Retirement Plan for Chicago Transit Authority Employees

Actuarial Valuation Report as of January 1, 2021, including supplementary disclosure information for GASB Statement Nos. 67 and 68

September 2021

110 West Berry Street, Suite 1300
Fort Wayne, IN 46802

September 3, 2021

Board of Trustees and Executive Director
Retirement Plan for Chicago Transit Authority Employees
55 West Monroe St., Suite 1950
Chicago, IL 60603

Ladies and Gentlemen:

This report presents the results of the annual valuation of the assets and liabilities of The Retirement Plan for Chicago Transit Authority Employees (Plan) as of January 1, 2021, prepared in accordance with 40 ILCS 5/22-101(e). In addition, it includes disclosure information as of December 31, 2020, required under Governmental Accounting Standards Board Statement Nos. 67 and 68. The actuarial valuation of the Plan is performed annually and Buck Global, LLC (Buck) was retained to perform the valuation as of January 1, 2021. This valuation has been conducted in accordance with all applicable Actuarial Standards of Practice issued by the Actuarial Standards Board.

The actuarial valuation is based on unaudited financial and member data provided by the staff of the Plan and summarized in this report. The benefits considered are those delineated in the Plan and are governed by legislation contained in the Illinois Compiled statutes, particularly Chapter 40, as amended and restated effective December 31, 2012. The actuary did not verify the data submitted but did perform tests for consistency and reasonableness. The accuracy of the results contained in this report is dependent upon the accuracy of the data.

Contribution rates were determined in accordance with 40 ILCS 5/22-101(e) using the projected unit credit cost method and, under the actuarial assumptions used in the valuation, are expected to produce a funded ratio of at least 60 percent no later than ten years after the valuation year through fiscal year end 2039. Contribution rates reflect the issuance of bond or notes by the Chicago Transit Authority (Authority), as defined in 70 ILCS 3605/12c. Authority contribution rates are adjusted by a debt service credit, for debt service paid in the prior year, of up to six percent of compensation per year from 2009 to 2040, as defined in 40 ILCS 5/22-101(e)(2).

Results of this valuation deviated from those that would have been projected based on the results of the January 1, 2020 actuarial valuation for a number of reasons including market returns of 7.60% compared to the 8.25% assumed rate of return, demographic experience, updated participant data, payroll and salary increases that were greater than expected. However, the plan is still projected to meet the funding ratio standards set forth in ILCS 5/22-101(e) and, therefore, there is no need to increase authority and employee contribution rates to comply with 40 ILCS 5/22-101(e). The rates will remain as follows:

Annual Contributions to the Plan (Percentage of Compensation)		
Fiscal Year	Authority	Employees
2022 to 2040	20.647%	13.324%

Based on these rates, the sum of current assets, net bond proceeds, future contributions and investment earnings, less benefit payments and expenses, assets held by the Plan are projected to be equal to at least 60 percent of actuarial liabilities by 2031 and through fiscal year end 2040, if these contributions, expressed as a percentage of compensation, are made to the Plan and the Plan experiences no net actuarial losses in the future.

40 ILCS 5/22-101(e)(4) provides for a minimum contribution, determined either by the Board of Trustees or the Auditor General, to bring the funded ratio of the Plan “up to” or “to no less than” 90% by December 31, 2059.

While not required by 40 ILCS 5/22-101(e)(3), for informational purposes, Buck has provided a contribution amount equal to the Actuarial Math Contribution:

- Fund 100% of the entry age normal cost method
- Fund the expected administrative expenses for the fiscal year
- Pay off the unfunded liability over 20 years and as a level percentage of payroll

Under this method, a contribution of approximately 33.23% of payroll (total contribution) is appropriate.

The results documented in this report are estimated based on data that may be imperfect and on assumptions about future events. Assumptions may have been made about participant data or other factors. Reasonable efforts were made in this valuation to ensure that items that were significant in the context of the actuarial liabilities or costs are treated appropriately and not excluded or included inappropriately. We believe that the use of approximation in our calculations, if any, has not resulted in a significant difference relative to the results we would have obtained using more detailed calculations.

A range of results, different from those presented in this report could be considered reasonable. The numbers are not rounded, but this is for convenience only and should not imply precision, which is not inherent in actuarial calculations.

Experience studies are performed once in every five-year period. This valuation was prepared on the basis of the demographic and economic assumptions that were recommended on the basis of an Experience Review covering the period from January 1, 2013 through December 31, 2017 and adopted by the Board of Trustees at their April 2019 meeting, which include an 8.25% per annum rate of investment return. These assumptions will remain in effect for valuation purposes until such time as the Board of Trustees adopts revised assumptions.

We believe that the economic and demographic assumptions adopted in accordance with the recent experience study are reasonable and appropriate for the purposes of this valuation. The assumptions and methods used for financial reporting and all supporting schedules fulfill the requirements of GASB Statement Nos. 67 and 68.

Historical valuation results presented in this report represent results taken from prior actuarial reports, and results shown for some years may reflect funding methods and techniques used by the prior actuary. Our report/certification does not apply to those results, other than to represent that our report has presented accurate information developed by prior actuaries.

Where presented, the “funded ratio”, “funded status” and “unfunded accrued liability” typically are measured using the actuarial value of assets. It should be noted that use of the market value of assets would result in different values of the funded ratio, funded status and unfunded accrued liability. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but not for assessment of the funded status of the plan if it were to settle (i.e., purchase annuities to cover) a portion or all of its liabilities.

Where presented, the “net pension liability” is measured on a market value of assets basis. This item presented may not be appropriate for evaluating the need and level of future contributions and make no assessment regarding the cost to settle (i.e., purchase annuities to cover) any portion of the Plan’s liabilities.

Future actuarial measurements may differ significantly from the current measurement presented in this report due to such factors as: plan experience different from that anticipated by the economic and demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law. An analysis of the potential range of such future measurements is beyond the scope of this report.

Use of this report for any other purpose, or by anyone other than the Board of Trustees or the Plan’s staff or its auditors, may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. Buck should be asked to review any statement to be made on the basis of the results contained in this report. Buck will accept no liability for any such statement made without prior review by Buck.

Actuarial Standard of Practice No. 56 (“ASOP 56”) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding methods specified in

this report. The output from the third-party vendor software is used as input to an internally developed model that applies applicable funding methods and policies to the liabilities derived and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this report. Buck has an extensive review process whereby the results of the liability calculations are checked using detailed sample output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal model are similarly reviewed in detail and at a high level for accuracy, reasonability and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. The review is performed by experts within the company who are familiar with applicable funding methods as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked and reviewed by multiple experts within the company who are familiar with the details of the required changes.

In our opinion the calculations also comply with Illinois law, and where applicable, the Statements of the Governmental Accounting Standards Board. We certify that the information presented herein is accurate and fairly portrays the actuarial position of the Plan as of January 1, 2021.

Qualified actuaries completed the valuation in accordance with accepted actuarial procedures as prescribed by the Actuarial Standards Board. The qualified actuaries are members of the American Academy of Actuaries and are experienced in performing actuarial valuations of public employee retirement systems. To the best of our knowledge, this report is complete and accurate and has been prepared in accordance with generally accepted actuarial principles and practice. The undersigned are all qualified to render the opinions contained in this report.

Respectfully submitted,

Buck Global, LLC

David L. Driscoll, FSA, EA, MAAA, FCA

Principal, Consulting Actuary

Kevin S. Spanier, ASA, EA, MAAA, FCA

Director, Retirement Actuary

Table of Contents

Executive Summary

Membership

Actives: As of January 1, 2021, there were 8,078 members in active service covered under the provisions of the Plan. The significant age, service, salary and accumulated contribution information for these members is summarized below, along with corresponding figures from the last actuarial valuation one year earlier.

	January 1, 2021	January 1, 2020
Number of active employees [1]	8,078	8,057
Average age	48.3	48.5
Average years of service	12.5	13.3
Total annual valuation salary [2]	$650,048,131	$631,411,861
Average annual salary [2]	$81,541	$79,453
Total accumulated contributions	$634,800,523	$588,433,604
Average accumulated contributions [2]	$79,629	$74,045

1 Active statistics include all participants who are actively employed, which includes 18 participants this year and 10 participants last year who are on leave and 106 participants this year and 110 particpants last year who have opted out of participating in the Plan and are only entitled to a return of their contributions.

2 The salary information for the 106 participants this year & 110 particpants last year who have opted out of participating in the Plan is not included.

The number of active members increased by 0.3% from the previous valuation date. The average age of the active members decreased by 0.4%. The average service decreased by 6.0%. The total annual valuation salary increased by 3.0%. The average salary increased by 2.6% from the previous valuation.

Distributions of active members by age and service are given in Section 5.2.

Terminated Vested: In addition to the active members, there were 160 terminated vested members who did not elect to receive their accumulated contributions when they left covered employment. The significant age and annual benefit information for these terminated vested members is summarized below with comparative figures from the last actuarial valuation one year earlier.

	January 1, 2021	January 1, 2020
Number of deferred vested members [3]	160	151
Average age	56.5	56.8
Average annual benefit	$27,102	$27,625

3 Number of deferred vested members includes 6 in 2021 and 4 in 2020 who were pending cashouts after the valuation date. These members are not included in the calculation of the average benefit.

The number of terminated vested members increased by 6.0% from the previous valuation. The average age of the terminated vested members decreased by 0.3 years. The average annual pension benefit for these members decreased by 1.9% from the previous valuation.

Distributions of terminated vested members by age and pension benefit are given in Section 5.4.

Retirees and Beneficiaries: In addition to the active and terminated vested members, there were 8,108 retired members, 1,303 members with disability allowances and 1,205 beneficiaries who are receiving monthly benefit payments on the valuation date. The significant age and annual benefit information for these members are summarized below with comparative figures from the last actuarial valuation performed one year earlier.

	January 1, 2021	January 1, 2020
Number of members receiving payments [4]		
➢ Retirees	8,108	8,070
➢ Disability Allowances	1,303	1,302
➢ Beneficiaries	1,205	1,187
➢ Total	10,616	10,559
Average age	71.4	71.2
Annual benefit amounts		
➢ Retirees	$254,022,477	$245,555,648
➢ Disability Allowances	$24,189,323	$23,749,211
➢ Beneficiaries	$15,411,942	$14,633,375
➢ Total	$293,623,742	$283,938,234
Average annual benefit payments	$27,659	$26,898

4 Number of beneficiaries includes 3 in 2020 who were pending cashouts after the valuation date. These members are not included in the calculation of the average benefit.

The number of members receiving payments increased by 0.5% from the previous valuation date. The average age of these members increased by 0.2 years. The total annual benefit payments for these members increased by 3.4% from the previous valuation date.

Distributions of retired members by age and benefit amounts are given in Section 5.3.

Plan Assets

The Plan's assets are held in trust and invested for the exclusive benefit of Plan members. The trust is funded by member and employer contributions and pays benefits directly to eligible members in accordance with Plan provisions. The assets are audited annually and are reported at fair value. On a fair value basis, the Plan has Net Assets Available for Benefits of $1,941.2 million as of January 1, 2021. This includes an increase of $50.7 million over the Net Assets Available for Benefits of $1,890.5 million as of January 1, 2020. During the prior year, the investment return was 7.6% as reported by the Plan.

Starting with the January 1, 2017 valuation, the Board of Trustees adopted an actuarial value of assets to be used for funding purposes. This method recognizes differences of asset returns from their expected levels over a period of five years. The actuarial value of assets is $1,955.3 million as of January 1, 2021. This includes an increase of $71.9 million over the actuarial value of assets of $1,883.4 million as of January 1, 2020. During the prior year, the investment return on the actuarial value assets was 7.84%.

A summary of the assets held for investment, a summary of changes in assets, and the development of the actuarial value of assets is shown in Section 2.

Actuarial Experience

Differences between the expected experience based on the actuarial assumptions and the actual experience create changes in the actuarial accrued liability, actuarial value of assets, and the unfunded actuarial accrued liability from one year to the next. These changes create an actuarial gain if the experience is favorable and an actuarial loss if the experience is unfavorable. The Plan experienced a total net actuarial loss of $34.8 million during the prior year. This net loss is approximately 0.97% of the Plan's prior year actuarial accrued liability. The net loss is a combination of two principal factors, demographic experience and investment performance.

The demographic experience tracks actual changes in the Plan's population compared to the assumptions for decrements such as mortality, turnover, and retirement, as well as pay increases. The Plan experienced a demographic loss of $27.1 million during the year ending December 31, 2020. This loss increased the unfunded actuarial accrued liability by $27.1 million and decreased the funded ratio by 0.40%.

Continued tracking of the demographic experience is warranted in order to confirm the appropriateness of the actuarial assumptions. Details of the demographic, economic, and other assumptions used to value the Plan liabilities and normal cost can be found in Section 6.

On the asset side, the Plan experienced a loss on a fair value of assets basis. The actual rate of return on the fair value of plan assets was 7.6% for the year ending December 31, 2020 compared to the assumption of 8.25%.

The rate of return on the actuarial value of plan assets for the year ending December 31, 2020 was approximately 7.8% compared to the assumption of 8.25%. The loss on the actuarial value of assets increased the unfunded actuarial accrued liability by $7.7 million and decreased the funded ratio by 0.21%. It should be noted that the Plan's assumed asset return of 8.25% is a long-term rate and short-term performance is not necessarily indicative of expected long-term future returns.

In our opinion, the economic assumptions comply with Actuarial Standards of Practice No. 27 and the demographic assumptions comply with Actuarial Standards of Practice No. 35.

A summary of the actuarial gains and losses experienced during the prior year is shown in Section 1.4.

Funded Status

The funded status is a measure of the progress that has been made in funding the Plan as of the valuation date. It is determined as a ratio of the actuarial value of assets divided by the total actuarial accrued liability on the valuation date. The funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the Plan if the Plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

As of January 1, 2021, the funded ratio of the Plan is 53.27%. This represents an increase of 0.72% from the Plan's funded ratio of 52.55% as of January 1, 2020. Unless otherwise noted, the funded status shown in the report is based on the projected unit credit cost method.

A history of the unfunded actuarial accrued liability and the funded ratio is shown in Section 1.5
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Statutory Contributions

Actual required contribution rates were determined in accordance with 40 ILCS 5/22-101(e) using the projected unit credit cost method and calculated to produce an expected funded ratio of at least 60 percent no later than ten years after the valuation year through fiscal year end 2039 and 90 percent funding by fiscal year end 2059. Contribution rates reflect the issuance of bond or notes by the Authority, as defined in 70 ILCS 3605/12c. Authority contribution rates are adjusted by a debt service

credit, for debt service paid in the prior year, of up to six percent of compensation per year from 2009 to 2040, as defined in 40 ILCS 5/22-101(e)(2).

Actuarial Math Contributions

While not required by 40 ILCS 5/22-101(e), white papers on funding policies for public sector plans developed over the past few years suggest a funding policy be sufficient to pay the normal cost on the entry age normal cost basis and amortize the unfunded actuarial accrued liability over a fixed period of 20 years. We will broadly refer to this type of policy as an Actuarial Math Funding Policy. For informational purposes, Buck has provided a contribution amount based on the Actuarial Math Funding Policy.

Under Actuarial Math, the normal cost represents the cost of the benefits that accrue during the year for active members under the Entry Age Normal Cost Method, plus a load for the expected administrative expenses to be paid during the fiscal year. The Entry Age Normal Cost is determined as a level percent of pay over each individual career attributable to the respective plan year. The normal cost for 2021 has been determined to be $54.0 million, or 8.30% of pay. This represents a decrease in the normal cost rate of 0.78% of pay from last year's normal cost rate of 9.08%.

Under Actuarial Math, the cost method under which the actuarial accrued liability is determined is the entry age normal cost method. Under the entry age normal cost method, the actuarial accrued liability (AAL) is equal to the present value of projected benefits less the present value of future benefits to be accrued. The AAL amount is compared to the actuarial value of assets to determine if the Plan is ahead or behind in funding as of the valuation date. The difference between the total actuarial accrued liability and the actuarial value of assets equals the amount of unfunded actuarial accrued liability (UAAL) or surplus (if negative) on the valuation date. This amount is amortized over 20 years as a level percent of pay and added to the normal cost to determine the annual required contribution for the year suggested by public sector funding policy white papers.

The UAAL under the entry age normal cost method as of January 1, 2021 is $1,850.7 million. This represents an increase of $47.6 million in the unfunded actuarial accrued liability from last year's amount of $1,803.2 million. The annual payment required to amortize the unfunded actuarial accrued liability of $1,850.7 million as of January 1, 2021 is $153.6 million, or 23.63% of pay.

The total contribution suggested by actuarial math is the sum of the normal cost and the payment to the UAAL plus interest, or 33.23% of pay (8.30% of pay attributable to the normal cost plus 23.63% of pay attributable to the amortization of the unfunded plus 1.29% of pay for the mid-year interest adjustment).

The actuarial liabilities and development of the Actuarial Math Contribution is shown in the Comparative Summary and Section 1.1.

In our opinion, the measurement of the benefit obligations and determination of the actuarial cost of the Plan is performed in compliance with Actuarial Standards of Practice No. 4.

Accounting Information

The Governmental Accounting Standards Board (GASB) issues statements which establish financial reporting standards for defined benefit pension plans and accounting for the pension expenditures and expenses for governmental employers. The required financial reporting information for the Plan and the Employer under GASB Statement Nos. 67 and 68 can be found in Section 3.

Projections

As part of the annual actuarial valuation, a forecast of expected future valuation results is performed over a 30-year period beginning on the valuation date. This analysis provides a dynamic look into the future to identify trends in future employer contributions and funded status. The forecast replaces active members who are assumed to decrement (terminate, retire, etc.) during the period with new members resulting in a stable active membership. The forecast assumes all actuarial assumptions are

exactly realized each year during the forecast period. The results of these forecasts can be found in Section 4.

Changes in Plan Provisions

There have been no changes in the Plan provisions since the last actuarial valuation performed as of January 1, 2020. A summary of Plan and contribution provisions are outlined in Section 6.1.

Changes in Actuarial Assumptions, Methods, or Procedures

There have been no changes in the actuarial assumptions, methods and procedures from those used in the prior valuation.

The actuarial assumptions, methods and procedures are outlined in Section 6.2 and Section 6.3.

Comparative Summary of Key Actuarial Valuation Results

	January 1, 2021	January 1, 2020
1. Investment Return Assumption	8.25 %	8.25 %
2. Membership Data		
a. Active Employees		
Number	8,078	8,057
Annualized Salaries (in thousands)	650,048	631,412
Average Pay	81,541	79,453
b. Terminated Participants with Vested Benefits		
Number	160	151
Total Monthly Accrued Benefit	299,926	338,410
Average Monthly Accrued Benefit	2,258	2,302
c. Retirees and Beneficiaries		
Number	9,313	9,257
Total Monthly Pension	22,452,868	21,682,419
Average Monthly Pension	2,411	2,342
d. Disability Allowances		
Number	1,303	1,302
Total Monthly Pension	2,015,777	1,979,101
Average Monthly Pension	1,547	1,520
3. Statutory Minimum Contribution Rates (as a percentage of Payroll)*		
a. Employer Contribution Rate		
Gross Employer Rate	26.647 %	26.647 %
Credit for Debt Repayment	6.000 %	6.000 %
Net Employer Rate	20.647 %	20.647 %
b. Employee Contribution Rate	13.324 %	13.324 %
4. Actuarial Math Contribution		
a. Amortization Payment for UAAL		
i. Amount	153,616,190	149,667,414
ii. As a % of pay	23.63 %	23.70 %
b. Normal Cost		
i. Entry age normal cost amount	51,675,474	54,560,054
ii. Administrative expenses	2,300,000	2,800,000
iii. Normal cost	53,975,474	57,360,054
iv. As a % of pay	8.3 %	9.08 %
c. Interest Adjustment to Mid-Year		
i. Amount	8,393,471	8,370,659
ii. As a % of pay	1.29 %	1.33 %
d. Actuarial Contribution		
i. Amount	215,985,135	215,398,127
ii. As a % of pay	33.23 %	34.11 %
5. Actuarial Funded Status ($ in thousands)		
a. Actuarial Accrued Liability	3,670,670	3,583,859
b. Actuarial Value of Assets (AVA)	1,955,264	1,883,411
c. Unfunded Accrued Liability	1,715,406	1,700,448
d. Funded Ratio	53.3 %	52.6 %
e. Market Value of Assets (MVA)	1,941,166	1,890,466
f. Return on MVA (prior year)	7.6 %	15.7 %
g. Return on AVA (prior year)	7.8 %	7.6 %

* Contribution rate applicable for the plan year following the year of valuation.

Section 1 - Actuarial Funding Results

Section 1.1
Actuarial Liabilities and Normal Cost

Actuarial Accrued Liability	January 1, 2021	January 1, 2020
1. Active Members		
a. Retirement Benefits	1,008,491,976	1,003,377,111
b. Withdrawal Benefits	36,047,039	33,536,441
c. Disability Benefits	93,728,998	92,955,107
d. Death Benefits	11,773,685	11,542,358
Total	1,150,041,698	1,141,411,017
2. Inactive Members with Deferred Benefits	24,928,255	24,060,387
3. Retired Members and Beneficiaries Receiving Benefits	2,495,700,217	2,418,387,610
4. Total Actuarial Accrued Liability (1. + 2. + 3.)	**3,670,670,170**	**3,583,859,014**

Normal Cost	January 1, 2021	January 1, 2020
1. Active Members		
a. Retirement Benefits	53,979,871	52,964,949
b. Withdrawal Benefits	4,855,893	4,219,737
c. Disability Benefits	7,181,125	6,903,142
d. Death Benefits	903,722	847,849
2. Normal Cost	**66,920,611**	**64,935,677**
3. Total Normal Cost (As a % of pay)	**10.29%**	**10.28%**

Section 1.2
Actuarial (Gain) / Loss

Development of Actuarial (Gain) / Loss	Amount
1. Expected Actuarial Accrued Liability	
a. Actuarial Accrued Liability at January 1, 2020	3,583,859,014
b. Normal Cost at January 1, 2020	64,935,677
c. Interest on a. + b. to End of Year	301,025,562
d. Benefit Payments for 2020, with Interest to End of Year	306,254,534
e. Expected Actuarial Accrued Liability Before Changes (a. + b. + c. - d.)	3,643,565,719
2. Actuarial Accrued Liability at January 1, 2021	3,670,670,170
3. Liability (Gain) / Loss (2. – 1.e.)	27,104,451
4. Expected Actuarial Value of Assets	
a. Actuarial Value of Assets at January 1, 2020	1,883,410,704
b. Interest on a. to End of Year	155,381,384
c. Contributions Made for 2020	223,757,543
d. Interest on c. to End of Year	9,047,100
e. Benefit Payments and Administrative Expenses for 2020, with Interest to End of Year	308,665,213
f. Expected Actuarial Value of Assets at January 1, 2021 (a. + b. + c. + d. – e.)	1,962,931,518
5. Actuarial Value of Assets as of January 1, 2021	1,955,264,394
6. Actuarial Value Asset (Gain) / Loss (4.f. - 5.)	7,667,124
7. Total Actuarial (Gain) / Loss (3. + 6.)	34,771,575

Section 1.3
Actuarial Balance Sheet

Financial Resources	January 1, 2021	January 1, 2020
1. Actuarial Value of Assets	1,955,264,394	1,883,410,704
2. Present Value of Future Contributions	512,499,852	495,433,607
3. Unfunded Actuarial Accrued Liability/(Reserve)	1,715,405,776	1,700,448,310
4. Total Assets (1 + 2 + 3)	4,183,170,022	4,079,292,621

Benefit Obligations	January 1, 2021	January 1, 2020
1. Present Value of Future Benefits		
a. Active Members	1,662,541,550	1,636,844,624
b. Inactive Members	24,928,255	24,060,387
c. Retirees, disabilities and beneficiaries	2,495,700,217	2,418,387,610
d. Total	4,183,170,022	4,079,292,621

Section 1.4
Analysis of Financial Experience

Analysis of Actuarial (Gains) and Losses Resulting from Differences Between Assumed Experience and Actual Experience

Type of (Gain) or Loss	Year End December 31, 2020	As a % of Last Year's AAL
(1) COLA Experience	0	0.00%
(2) Salary Experience	14,275,759	0.40%
(3) Retiree Mortality Experience	(164,213)	0.00%
(4) Other (turnover, retirement ages, service purchase, etc.)		0.00%
(a) Unexpected Participant Pick Up	1,117,265	0.03%
(b) Unexpected Data Change for Decrementing Actives	9,301,194	0.26%
(c) Unexpected Data Change for Continuing Actives	(1,973,345)	-0.06%
(d) Unexpected Data Change for Continuing Inactives	(1,104,369)	-0.03%
(e) Unexpected Rehires	(39,894)	0.00%
(f) Difference between actual and expected benefit payments	(4,748,696)	-0.13%
(g) Miscellaneous	(30,967)	0.00%
(h) Total	2,521,188	0.07%
(5) Active Decrements	8,014,181	0.22%
(6) New Entrants	2,457,536	0.07%
(7) Liability (Gain) or Loss During Year, (1) + (2) + (3) + (4)(h) + (5) + (6)	27,104,451	0.76%
(8) Investment Experience	7,667,124	0.21%
(9) Total (Gain) or Loss During Year (7) + (8)	34,771,575	0.97%

Section 1.5
History of UAAL and Funded Ratio
($'s in 000's)

Valuation Date	Actuarial Accrued Liability (AAL)	Actuarial Value of Assets (AVA)	Funded Ratio (AVA as a % of AAL)	Unfunded Actuarial Accrued Liability (UAAL)
January 1, 2021	3,670,670	1,955,264	53.27%	1,715,406
January 1, 2020	3,583,859	1,883,411	52.55%	1,700,448
January 1, 2019	3,488,955	1,835,792	52.62%	1,653,163
January 1, 2018	3,423,218	1,802,216	52.65%	1,621,002
January 1, 2017	3,338,641	1,752,473	52.49%	1,586,168
January 1, 2016 *	3,267,121	1,743,216	53.36%	1,523,904
January 1, 2015 *	3,186,187	1,855,912	58.25%	1,330,275
January 1, 2014 *	3,105,567	1,892,714	60.95%	1,212,853
January 1, 2013 *	2,867,335	1,702,788	59.39%	1,164,547
January 1, 2012 *	2,808,184	1,662,196	59.19%	1,145,988
January 1, 2011	2,724,191	1,909,967	70.11%	814,224
January 1, 2010	2,588,462	1,936,849	74.83%	651,613

* Actuarial Value of Assets is Fair Market Value

Section 1.6
Solvency Test

Comparative Summary of Accrued Liability and Actuarial Value of Assets

	Accrued Liability for:				Portion of Accrued Liability Covered by Actuarial Value of Assets		
Valuation as of January 1	(1) Active Member Contributions	(2) Retirees, Beneficiaries, TVRs and Disabled	(3) Active Member (Employer Financed Portion)	Actuarial Value of Assets[1]	(1)	(2)	(3)
2021	634,800,523	2,520,628,472	515,241,175	1,955,264,394	100.00 %	52.39 %	0.00 %
2020	588,433,604	2,442,447,997	552,977,413	1,883,410,704	100.00 %	53.02 %	0.00 %
2019	544,522,986	2,370,131,785	574,300,017	1,835,791,586	100.00 %	54.48 %	0.00 %
2018	496,944,601	2,334,464,478	591,809,348	1,802,216,284	100.00 %	55.91 %	0.00 %
2017	449,593,044	2,284,019,564	605,028,706	1,752,472,572	100.00 %	57.04 %	0.00 %

1. Excludes health care assets.

Section 1.7
Projected Actuarial Results

Projection of Funded Status based on Board Approved Contribution Rates

	Board Adopted Contribution Rates			Board Adopted Contributions					
Year	Employee Contribution Percent	Employer Contribution Percent	Total Percent	Employee Contribution	Employer Contribution	Total Contribution	Actuarial Accrued Liability	Actuarial Value of Assets	Funded Ratio
2021	13.324%	20.647%	33.971%	86,610,708	134,218,529	220,829,237	3,670,670,170	1,955,264,394	53.27%
2022	13.324%	20.647%	33.971%	87,544,393	135,665,437	223,209,830	3,725,175,167	2,017,785,361	54.17%
2023	13.324%	20.647%	33.971%	88,783,933	137,586,322	226,370,255	3,777,974,390	2,061,299,799	54.56%
2024	13.324%	20.647%	33.971%	90,268,187	139,886,435	230,154,622	3,826,737,166	2,147,193,740	56.11%
2025	13.324%	20.647%	33.971%	92,329,607	143,080,968	235,410,575	3,871,620,598	2,209,085,814	57.06%
2026	13.324%	20.647%	33.971%	94,721,723	146,787,973	241,509,696	3,912,653,472	2,279,661,231	58.26%
2027	13.324%	20.647%	33.971%	97,148,711	150,549,018	247,697,729	3,949,528,797	2,354,160,569	59.61%
2028	13.324%	20.647%	33.971%	99,788,193	154,639,359	254,427,552	3,982,305,295	2,433,320,312	61.10%
2029	13.324%	20.647%	33.971%	102,590,921	158,982,679	261,573,600	4,011,211,547	2,518,794,965	62.79%
2030	13.324%	20.647%	33.971%	105,474,998	163,452,065	268,927,063	4,036,752,509	2,612,227,712	64.71%
2031	13.324%	20.647%	33.971%	108,686,863	168,429,413	277,116,276	4,059,452,612	2,714,812,789	**66.88%**
2032	13.324%	20.647%	33.971%	112,126,275	173,759,388	285,885,663	4,081,436,740	2,830,316,320	69.35%
2033	13.324%	20.647%	33.971%	115,643,243	179,209,548	294,852,791	4,103,717,413	2,961,181,975	72.16%
2034	13.324%	20.647%	33.971%	119,355,172	184,961,836	304,317,008	4,127,198,377	3,109,477,482	75.34%
2035	13.324%	20.647%	33.971%	123,265,871	191,022,152	314,288,023	4,153,242,597	3,278,103,470	78.93%
2036	13.324%	20.647%	33.971%	127,378,439	197,395,299	324,773,738	4,183,718,544	3,470,383,827	82.95%
2037	13.324%	20.647%	33.971%	131,690,226	204,077,172	335,767,398	4,220,866,142	3,690,055,112	87.42%
2038	13.324%	20.647%	33.971%	136,135,251	210,965,520	347,100,771	4,266,723,960	3,940,887,364	92.36%
2039	13.324%	20.647%	33.971%	140,688,929	218,022,245	358,711,174	4,322,994,127	4,226,291,076	97.76%
2040	13.324%	20.647%	33.971%	145,284,633	225,144,097	370,428,730	4,390,834,849	4,549,501,349	103.61%
2041	13.324%	26.647%	39.971%	149,953,093	299,906,186	449,859,279	4,468,991,243	4,913,357,337	109.94%

Section 2 - Plan Assets

Section 2.1
Statement of Net Plan Assets
($'s in 000's)

	As of December 31	
	2020	2019
ASSETS		
1. Total investments, at fair value	1,933,214	1,755,608
2. Invested securities lending cash collateral	46,060	53,594
3. Receivables:		
a. Employer contributions	13,693	12,217
b. Employee contributions	8,863	8,095
c. Securities sold, but not received	3,507	136,178
d. Accrued interest and dividends	1,113	1,796
e. Other	1,384	1,749
4. Total assets	2,007,834	1,969,237
LIABILITIES		
1. Payable upon return of securities	46,061	53,595
2. Accounts payable	2,886	3,608
3. Other payables	94	101
4. Securities purchased, but not paid	17,627	21,467
5. Total liabilities	66,668	78,771
Net assets held in trust for Plan benefits	**1,941,166**	**1,890,466**

Section 2.2
Changes in Net Plan Assets
($'s in 000's)

	As of December 31	
	2020	2019
ADDITIONS		
1. Net investment (loss) income	$ 123,612	$ 263,202
2. Employer contributions	135,832	121,668
3. Employee contributions	87,926	81,298
4. Other income	-	-
Total additions	$ 347,370	$ 466,168
DEDUCTIONS		
1. Benefit payments	$ 289,202	$ 281,004
2. Contribution refunds, including interest	5,151	7,110
3. Administrative expenses	2,317	2,815
Total liabilities	$ 296,670	$ 290,929
NET ASSETS HELD IN TRUST FOR PLAN BENEFITS		
1. Beginning of year	$ 1,890,466	$ 1,715,227
2. Net (decrease) increase	50,700	175,239
End of year	**$ 1,941,166**	**$ 1,890,466**

Section 2.3
Actuarial Value of Assets

Development of Actuarial Value of Assets	8.25%	Amount
1. Actuarial Value of Assets as of January 1, 2020		$ 1,883,410,704
2. Unrecognized Return as of January 1, 2020		7,055,468
3. Fair Value of Assets as of January 1, 2020		$ 1,890,466,172
4. Contributions		
a. Member (includes purchased service)		$ 87,925,661
b. Employer		135,831,883
c. Miscellaneous contributions		-
d. Total		$ 223,757,544
5. Distributions		
a. Benefit payments		$ 289,201,856
b. Refund of contributions		5,151,217
c. Administrative expenses		2,316,997
d. Total		$ 296,670,070
6. Expected Return at 8.25% on		
a. Item 1.		$ 155,381,383
b. Item 2.		582,076
c. Item 4.d.		9,047,100
d. Item 5.d.		11,995,143
e. Total [a. + b. + c. – d.]		$ 153,015,416
7. Actual Return on Fair Value for Fiscal Year, Net of Investment Expenses		$ 123,612,775
8. Return to be Spread for Fiscal Year (7. – 6.e) *		$ (29,402,641)
9. Total Fair Value of Assets as of January 1, 2021		$ 1,941,166,421
10. Return to be Spread		

Fiscal Year	Return to be Spread	Unrecognized Percent	Unrecognized Return
2020	$ (29,402,641)	80%	$ (23,522,112)
2019	125,251,315	60%	75,150,789
2018	(211,667,812)	40%	(84,667,125)
2017	94,702,377	20%	18,940,475
2016	(20,129,242)	0%	-
		Total	$ (14,097,973)

11. Actuarial Value of Assets as of January 1, 2021 (9. – 10.)	**$**	**1,955,264,394**
12. Recognized Rate of Return for the Year on Actuarial Value of Assets		**7.84%**
13. Rate of Return for the Year on Fair Value of Assets (reported by investment consultant-net of inv. exp.)		**7.60%**

* Annual Return to be Spread calculation based on assumed 8.25% investment return which includes an assumption that all expenses and revenues are on average paid at mid-year

Section 2.4
Historical Asset Rate of Return

Year Ending December 31	Fair Value Annual Recognized Rate of Return [1]	Actuarial Value Annual Recognized Rate of Return
2020	7.60%	7.84%
2019	15.70%	7.57%
2018	-3.53%	6.99%
2017	14.40%	9.10%
2016	6.80%	8.00%
2015	-0.20%	N/A

1 As reported by the Plan.

Section 2.5
Forecast of Expected Benefit Payments

Year Ending December 31	Active Members	Inactive Members	Total Payments
2021	14,629,962	293,671,463	308,301,425
2022	30,522,470	285,269,510	315,791,980
2023	45,714,896	278,104,312	323,819,208
2024	60,503,180	270,869,346	331,372,526
2025	75,424,140	263,224,884	338,649,024
2026	90,506,296	255,235,216	345,741,512
2027	105,374,077	247,018,568	352,392,645
2028	119,677,457	238,522,289	358,199,746
2029	133,430,988	229,773,260	363,204,248
2030	146,872,560	220,890,232	367,762,792
2031	159,572,007	211,778,097	371,350,104
2032	171,597,718	202,460,993	374,058,711
2033	183,078,834	192,989,672	376,068,506
2034	193,557,952	183,453,430	377,011,382
2035	202,757,024	173,906,037	376,663,061
2036	210,599,922	164,304,072	374,903,994
2037	217,135,298	154,730,050	371,865,348
2038	222,660,559	145,283,561	367,944,120
2039	227,279,689	135,847,771	363,127,460
2040	231,207,798	126,589,153	357,796,951
2041	234,438,369	117,506,896	351,945,265
2042	237,225,303	108,669,795	345,895,098
2043	239,341,448	100,143,863	339,485,311
2044	241,134,871	91,910,232	333,045,103
2045	242,494,134	84,018,160	326,512,294
2046	243,554,029	76,451,170	320,005,199
2047	244,019,697	69,247,074	313,266,771
2048	244,035,628	62,439,970	306,475,598
2049	243,444,451	56,057,599	299,502,050
2050	242,757,260	50,088,389	292,845,649
2051	241,460,531	44,560,315	286,020,846
2052	239,513,675	39,428,525	278,942,200
2053	236,940,556	34,702,246	271,642,802
2054	233,584,432	30,380,917	263,965,349
2055	229,734,600	26,452,871	256,187,471
2056	224,739,303	22,903,912	247,643,215
2057	218,794,431	19,717,508	238,511,939
2058	212,025,938	16,875,303	228,901,241
2059	204,426,163	14,356,872	218,783,035
2060	196,206,433	12,140,268	208,346,701
2061	187,526,761	10,202,408	197,729,169
2062	178,501,828	8,519,637	187,021,465
2063	169,232,375	7,068,655	176,301,030
2064	159,888,812	5,826,633	165,715,445
2065	150,575,331	4,771,514	155,346,845
2066	141,305,843	3,882,279	145,188,122
2067	132,172,091	3,138,949	135,311,040
2068	123,223,269	2,522,616	125,745,885
2069	114,493,095	2,015,744	116,508,839
2070	106,020,190	1,602,236	107,622,426
2071	97,834,219	1,267,526	99,101,745
2072	89,954,320	998,641	90,952,961
2073	82,398,106	784,101	83,182,207

Section 2.5
Forecast of Expected Benefit Payments, continued

Year Ending December 31	Active Members	Inactive Members	Total Payments
2074	75,182,073	613,940	75,796,013
2075	68,315,010	479,658	68,794,668
2076	61,802,842	374,139	62,176,981
2077	55,650,446	291,454	55,941,900
2078	49,860,587	226,764	50,087,351
2079	44,435,481	176,195	44,611,676
2080	39,376,431	136,692	39,513,123
2081	34,683,249	105,848	34,789,097
2082	30,353,489	81,786	30,435,275
2083	26,383,103	63,036	26,446,139
2084	22,765,533	48,460	22,813,993
2085	19,492,105	37,168	19,529,273
2086	16,550,772	28,464	16,579,236
2087	13,927,209	21,789	13,948,998
2088	11,605,898	16,694	11,622,592
2089	9,570,046	12,816	9,582,862
2090	7,802,036	9,864	7,811,900
2091	6,283,208	7,609	6,290,817
2092	4,993,832	5,874	4,999,706
2093	3,913,527	4,531	3,918,058
2094	3,021,444	3,483	3,024,927
2095	2,296,178	2,657	2,298,835
2096	1,716,269	2,002	1,718,271
2097	1,260,734	1,485	1,262,219
2098	909,533	1,080	910,613
2099	643,989	766	644,755
2100	447,261	527	447,788
2101	304,551	352	304,903
2102	203,228	226	203,454
2103	132,852	140	132,992
2104	85,069	83	85,152
2105	53,351	47	53,398
2106	32,758	26	32,784
2107	19,687	14	19,701
2108	11,583	7	11,590
2109	6,673	4	6,677
2110	3,760	2	3,762
2111	2,069	1	2,070
2112	1,114	0	1,114
2113	584	0	584
2114	297	0	297
2115	147	0	147
2116	70	0	70
2117	32	0	32
2118	14	0	14

Note: Forecast based on the present members without assumption about replacement members

Section 3 - Accounting Information

Section 3.1
Actuarial Methods and Assumptions for GASB 67/68 Disclosure Purposes

The total pension liability as of December 31, 2020 was determined by rolling forward the total pension liability as of January 1, 2020 to December 31, 2020 using the following actuarial methods and assumptions, applied to all periods included in the measurement. All other assumptions such as retirement rates, termination rates, and disability rates used to determine the total pension liability are set forth in Section 6 - Basis of the Actuarial Valuation.

Valuation Date:	January 1, 2020
Actuarial Cost Method:	Entry Age Normal – Level Percentage of Pay
Amortization Method:	For pension expense; the difference between expected and actual liability experience and changes of assumptions are amortized over the average of the expected remaining service lives of all members. The difference between projected and actual earnings is amortized over a closed period of five years.
Mortality:	Active members and *Healthy pensioners,* including beneficiaries prior to their associated member's death*:* The SOA Public Mortality General Below Median generational with Improvement Scale MP-2018 with an adjustment for female participants. *Disabled pensioners:* The SOA Public Disability Mortality General Below Median generational with Improvement Scale MP-2018. Survivors*:* The SOA Public Survivor Mortality General Below Median generational with Improvement Scale MP-2018.
Experience Study:	The actuarial assumptions used were based on the results of an actuarial experience study for the period January 1, 2013 through December 31, 2017, which have been adopted by the Board.

Section 3.2
Schedule of Expected Changes in Net Pension Liability as of December 31, 2020

The GASB Statement No. 67 Change in Net Pension Liability

Schedule of Changes in Net Pension Liability		
Fiscal Year Ending	**Dec. 31, 2020**	**Dec. 31, 2019**
Total Pension Liability		
Service Cost	$ 54,560,054	$ 53,967,282
Interest	294,244,949	286,687,425
Changes of Benefit Terms	-	-
Difference between Expected and Actual Experience	62,819,793	41,530,311
Change of Assumptions	-	-
Benefit Payments, including Refund of Member Contributions	(294,353,073)	(288,113,446)
Net Change in Total Pension Liability	117,271,723	94,071,572
Total Pension Liability - Beginning of Year	$ 3,656,305,518	$ 3,562,233,946
Total Pension Liability - End of Year	$ 3,773,577,241	$ 3,656,305,518
Plan Fiduciary Net Position		
Employer Contributions	$ 135,831,883	$ 121,667,942
Member Contributions	87,925,661	81,298,269
Net Investment Income	123,612,775	263,201,019
Benefit Payments, including Refund of Member Contributions	(294,353,073)	(288,113,446)
Administrative Expenses	(2,316,997)	(2,814,677)
Other	-	-
Net Change in Plan Fiduciary Net Position	50,700,249	175,239,107
Plan Fiduciary Net Position - Beginning of Year	$ 1,890,466,172	$ 1,715,227,065
Plan Fiduciary Net Position - End of Year	$ 1,941,166,421	$ 1,890,466,172

Section 3.3
Net Pension Liability (Asset)

The GASB Statement No. 67 Net Pension Liability

Net Pension Liability (Asset)		
Valuation Date	**Dec. 31, 2020**	**Dec. 31, 2019**
Total Pension Liability	$ 3,773,577,241	$ 3,656,305,518
Plan Fiduciary Net Position	1,941,166,421	1,890,466,172
Net Pension Liability (Asset)	$ 1,832,410,820	$ 1,765,839,346
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability (Asset)	51.44%	51.70%

Section 3.4
Sensitivity

The GASB Statement No. 67 Sensitivity of Net Pension Liability

Sensitivity of the Net Pension Liability to Changes in the Discount Rate			
December 31, 2020	**1% Decrease**	**Current**	**1% Increase**
Discount Rate	7.25%	8.25%	9.25%
Net Pension Liability (Asset)	$ 2,190,522,904	$ 1,832,410,820	$ 1,525,209,832

The discount rate used to measure the total pension liability was 8.25%. The projection of cash flows used to determine the discount rate assumed that the Plan's contributions will continue to follow the current funding policy. Based on those assumptions, the Plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. In the event of benefit payments not covered by the Plan's fiduciary net position, a municipal bond rate of 1.93% would be used to discount the benefit payments not covered by the Plan's fiduciary net position. The 1.93% rate equals the S&P Municipal Bond 20-Year High Grade Index at December 31, 2020. The rate was 3.26% as of December 31, 2019. Please see the supporting exhibits for additional detail.

Long-term expected rate of return. The long-term expected rate of return on system investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of system investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of long-term geometric rates of return for each major asset class included in the system's target asset allocation as of December 31, 2020 are summarized below:

Asset Class	Long-Term Expected Rate of Return
Inflation	2.08%
Fixed Income	3.60%
Domestic Equity	7.53%
International Equity	6.32%
Private Equity	9.23%
Real Estate	7.22%
Hedge Funds	6.11%
Infrastructure	6.19%

Section 3.5
Pension Expense

The GASB Statement No. 68 Pension Expense

Pension Expense		
Measurement Year Ending	**Dec. 31, 2020**	**Dec. 31, 2019**
Service Cost	$ 54,560,054	$ 53,967,282
Interest	294,244,949	286,687,425
Projected Earnings on Plan Investments	(153,015,416)	(137,949,704)
Member Contributions	(87,925,661)	(81,298,269)
Administrative Expense	2,316,997	2,814,677
Current Period:		
Changes of Benefit Terms	-	-
Changes of Assumptions	-	-
Difference between Expected and Actual Experience	15,321,901	10,055,766
Difference between Expected and Actual Investment Earnings	5,880,528	(25,050,263)
Recognition of Prior Years:		
Deferred Inflows	(49,547,359)	(24,497,096)
Deferred Outflows	66,807,589	92,107,232
Others	-	-
Total Pension Expense	$ 148,643,582	$ 176,837,050

Section 3.6
Supporting Exhibits

Schedule of Deferred Inflows and Outflows

Amortization of the Difference Between Expected and Actual Experience

Measurement Date	2015	2016	2017	2018	2019	2020	Outflows	Inflows	Total
Amount Established	$ 13,082,408	$ 51,517,655	$ 13,679,323	$ 7,455,309	$ 41,530,311	$ 62,819,793			
Recognition Period	4.52	4.49	4.42	4.45	4.13	4.10			
Amount Recognized in FY									
2015	$ 2,894,338						$ 2,894,338	$ -	$ 2,894,338
2016	2,894,338	$ 11,473,865					14,368,203	-	14,368,203
2017	2,894,338	11,473,865	$ 3,094,869				17,463,072	-	17,463,072
2018	2,894,338	11,473,865	3,094,869	$ 1,675,350			19,138,422	-	19,138,422
2019	1,505,056	11,473,865	3,094,869	1,675,350	$ 10,055,766		27,804,906	-	27,804,906
2020	-	5,622,195	3,094,869	1,675,350	10,055,766	$ 15,321,901	35,770,081	-	35,770,081
2021	-	-	1,299,847	1,675,350	10,055,766	15,321,901	28,352,864	-	28,352,864
2022	-	-	-	753,909	10,055,766	15,321,901	26,131,576	-	26,131,576
2023	-	-	-	-	1,307,247	15,321,901	16,629,148	-	16,629,148
2024	-	-	-	-	-	1,532,189	1,532,189	-	1,532,189
Deferred Balance at 12/31									
2015	$ 10,188,070						$ 10,188,070	$ -	$ 10,188,070
2016	7,293,732	$ 40,043,790					47,337,522	-	47,337,522
2017	4,399,394	28,569,925	$ 10,584,454				43,553,773	-	43,553,773
2018	1,505,056	17,096,060	7,489,585	$ 5,779,959			31,870,660	-	31,870,660
2019	-	5,622,195	4,394,716	4,104,609	$ 31,474,545		45,596,065	-	45,596,065
2020	-	-	1,299,847	2,429,259	21,418,779	$ 47,497,892	72,645,777	-	72,645,777
2021	-	-	-	753,909	11,363,013	32,175,991	44,292,913	-	44,292,913
2022	-	-	-	-	1,307,247	16,854,090	18,161,337	-	18,161,337
2023	-	-	-	-	-	1,532,189	1,532,189	-	1,532,189

Amortization of Changes in Assumptions

Measurement Date	2015	2016	2017	2018	2019	2020	Outflows	Inflows	Total
Amount Established	$ -	$ -	$ -	$ (24,726,963)	$ -	$ -			
Recognition Period				4.45					
Amount Recognized in FY									
2015	$ -						$ -	$ -	$ -
2016	-	$ -					-	-	-
2017	-	-	$ -				-	-	-
2018	-	-	-	$ (5,556,621)			-	(5,556,621)	(5,556,621)
2019	-	-	-	(5,556,621)	$ -		-	(5,556,621)	(5,556,621)
2020	-	-	-	(5,556,621)	-	$ -	-	(5,556,621)	(5,556,621)
2021	-	-	-	(5,556,621)	-	-	-	(5,556,621)	(5,556,621)
2022	-	-	-	(2,500,479)	-	-	-	(2,500,479)	(2,500,479)
2023	-	-	-	-	-	-	-	-	-
2024	-	-	-	-	-	-	-	-	-
Deferred Balance at 12/31									
2015	$ -						$ -	$ -	$ -
2016	-	$ -					-	-	-
2017	-	-	$ -				-	-	-
2018	-	-	-	$ (19,170,342)			-	(19,170,342)	(19,170,342)
2019	-	-	-	(13,613,721)	$ -		-	(13,613,721)	(13,613,721)
2020	-	-	-	(8,057,100)	-	$ -	-	(8,057,100)	(8,057,100)
2021	-	-	-	(2,500,479)	-	-	-	(2,500,479)	(2,500,479)
2022	-	-	-	-	-	-	-	-	-
2023	-	-	-	-	-	-	-	-	-

Amortization of the Difference Between Projected and Actual Earnings

Measurement Date	2015	2016	2017	2018	2019	2020	Outflows	Inflows	Total
Amount Established	$ 139,993,404	$ 20,129,242	$ (94,702,377)	$ 211,667,813	$ (125,251,315)	$ 29,402,641			
Recognition Period	5.00	5.00	5.00	5.00	5.00	5.00			
Amount Recognized in FY									
2015	$ 27,998,681						$ 27,998,681	$ -	$ 27,998,681
2016	27,998,681	$ 4,025,849					32,024,530	-	32,024,530
2017	27,998,681	4,025,849	$ (18,940,475)				32,024,530	(18,940,475)	13,084,055
2018	27,998,681	4,025,849	(18,940,475)	$ 42,333,563			74,358,093	(18,940,475)	55,417,618
2019	27,998,680	4,025,849	(18,940,475)	42,333,563	$ (25,050,263)		74,358,092	(43,990,738)	30,367,354
2020	-	4,025,846	(18,940,475)	42,333,563	(25,050,263)	$ 5,880,528	52,239,937	(43,990,738)	8,249,199
2021	-	-	(18,940,477)	42,333,563	(25,050,263)	5,880,528	48,214,091	(43,990,740)	4,223,351
2022	-	-	-	42,333,561	(25,050,263)	5,880,528	48,214,089	(25,050,263)	23,163,826
2023	-	-	-	-	(25,050,263)	5,880,528	5,880,528	(25,050,263)	(19,169,735)
2024	-	-	-	-	-	5,880,529	5,880,529	-	5,880,529
Deferred Balance at 12/31									
2015	$ 111,994,723						$ 111,994,723	$ -	$ 111,994,723
2016	83,996,042	$ 16,103,393					100,099,435	-	100,099,435
2017	55,997,361	12,077,544	$ (75,761,902)				68,074,905	(75,761,902)	(7,686,997)
2018	27,998,680	8,051,695	(56,821,427)	$ 169,334,250			205,384,625	(56,821,427)	148,563,198
2019	-	4,025,846	(37,880,952)	127,000,687	$ (100,201,052)		131,026,533	(138,082,004)	(7,055,471)
2020	-	-	(18,940,477)	84,667,124	(75,150,789)	$ 23,522,113	108,189,237	(94,091,266)	14,097,971
2021	-	-	-	42,333,561	(50,100,526)	17,641,585	59,975,146	(50,100,526)	9,874,620
2022	-	-	-	-	(25,050,263)	11,761,057	11,761,057	(25,050,263)	(13,289,206)
2023	-	-	-	-	-	5,880,529	5,880,529	-	5,880,529

Schedule of CTA Contributions ($'s in 000's)

	2020	2019	2018	2017	2016	2015	2014	2013	2012	2011
Employer Portion of Required Contribution on a statutory basis	$ 132,232	$ 116,367	$ 112,265	$ 106,662	$ 82,001	$ 81,731	$ 80,488	$ 76,899	$ 61,982	$ 55,976
Actual Employer Contributions	$ 135,832	$ 121,668	$ 117,115	$ 104,523	$ 83,855	$ 82,800	$ 82,268	$ 79,518	$ 62,788	$ 60,318
Contribution deficiency (excess)	$ (3,600)	$ (5,301)	$ (4,850)	$ 2,139	$ (1,854)	$ (1,069)	$ (1,780)	$ (2,619)	$ (806)	$ (4,342)
Covered payroll	$ 640,442	$ 645,799	$ 623,037	$ 595,047	$ 575,444	$ 573,548	$ 564,827	$ 550,616	$ 548,515	$ 541,354
Contributions as a percentage of covered payroll	20.65%	18.02%	18.02%	17.93%	14.25%	14.25%	14.25%	13.97%	11.30%	10.34%

Notes to Schedule -

Valuation Date: Actuarially determined contribution rates are calculated as of January 1, one year prior to the end of the fiscal year in which contributions are reported

Other information:

1. The demographic assumptions were updated in 2019 to bring the assumptions more in line with actual plan experience.

Section 3.6
Supporting Exhibits, continued

Projection of Fiduciary Net Position

Year	Projected Beginning Fiduciary Net Position (a)	Projected Total Contributions* (b)	Projected Benefit Payments (c)	Projected Administrative Expense (d)	Projected Investment Earnings (e)	Projected Ending Fiduciary Net Position (f) = (a) + (b) - (c) - (d) + (e)
2021	1,941,166,421	220,827,851	308,301,425	2,300,000	156,516,451	2,007,909,297
2022	2,007,909,297	220,177,292	315,810,682	2,346,000	161,690,955	2,071,620,862
2023	2,071,620,862	220,190,292	323,854,985	2,392,920	166,620,536	2,132,183,785
2024	2,132,183,785	220,454,836	331,423,582	2,440,778	171,319,720	2,190,093,980
2025	2,190,093,980	221,679,014	338,713,455	2,489,594	175,850,086	2,246,420,031
2026	2,246,420,031	223,513,129	345,817,188	2,539,386	180,281,908	2,301,858,494
2027	2,301,858,494	225,204,909	352,477,620	2,590,174	184,652,631	2,356,648,240
2028	2,356,648,240	227,362,907	358,292,273	2,641,977	189,022,842	2,412,099,739
2029	2,412,099,739	229,858,382	363,302,484	2,694,817	193,493,777	2,469,454,598
2030	2,469,454,598	232,425,199	367,864,919	2,748,713	198,142,686	2,529,408,851
2031	2,529,408,851	235,833,062	371,454,357	2,803,687	203,079,348	2,594,063,217
2032	2,594,063,217	239,905,394	374,163,388	2,859,761	208,466,188	2,665,411,650
2033	2,665,411,650	244,138,175	376,172,099	2,916,956	214,440,046	2,744,900,816
2034	2,744,900,816	248,937,020	377,112,656	2,975,295	221,151,544	2,834,901,429
2035	2,834,901,429	254,335,061	376,760,894	3,034,801	228,806,668	2,938,247,462
2036	2,938,247,462	260,363,700	374,997,408	3,095,497	237,645,318	3,058,163,575
2037	3,058,163,575	267,036,596	371,953,571	3,157,407	247,928,767	3,198,017,959
2038	3,198,017,959	274,144,420	368,026,576	3,220,555	259,910,366	3,360,825,614
2039	3,360,825,614	281,583,307	363,203,779	3,284,966	273,835,165	3,549,755,341
2040	3,549,755,341	289,311,763	357,866,937	3,350,666	289,947,476	3,767,796,977
2041	3,767,796,977	297,317,419	352,008,859	3,417,679	308,493,748	4,018,181,606
2042	4,018,181,606	305,601,666	345,952,354	3,486,033	329,727,550	4,304,072,435
2043	4,304,072,435	314,112,656	339,536,385	3,555,753	353,914,260	4,629,007,213
2044	4,629,007,213	322,970,651	333,090,235	3,626,868	381,337,290	4,996,598,051
2045	4,996,598,051	332,204,236	326,551,800	3,699,406	412,298,306	5,410,849,387
2046	5,410,849,387	341,795,939	320,039,457	3,773,394	447,122,177	5,875,954,652
2047	5,875,954,652	351,796,334	313,296,214	3,848,862	486,167,300	6,396,773,210
2048	6,396,773,210	362,163,092	306,500,687	3,925,839	529,825,634	6,978,335,410
2049	6,978,335,410	372,899,484	299,523,264	4,004,356	578,517,557	7,626,224,831
2050	7,626,224,831	383,898,634	292,863,468	4,084,443	632,679,193	8,345,854,747
2051	8,345,854,747	395,199,693	286,035,740	4,166,132	692,778,351	9,143,630,920
2052	9,143,630,920	406,871,618	278,954,615	4,249,454	759,349,751	10,026,648,220
2053	10,026,648,220	418,768,885	271,653,144	4,334,443	832,971,497	11,002,401,015
2054	11,002,401,015	431,117,864	263,973,985	4,421,132	914,277,388	12,079,401,150
2055	12,079,401,150	443,959,012	256,194,723	4,509,555	1,003,960,060	13,266,615,944
2056	13,266,615,944	457,316,100	247,649,357	4,599,746	1,102,787,207	14,574,470,148
2057	14,574,470,148	471,229,497	238,517,202	4,691,741	1,211,613,252	16,014,103,954

*The contributions displayed contain both employer and employee contributions.

Since the projected investment earnings become greater than the projected benefit payments including administrative expenses, the Plan's fiduciary net position is sufficient to cover all the projected future benefit payments of current Plan members.

Actuarial Present Value of Projected Benefit Payments

					8.25%	1.93%	8.25%
Year	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	Funded Portion of Projected Benefit Payments	Unfunded Portion of Projected Benefit Payments	Present Value of Funded Benefit Payments	Present Value of Unfunded Benefit Payments	Present Value of Benefit Payments Using Single Discount Rate
2021	1,941,166,421	308,301,425	308,301,425	-	284,805,012	-	284,805,012
2022	2,007,909,297	315,810,682	315,810,682	-	269,507,593	-	269,507,593
2023	2,071,620,862	323,854,985	323,854,985	-	255,309,439	-	255,309,439
2024	2,132,183,785	331,423,582	331,423,582	-	241,363,607	-	241,363,607
2025	2,190,093,980	338,713,455	338,713,455	-	227,873,028	-	227,873,028
2026	2,246,420,031	345,817,188	345,817,188	-	214,921,145	-	214,921,145
2027	2,301,858,494	352,477,620	352,477,620	-	202,365,378	-	202,365,378
2028	2,356,648,240	358,292,273	358,292,273	-	190,026,514	-	190,026,514
2029	2,412,099,739	363,302,484	363,302,484	-	177,998,860	-	177,998,860
2030	2,469,454,598	367,864,919	367,864,919	-	166,498,116	-	166,498,116
2031	2,529,408,851	371,454,357	371,454,357	-	155,309,672	-	155,309,672
2032	2,594,063,217	374,163,388	374,163,388	-	144,519,493	-	144,519,493
2033	2,665,411,650	376,172,099	376,172,099	-	134,222,034	-	134,222,034
2034	2,744,900,816	377,112,656	377,112,656	-	124,302,664	-	124,302,664
2035	2,834,901,429	376,760,894	376,760,894	-	114,722,141	-	114,722,141
2036	2,938,247,462	374,997,408	374,997,408	-	105,482,833	-	105,482,833
2037	3,058,163,575	371,953,571	371,953,571	-	96,652,779	-	96,652,779
2038	3,198,017,959	368,026,576	368,026,576	-	88,343,966	-	88,343,966
2039	3,360,825,614	363,203,779	363,203,779	-	80,541,583	-	80,541,583
2040	3,549,755,341	357,866,937	357,866,937	-	73,310,043	-	73,310,043
2041	3,767,796,977	352,008,859	352,008,859	-	66,614,318	-	66,614,318
2042	4,018,181,606	345,952,354	345,952,354	-	60,478,691	-	60,478,691
2043	4,304,072,435	339,536,385	339,536,385	-	54,833,315	-	54,833,315
2044	4,629,007,213	333,090,235	333,090,235	-	49,692,653	-	49,692,653
2045	4,996,598,051	326,551,800	326,551,800	-	45,004,346	-	45,004,346
2046	5,410,849,387	320,039,457	320,039,457	-	40,745,345	-	40,745,345
2047	5,875,954,652	313,296,214	313,296,214	-	36,846,964	-	36,846,964
2048	6,396,773,210	306,500,687	306,500,687	-	33,300,451	-	33,300,451
2049	6,978,335,410	299,523,264	299,523,264	-	30,062,238	-	30,062,238
2050	7,626,224,831	292,863,468	292,863,468	-	27,153,640	-	27,153,640
2051	8,345,854,747	286,035,740	286,035,740	-	24,499,389	-	24,499,389
2052	9,143,630,920	278,954,615	278,954,615	-	22,071,944	-	22,071,944
2053	10,026,648,220	271,653,144	271,653,144	-	19,856,096	-	19,856,096
2054	11,002,401,015	263,973,985	263,973,985	-	17,824,295	-	17,824,295
2055	12,079,401,150	256,194,723	256,194,723	-	15,980,616	-	15,980,616
2056	13,266,615,944	247,649,357	247,649,357	-	14,270,284	-	14,270,284
2057	14,574,470,148	238,517,202	238,517,202	-	12,696,594	-	12,696,594

Since the projected investment earnings become greater than the projected benefit payments including administrative expenses, the Plan's fiduciary net position is sufficient to cover all the projected future benefit payments of current Plan members.

Section 4 - Actuarial Funding Projections

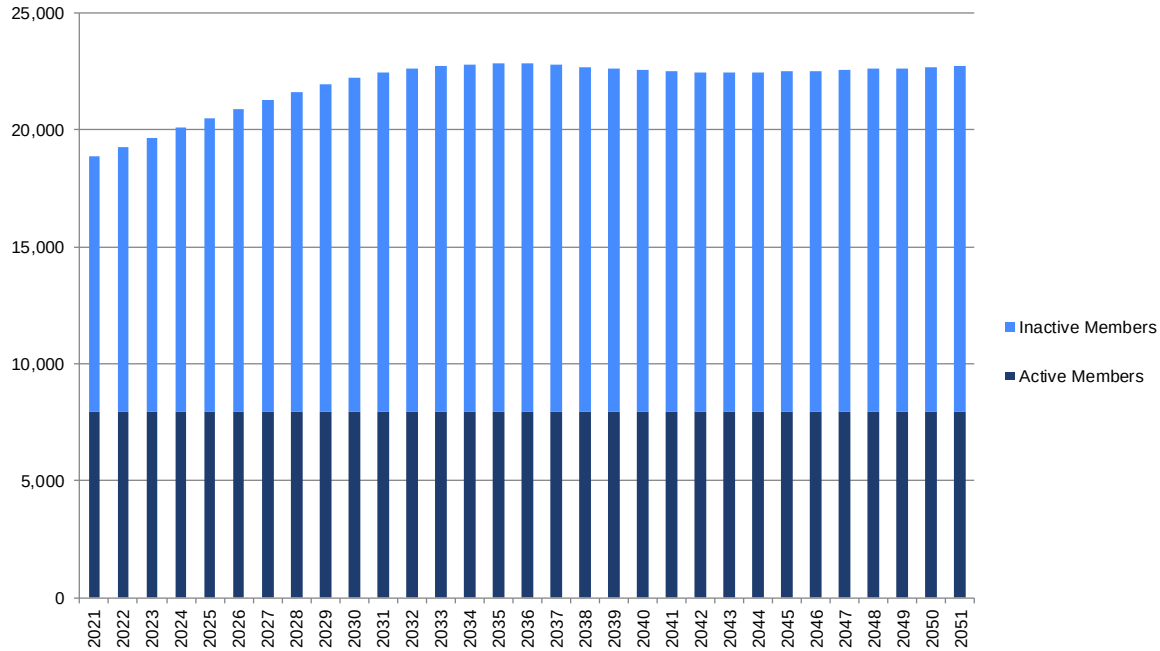
Section 4.1
Projection Assumptions and Methods

Key Assumptions

- 8.25% investment return on the Fair Value of Assets in all future years.
- The Actuarial Value of Assets is based on a five-year smoothing method.
- Actuarial assumptions and methods as described in Section 6. All future demographic experience is assumed to be exactly realized.
- The statutory contribution is contributed each year.
- Projections assume a 0% increase in the total active member population. All new future members are expected to enter the plan after 12 months of continuous service and contribution rates are determined as a percent of total payroll.

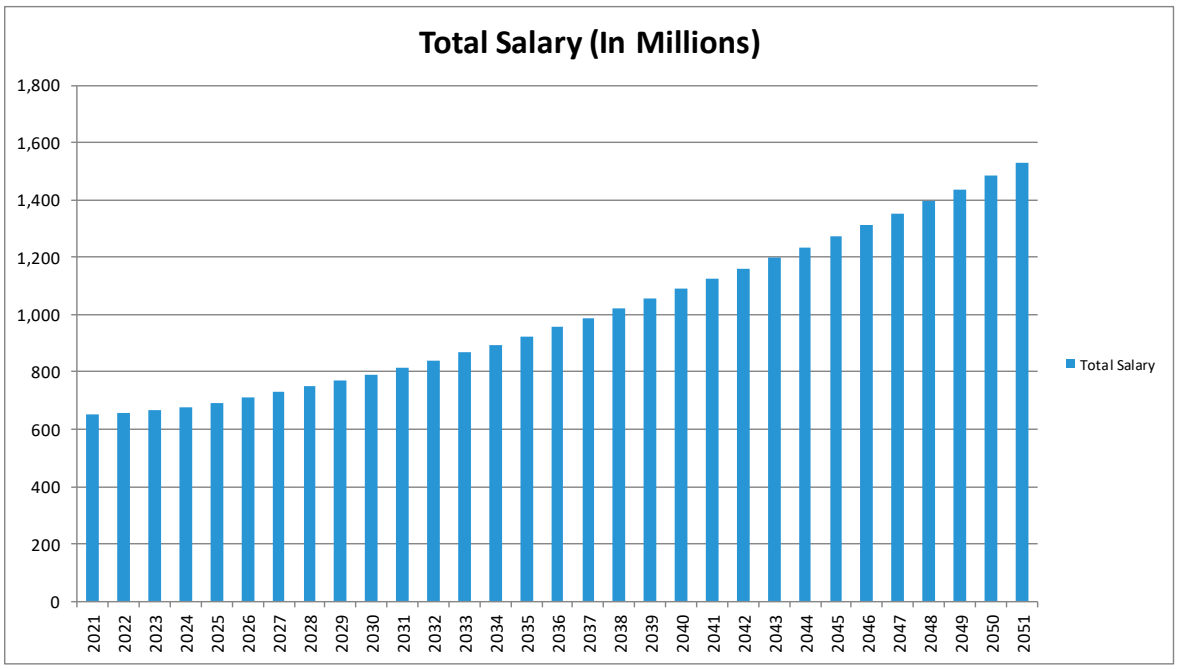
Section 4.2
Membership Projection

Projected Member Count

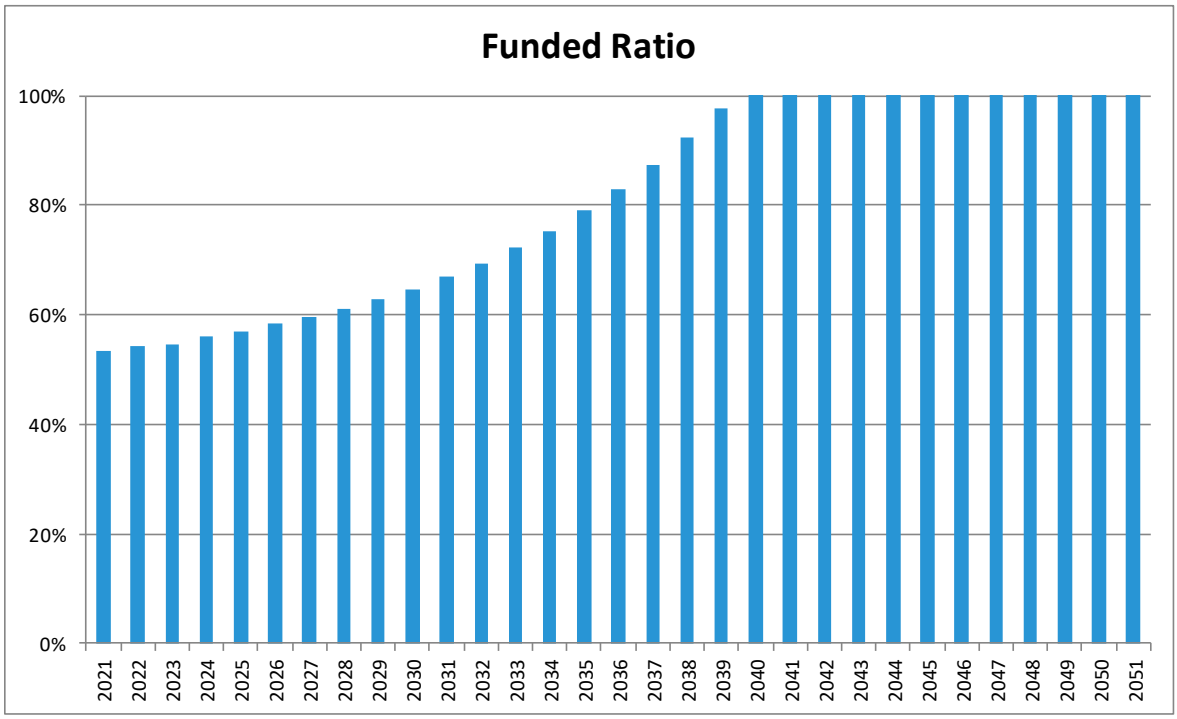


Section 4.2
Membership Projection, continued

Projected Current and New Member Payroll



Section 4.3
Projection of Funded Status



Section 5 - Member Data

Section 5.1
Summary of Membership Data as of January 1, 2021
(Annual Salaries and Annual Benefits $ in 000's)

Item	Male	Female	Total
Number of Members [1]	5,500	2,578	8,078
Annual Salaries [2]	$471,549	$178,499	$650,048
Average Age [1]	48.82	47.27	48.32
Average Service [1]	13.03	11.36	12.49

Terminated Vested Employees

Item	Male	Female	Total
Number of Members	111	49	160
Annual Accrued Benefit	$2,892	$1,281	$4,173
Average Age	56.26	56.94	56.47

Retirees and Beneficiaries

Item	Male	Female	Total
Number of Members	6,584	2,729	9,313
Annual Retirement Benefit	$210,430	$59,004	$269,434
Average Age	72.50	72.12	72.39

Disability Allowances

Item	Male	Female	Total
Number of Members	697	606	1,303
Annual Disability Benefit	$13,913	$10,276	$24,189
Average Age	65.14	63.27	64.27

1 Active statistics include all participants who are actively employed, 18 participants who are on leave and 106 participants who have opted out of participating in the Plan and are only entitled to a return of their contributions.

2 The salary information for the 106 participants who have opted out of participating in the Plan is not included.

Section 5.2
Age and Service Distribution of Active Members as of January 1, 2021

Number of Participants

	Years of Service									
Age	**Under 5**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**Over 40**	**Total**
Under 25	25	-	-	-	-	-	-	-	-	25
25-29	280	32	1	-	-	-	-	-	-	313
30-34	450	203	26	1	-	-	-	-	-	680
35-39	328	269	172	69	3	-	-	-	-	841
40-44	344	267	171	230	103	5	-	-	-	1,120
45-49	236	271	168	230	284	70	2	-	-	1,261
50-54	208	249	167	274	335	209	45	1	-	1,488
55-59	133	206	126	211	315	176	83	9	-	1,259
60-64	70	150	97	135	206	126	50	11	6	851
Over 65	18	50	26	34	56	23	17	5	11	240
Total	2,092	1,697	954	1,184	1,302	609	197	26	17	8,078

Section 5.3
Retirement Retiree and Beneficiary Data as of January 1, 2021

Number and Average Annual Allowance

Age Last Birthday	Number	Annual Allowance	Average Allowance
Retired Annuitants			
Under 50	19	$997,265	$52,488
50-54	161	$7,603,586	$47,227
55-59	491	$22,128,544	$45,068
60-64	920	$37,217,798	$40,454
65-69	1610	$55,243,049	$34,312
70-74	2011	$59,751,691	$29,712
75-79	1545	$41,381,249	$26,784
Over 79	1351	$29,699,295	$21,983
Total	8,108	$254,022,477	$31,330
Surviving Spouses			
Under 50	5	$95,705	$19,141
50-54	26	$396,469	$15,249
55-59	74	$942,351	$12,735
60-64	130	$1,725,790	$13,275
65-69	149	$2,373,362	$15,929
70-74	239	$3,383,790	$14,158
75-79	222	$2,868,991	$12,923
Over 79	360	$3,625,484	$10,071
Total	1,205	$15,411,942	$12,790
Disability Allowances			
Under 50	109	$1,955,952	$17,945
50-54	151	$3,054,732	$20,230
55-59	212	$4,639,468	$21,884
60-64	232	$5,124,420	$22,088
65-69	194	$3,747,201	$19,315
70-74	194	$2,876,558	$14,828
75-79	116	$1,620,471	$13,970
Over 79	95	$1,170,521	$12,321
Total	1,303	$24,189,323	$18,564

Section 5.4
Inactive Vested Employee Data as of January 1, 2021

Number and Average Accrued Benefit

Age Last Birthday	Number	Annual Accrued Benefit	Average Accrued Benefit
Terminated Vested [1]			
Under 35	3	$41,293	$20,647
35-39	1	$25,680	$25,680
40-44	10	$189,102	$21,011
45-49	13	$297,159	$22,858
50-54	29	$633,076	$25,323
55-59	43	$1,228,368	$28,567
60-64	55	$1,680,902	$30,562
65-69	5	$65,522	$13,104
Over 70	1	$12,574	$12,574
Total	160	$4,173,676	$27,102

1 Number of deferred vested members includes 6 in 2021 who were pending cashouts after the valuation date. These members are not included in the calculation of the average benefit.

Section 6 - Basis of the Actuarial Valuation

Section 6.1
Summary of Plan and Contribution Provisions

Eligibility—All full-time permanent employees of the Chicago Transit Authority are included in the Plan after completing 12 months of continuous service unless specifically excluded by the terms of a collective bargaining agreement. Exempt non-vested employees may opt out of the Plan. Chicago Transit Authority Board members are not included.

Contributions—The Chicago Transit Authority will contribute a percent of compensation for all participating employees and each participating employee will contribute a percent of his compensation to the Plan:

Annual Contributions to the Plan (Percentage of Compensation)	
Authority	**Employees**
20.647%	13.324%

For years through 2040, the amount paid by the Authority with respect to debt service on bonds issued for contribution to the Plan shall be treated as a credit against the amount of required contribution up to an amount not to exceed six percent of compensation paid by the Authority in the following year. The amount paid in debt service is always greater than six percent of projected compensation.

In order to be eligible for the credit, the debt service payment may not be paid with the proceeds of bonds or notes issued by the CTA for any calendar year after 2008. Buck has confirmed that the debt service payment for the year triggering the credit was not paid with the proceeds of bonds or notes issued by the CTA for any calendar year after 2008.

Minimum contributions as set forth elsewhere in this report may also apply.

Normal Retirement—The normal retirement age is 65. For employees retiring on or after January 1, 2001 the annual normal retirement pension is equal to the sum of (a) and (b) below, but not greater than 70.0% of the employee's average annual compensation:

(a) 1% of the employee's past service compensation as of May 31, 1948, for each full year of continuous service prior to June 1, 1949, plus
(b) 2.15% of average annual compensation for each year (and fraction of completed calendar months) of continuous service after June 1, 1949.

Average annual compensation is equal to the highest average compensation over any four calendar years out of the final 10 calendar years prior to normal retirement (or actual retirement, if later). If an employee has at least 20 years of service, his minimum annual pension is $2,220.

Early Retirement:

Employees hired before January 18, 2008: An employee may retire early after attaining age 55 and completing at least three years of continuous service, or after completion of 25 years of continuous service. The early retirement pension is equal to the accrued normal retirement pension based on compensation and service at early retirement, reduced by 5% for each year or fraction younger than age 65. The 5% per year reduction is not applied if the employee has at least 25 years of service. Employees hired after September 5, 2001 may retire early with unreduced benefits after attaining age 55 and completing at least 25 years of service.

Employees hired on and after January 18, 2008: An employee may retire with unreduced benefits upon attainment of age 64 with 25 years of service. An employee may retire with a benefit reduced as described above upon attainment of age 55 with 10 years of continuous service.

Disability Allowance:

An employee is eligible for a disability allowance if he becomes disabled after completing 10 years of service, or if his disability after completing five years of service is covered under the Workmen's Compensation Act. An employee is disabled if he either (a) is totally and permanently disabled or (b) is unable to return to work at their same job after receiving 26 weeks of benefits under the Authority's Group Accident and Sickness Insurance or from the Authority under the Workmen's Compensation Act. The disability allowance is equal to the normal retirement pension based on compensation and service at disability subject to a minimum annual pension of $4,800.

Death Benefits:

If an employee dies prior to retirement or disability and after one year of service, his contributions, accumulated with interest, are paid to his beneficiary. "Interest" is equal to the rate of interest earned by the Fund (to a maximum of 2%) prior to January 1, 1971, 1/2 of the rate of interest earned by the Fund (to a maximum of 3%) between January 1, 1971, and January 1, 1980, and 3% after December 31, 1979. If an employee dies after 90 days of service but prior to one year of service, his contributions, without interest, are paid to his beneficiary; and if he dies prior to 90 days of service, his contributions are not refunded.

If an employee is eligible for early retirement, he is automatically covered by a surviving spouse benefit, payable upon his death prior to retirement, in lieu of a return of his contributions. The spouse benefit is equal to 1/2 of the pension which would have been payable to the employee if he had retired on the first day of the month of his death and had elected an optional form of pension providing 1/2 of his reduced pension to his surviving spouse. Employees may elect not to be covered by this option and provide for the payment of their contributions with interest to their beneficiary in lieu thereof.

If an employee dies after his retirement pension has commenced, his beneficiary receives the excess, if any, of his contributions, accumulated with interest to his retirement date, over the sum of the pension payments made to him. However, if his surviving spouse is entitled to a pension after his death, such excess will not be paid to his beneficiary. At the death of the surviving spouse, the excess, if any, of the contributions accumulated with interest to his retirement date over the sum of the pension payments made to him and his surviving spouse will be paid.

A retired employee's beneficiary will receive a death benefit equal to the amount from the following schedule according to the employee's age and service at retirement:

Age	Service	Age + Service	Death Benefit
65	20	N/A	$8,000
60	N/A	90	$8,000
N/A	25	N/A	$8,000
N/A	N/A	94	$8,000
60-64	20	N/A	$6,000
55-59	20	N/A	$5,000
All Others			$2,000

Termination Benefits:

If an employee terminates his employment prior to eligibility for retirement or disability and after completing one year of service, he receives a refund of his contributions plus interest (3% after December 31, 1979). If he terminates after 90 days but prior to one year, he receives his contributions without interest, and if he terminates less than 90 days after hire, he receives no refund. If an employee has completed 10 years of continuous service and elects to leave his contributions in the Plan, he remains entitled to his normal retirement pension beginning at age 65 but based on his compensation and service at termination.

Optional Benefit Forms:

In lieu of a normal pension, an employee may elect an optional annuity of equivalent actuarial value providing payments of 1/2, 2/3, or all of his reduced pension to his spouse after his death (Option A).

Alternatively, an employee may elect an optional annuity of equivalent actuarial value providing payments of 1/2, 2/3, or all of his reduced pension to his spouse after his death with the further provision that his benefit will be restored to the full amount to him after the death of his spouse (Option B).

Retired Employees:

Benefits for retired employees have been valued according to benefits in effect at time of retirement as modified by subsequent amendments. Such benefits are kept on records maintained by the Authority.

Voluntary Early Retirement Incentive Program:

During 1997, the Plan was amended to offer enhanced retirement benefits to all employees who have at least 25 years of continuous service on or before December 31, 1999, and who have not retired prior to January 1, 1997. Those eligible on or before June 30, 1997 must elect to participate during the period March 1, 1997, to June 30, 1997. Employees eligible during the period July 1, 1997, to December 31, 1999, must elect to participate between July 1, 1997, and February 28, 1998. All eligible employees who elect to participate must retire no later than December 31, 1999. The benefit is determined based on a formula multiplier of 2.40% of average annual compensation with the benefit cap at 70.0% of such average annual compensation.

Ad hoc increases in retiree benefits:
As part of the Arbitration Award ruling of November 13, 2003, the following ad hoc increases were given to retirees in payment status as of January 1, 2000:

(a) $75 per month for members retired before January 1,1980
(b) $50 per month for members who retired on or after January 1, 1980, but before January 1, 1991
(c) $40 per month for members who retired on or after January 1, 1991, but before January 1, 2000

As part of an Arbitration Award ruling of June 26, 2007, another ad hoc adjustment was made for participants.

Contribution Requirements Under P.A. 95-0708

Beginning January 18, 2008, the Authority shall make contributions to the Plan in an amount equal to 12 percent of compensation and participating employees shall make contributions in an amount equal to six percent of compensation. For years through 2040, the amount paid by the Authority with respect to debt service on bonds issued for contribution to the Retirement Plan shall be treated as a credit against the amount of required contribution, up to an amount not to exceed six percent of compensation paid by the Authority in the following year.

If the funded ratio is projected to decline below 60 percent in any year before 2040 using reasonable actuarial assumptions and the projected unit credit funding method, the contribution shall be increased so that the funded ratio is not projected to drop below 60 percent. If the funded ratio drops below 60 percent in any year before 2040, the contribution shall be increased so that the funded ratio is projected to reach 60 percent within 10 years. The increase in contributions shall be effective as of the January 1 following the determination, or 30 days following the determination, whichever is later. One-third of the increase in contributions shall be paid by participating employees and two-thirds by the Authority.

Beginning in 2040, the minimum contribution for each fiscal year shall be predetermined each year as the amount required to bring the total assets of the Plan up to 90 percent of the total actuarial liabilities by the end of 2059, using the projected unit credit funding actuarial cost method and reasonable actuarial assumptions. Participating employees shall be responsible for one-third of the required contribution and the Authority shall be responsible for two-thirds of the required contribution.

Beginning in 2060, the minimum contribution for each year shall be an amount needed to maintain the total assets of the Plan at 90 percent of the total actuarial liabilities of the Plan and the contribution shall be funded one-third by participating employees and two-thirds by the Authority.

Section 6.2
Description of Actuarial Methods and Valuation Procedures

A. Actuarial Cost Method

Liabilities and contributions shown in this report are computed using the **Projected Unit Credit Cost Method** of funding.

Sometimes called a “funding method,” this is a particular technique used by actuaries for establishing the amount and incidence of the annual actuarial cost of pension plan benefits, or normal cost, and the related unfunded actuarial accrued liability. Ordinarily the annual contribution to the plan is comprised of (1) the normal cost and (2) an amortization payment on the unfunded actuarial accrued liability.

Under the Projected Unit Credit Cost Method, the **Normal Cost** for the given year is computed as the present value of the unit of benefit attributable to that year for each active member. The Normal Cost for the Plan is determined by summing individual results for each active member.

The **Actuarial Accrued Liability** under this method at any point in time is equal to the present value of benefits accrued to the measurement date using a service pro-rate method.

The **Unfunded Actuarial Accrued Liability** is the excess of the Actuarial Accrued Liability over the Actuarial Value of Plan Assets actually on hand on the valuation date.

Under this method experience gains or losses, i.e. decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions, adjust the Unfunded Actuarial Accrued Liability.

The **Funded Ratio** is the ratio of the actuarial value of assets to the Actuarial Accrued Liability.

B. Asset Valuation Method

The actuarial value of assets is based on a five-year smoothing method and is determined by spreading the effect of each year’s investment return in excess of or below the expected return. The Fair Value of assets at the valuation date is reduced by the sum of the following:

1. 80% of the return to be spread during the first year preceding the valuation date,
2. 60% of the return to be spread during the second year preceding the valuation date,
3. 40% of the return to be spread during the third year preceding the valuation date,
4. 20% of the return to be spread during the fourth year preceding the valuation date

C. Valuation Procedures

No actuarial liability is included for members who terminated non-vested prior to the valuation date, except those due a refund of contributions.

The compensation amounts used in the projection of benefits and liabilities were January 1, 2021 rates of pay provided by staff of the Retirement Board of Trustees.

No termination or retirement benefits were projected to be greater than the dollar limitation required by the Internal Revenue Code Section 415 for governmental plans.

Annual increases in salary were limited to the dollar amount defined under Internal Revenue Code Section 401(a)(17) for affected members.

Section 6.3
Summary of Actuarial Assumptions and Changes in Assumptions

Rate of Covered Pay: The rate of covered pay for participants has been estimated at $650,048,131 for 2021. The following adjustments were made to the actual covered earnings for 2020 supplied by the Authority:

(a) No earnings or a fractional year of earnings were submitted for employees with a work status date in 2020 who were hired during 2019. We have annualized the 2019 earnings and assumed minimum earnings of $50,750 per year for this group.

(b) For employees on layoff, extended leave of absence, or inactive status, we have assumed minimum earnings of $50,750 per year.

(c) For all employees, 2021 salary was assumed to increase 1.50% from 2020.

Retiree Benefits: The benefit amounts received for retirees were compared to information received from the Authority for the prior valuation.

Earnings on Plan Assets: 8.25% per annum, compounded annually, net of investment expenses.

Salary Inflation: 3.10% per annum

Compensation Increases: According to the following table, compounded annually, assumed end of year (includes inflation):

Years of Service	Rate
1	11.00%
2	12.00%
3	16.00%
4	8.00%
>=5	3.50%

Mortality:

(a) *Active Members & Healthy Retirees* — The SOA Public Mortality General Below Median generational with Improvement Scale MP-2018 with a 13% increase adjustment for female participants.

(b) *Survivors* — The SOA Public Survivor Mortality General Below Median generational with Improvement Scale MP-2018. Beneficiaries of current retirees are assumed to have the same mortality as active members & healthy retirees prior to the death of the member retiree.

(c) *Disabled Retirees* — The SOA Public Disability Mortality General Below Median generational with Improvement Scale MP-2018.

Withdrawals from Service: According to the following table shown for illustrative ages:

Age	Rates of Termination for Reasons Other than Death or Disability
25	8.50%
30	7.00%
35	4.90%
40	3.80%
45	3.20%
50	2.70%
55 & Older	0.00%

If service is 25 or greater, no withdrawal is assumed.

Recovery from disability without returning to work: Disabled members are assumed to recover according to the following table as shown for illustrative ages:

Sample Attained Ages	Disabled Recovery [1]	
	Men	Women
30	3.419%	3.954%
35	2.899%	3.463%
40	2.215%	2.881%
45	1.392%	2.204%
50	0.549%	1.419%
55	0.029%	0.580%
60	0.000%	0.021%
65	0.000%	0.000%
70	0.000%	0.000%
75	0.000%	0.000%
80	0.000%	0.000%

1. Disability recovery after verification of the ability to return to work in the same position as determined by the Plan's Disability manager.

Disability Allowance: According to the following table as shown for illustrative ages:

Age	Rate of Disability
25	0.10%
30	0.10%
35	0.25%
40	0.50%
45	0.73%
50	0.85%
55	1.15%
60	1.25%
65 & older	1.25%

Service Retirements:

Age	Pre 1/19/2008 Hires Probability of Retirement		Post 1/18/2008 Hires Probability of Retirement	
	Service<25	Service>25	Service<25	Service>25
45-54	0.00%	20.00%	0.00%	0.00%
55	2.00%	20.00%	2.00%	2.00%
56	2.00%	20.00%	2.00%	2.00%
57	2.50%	20.00%	2.50%	2.50%
58	3.00%	20.00%	3.00%	3.00%
59	3.50%	25.00%	3.50%	3.50%
60	4.00%	25.00%	4.00%	4.00%
61	5.00%	35.00%	5.00%	5.00%
62	15.00%	35.00%	15.00%	15.00%
63	15.00%	35.00%	15.00%	15.00%
64	20.00%	35.00%	20.00%	20.00%
65	30.00%	40.00%	30.00%	30.00%
66	30.00%	30.00%	30.00%	30.00%
67	30.00%	30.00%	30.00%	30.00%
68	30.00%	30.00%	30.00%	30.00%
69	30.00%	30.00%	30.00%	30.00%
70-74	30.00%	30.00%	30.00%	30.00%
75	100.00%	100.00%	100.00%	100.00%

Spouse Data: 75% of employees eligible at retirement are assumed to be married, 40% of those married are assumed to elect a 50% J&S option (Option A or B–50%). Of those electing a 50% J&S, 75% are assumed to elect the pop up feature (Option B–50%) and the average equivalency factors to convert their accrued pension to a spouse option (Option A–50%) and (Option B-50%) are assumed to be 88% and 86%, respectively. A wife is assumed to be 3 years younger than her husband. Actual dependent coverage data was used for participants retired as of the valuation date.

Section 6.3
Summary of Actuarial Assumptions and Changes in Assumptions, continued

Miscellaneous and Technical Assumptions:

Pay Increase Timing:	End of (Fiscal) year.
Decrement Timing:	Decrements of all types are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Benefit Service:	Exact fractional service from date of participation is used to determine the amount of benefit payable.
Decrement Relativity:	Decrement rates are used directly based on assumptions, without adjustment for multiple decrement table effects.
Decrement Operation:	Disability and turnover do not operate after 25 years of service.
Actuarial Math Contribution Expense Load:	Prior year expenses rounded to the nearest $100,000

Summary of changes since January 1, 2020 Valuation

There have been no changes from those used in the prior valuation.

Section 7 - ASOP 51

Actuarial Standard of Practice No. 51 Disclosures

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities and the corresponding funded status of the Plan. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the Plan. Understanding the risks to the funding of the Plan is important. Therefore, a new Actuarial Standard of Practice has been adopted. Actuarial Standard of Practice No. 51 (ASOP 51) requires certain disclosures of potential risks to the Plan and provides useful information for intended users of actuarial reports that determine Plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions. While this public pension plan is not subject to the funding provisions of ERISA, The Retirement Plan for Chicago Transit Authority Employees uses the information presented to assist in making contribution decisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is “negative” but all risk should be understood and accepted based on knowledge, judgment and educated decisions. Future measurements may deviate in ways that produce “positive” or “negative” financial impacts to the Plan.

In the actuary’s professional judgment, the following risks may reasonably be anticipated to significantly affect the plan’s future financial condition.

- Investment risk – the risk that assets will not return as expected
- Interest rate risk – the risk that the general level of interest rates will increase or decrease significantly from current levels
- Contribution risk – the risk that the actual contribution made will be different than the actuarially determined contribution
- Asset liability mismatch - potential that changes in asset values are not matched by changes in the value of liabilities
- Longevity and other demographic risk – the risk that mortality or other demographic experience will be different from expected

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the Plan. This list is not all-inclusive; it is an attempt to identify the most significant risks and how those risks might affect the results shown in this report.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the Plan sponsor to make contributions to the Plan. In addition, this valuation report in not intended to provide investment advice or to provide guidance on the management or reduction of risk. Buck welcomes the opportunity to assist in such matters as part of a separate project or projects utilizing the appropriate staff and resources for those objectives.

Section 7 - ASOP51, continued

Assessment of Risks

- Investment return - One type of investment risk is that assets materially underperform expected return.

    - Lower assets mean higher unfunded liability and larger contribution amounts. For example, if the trust earns 1% less than assumed each year for ten years, the projected fair value of assets would be approximately 10% lower than expected.
    - The five-year smoothing method used for the actuarial value of assets defers a portion of investment gain/loss in each of the previous five years. If the assumed return on assets consistently overestimates the actual return on assets, the actuarial value of assets will be consistently higher than the true market value. Consistent underestimation of the unfunded liability can prevent the Plan from achieving anticipated funding goals even when all minimum required contributions are made timely.

- Asset growth does not keep pace with liability increases over time - One type of investment risk is that asset returns do not keep pace with liability growth over time. Plan liabilities are based on the discounted present value of anticipated future benefit payments. That present value grows at the discount rate as time passes and the future payouts move closer. If investment returns are lower than the rates used to discount liabilities, plan liabilities will increase more rapidly than plan assets. Over extended periods of time, such as those involved in pension obligations, these discrepancies can accumulate to significant shortfalls.

- Market shocks or regime changes - Invested assets are subject to significant disruptions from market shocks, such as the financial crisis of 2008/2009, or as a result of systemic regime changes that persist for years, such as historically low interest rates over the recent decade.

- Liability duration versus asset duration: Unless assets are explicitly structured to mimic the characteristics of plan liabilities, there is a risk that economic scenarios that effect interest rates will have a larger impact on liability than on assets. This is because plan liability is the discounted value of benefit payments that extend way out into future years, i.e. have a long duration. Even relatively small changes in interest rates can have a significant impact on plan liability; a decline in interest rates increases liability, while a rise in interest rates decreases liability. Plan investments typically have a shorter duration with respect to interest rate changes, often holding fixed income securities with lower durations than plan liabilities, and typically maintaining some moneys in equity investments that are not as directly sensitive to interest rate changes.

  For this Plan, a 1% decline in the discount rate used to value funding liabilities (from 8.25% to 7.25%), would increase the Plan's liabilities by approximately 9.66%.

- Salary increases - Plan costs are sensitive to salary increases, with higher rates leading to higher obligations. This is because benefits at retirement are pay related, meaning that higher pay generates higher benefit levels at retirement. Compensation increases greater than assumed lead to actuarial losses since projected benefits are higher than predicted by assumed rates.

- Longevity and other demographic risks - Potential that mortality or other demographic experience (retirement, turnover, disability) may be different than expected. As the Plan matures and the majority of participants reach (or have reached) retirement eligibility, risks associated when participants retire can become significant. The Plan provides for unreduced early retirement benefits after meeting certain age and service conditions. These benefits are highly subsidized and thus can be significantly more valuable than normal retirement benefits and regular early retirement benefits. The demographic assumptions used to determine the actuarial valuation attempt to account for unreduced early retirement based on historical plan experience. However, due to the unpredictable nature of such benefits, future experience could differ significantly from past experience.

In addition to the risk that participants will not retire as expected, the Plan is subject to longevity risk the risk that participants will live longer (or shorter) than expected.

- Declining active workforce - since employer contributions are based on a percentage of participant's salaries, a declining active workforce will have the impact of the Plan potentially receiving lower contributions. In addition, if the required dollar amount of contributions remain level or increase, a declining active workforce will result in higher contribution rates in order to meet required contribution levels.

- Contribution risk – risk of not contributing an actuarially determined contribution. The Plan contribution is a statutory amount. There is a risk associated with the employer's contribution when the statutory amount and the actuarially determined contribution (Actuarial Math Contribution) amount differ. Actuarially determined contributions are calculated to adequately fund the Plan. Therefore, when the statutory contribution is lower than the actuarially determined contribution, there is an increased risk the Plan may not be sustainable in the long term.

Historical Results

The following table shows selected historical values of key valuation measures. These items illustrate how actual volatility has impacted the Plan in recent years and gives additional context to the risks described above. Further information can be found in the actuarial valuation reports for each year.

Valuation Date	1/1/2017	1/1/2018	1/1/2019	1/1/2020	1/1/2021
Actuarial Value of Assets (Billion)	1.75 *	1.80	1.84	1.88	1.96
Asset Return in Prior Year	6.80%	14.40%	-3.53%	15.70%	7.60%
Investment gain/(loss) - AVA basis (Million)	(20.1)	13.6	(22.2)	(12.3)	(7.7)
Actuarial Accrued Liability (Billion)	3.34	3.42	3.49	3.58	3.67
Liability duration	9.76	9.66	9.48	9.50	9.66
The ratio of retired life** actuarial accrued liability to total actuarial accrued liability	68.0%	67.7%	67.4%	67.5%	68.0%
The ratio of cashflow to actuarial value of assets	-7.2%	-5.8%	-4.9%	-4.7%	-3.7%
The ratio of actuarial value of assets to participant payroll	304.5%	302.9%	294.7%	298.3%	300.8%
Normal cost (Million)	60.7	62.9	64.0	64.9	66.9
Discount rate	8.25%	8.25%	8.25%	8.25%	8.25%
Non-Investment gain/(loss) (Million)	(16.3)	(31.1)	(67.3)	(37.6)	(27.1)
Funding Policy contribution (Million)	103.0	107.1	112.3	130.4	134.2

* Actuarial Value of Assets is Fair Market Value

** Retired members and beneficiaries

Commentary on Plan Maturity Measures

The ratio of retired life actuarial accrued liability to total actuarial accrued liability

A mature plan will often have a ratio above 60 - 65 percent. A higher percentage will generally indicate an increased need for asset / liability matching due to inability to absorb volatility in future returns.

The ratio of cashflow to actuarial value of assets

The cashflow as a percentage of assets means the fund may need to invest in more liquid assets to cover the benefit payments. More liquid assets may not garner the same returns as less liquid assets and therefore increase the investment risk. However, there may already be enough liquid assets to cover the benefit payments, less investment return is needed to cover the shortfall, or only a small portion of assets will need to be converted to cash. Therefore, the investment risk is likely not amplified at this time. This maturity measure should be monitored for continual negative trend with greater magnitude.

The ratio of actuarial value of assets to participant payroll

Plans that have higher asset-to-payroll ratios experience *more* volatile employer contributions (as a percentage of payroll) due to investment return. For example, if lower than expected asset return increases the unfunded liability of two plans by the same percent the plan with a higher assets-to-payroll ratio may experience higher contribution volatility than a plan with a lower asset-to-payroll ratio.

Glossary of Terms

Actuarial Accrued Liability	Total accumulated cost to fund pension benefits arising from service in all prior years.
Actuarial Cost Method	Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension plan for a group of plan members to the years of service that give rise to that cost.
Actuarial Present Value of Future Benefits	Amount which, together with future interest, is expected to be sufficient to pay all future benefits.
Actuarial Valuation	Study of probable amounts of future pension benefits and the necessary amount of contributions to fund those benefits.
Actuary	Person who performs mathematical calculations pertaining to pension and insurance benefits based on specific procedures and assumptions.
Normal Cost	That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.
Unfunded Actuarial Accrued Liability (UAAL)	The portion of the actuarial accrued liability not offset by plan assets.