Classic Values, Innovative Advice

City of Allentown Police Pension Plan

Actuarial Valuation Report as of January 1, 2021

Produced by Cheiron

September 2021

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September 29, 2021

City of Allentown Pension Board
Department of Finance, Room 227
435 Hamilton Street
Allentown, PA 18101-1699

Dear Members of the Board:

At your request, we have conducted our annual actuarial valuation of the City of Allentown Police Pension Plan as of January 1, 2021. The purpose of this report is to present the annual actuarial valuation of the City of Allentown Police Pension Plan. This report is for the use of the City of Allentown's Pension Board and its auditors in preparing financial reports in accordance with applicable law and accounting requirements. The report does not include calculations under GASB Statements No. 67 and No. 68 which are provided in a separate report.

Your attention is called to the Foreword in which we refer to the general approach employed in the preparation of this report. We also comment on the sources and reliability of both the data and the actuarial assumptions on which our findings are based. The results of this report are only applicable to the funded status of the Plan as of January 1, 2021 and will be used to determine the Plan's 2022 and 2023 Minimum Municipal Obligation (MMO). The final MMOs are dependent upon the payroll of the active population as provided by the City.

Future actuarial valuation results may differ significantly from the current actuarial valuation results presented in this report due to such factors as the following: plan experience differing from that anticipated by the assumptions; changes in assumptions; and changes in plan provisions or applicable law. The results and projections provided in this report rely on future plan experience conforming to the underlying assumptions and methods outlined in this report. To the extent that the actual plan experience deviates from the underlying assumptions and methods, or there are any changes in plan provisions or applicable laws, the results would vary accordingly and projections may change materially.

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

This report was prepared exclusively for the City of Allentown's Pension Board for the purpose described herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

Sincerely,
Cheiron

Karen Zangara

Karen Zangara, FSA, EA, MAAA
Principal Consulting Actuary

Brett Warren

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FOREWORD

Cheiron has performed the actuarial valuation of the City of Allentown Police Pension Plan as of January 1, 2021. The purpose of this report is to:

1) **Measure and disclose**, as of the valuation date, the financial condition of the Plan, in compliance with Act 205;
2) **Indicate trends** in the financial progress of the Plan; and
3) **Determine an estimated Minimum Municipal Obligation** (MMO) for calendar year 2023 and to provide the actual MMOs for 2021 and 2022 in accordance with Act 44 and Act 205.

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

Section I presents a summary containing our findings and disclosing important trends experienced by the Plan in recent years as well as a risk assessment, which includes a review of potential risk and projected financial outlook associated with the Plan.

Section II contains details on Plan assets, together with pertinent performance measurements.

Section III provides details on the Plan's liabilities.

Section IV provides the amortization requirements, the actual MMOs for 2021 and 2022, and the estimated MMO for 2023. The actual 2023 MMO amount will be finalized once the payroll for the 2023 year is provided by the City of Allentown. The 2022 and 2023 MMOs are based on the January 1, 2021 actuarial valuation results.

The appendices to this report contain supplemental information based upon assets excluding proceeds from pension obligation bonds, a summary of the Plan's membership at the valuation date, a summary of the major provisions of the Plan, and the actuarial methods and assumptions used in the valuation.

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

SECTION I – BOARD SUMMARY

The following table sets out the principal results of this year's valuation and compares them to last year's results.

Table I-1
Summary of Principal Plan Results

Valuation as of:	1/1/2020	1/1/2021	% Change
Participant Counts			
Actives	207	214	3.4%
Terminated Vested and Inactive Members	12	14	16.7%
In Pay Status	288	293	1.7%
Total	507	521	2.8%
Annual Salaries of Active Members (from prior year)*	$ 17,877,177	$ 18,458,126	3.2%
Average Annual Salary	86,363	86,253	-0.1%
W-2 Wages for Active Members (from prior year)	20,181,769	21,919,008	8.6%
Annual Retirement Allowances for Retired Members and Beneficiaries	$ 11,512,752	$ 12,293,158	6.8%
Average Monthly Retirement Benefit	3,331	3,496	5.0%
Financial Information			
Market Value of Assets (MVA)	$ 180,698,735	$ 199,417,325	10.4%
Actuarial Value of Assets (AVA)	172,043,392	186,545,645	8.4%
Actuarial Liability	$ 210,488,281	$ 231,507,633	10.0%
Unfunded Actuarial Liability	38,444,889	44,961,988	17.0%
Funding Ratio (MVA)	85.8%	86.1%	
Funding Ratio (AVA)	81.7%	80.6%	
Contributions and Cash Flows			
Contribution (actual/*expected)*	$ 8,970,404	*$ 8,973,989*	0.0%
Prior Year Benefit Payments	11,133,444	11,811,083	6.1%
Prior Year Administrative Expenses	134,819	102,831	-23.7%
Prior Year Total Investment Income	31,003,881	21,662,100	

* Base pay plus the lesser of the overtime pay and 10% of base pay.

General Comments

- For plans that are either not distressed or minimally distressed, the future gains and losses of the Plan are required to be amortized over the lesser of the maximum amortization periods, as outlined in Appendix D, or the average future service for the active participants in the Plan which is 10.38 years as of January 1, 2021 and, per Act 205, rounded up to 11 years. The City of Allentown was determined to be minimally distressed (86% funded on an aggregate basis for all plans) by the Pennsylvania Auditor General in 2020 and in accordance with Act 205 Section 502. Plan distress categories as outlined by Act 44 are provided below:

Funding Ratio	Distress Level
90% and above	None
70% to 89%	Minimal
50% to 69%	Moderate
Less than 50%	Severe

- The Board adopted a reduction in the discount rate from 7.50% to 7.40% which increased the liabilities by $2,708,250.
- The Board adopted a change in retirement assumption rates based on years-of-service to better align with future expectations of retirement which increased the liabilities by $5,564,996.
- The Market Value of Assets returned 12.09% in 2020.
- The Actuarial Value of Asset (AVA) method smooths gains and losses over 5 years was applied. For the AVA, the Plan experienced a gain in 2020 of about $4.7 million, which yielded a return of 10.23% versus the assumed return of 7.50%. However, over the two-year period covering 2019 and 2020, there was an AVA gain of $3.8 million.
- During calendar year 2020, the Police Pension Plan received $8,970,404 in contributions and paid out $11,913,914 in benefits and expenses. Comparing these two amounts results in a negative cash flow of $2,943,510 which means the Plan is currently using investment returns to pay for benefits and expenses not covered by contributions. Such a situation is expected for a mature plan.
- On the liability side, the Plan experienced a two-year loss totaling $6,311,282 primarily due to new retirees and data updates. The assumption changes increased the liability by $8,273,246.
- Overall, the Plan experienced a net loss (investment gain and liability loss) of $2,560,876 during the two-year period covering 2019 and 2020. In addition, since the January 1, 2019 valuation there is a loss of $813,871 over the two-year period from the timing of contributions.

Risk Assessment

Significant risks that may result in actual future measurements deviating from those expected by this valuation include investment risk, as well as longevity and other demographic risk. Investment risk is the potential that future investment returns will deviate from those that are expected. Longevity and other demographic risk is the potential that mortality or other demographic experience will deviate from that which is expected by the valuation assumptions.

The volatility of the measurements due to differences in the actual investment returns is examined later in this section with projections that assume rates of return other than the valuation assumption. We anticipate that for this plan the demographic assumption that presents the most risk to future actual measurements deviating from expected is the rate of salary increase, which impacts the Cost of Living Adjustment (COLA) growth for retirees, and potentially the mortality rate and the retirement rates.

- If salary/rank pay growth is generally lower than anticipated, the plan's future financial status will be improved while if salary/rank pay is generally higher than anticipated, it will be degraded from that expected by this valuation. Salary/rank pay growth is especially a risk for the plan because of how this impacts not only liabilities for active participants, but for retirees as well because their COLA increase occurs when the pension allowance falls below half of the current salary for a police officer of the same rank based upon rank at retirement.
- If mortality rates are generally higher than anticipated, the plan's future financial status will be improved while if mortality rates are generally lower than anticipated, then it will decline from that expected by this valuation.
- The Board updated the retirement assumptions for this Plan to better align with the recent retirement rates under this plan. However, if future retirement rates are greater than expected under this updated retirement rate table, then future losses will occur. We suggest that this retirement assumption continues to be monitored to determine if future modifications may be needed.

In the "Trends" part of this section, there are a number of historical measures shown that demonstrate the potential volatility of the Plan's actuarial measurements as a result of deviation of actual experience. For example, the proportion of the Plan's members that are in payment status has grown, which makes the volatility of mortality risk greater.

The remainder of this section analyzes past trends in the Plan's funding and presents projections under various economic outlooks.

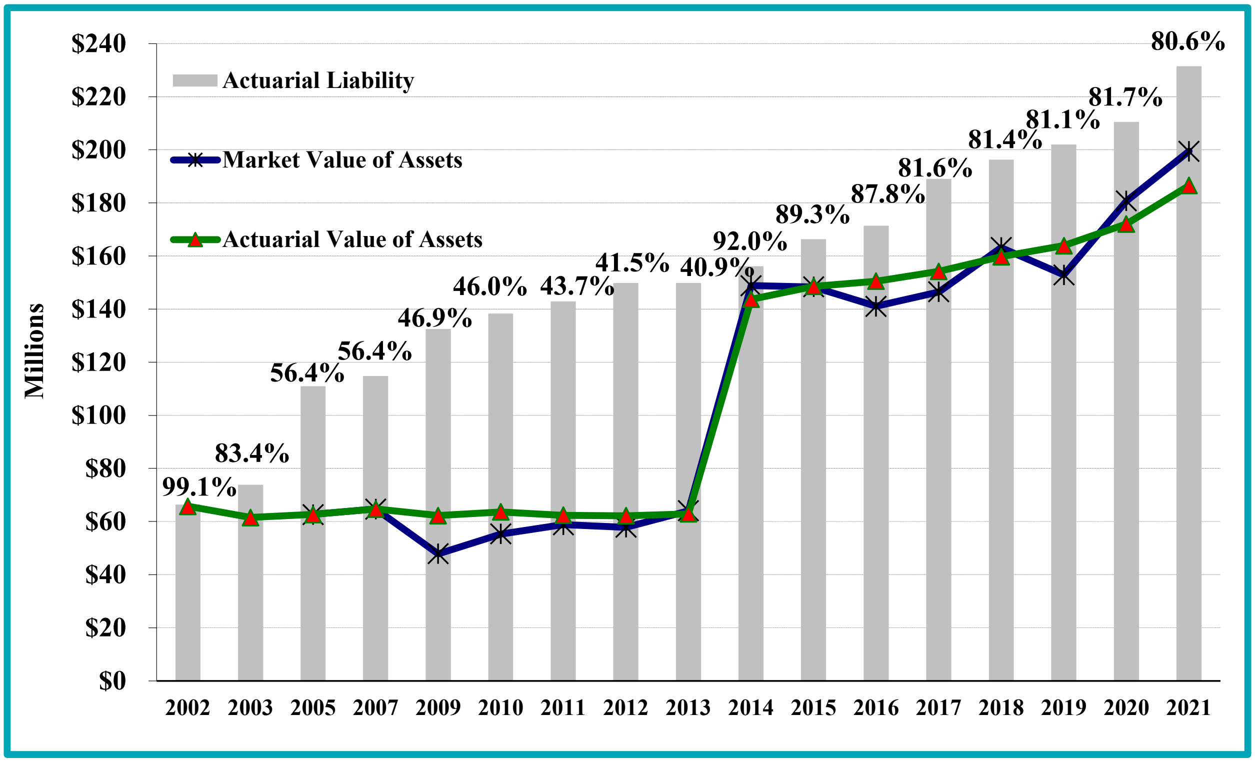
SECTION I – BOARD SUMMARY

Trends

It is important to take a step back from the latest results and view them in the context of the Plan's recent history. Below we present a series of charts which display key factors in the valuations over the last several years.

Assets and Liabilities

The gray bars represent the Actuarial Liability mentioned in this report. The green and blue lines represent the asset values. Prior to 2007, the Actuarial Value of Assets equaled the Market Value of Assets. The funding ratios shown in the graph above each gray bar are equal to the Actuarial Value of Assets divided by the Actuarial Liability. The January 1, 2014 assets reflect the $84.5 million Note contribution in 2013 and increased the funding ratio to 92.0%.

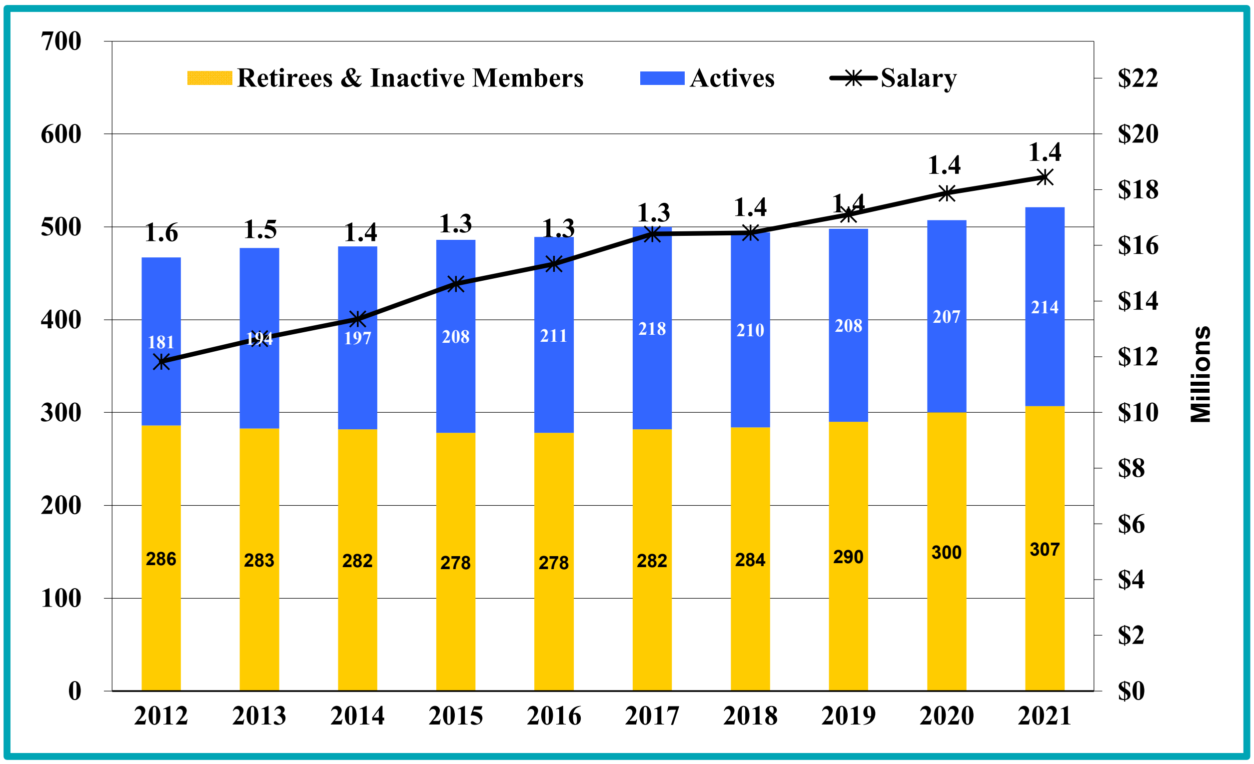


Results before 2010 are from the prior actuary. Valuations performed biennially from 2003 – 2009. The Actuarial Liability results for 2014 and 2016 reflect the 2013 and 2015 actuarial assumptions (respectively) in order that the 2015 and 2017 Act 205 results reflect all assumption changes since the prior Act 205 filing. This is required under Act 205.

SECTION I – BOARD SUMMARY

Participant Trends

Here we compare the membership counts (left-hand scale) and the total salary (right-hand scale). The ratio (at the top of each bar) is the number of inactive participants divided by the number of active participants. The amount shown is pensionable pay for the year (base pay plus overtime pay limited to 10% of the base pay). The ratio of inactive to active participants is a measure of the maturity of the plan. When this ratio is above one, the fund is more mature and potentially at a higher risk. This is because the assets backing the retiree benefits have become large relative to the contribution base, i.e. the active participant payroll. As assets grow relative to the pensionable payroll, any asset gain or loss can have a significant impact, resulting in volatile costs from year-to-year even with the application of asset smoothing methods.

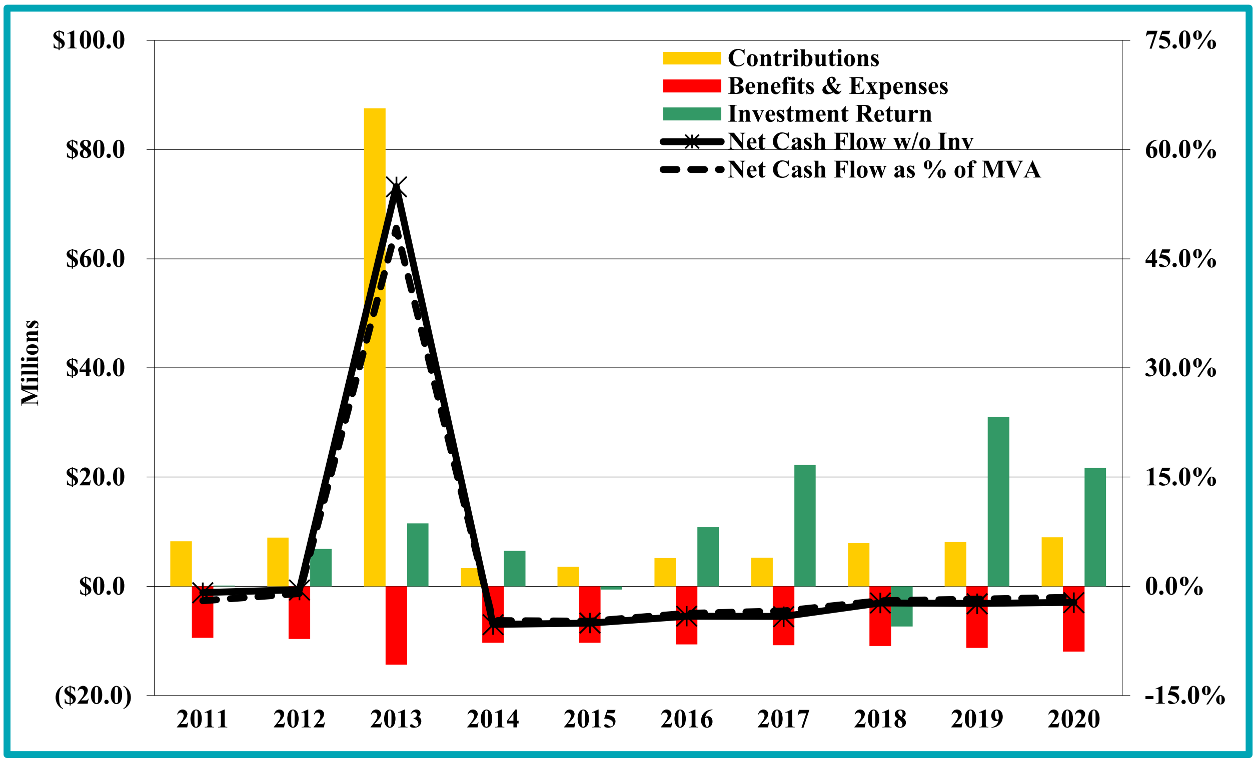


SECTION I – BOARD SUMMARY

Cash Flows

Plan cash flow is a critical measure, as it reflects the ability to make benefit payments without necessitating difficult investment decisions, especially during volatile markets. The laddered bond approach the Board has adopted for this plan helps to mitigate this risk. Cash flow is defined as contributions received less benefit payments and expenses.

The Plan's net cash flow (NCF) has been negative except for 2013. Due to the $87.5 million contribution, which includes a $84.5 million Note payment (under section 404(h) of Act 205) from the City's water and sewer lease proceeds, the plan had a substantial positive net cash flow in 2013. As anticipated, the plan experienced negative net cash flows from 2014-2020. The implication of a plan in a negative cash flow position is that return on investment must first cover the negative cash flow before the assets can increase. The NCF as a percentage of the Market Value of Assets (right vertical axis) was about 1.5% in 2020, so the net assets will not increase unless investment returns exceed 1.5%, if there are similar cash flows in 2021.

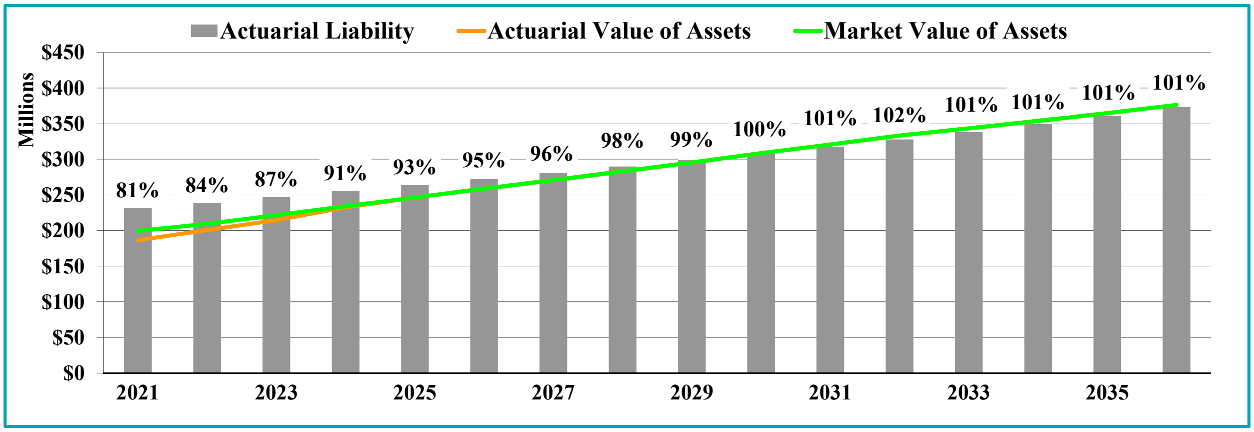


SECTION I – BOARD SUMMARY

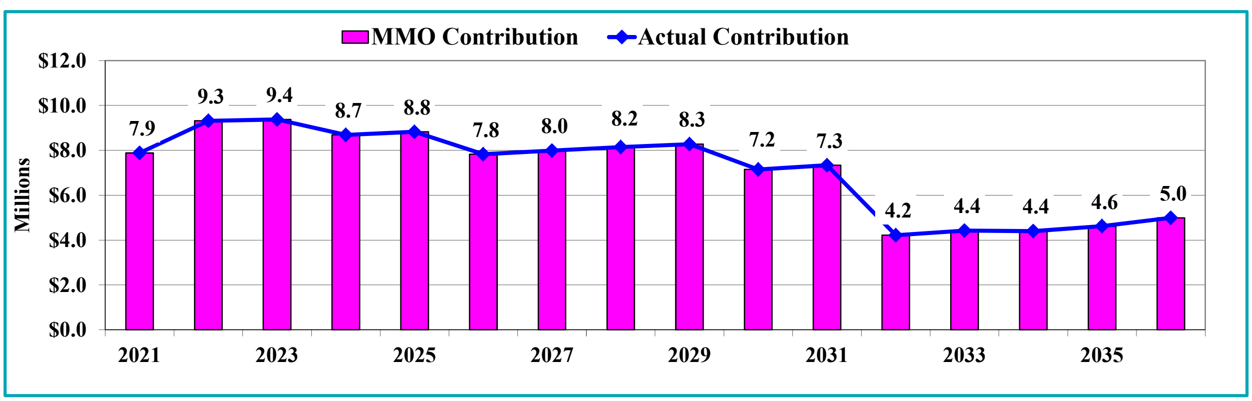
Baseline Projections - Asset Returns of 7.40% per year

We have included two charts projecting the funded ratio and Minimum Municipal Obligations for the next 15 years, assuming that the Plan's assets earn 7.40%.

The gray bars represent the liabilities with the orange and green lines representing the asset values. The Actuarial Value of Assets and the Market Value of Assets are expected to converge over the next five years. This projection assumes all assumptions outlined in Appendix D are fully realized and that the MMO is paid in full each year. The funded ratio (Actuarial Value of Assets divided by liabilities) listed on top of each of the bars increases to 101% at the end of the 15-year projection period.



This next chart projects the MMO over the same period. On top of each bar is the projected MMO amount in millions of dollars. If all assumptions are met, the projected MMO will increase to $9.4 million in 2023 before dropping to $4.2 million in 2032. The gradual increase in the MMO projections is due in part to the timing delay in the contribution payment and the annual expected increase in the normal cost as salaries are projected to increase. The projected MMO decreases near the end of the period once the plan becomes fully funded.

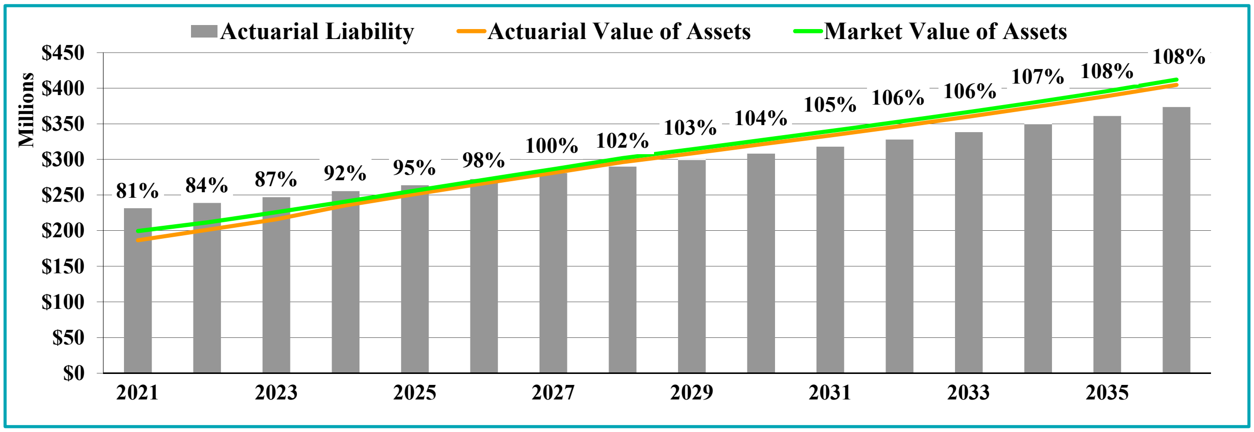


SECTION I – BOARD SUMMARY

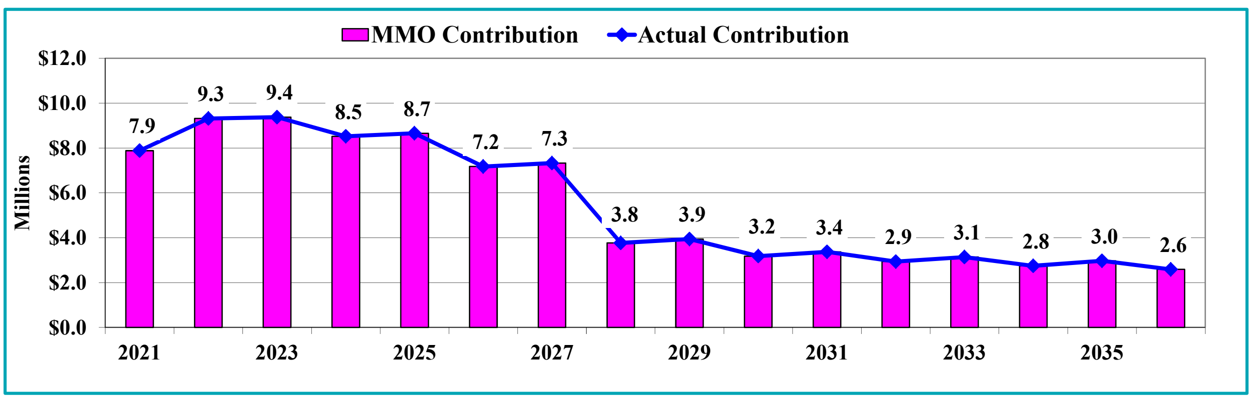
Optimistic Projections - Asset Returns of 8.40% per year

The charts below show the expected progress of the Plan over 15 years, assuming that the Plan's assets earn 8.40%, 1.0% higher than the valuation assumption. All other assumptions are consistent with the Baseline projections.

The funded ratio (Actuarial Value of Assets divided by liabilities) listed on top of each of the bars increases to 108% at the end of the 15-year projection period.



This next chart projects the MMO over the same period. On top of each bar is the projected MMO amount in millions of dollars. When the plan is projected to become over funded, 10% of the surplus assets above the liabilities are used to reduce MMO.

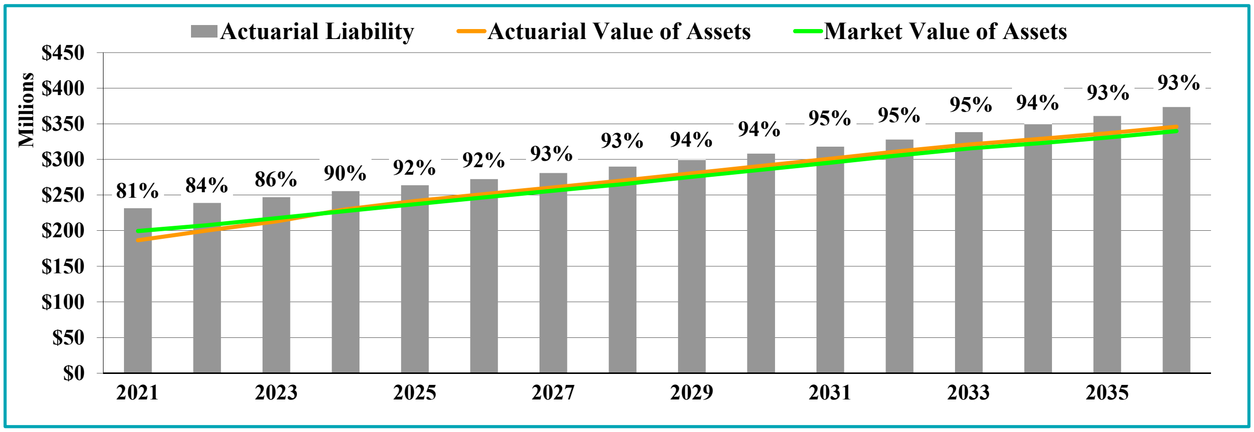


SECTION I – BOARD SUMMARY

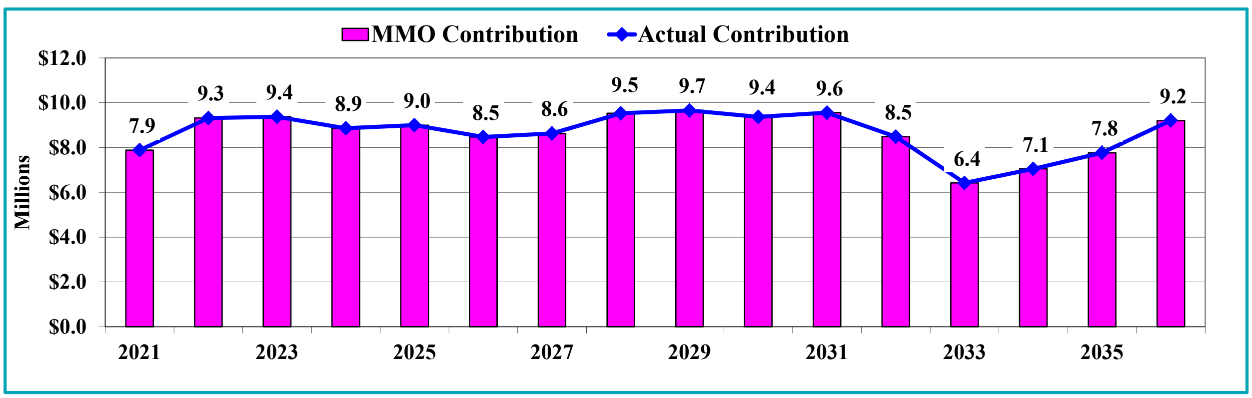
Pessimistic Projections - Asset Returns of 6.40% per year

The charts below show the expected progress of the Plan over 15 years, assuming that the Plan's assets earn 6.40%, 1.0% lower than the valuation assumption. All other assumptions are consistent with the Baseline projections.

The funded ratio (Actuarial Value of Assets divided by liabilities) listed on top of each of the bars increases to 93% at the end of the 15-year projection period.



This next chart projects the MMO over the same period. On top of each bar is the projected MMO amount in millions of dollars.



SECTION I – BOARD SUMMARY

The projections provided above are based upon the January 1, 2021 valuation and the methods, assumptions, plan provisions and data as outlined in this report. To the extent that the actual plan experience deviates from the underlying assumptions and methods, (for example, if the asset returns are less than expected, the demographic data experience is different from the assumptions, or there are any changes in plan provisions or applicable laws) *the results will vary accordingly and possibly materially*, resulting in potentially larger MMOs than currently expected. Please note that these projections should be replaced once new data and valuations are completed in the future.

The MMO Pay used in the MMO calculation in the table below is provided by the City of Allentown and may differ from the valuation pay provided throughout this report which is based on actual participant data included in the actuarial valuation as of January 1 of each year.

Table I-2
Minimum Municipal Obligation (Actual and *Estimated)*

Based Upon Valuation Report	**1/1/2019**	**1/1/2021**	**1/1/2021**
Calendar Year	**2021**	**2022**	***2023***
(1) MMO Pay *(Estimated)*	$ 21,794,634	$ 20,780,334	*$ 21,715,000*
(2) Normal Cost %	18.69%	19.09%	19.09%
(3) Total Normal Cost	4,073,417	3,966,966	*4,145,394*
(4) Amortization of UAL	4,810,572	6,270,370	6,191,739
(5) Total Administration Expense	90,000	120,000	120,000
(6) Total Financial Requirement	$ 8,973,989	$ 10,357,336	*$ 10,457,133*
(7) Estimated Employee Contributions	1,089,732	1,039,017	*1,085,750*
(8) Minimum Municipal Obligation [(6)-(7)]	$ 7,884,257	$ 9,318,319	*$ 9,371,383*

SECTION II – ASSETS

Pension Plan assets play a key role in the financial operation of the Plan and in the decisions the Board may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely have an impact on benefit levels, contributions, and the ultimate security of participants' benefits.

In this section, we present detailed information on Plan assets including:

- **Disclosure** of Plan assets at January 1, 2020 and January 1, 2021;
- Statement of the **changes** in market values during the year;
- An assessment of **investment performance**; and
- Development of the **actuarial value of assets**.

Disclosure

The market value of assets represents the "snap-shot" or "cash-out" values which provide the principal basis for measuring financial performance from one year to the next. Market values, however, can fluctuate widely with corresponding swings in the marketplace.

Table II-1
Disclosure of Plan Assets*

	1/1/2020	1/1/2021
Assets		
Investments	$ 181,105,077	$ 199,408,354
Receivables	37,516	30,154
Due from City's General Fund	0	0
Total Assets	$ 181,142,593	$ 199,438,508
Liabilities		
Accounts Payable	$ 12,371	$ 21,183
Due to City's General Fund	431,487	0
Total Liabilities	$ 443,858	$ 21,183
Net Assets Available for Benefits	**$ 180,698,735**	**$ 199,417,325**

*Assets are based on the Annual Comprehensive Financial Report (ACFR) for each year end.

SECTION II – ASSETS

Changes in Market Value

The components of asset change are:

- Contributions
- Benefit payments
- Expenses (administrative and investment consulting)
- Investment income (realized and unrealized)

The specific changes during the 2019 and 2020 plan years are presented below:

Table II-2
Changes in Market Value

	2019	2020
Beginning of Year Assets	$ 152,846,893	$ 180,698,735
Additions		
Employer Contributions	$ 7,046,609	$ 7,918,392
Member Contributions	1,069,615	1,052,012
Interest and Dividends	3,897,395	3,656,943
Net Appreciation / (Depreciation)	27,106,486	18,005,157
Total Additions	$ 39,120,105	$ 30,632,504
Deductions		
Benefit Payments	$ 11,133,444	$ 11,811,083
Administrative expense	134,819	102,831
Total Deductions	$ 11,268,263	$ 11,913,914
Net Change in Market Value of Assets	$ 27,851,842	$ 18,718,590
End of Year Assets	$ 180,698,735	$ 199,417,325

The two-year average of the administrative expenses paid from the plan assets, rounded to the nearest $10,000, is $120,000, which includes the investment consultant fees as reported as a separate line item on the asset statements. This is the projected expense estimate for the 2022 and 2023 MMO determinations.

Investment Performance

The following table calculates the investment related gain/loss for the most recent two calendar years on a market value basis. The market value gain/loss is an appropriate measure for comparing the actual asset performance to the long-term 7.50% assumption. Effective January 1, 2021, the long-term investment return assumption changed to 7.40%. Future investment gains and losses will be calculated relative to the new assumption.

Table II-3
Market Value of Assets Gain/(Loss)

Item	2019	2020	Total Period
Beginning of Year Market Value	$ 152,846,893	$ 180,698,735	$ 152,846,893
Contributions	8,116,224	8,970,404	17,086,628
Benefit Payments	(11,133,444)	(11,811,083)	(22,944,527)
Administrative Expenses	(134,819)	(102,831)	(237,650)
Expected Investment Earnings (7.50%)	11,347,452	13,444,019	23,317,239
Expected Market Value on December 31	$ 161,042,306	$ 191,199,244	$ 170,068,583
Investment Gain / (Loss)	19,656,429	8,218,081	29,348,742
End of Year Market Value	$ 180,698,735	$ 199,417,325	$ 199,417,325
Return	20.50%	12.09%	16.25%

The Total Period reconciliation reflects total benefit payments, contributions and expenses during this two-year period. Investment earnings do not follow the additive property and instead are calculated based on the beginning and end of Total Period values.

SECTION II – ASSETS

Assets at Actuarial Value

The Actuarial Value of Asset (AVA) method smooths gains and losses over five years. The resulting value is then limited to be no greater than 120% and no less than 80% of the Market Value of Assets on the valuation date. Additional details regarding this actuarial methodology are included in Appendix D of the report.

The table below shows the development of the actuarial asset value applied to this valuation.

Table II-4
Development of Actuarial Value of Assets
5-Year Smoothing Method

Market Value of Assets as of January 1, 2021					$ 199,417,325
Plan Year	**Investment Gains / (Losses)**	**Percent Recognized**	**Percent Deferred**		**Amount Deferred**
2016	$ 138,937	100%	0%		$ 0
2017	11,473,764	80%	20%		2,294,753
2018	(19,478,488)	60%	40%		(7,791,395)
2019	19,656,429	40%	60%		11,793,857
2020	8,218,081	20%	80%		6,574,465
					$ 12,871,680
Preliminary Actuarial Value as of January 1, 2021					$ 186,545,645
Corridor for Actuarial Value					
- Lower Limit				80%	$ 159,533,860
- Upper Limit				120%	$ 239,300,790
Actuarial Value of Assets as of January 1, 2021					$ 186,545,645
- as a percent of Market Value of Assets					93.5%

SECTION II – ASSETS

The following table calculates the investment related gain/loss for the most recent two calendar years on an actuarial value basis.

Table II-5
Actuarial Value of Assets Gain/(Loss)

Item	2019	2020	Total Period
Beginning of Year Actuarial Value	$ 163,859,683	$ 172,043,392	$ 163,859,683
Contributions	8,116,224	8,970,404	17,086,628
Benefit Payments	(11,133,444)	(11,811,083)	(22,944,527)
Administrative Expenses	(134,819)	(102,831)	(237,650)
Expected Investment Earnings (7.50%)	12,173,411	12,794,868	25,031,105
Expected Actuarial Value on December 31	$ 172,881,055	$ 181,894,750	$ 182,795,239
Investment Gain / (Loss)	(837,663)	4,650,895	3,750,406
End of Year Actuarial Value	$ 172,043,392	$ 186,545,645	$ 186,545,645
Return	6.99%	10.23%	8.58%

The Total Period reconciliation reflects total benefit payments, contributions and expenses during this two-year period. Investment earnings do not follow the additive property and instead are calculated based on the beginning and end of Total Period values.

SECTION III – LIABILITIES

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

- **Disclosure** of Plan liabilities at January 1, 2020 and January 1, 2021;
- Statement of **changes** in these liabilities during the year; and
- Development of the actuarial gain / loss for the year ending December 31, 2020.

Disclosure

Two types of liabilities are calculated and presented in this report.

- **Present Value of Benefits:** Used for analyzing the financial outlook of the Plan, this represents the amount of money needed today to fully fund all future benefits and expenses of the Plan, assuming participants continue to accrue benefits.
- **Actuarial Liability:** Used for funding calculations, this liability is calculated by taking the Present Value of Benefits above and subtracting the present value of future Member Contributions and future Employer Normal Costs under an acceptable actuarial funding method. Employer Normal Costs are developed under the **Entry Age Normal** funding method, with normal cost as a percent of pay determined to be level at each active participant's entry age.

The following table discloses both of these liabilities for the current and prior valuations. The liability is also compared to the Plan's assets to determine the **net surplus** or **unfunded liability**. The net surplus or unfunded liability shown in this report is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the Plan's benefit obligation in the event of a plan termination or other similar actions.

SECTION III – LIABILITIES

Table III-1
Liabilities/Net (Surplus)/Unfunded

		January 1, 2020		January 1, 2021
Present Value of Future Benefits				
(1) Active Participant Benefits				
Retirement Benefits	$	96,898,116	$	107,024,724
Disability Benefits		2,381,497	$	2,029,060
Survivor Benefits		2,212,443		1,898,915
Refund of Members Contribution with Interest		0		0
Other: Vested Benefits		3,304,122		3,705,536
Total Active Participant Benefits*	$	104,796,178	$	114,658,235
(2) Inactive Participant Benefits				
Retirement Benefits	$	123,302,323	$	134,477,232
Disability Benefits	$	3,570,887	$	4,157,751
Survivor Benefits		14,275,538		14,320,024
Terminated Vested and Inactive Members		1,626,797		1,262,019
Total Inactive Participant Benefits	$	142,775,545	$	154,217,026
(3) **Present Value of Benefits (PVFB)** [(1) +(2)]	**$**	**247,571,723**	**$**	**268,875,261**
Actuarial Value of Assets (AVA)	$	172,043,392	$	186,545,645
Present Value of Future Contributions		75,528,331		82,329,616
Total Resources	**$**	**247,571,723**	**$**	**268,875,261**
Actuarial Liability				
Present Value of Benefits (PVFB)	$	247,571,723	$	268,875,261
Present Value of Future Normal Costs (PVFNC)		37,083,442		37,367,628
Actuarial Liability (AL = PVFB – PVFNC)	**$**	**210,488,281**	**$**	**231,507,633**
Actuarial Value of Assets (AVA)		172,043,392		186,545,645
Net (Surplus)/Unfunded (AL – AVA)	**$**	**38,444,889**	**$**	**44,961,988**

* The amount of the accumulated member contributions without accrued interest is $9,722,661 for all active members as of January 1, 2021.

SECTION III – LIABILITIES

Changes in Liabilities

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

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

Unfunded liabilities will change because of all of the above, and also due to changes in Plan assets resulting from:

- Contributions different than expected
- Investment earnings different than expected

In each valuation, we report on those elements of change which are of particular significance, potentially affecting the long-term financial outlook of the Plan. In the following table we present key changes in liabilities since the valuation as of January 1, 2019. The accrual of benefits is the normal cost under the Entry Age Normal cost method.

Table III-2
Change in Actuarial Liability

Liabilities on 01/01/2019	$	202,033,321
Liabilities on 01/01/2021		231,507,633
Liability Increase (Decrease)	$	29,474,312
Change Due to:		
Plan Amendment	$	0
Assumption Change		8,273,246
Method Change		0
Accrual of Benefits		7,229,289
Benefit Payments		(22,944,527)
Passage of Time		30,605,022
Liability (Gain)/Loss		6,311,282
Total	$	29,474,312

SECTION III – LIABILITIES

The following table provides the Normal Cost, which is the cost for the additional benefit accrued during the year. The Normal Cost as a percent of payroll as of January 1, 2019 is used to calculate the 2021 MMO. The Normal Cost as a percent of payroll as of January 1, 2021 is used to calculate the 2022 and 2023 MMO.

Table III-3
Normal Cost and Normal Cost as Percentage of W-2 Payroll

	2019	2021
Normal Cost	$ 3,567,206	$ 4,183,341
W-2 Wages for active members from prior year	$ 19,088,373	$ 21,919,008
Normal Cost as a Percent of the Estimated Payroll	18.69%	19.09%

SECTION IV – MINIMUM MUNICIPAL OBLIGATION

The actuarial funding method used to determine the normal cost and the unfunded actuarial liability is the **Entry Age Normal** (EAN) cost method. The normal cost is based on the normal cost rate determined by taking the value, as of entry age into the plan, of each member's projected future benefits. This value is then divided by the value, also at entry age, of each member's expected future salary producing a normal cost rate as a percent of salary that should remain relatively constant over a participant's career. The normal cost rate is multiplied by current salary to determine each member's normal cost. The total normal cost of the plan is the summation of each member's normal cost. Finally, the normal cost is reduced by the total member contributions to produce the employer normal cost.

The actuarial liability for active participants is the present value of all future benefits expected to be earned under the plan minus the present value of future normal costs. The actuarial liability for inactive participants is the present value of all future pension benefits to be paid from the plan to the retirees and vested terminated participants. The unfunded actuarial liability is the difference between the EAN actuarial liability and the actuarial value of assets.

The amortization requirement is the annual contribution to reduce the unfunded actuarial liability recognized over a certain time period, as outlined in Act 205 and revised by Act 44. The amortization time periods are provided in Appendix D of this report.

In the following charts, we show the actual MMOs for 2021 and 2022. The payroll amounts shown reflect the information provided by the City for those years.

The MMO for 2023 has been estimated based on the results of this valuation and the 2022 estimated payroll. The actual amount will vary based on actual payroll as provided by the City of Allentown.

SECTION IV – MINIMUM MUNICIPAL OBLIGATION

The MMO pay used in the MMO calculation in the table below is provided by the City of Allentown and may differ from the valuation pay provided throughout this report which is based upon actual participant data included in the actuarial valuation as of January 1 of each year.

Table IV-1
Minimum Municipal Obligation (Actual and *Estimated*)

Based on Valuation Report:	**1/1/2019**	**1/1/2021**	***1/1/2021***
Calendar Year:	**2021**	**2022**	***2023***
1. MMO pay (actual/*estimated)* (prior year W2 pay reported by the City)	$ 21,794,634	$ 20,780,334	*$ 21,715,000*
2. Total Normal Cost Percentage	18.69%	19.09%	19.09%
3. Total Normal Cost [(1) x (2)]	$ 4,073,417	$ 3,966,966	*$ 4,145,394*
4. Total Amortization Requirement	4,810,572	6,270,370	6,191,739
5. Total Administrative Expenses	90,000	120,000	120,000
6. **Total Financial Requirement** [(3) + (4) + (5)]	**$ 8,973,989**	**$ 10,357,336**	***$ 10,457,133***
7. Estimated Member Contribution Rate	5.00%	5.00%	*5.00%*
8. Estimated Member Contributions [(1) x Member Contribution Rate]	1,089,732	1,039,017	*1,085,750*
9. Estimated Employer Portion of MMO [(6) - (8)]	$ 7,884,257	$ 9,318,319	*$ 9,371,383*

SECTION IV – MINIMUM MUNICIPAL OBLIGATION

The following table summarizes the development of the gains and losses from 2019 to 2021.

Table IV-2
Development of Actuarial Gain / (Loss)

Unfunded Liability as of 01/01/2019	$	38,173,638
Normal Cost	$	7,229,289
Contributions made		
a. Employee Contributions	$	(2,121,627)
b. Local Portion		(14,965,001)
Actual Expenses	$	237,650
Interest on above		5,573,917
Plan Changes	$	0
Assumption Changes		8,273,246
Method Changes		0
Expected Unfunded Liability as of 01/01/2021	$	42,401,112
Actual Unfunded Liability as of 01/01/2021		44,961,988
Actuarial Gain / (Loss)	$	(2,560,876)
- Investment Gain / (Loss)		3,750,406
- Liability Gain / (Loss)		(6,311,282)

This table provides the gains/(losses) for the new amortization base.

Table IV-3
Total Gain/(Loss)

Investment Gain / (Loss)	$	3,750,406
Liability Gain / (Loss)		(6,311,282)
Timing and interest Gain / (Loss)		(813,871)
Total Gain/(Loss)	$	(3,374,747)

SECTION IV – MINIMUM MUNICIPAL OBLIGATION

The following tables provide the schedule of amortization bases as of January 1, 2021. The $3,374,747 actuarial loss reflects the explicit loss for the two-year period as provided above along with the timing and interest loss due to the delayed contribution method as followed under Act 205.

The assumption change base of $8,273,246 accounts for the change in the assumptions for the interest rate and retirement rates used to value liabilities which are detailed in Appendix D and in the Board Summary. The amortized payments prior to 2021 were re-determined based on the updated interest rate assumption.

Table IV-4
Schedule of Amortization Bases Including Bond Proceeds for Minimum Contributions as of January 1, 2021

Original Date	Type	Original Amount	Original Period	Remaining Period	Payment	Balance	Date Fully Amortized
1/1/2002	Investment Loss	$ 480,106	30	11	$ 2,646	$ 20,890	12/31/2031
1/1/2003	Investment Loss	7,174,076	30	12	39,463	329,579	12/31/2032
1/1/2005	Plan Amendment	21,864,229	20	4	140,099	505,094	12/31/2024
1/1/2007	Actuarial Loss	10,623,640	15	1	78,631	78,631	12/31/2021
1/1/2009	Assumption Change	(14,353,695)	20	8	(91,206)	(575,958)	12/31/2028
1/1/2009	Actuarial Loss	38,047,505	20	8	241,759	1,526,696	12/31/2028
1/1/2011	Actuarial Loss	15,354,171	20	10	97,191	719,779	12/31/2030
1/1/2013	Assumption Change	4,976,960	15	7	36,347	207,479	12/31/2027
1/1/2013	Actuarial Loss	11,938,286	20	12	75,300	628,866	12/31/2032
1/1/2015	Assumption Change	4,837,709	14	8	529,421	3,343,260	12/31/2028
1/1/2015	Actuarial Loss	7,193,083	14	8	787,184	4,971,019	12/31/2028
1/1/2017	Assumption Change	8,027,201	14	10	876,415	6,490,560	12/31/2030
1/1/2017	Actuarial Loss	10,841,897	14	10	1,183,726	8,766,439	12/31/2030
1/1/2019	Actuarial Loss	6,999,770	13	11	798,130	6,301,661	12/31/2031
1/1/2021	Assumption Change	8,273,246	11	11	1,047,839	8,273,246	12/31/2031
1/1/2021	Actuarial Loss	3,374,747	11	11	427,425	3,374,747	12/31/2031
					$ 6,270,370	$ 44,961,988	

APPENDIX A – SUPPLEMENTAL INFORMATION EXCLUDING BOND PROCEEDS

Allentown received the proceeds of a Pension Obligation Bond in 1996 and Note payment in 2013 which improved the financial status of the Plan. This section provides the development of the unfunded liability based upon assets without the bond proceeds and the Note payment and the amortization amount of this unfunded liability.

Under Act 205 section 404, municipalities that issue bonds (or notes) to fund the unfunded actuarial liabilities must complete Exhibit I of the Act 205 form reflecting the funded status and MMO determination of the plan as if the bond issuance (or notes) had not occurred. The contributions used for determining the assets excluding the bonds and the Note payment as of the valuation date are based upon "hypothetical amortization contributions that would have been made had bond issue proceeds not been deposited", as described on the Act 205 form. In addition, investment earnings exclude earnings on bond issue proceeds (as instructed) by applying the rate of market returns for the year on the assets excluding the bonds.

The tables in this section consist of:

- Market Value of Assets without Bond Proceeds
- Actuarial Value of Assets without Bond Proceeds
- Unfunded Liability without Bond Proceeds
- Actuarial (Gain)/Loss without Bond Proceeds
- Schedule of Amortization bases without Bond Proceeds

Table A-1
Market Value of Assets with Gain/(Loss) without Bond

	2019	2020	Total Period
Beginning of Year Market Value	**$ 108,433,590**	**$ 136,364,148**	**$ 108,433,590**
Contributions	16,466,780	16,948,154	33,414,934
Benefit Payments	(11,133,444)	(11,811,083)	(22,944,527)
Administrative Expenses	(134,819)	(102,831)	(237,650)
Investment Earnings*	22,732,041	16,777,078	39,509,119
Estimated Market Value on December 31	**$ 136,364,148**	**$ 158,175,466**	**$ 158,175,466**
Expected Investment Earnings (7.50%)	8,323,939	10,412,682	17,656,014
Expected Market Value on December 31	$ 121,956,046	$ 151,811,070	$ 136,322,361
Investment Gain / (Loss)	14,408,102	6,364,396	21,853,105
End of Year Market Value	$ 136,364,148	$ 158,175,466	$ 158,175,466

* Based upon market value with bond returns in Table II - 3

APPENDIX A – SUPPLEMENTAL INFORMATION EXCLUDING BOND PROCEEDS

Table A-2
Development of Actuarial Value of Assets Without Bond
5-Year Smoothing Method

Market Value of Assets as of January 1, 2021					$ 158,175,466
Plan Year	**Investment Gains / (Losses)**	**Percent Recognized**	**Percent Deferred**		**Amount Deferred**
2016	$ 83,735	100%	0%		$ 0
2017	7,310,431	80%	20%		1,462,086
2018	(13,325,548)	60%	40%		(5,330,219)
2019	14,408,102	40%	60%		8,644,861
2020	6,364,396	20%	80%		5,091,517
					$ 9,868,245
Preliminary Actuarial Value as of January 1, 2021					$ 148,307,221
Corridor for Actuarial Value					
- Lower Limit				80%	$ 126,540,373
- Upper Limit				120%	$ 189,810,559
Actuarial Value of Assets as of January 1, 2021					$ 148,307,221
- as a percent of Market Value of Assets					93.8%

Table A-3
Liabilities/Net (Surplus)/Unfunded Based upon Assets without Bond

	January 1, 2021
Actuarial Liability	$ 231,507,633
Actuarial Value of Assets without Bond	148,307,221
Net (Surplus)/Unfunded without Bond (AL – AVA)	$ 83,200,412

APPENDIX A – SUPPLEMENTAL INFORMATION EXCLUDING BOND PROCEEDS

The following table provides the explicit gains/(losses) of the unfunded liability based upon the assets without the bond.

Table A-4 Development of Actuarial Gain/(Loss) without the Bond		
Unfunded Liability without Bond as of 01/01/2019	$	86,097,275
Normal Cost	$	7,229,289
Contributions made		
a. Employee Contributions	$	(2,121,627)
b. Local Portion		(31,293,307)
Actual Expense	$	237,650
Interest on above		11,737,035
Plan Changes	$	0
Assumption Changes	$	8,273,246
Method Changes		0
Expected Unfunded Liability as of 01/01/2021	$	80,159,561
Actual Unfunded Liability as of 01/01/2021		83,200,412
Actuarial Gain / (Loss)	$	(3,040,851)
- Investment Gain / (Loss)		3,270,431
- Liability Gain / (Loss)		(6,311,282)

Table A-5 Total Gain/(Loss) without Bond		
Investment Gain / (Loss)	$	3,270,431
Liability Gain / (Loss)		(6,311,282)
Timing and interest Gain / (Loss)		(147,960)
Total Gain/(Loss)	$	(3,188,811)

APPENDIX A – SUPPLEMENTAL INFORMATION EXCLUDING BOND PROCEEDS

The following table provides the schedule of amortization bases as of January 1, 2021 without bond proceeds. Plan amendments and assumption changes prior to January 1, 2015 have not been adjusted by the 2013 Cancellation Ratio based on the 2013 Note contribution paid by the City, which triggered the application of Act 205 Section 404(h) to the Amortization Bases Including Bond Proceeds.

Table A-6
Schedule of Amortization Bases Excluding Bond for Minimum Contributions as of January 1, 2021

Original Date	Type	Original Amount	Original Period	Remaining Period	Annual Payment	Remaining Balance	Date Fully Amortized
1/1/2002	Investment Loss	$ 480,106	30	11	$ 38,261	$ 302,092	12/31/2031
1/1/2003	Investment Loss	7,174,076	30	12	570,715	4,766,340	12/31/2032
1/1/2005	Plan Amendment	21,864,229	20	4	2,026,102	7,304,612	12/31/2024
1/1/2007	Actuarial Loss	9,899,371	15	1	1,059,623	1,059,623	12/31/2021
1/1/2009	Assumption Change	(13,527,285)	20	8	(1,243,062)	(7,849,862)	12/31/2028
1/1/2009	Actuarial Loss	36,459,820	20	8	3,350,400	21,157,573	12/31/2028
1/1/2011	Actuarial Loss	15,012,528	20	10	1,374,294	10,177,753	12/31/2030
1/1/2013	Assumption Change	4,976,960	15	7	525,651	3,000,547	12/31/2027
1/1/2013	Actuarial Loss	12,911,978	20	12	1,177,794	9,836,372	12/31/2032
1/1/2015	Assumption Change	4,837,709	14	8	529,421	3,343,260	12/31/2028
1/1/2015	Actuarial Loss	6,935,306	14	8	758,974	4,792,876	12/31/2028
1/1/2017	Assumption Change	8,027,201	14	10	876,416	6,490,561	12/31/2030
1/1/2017	Actuarial Loss	5,711,586	14	10	623,595	4,618,221	12/31/2030
1/1/2019	Actuarial Loss	3,041,750	13	11	346,827	2,738,387	12/31/2031
1/1/2021	Assumption Change	8,273,246	11	11	1,047,839	8,273,246	12/31/2031
1/1/2021	Actuarial Loss	3,188,811	11	11	403,875	3,188,811	12/31/2031
					$ 13,466,725	$ 83,200,412	

APPENDIX B – MEMBERSHIP INFORMATION

The data for this valuation was provided by the City as of January 1, 2021. Cheiron did not audit any of the data; however, we performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standards of Practice No. 23.

The following is a list of data charts contained in this section:

- Summary of Participant Data
- Age/Service Distribution for Active Participants, including counts and total salary
- Counts and Total Benefit Amount by Age for Retirees, Beneficiaries, and Disabled Participants
- Reconciliation of Active, Terminated Vested, and In-Pay Participants

SUMMARY OF PARTICIPANT DATA	1/1/2020	1/1/2021
Active Participants		
Count	207	214
New Entrants	10	21
Average Age	40.0	39.3
Average Benefit Service	12.0	11.7
Annual Payroll*	$ 17,877,177	$ 18,458,126
Retirees and Beneficiaries Receiving Payments		
Count	288	293
Average Age	65.7	65.3
Annual Benefits	$ 11,512,752	$ 12,293,158
Average Monthly Benefit	$ 3,331	$ 3,496
Terminated Vested Participants and Inactive Members		
Count**	12	14
Accumulated Member Contributions w/o Interest	$ 111,343	$ 146,342
Annual Benefits	$ 114,673	$ 106,037
Average Monthly Benefit	$ 3,185	$ 2,945

The estimated benefit payments for the current plan year are $12,831,697.

*Includes base pay plus the lesser of the overtime pay and 10% of base pay.
**In 2020, nine members entitled to only contributions without interest and three members entitled to a monthly benefit. In 2021, eleven members entitled to only contributions without interest and three members entitled to a monthly benefit.

APPENDIX B – MEMBERSHIP INFORMATION

Summary of Active Data with Base Pay as of January 1, 2021

	YEARS OF CREDITED SERVICE																			
	Under 1		1 to 4		5 to 9		10 to 14		15 to 19		20 to 24		25 to 29		30 to 34		35 to 39		40 & up	
Attained Age	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.	No.	Average Comp.
Under 25	5	$ 49,253	4	$ 65,039	0	$ 0	0	$ 0	0	$ 0	0	$ 0	0	$ 0	0	$ 0	0	$ 0	0	$ 0
25 to 29	9	54,015	17	73,653	2	87,181	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30 to 34	1	60,190	6	75,163	22	88,289	3	87,701	0	0	0	0	0	0	0	0	0	0	0	0
35 to 39	1	42,785	5	79,115	9	88,296	25	88,761	1	88,560	0	0	0	0	0	0	0	0	0	0
40 to 44	0	0	1	87,496	5	85,485	14	90,394	23	94,048	6	93,556	0	0	0	0	0	0	0	0
45 to 49	1	42,812	1	68,213	4	89,318	11	90,713	8	92,635	6	94,670	0	0	0	0	0	0	0	0
50 to 54	0	0	0	0	0	0	5	88,476	6	93,645	6	98,645	3	101,225	0	0	0	0	0	0
55 to 59	0	0	0	0	0	0	0	0	1	105,167	1	97,055	0	0	0	0	0	0	0	0
60 to 64	0	0	0	0	0	0	1	95,207	0	0	1	96,685	0	0	0	0	0	0	0	0
65 to 69	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

APPENDIX B – MEMBERSHIP INFORMATION

Summary of Inactive Data as of January 1, 2021

AGE DISTRIBUTION OF INACTIVE PARTICIPANTS
PENSIONERS AND BENEFICIARIES RECEIVING BENEFITS AS OF JANUARY 1, 2021

	Disability Retirements			Normal, Early Deferred Vested Retirements			Surviving Spouses and Beneficiaries Receiving Benefits			Total		
Age	Number		Monthly Benefit	Number		Monthly Benefit	Number		Monthly Benefit	Number		Monthly Benefit
Under 55	7	$	22,130	58	$	287,498	7	$	20,545	72	$	330,173
55-59	1		1,746	38		173,043	8		11,348	47		186,137
60-64	1		922	39		167,171	4		7,382	44		175,475
65-69	1		1,490	25		93,264	7		15,624	33		110,378
70-74	0		0	24		72,443	11		27,259	35		99,702
75-79	0		0	12		36,340	6		13,594	18		49,934
80 & Over	0		0	20		33,377	24		39,254	44		72,631
Total	10	$	26,288	216	$	863,136	67	$	135,006	**293**	**$**	**1,024,430**

APPENDIX B – MEMBERSHIP INFORMATION

Participant Reconciliation from January 1, 2020 to January 1, 2021

		Actives	Inactive	Term. Vested	Disabled	Retired	Beneficiary	Total
January 1, 2020 valuation		**207**	**9**	**3**	**9**	**211**	**68**	**507**
Additions / QDROs		21	1					**22**
Reductions								
a.	Terminated - not vested, refund due	(1)	1					
b.	Deaths without beneficiary					(5)	(4)	(9)
	Total	**(1)**	**1**			**(5)**	**(4)**	**(9)**
Changes in status								
b.	Terminated - vested	(1)		1				
c.	Retired	(11)		(1)		12		
d.	Disabled	(1)			1			
e.	Died with beneficiary					(3)	3	
f.	Data corrections					1		1
	Total	**(13)**			**1**	**10**	**3**	**1**
January 1, 2021 valuation		**214**	**11**	**3**	**10**	**216**	**67**	**521**

APPENDIX B – MEMBERSHIP INFORMATION

Active Members	Count		Annual Pay
As of last valuation date	207	$	17,877,177
Separations from active service			
Refund of contributions	1	$	90,220
Separation with deferred benefit	1		89,996
Separation due refund	0		0
Disability	1		90,795
Death	0		0
Retirement with service retirement benefit	11		1,034,637
Total separations	**14**	**$**	**1,305,648**
As of current valuation date using prior pay	**193**	**$**	**16,571,529**
As of current valuation date using current pay	**193**	**$**	**17,363,104**
New entrants	21		1,095,022
As of current valuation date	**214**	**$**	**18,458,126**

Service retirement benefit recipients	Count		Annual Benefit
As of last valuation date	211	$	9,557,980
New Benefit recipients	13		923,035
Total	**224**	**$**	**10,481,015**
Terminations	0	$	0
Deaths	8		129,498
Others	0		0
Total terminations	**8**	**$**	**129,498**
COLA increase			6,120
QDRO Decrease			
As of current valuation date	**216**	**$**	**10,357,637**

APPENDIX B – MEMBERSHIP INFORMATION

Disability benefit recipients	Count	Annual Benefit
As of last valuation date	9	$ 262,495
New Benefit recipients	1	49,861
Total	**10**	**$ 312,356**
Terminations	0	$ 0
Deaths	0	0
Others	0	0
Total terminations	**0**	**$ 0**
COLA increase		3,094
As of current valuation date	**10**	**$ 315,450**

Surviving Spouses	Count	Annual Benefit
As of last valuation date	68	$ 1,614,383
New Benefit recipients	3	77,895
Total	**71**	**$ 1,692,278**
Terminations	0	$ 0
Deaths	4	72,207
Others	0	0
Total terminations	**4**	**$ 72,207**
As of current valuation date	**67**	**$ 1,620,071**

APPENDIX B – MEMBERSHIP INFORMATION

Inactive Refund Due	Count		Balance
As of last valuation date	9	$	111,343
New recipients	2		34,999
Total	**11**	**$**	**146,342**
Refund	0	$	0
Total terminations	**0**	**$**	**0**
As of current valuation date	**11**	**$**	**146,342**

Deferred Benefits	Count		Annual Benefit
As of last valuation date	3		114,673
New recipients	1		32,885
Total	**4**	**$**	**147,558**
Retirees	1	$	41,520
Deaths	0		0
Others	0		0
Total terminations	**1**	**$**	**41,520**
As of current valuation date	**3**	**$**	**106,038**

APPENDIX C –SUMMARY OF PLAN PROVISIONS

1. Normal Retirement

Participants hired prior to January 1, 2009:

Eligibility: 20 years of service.

Basic Benefit: The retirement benefit shall be 50.5% of the rate of monthly pay of the employee at the time of retirement or the highest average annual salary during any five years of service.

Service Increment: 7.5% of salary for the first full year of service over 20 years, plus 3.0% of salary for each of the next four full years of service up to a maximum of 19.5% of salary. Service after attaining age 65 is excluded.

The maximum benefit is 70% of salary.

Salary will include base pay, longevity, holiday pay, festive pay, shift differential and overtime. Overtime shall be limited to 10% of base pay for the rate of monthly pay.

The minimum benefit is $10,400 per year.

Participants hired on or after January 1, 2009:

Eligibility: 20 years of service.

Basic Benefit: The retirement benefit shall be 50% of the rate of monthly pay of the employee at the time of retirement or the highest average annual salary during any five years of service.

Service Increment: One-fortieth (1/40th) times the Basic Benefit for each year of service in excess of 20 years. The total Service Increment cannot exceed $6,000 in total annual benefit increase (i.e. $500 additional monthly benefit). Service after attaining age 65 is excluded.

Salary will include base pay, longevity, holiday pay, festive pay, shift differential and overtime. Overtime shall be limited to 10% of base pay for the rate of monthly pay.

The minimum benefit is $10,400 per year.

2. Early Retirement

None permitted.

APPENDIX C –SUMMARY OF PLAN PROVISIONS

3. Termination Benefits

Vesting: 100% after 12 years of service.

Termination before normal retirement eligibility: Member becomes eligible for retirement at the point he would have attained eligibility for normal retirement had he continued in employment. Prior to 20 years, the benefit is based upon a pro-rated portion of the normal retirement benefit. After 20 years, the benefit is the normal retirement benefit.

Non-Vested Benefit: Refund of contributions (including any military buy-back contributions, if applicable) without interest.

4. Survivor Benefits

Members retired on or after December 17, 1969, active members dying in the line of duty, active members dying not in the line of duty with 10 or more years of service: 100% of the pension benefit applicable to the member.

Active members not dying in the line of duty with less than 10 years of service: 50% of the pension benefit applicable to the member.

Survivors include the spouse of the member, domestic partner, dependent children, or dependent parents approved by the Pension Board. If the spouse dies leaving dependent children, then the dependent children will continue to receive survivor benefits until age 18.

Killed-in-Service - The survivor shall receive 62.5% of officer's wages or 50.5% plus service increments which the officer would be entitled to receive at the time of death, whichever is higher.

5. Disability Benefits

Annual Benefit prior to Normal Retirement Eligibility: 50.5% of Salary plus any Service Increment earned.

Annual Benefit if Retirement Eligible: The normal retirement benefit.

6. Credit for Military Service

Any member with military service prior to becoming a member in the Plan may purchase credited military service, not to exceed five (5) years of such service.

7. Purchased Service

Not applicable.

APPENDIX C –SUMMARY OF PLAN PROVISIONS

8. Employee Contributions

5% of salary. Salary will include base pay, longevity, holiday pay, festive pay, shift differential and overtime.

9. Cost of Living Adjustment

Participants and their beneficiaries retiring after January 1, 2007 shall receive an annual cost of living adjustment (COLA) once each retiree is eligible for the COLA. Annual COLAs do not occur until the pension allowance is less than half of the current salary for a police officer based upon rank at retirement. Such increases shall be in conformity with the uniform scale, which may be based on the cost of living, but the total of such allowances shall not at any time exceed ½ of the current salary benefit paid to the patrolmen of the highest grade.

Participants and their beneficiaries retiring between January 1, 2005 and December 31, 2006 will receive the same COLA as those retiring after January 1, 2007 unless they opted out as of their benefit commencement date.

10. Changes Since Last Valuation (i.e., since January 1, 2019 under Act 205)

There have been no changes in plan provisions since the prior valuation, however, the City provided clarification of the retirement eligibility provisions for participants hired January 1, 2009 or later.

APPENDIX D – ACTUARIAL ASSUMPTIONS AND METHODS

A. Demographic and Economic Assumptions

The demographic and economic assumptions are selected by the City of Allentown Pension Board. Some of these assumptions have been updated since Cheiron became the actuary to the Plan. For the updated assumptions, experience studies have been completed as requested by the Board and based on Cheiron's review of assumptions for reasonability.

1. Mortality Rates

Healthy Mortality: RP-2000 Blue Collar Combined Healthy Mortality Table projected generationally from base year 2000 using 50% of Scale AA.

Disabled Mortality: RP-2000 Disabled Mortality Table.

The mortality assumption was set by the City of Allentown Pension Board, which has control over the selection of the pension valuation assumptions, rather than the actuary. Based upon limited data, this mortality assumption was reviewed and appears to be reasonable in terms of reflecting projected mortality improvement in the future.

2. Disability Rates

100% of the 1955 United Auto Workers Table.

Age	Male	Female
30	0.04%	0.06%
35	0.05%	0.08%
40	0.07%	0.10%
45	0.10%	0.15%
50	0.18%	0.26%
55	0.36%	0.49%
60	0.90%	1.21%
>=65	0.00%	0.00%

3. Termination Rates

Plan specific rates based, in part, on the following table:

Age	Male	Female
25	5.00%	7.50%
30	3.75%	5.00%
35	2.50%	3.75%
40	1.50%	2.50%
45	0.75%	1.25%
>=50	0.00%	0.00%

APPENDIX D – ACTUARIAL ASSUMPTIONS AND METHODS

4. **Retirement Rates for Active Employees**

Service	Rate
0-19	0.00%
20	20.0%
21	30.0%
22-28	15.0%
>=29	100.0%

Assumed retirement date for active participants who are assumed to terminate prior to attaining retirement eligibility or current terminated vested participants is the date the Member would have attained eligibility for normal retirement had the member continued in employment.

5. **Percent Married**

80% of active members are assumed to be married.

6. **Age of Spouse**

Female spouse is assumed to be two years younger than male spouse.

7. **Investment Return**

7.40% per annum, net of investment management expenses.

8. **Salary Increase**

Salary increases:

With Merit Increases:	4.5% compounded annually.
Without Merit Increases:	3.5% compounded annually.

9. **Overtime**

Participants are assumed to attain overtime pay equal to a ratio of base pay at retirement. The ratio is calculated separately for each participant. The numerator of the ratio is the average of the participant's overtime earnings during the three-year period prior to the valuation. The denominator is the individual's base pay during the year immediately preceding the valuation.

10. **Credit for Military Service**

Military service purchased as of the valuation date, as provided by the City, is reflected in the valuation results. Future possible military service purchases are not assumed.

APPENDIX D – ACTUARIAL ASSUMPTIONS AND METHODS

11. Form of Annuity

Married participants: 100% Joint and Survivor Annuity.

Single participants: Life Annuity.

12. Cost of Living Adjustment

2.4% per year upon eligibility to receive a COLA.

For participants eligible to receive a COLA, the pay of the same rank as the participant as of their retirement date is projected into the future to determine the date that future benefit increases are expected to begin.

Active participants:
If hired after 2008: COLA increases assumed to begin four years after retirement date.
If hired prior to 2009: COLA increases assumed to begin 15 years after retirement date.

13. Expenses

Expenses are assumed to equal the two-year average of paid administrative expenses, rounded to the nearest $10,000. Expenses are assumed to increase based on without merit salary scale in the future for MMO projections.

14. Rationale for Assumptions

In accordance with Actuarial Standard of Practice No. 27, the rationale for the 7.40% discount rate is based on the Board's investment risk preference, the Plan's current asset allocation, and the investment manager's capital market outlook.

For the demographic assumptions, the rate of retirement is based the Board's expectation based on review of recent retirement rates which have increased in the past few years. The rates of mortality were selected based on plan experience as reviewed by Cheiron with the Board. These rates are monitored for reasonability.

15. Changes since last biennial valuation (i.e., since January 1, 2019 under Act 205)

Retirement rates were changed by the Board to better reflect the assumed retirement rates for active participants based on attained service.

The investment return assumption was decreased from 7.50% to 7.40%.

APPENDIX D – ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

1. Funding Method

Under the entry age normal actuarial cost method, the individual entry age normal cost is determined for each participant by calculating the annual contribution rate as a level percent of pay required to fund that individual's expected benefits, based on the current plan provisions, over the participant's expected active working lifetime with the Plan at entry.

At the valuation date, the present value of future normal cost is calculated for each individual participant by multiplying the entry age normal cost by the present value of the participant's expected future salary with the Plan. The cost for each participant is then summed to yield the present value of future normal costs.

The excess of the present value of future benefits for all individuals at the valuation date over the present value of future normal costs is called the actuarial liability, or past service liability.

2. Amortization Method

Under Act 44 of 2009, the unfunded actuarial liability is amortized as a level dollar amount over the lesser of:

(a) (i) 30 years, with respect to the initial liability as of 1/1/85 (or first valuation);
(ii) 20 years, with respect to actuarial gains and losses;
(iii) 15 years, with respect to changes due to actuarial assumptions;
(iv) 10 years, with respect to changes in benefits not mandated by the state for active members;
(v) 1 year, with respect to changes in benefits not mandated by the state for currently retired members;
(vi) 20 years, with respect to state mandated benefit changes;

or

(b) The average assumed working lifetime of active employees as of the date the liability was established, rounded to the next highest whole year.

If the Plan for the prior biennial valuation was determined to be moderately or severely distressed, then the amortization period is only determined by (a).

APPENDIX D – ACTUARIAL ASSUMPTIONS AND METHODS

3. Actuarial Value of Assets

The actuarial value of assets is determined in accordance with Section 3.16 of Revenue Procedure 2000-40, using a five-year smoothing period. The resulting actuarial value of assets is then limited to be no greater than 120% and no less than 80% of the market value of assets on the valuation date.

4. Disclosure regarding Models Used

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

Projections in this report were developed using R-scan, our proprietary tool for the intended purpose of developing projections. The model is also used to stress test the impact of volatile asset returns over the projection period. While the assumptions individually are reasonable for the underlying report that supports the projections, specifically for projection purposes, they are also considered reasonable in the aggregate.

5. Changes in Method Since Last Valuation

None.