the valuation date.

**6. Actuarial Present Value (Present Value)**

The value as of a given date of a future amount or series of payments, the actuarial present value discounts the payments to the given date at the assumed investment return and includes the probability of the payment being made. As a simple example: assume you owe \$100 to a friend one year from now. Also, assume there is a 1% probability of your friend dying over the next year, in which case you will not be obligated to pay him. If the assumed investment return is 10%, the actuarial present value is:

$$\frac{\text{Amount}}{\$100} \times \frac{\text{Probability of Payment}}{(1 - .01)} \times \frac{1/(\text{1+Discount Rate})}{1/(1+.1)} = \frac{\text{Present Value}}{\$90}$$

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX D – GLOSSARY OF TERMS**

**7. Actuarial Valuation Date**

The date as of which an actuarial valuation is performed. This date may be up to 24 months prior to the measurement date and up to 30 months prior to the employer's reporting date.

**8. Actuarial Value of Assets**

The value of cash, investments, and other property belonging to an OPEB plan as used by the actuary for the purpose of an actuarial valuation. The purpose of an actuarial value of assets is to smooth out fluctuations in market values. This way long-term costs are not distorted by short-term fluctuations in the market.

**9. Amortization Payment**

The portion of the OPEB plan contribution which is designed to pay interest and principal on the unfunded actuarial liability in order to pay for that liability in a given number of years.

**10. Entry Age Normal Actuarial Cost Method**

A method under which the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages.

**11. Normal Cost**

That portion of the actuarial present value of OPEB plan benefits and expenses which is allocated to a valuation year by the actuarial cost method.

**12. Unfunded Actuarial Liability**

The excess of the actuarial liability over the actuarial value of assets.

**13. Funded Percentage**

The ratio of the actuarial value of assets to the actuarial liabilities.

**14. Mortality Table**

A set of percentages which estimate the probability of death at a particular point in time. Typically, the rates are annual and based on age and sex.

**CITY OF CINCINNATI  
POSTRETIREMENT HEALTH FUND  
ACTUARIAL VALUATION AS OF DECEMBER 31, 2020**

**APPENDIX D – GLOSSARY OF TERMS**

**15. Discount Rate**

The assumed interest rate used for converting projected dollar-related values to a present value as of the valuation date.

**16. Medical Trend**

The assumed increase in dollar-related values in the future due to the increase in the cost of health care.

**17. Entry Age Actuarial Cost Method**

The actuarial cost method required for GASB 74 and 75 calculations. Under this method, the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this actuarial present value allocated to a valuation year is called the Service Cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future service costs is called the total OPEB liability.



**Cincinnati Retirement System**

City of Cincinnati  
Retirement System  
Executive Summary

**April 30, 2021**



## Summary of Cash Flows

	Last Month
Beginning Market Value	\$2,415,127,027
Net Cash Flow	-\$12,158,017
Net Investment Change	\$65,073,282
Ending Market Value	\$2,468,042,293

## Market Value

	Market Value (\$)	% of Portfolio	Policy %	Policy Difference (\$)
<b>Total Fund Composite</b>	<b>2,468,042,293</b>	<b>100.0</b>	<b>100.0</b>	<b>0</b>
Fixed Income Composite	395,097,901	16.0	14.0	49,571,980
Private Debt Composite	2,436,127	0.1	3.0	-71,605,142
U.S. Equity Composite	798,995,854	32.4	27.5	120,284,224
Non-U.S. Equity Composite	589,396,043	23.9	23.0	21,746,316
Risk Parity Composite	103,882,552	4.2	5.0	-19,519,563
Real Estate Composite	197,604,095	8.0	7.5	12,500,924
Infrastructure Composite	157,698,391	6.4	10.0	-89,105,838
Private Equity Composite	208,165,254	8.4	10.0	-38,638,975
Total Cash Equivalents	14,766,075	0.6	--	14,766,075

## Performance

	1 Mo	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	Inception	Inception Date
<b>Total Fund Composite</b>	<b>2.7%</b>	<b>7.5%</b>	<b>7.6%</b>	<b>34.0%</b>	<b>9.6%</b>	<b>10.1%</b>	<b>8.2%</b>	<b>9.1%</b>	<b>May-85</b>
Target Benchmark	2.3%	6.2%	6.5%	30.1%	9.7%	10.2%	7.9%	--	May-85
<b>Fixed Income Composite</b>	<b>0.9%</b>	<b>-0.8%</b>	<b>-0.7%</b>	<b>10.5%</b>	<b>5.9%</b>	<b>5.4%</b>	<b>4.5%</b>	<b>5.8%</b>	<b>Nov-95</b>
BBgBarc US Aggregate TR	0.8%	-1.9%	-2.6%	-0.3%	5.2%	3.2%	3.4%	5.0%	Nov-95
<b>Private Debt Composite</b>	<b>0.2%</b>	<b>-22.1%</b>	<b>-21.2%</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>-11.8%</b>	<b>Sep-20</b>
BBgBarc US Aggregate TR	0.8%	-1.9%	-2.6%	-0.3%	5.2%	3.2%	3.4%	-2.0%	Sep-20
<b>U.S. Equity Composite</b>	<b>4.5%</b>	<b>16.3%</b>	<b>17.6%</b>	<b>61.8%</b>	<b>15.6%</b>	<b>15.8%</b>	<b>12.4%</b>	<b>9.8%</b>	<b>Feb-89</b>
Russell 3000	5.2%	12.3%	11.8%	50.9%	18.9%	17.7%	14.0%	11.1%	Feb-89
<b>Non-U.S. Equity Composite</b>	<b>3.3%</b>	<b>9.8%</b>	<b>8.8%</b>	<b>48.1%</b>	<b>5.0%</b>	<b>8.9%</b>	<b>5.2%</b>	<b>6.4%</b>	<b>May-93</b>
MSCI ACWI ex USA	2.9%	6.3%	6.5%	43.0%	7.0%	9.8%	4.7%	--	May-93
<b>Risk Parity Composite</b>	<b>4.1%</b>	<b>2.9%</b>	<b>3.1%</b>	<b>19.4%</b>	<b>8.2%</b>	<b>7.8%</b>	<b>--</b>	<b>4.8%</b>	<b>Jul-12</b>
60% Wilshire 5000/40% BarCap Aggregate	3.5%	6.6%	6.0%	28.3%	13.8%	12.1%	10.0%	10.8%	Jul-12
<b>Real Estate Composite</b>	<b>0.1%</b>	<b>2.3%</b>	<b>2.4%</b>	<b>3.3%</b>	<b>5.2%</b>	<b>6.5%</b>	<b>10.0%</b>	<b>5.3%</b>	<b>Aug-07</b>
NFI	0.0%	1.3%	1.9%	2.1%	3.8%	5.1%	8.5%	4.2%	Aug-07
NPI	0.0%	1.1%	1.7%	3.0%	4.7%	5.7%	8.7%	6.0%	Aug-07
<b>Infrastructure Composite</b>	<b>2.3%</b>	<b>2.3%</b>	<b>2.1%</b>	<b>14.2%</b>	<b>8.1%</b>	<b>5.5%</b>	<b>7.0%</b>	<b>8.1%</b>	<b>Aug-08</b>
3 Month T-Bill +4%	0.3%	1.0%	1.3%	4.1%	5.4%	5.2%	4.6%	4.5%	Aug-08
<b>Private Equity Composite</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>27.8%</b>	<b>13.6%</b>	<b>13.6%</b>	<b>12.4%</b>	<b>8.2%</b>	<b>Jul-93</b>
Cambridge Associates All PE	0.0%	0.0%	0.0%	35.9%	15.7%	16.0%	13.3%	15.6%	Jul-93

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