

THE CORPORATION OF THE CITY OF HAMILTON  
HAMILTON MUNICIPAL RETIREMENT FUND  
Actuarial Valuation as at December 31, 2021

September 22, 2022

Registration Number: 0275123

This document is being filed with the Pension Authorities as required by statute and contains confidential financial information regarding the plan, the plan sponsor, and the plan members. Therefore, pursuant to subsection 20(1)(b) of the *Access to Information Act (Canada)*, or a corresponding provision under any comparable federal or provincial legislation, a government institution shall not disclose this document to any party as a result of a request under the *Access to Information Act (Canada)* or other applicable legislation.



## DISCLAIMERS

This document is an actuarial valuation report of a pension plan. It is technical in nature and the reader should seek expert advice to fully understand it. The actuarial results presented here are based on numerous economic and demographic assumptions as to future events. Emerging experience, differing from the assumptions, will result in gains or losses that will be revealed in future actuarial valuations.

This report is based on the terms of engagement listed in Appendix A.

This report is based on the premise that all the plan's assets, including any letters of credit, are available to meet the plan's liabilities included in this valuation.

This report is based on the premise that the plan remains a going concern. This report does not address the disposition of any surplus assets remaining in the event of plan windup. If an applicable pension regulator or other entity with jurisdiction directs otherwise, certain financial measures contained in this report, including contribution requirements, may be affected.

The results presented in this report have been developed using a particular set of actuarial assumptions. Other results could have been developed by selecting different actuarial assumptions. The results presented in this report are reasonable actuarial results based on actuarial assumptions reflecting our expectation of future events.

Future contribution levels may change as a result of future changes in the actuarial methods and assumptions, the membership data, the plan provisions and the legislative rules, or as a result of future experience gains or losses, none of which have been anticipated at this time.

The results were developed with various data as at the valuation date that were provided to us: plan membership data, plan assets data, plan provisions and statement of investment policy. Towers Watson Canada Inc. ("WTW") has relied on these data after verifying them and assessing their reasonableness. However, WTW has not independently audited these data.

The information contained in this report was prepared for The Corporation of the City of Hamilton, for its internal use and for filing with the Pension Authorities, in connection with the actuarial valuation of the plan prepared by WTW. This report is not intended, nor necessarily suitable, for other parties or for other purposes. Furthermore, some results in this report are based on assumptions mandated by legislation. These results may not be appropriate for purposes other than those for which they were prepared. Further distribution of all or part of this report to other parties (except where such distribution is required by applicable legislation) or other use of this report is expressly prohibited without WTW's prior written consent. WTW is available to provide additional information with respect to this report to the above-mentioned intended users upon request.

The numbers in this report are not rounded. The fact that numbers are not rounded does not imply a greater level of precision than if the numbers had been rounded.

## Definitions

**CIA** means the Canadian Institute of Actuaries.

**Pension Authorities** means the Financial Services Regulatory Authority of Ontario and the Canada Revenue Agency ("CRA").

**Pension Legislation** means the *Pension Benefits Act (Ontario)* and Regulation thereto and the *Income Tax Act (Canada)* and Regulations thereto ("ITA").

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# Introduction

## Purpose

This report with respect to the Hamilton Municipal Retirement Fund has been prepared for The Corporation of the City of Hamilton, the plan administrator, and presents the results of the actuarial valuation of the plan as at December 31, 2021.

The principal purposes of the report are:

- to present information on the financial position of the plan on going concern, solvency and hypothetical windup bases; and
- to provide the basis for employer contributions.

## Significant Events since Previous Actuarial Valuation (December 31, 2019)

There have been no changes to the plan provisions or the legislative and actuarial standards having an impact on the valuation results.

Changes to the going concern basis, if any, are described in Appendix C. Changes to the solvency and hypothetical windup bases are described in Appendix D.

On March 11, 2020, the World Health Organization declared COVID-19 to be a pandemic. Various public health measures have been taken worldwide to contain the spread of COVID-19. Long-term effects of COVID-19 on financial markets, regulations, and experience are uncertain and still evolving. Per discussions with The Corporation of the City of Hamilton, the assumptions used in this report make no specific allowances for the future effects of COVID-19. There may be effects on the financial position of the plan that will be reflected in future actuarial valuations.

## Subsequent Events

We completed this actuarial valuation on September 22, 2022.

Since the valuation date, there has been market instability, characterized by rising interest rates and volatile equity markets. On February 24, 2022, Russia initiated military action against Ukraine, and in response, multiple jurisdictions have imposed economic sanctions on Russia, and a number of large companies have voluntarily curtailed their business activities in Russia. The war in Ukraine and related events are likely to intensify the effects of current market conditions. The assumptions used in this report make no specific allowances for future effects of these events. The effects on the financial position of the plan will be reflected in future actuarial valuations.

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To the best of our knowledge and on the basis of our discussions with The Corporation of the City of Hamilton, no other events which would have a material financial effect on the actuarial valuation occurred between the actuarial valuation date and the date this actuarial valuation was completed.

### **Next Valuation**

The next actuarial valuation of the plan must be performed with an effective date not later than December 31, 2024.

## Section 1: Going Concern Financial Position

### 1.1 Statement of Financial Position

	December 31, 2021			December 31, 2019
	Fire	Others	Total	Total
<b>Going Concern Value of Assets</b>	\$ 68,996,013	\$ 4,725,552	\$ 73,721,565	\$ 71,445,290
<b>Actuarial Liability</b>				
Active members	\$ 0	\$ 0	\$ 0	\$ 0
Retired members	30,431,280	551,095	30,982,375	38,471,763
Beneficiaries	15,509,263	1,743,648	17,252,911	18,337,071
Terminated vested members	0	131,969	131,969	129,484
Provision for future pension increases	6,455,228	312,533	6,767,761	8,273,523
Total actuarial liability	\$ 52,395,771	\$ 2,739,245	\$ 55,135,016	\$ 65,211,841
<b>Actuarial Surplus (Unfunded Actuarial Liability)</b>	\$ 16,600,242	\$ 1,986,307	\$ 18,586,549	\$ 6,233,449
<b>Funded Ratio</b>			133.7%	109.6%
Provision for Adverse Deviation (PfAD)	\$ 2,986,135	\$ 157,736	\$ 3,143,871	\$ 3,700,990
<b>Actuarial Surplus (Unfunded Actuarial Liability) After PfAD</b>	\$ 13,614,107	\$ 1,828,571	\$ 15,442,678	\$ 2,532,459
<b>Excess Actuarial Surplus <sup>1</sup></b>			\$ 872,956	\$ 0

**Note:**

<sup>1</sup> Considered to be nil if there is a hypothetical windup or solvency deficit.

**Comments:**

- The plan provides for indexation (escalated adjustments, as defined in the Pension Legislation). The actuarial liability as at December 31, 2021 shown above includes \$6,767,761 in respect of indexation. The actuarial liability in respect of indexation has not been included in determining the PfAD.
- The split of assets between "Fire" and "Others" groups is provided by The Corporation of the City of Hamilton, based on the pension payroll in effect at the valuation date.

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## 1.2 Reconciliation of Financial Position and Provision for Adverse Deviations

### 1.2.1 Reconciliation of Financial Position

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Actuarial surplus (unfunded actuarial liability) as at December 31, 2019	\$	6,233,449	
Net special payments			0
Expected interest on:			
■ Actuarial surplus (unfunded actuarial liability)	\$	418,196	
■ Amortization payments and PfAD contributions		<u>0</u>	418,196
Plan experience:			
■ Investment gains (losses)	\$	9,258,592	
■ Mortality gains (losses)		3,672,577	
■ Pension increases less than 2% per annum assumed		158,779	
■ Miscellaneous		<u>6,202</u>	13,096,150
Change in Actuarial Basis			
■ Economic assumptions			<u>(1,161,246)</u>
Actuarial surplus (unfunded actuarial liability) as at December 31, 2021	\$		18,586,549

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**1.2.2 Reconciliation of Provision for Adverse Deviations**

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Provision for adverse deviations as at December 31, 2019	\$	3,700,990
Change in provision for adverse deviations:		
■ Increase (decrease) due to change in PfAD level	\$	0
■ Increase (decrease) due to change in actuarial liability	<u>(557,119)</u>	(557,119)
Provision for adverse deviations as at December 31, 2021	\$	3,143,871

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### 1.3 Contributions (Ensuing Year)

	December 31, 2021	December 31, 2019
<b>Employer Normal Actuarial Cost</b>		
Normal actuarial cost in respect of benefit accruals	\$ 0	\$ 0
Provision for adverse deviations (PfAD)	0	0
Estimated member contributions	(0)	(0)
Employer normal actuarial cost	\$ 0	\$ 0

## Section 2: Solvency and Hypothetical Windup Financial Position

### 2.1 Statement of Solvency and Hypothetical Windup Financial Position

	December 31, 2021			December 31, 2019
	Fire	Others	Total	Total
<b>Solvency Value of Assets</b>				
Market value of assets	\$ 68,996,013	\$ 4,725,552	\$ 73,721,565	\$ 71,445,290
Provision for plan windup expenses	(140,385)	(9,615)	(150,000)	(150,000)
Total solvency value of assets	\$ 68,855,628	\$ 4,715,937	\$ 73,571,565	\$ 71,295,290
<b>Solvency Liability</b>				
Active members	\$ 0	\$ 0	\$ 0	\$ 0
Retired members	30,643,392	532,080	31,175,472	38,941,792
Beneficiaries	15,866,459	1,786,577	17,653,036	18,788,666
Terminated vested members	0	131,969	131,969	129,484
Total actuarial liability	\$ 46,509,851	\$ 2,450,626	\$ 48,960,477	\$ 57,859,942
<b>Solvency Surplus (Unfunded Solvency Liability)</b>	\$ 22,345,777	\$ 2,265,311	\$ 24,611,088	\$ 13,435,348
<b>Solvency ratio</b>			150.6%	123.5%
Value of excluded benefits	\$ 11,174,746	\$ 555,298	\$ 11,730,044	\$ 14,959,982
Total hypothetical windup liability	\$ 57,684,597	\$ 3,005,924	\$ 60,690,521	\$ 72,819,924
<b>Hypothetical Windup Surplus (Unfunded Hypothetical Windup Liability)</b>	\$ 11,171,031	\$ 1,710,013	\$ 12,881,044	\$ (1,524,634)
Lesser of estimated employer contributions for the period until the next actuarial valuation and the prior year credit balance			\$ 0	\$ 0
<b>Transfer ratio</b>			121.5%	98.1%

**Comments:**

- As a result of Ontario Regulation 73/95, coverage under the Pension Benefit Guarantee Fund (PBGF) is exempted and PBGF assessment is not required.
- The solvency actuarial valuation results presented in this report are determined under a scenario where, following a plan windup, the employer continues its operations.
- The split of assets between "Fire" and "Others" groups is provided by the Corporation of the City of Hamilton, based on the pension payroll in effect at the valuation date.
- The hypothetical windup valuation results presented in this report are determined under the same scenario used for the solvency valuation.
- As the transfer ratio is not less than 100%, payments of the commuted value of pension entitlements for terminated members can be paid in full. Pursuant to Regulations 19(4) or 19(5) to the Pension Legislation, approval of the Financial Services Regulatory Authority of Ontario Chief Executive Officer will be required to make commuted value transfers if there has been a significant decline in the transfer ratio after the actuarial valuation date.

## 2.2 Determination of the Statutory Solvency Excess (Deficiency)

In calculating the statutory solvency excess (deficiency), various adjustments may be made to the solvency financial position.

	December 31, 2021	December 31, 2019
Solvency surplus (unfunded solvency liability)	\$ 24,611,088	\$ 13,435,348
Adjustments to solvency position:		
■ Present value of existing amortization payments	\$ 0	\$ 0
■ Smoothing of asset value	0	0
■ Averaging of liability discount rate	0	0
■ Prior year credit balance	0	0
■ Total	<u>\$ 0</u>	<u>\$ 0</u>
Pre-adjustment solvency excess (solvency deficiency)	\$ 24,611,088	\$ 13,435,348
■ Adjustment to reflect reduced solvency deficiency <sup>1</sup>	<u>7,344,072</u>	<u>8,678,991</u>
Solvency excess (reduced solvency deficiency)	\$ 31,955,160	\$ 22,114,339

**Note:**

<sup>1</sup> The adjustment to reflect reduced solvency deficiency is included to take into account the funding target of 85% on a solvency basis. The adjustment is equal to 15% of the solvency liability

## Section 3: Contributions

### 3.1 Estimated Minimum Employer Contribution (Ensuing Years)

The estimated minimum employer contributions for the next three years are as follows:

Year	2022	2023	2024
Normal actuarial cost (excluding the PfAD)	\$ 0	\$ 0	\$ 0
PfAD	0	0	0
Estimated member contributions	(0)	(0)	(0)
Employer normal actuarial cost	\$ 0	\$ 0	\$ 0
Amortization payments			
■ Going concern	0	0	0
■ Solvency	0	0	0
■ Sub-total	\$ 0	\$ 0	\$ 0
Application of prior year credit balance	(0)	(0)	(0)
Application of available actuarial surplus <sup>1</sup>	(0)	(0)	(0)
Estimated minimum employer contribution	\$ 0	\$ 0	\$ 0

#### Notes:

<sup>1</sup> The available actuarial surplus is the lesser of the going concern actuarial surplus after PfAD and the amount that, if it were deducted from the solvency assets of the plan, would reduce the transfer ratio to 105%.

### 3.2 Estimated Maximum Employer Contribution (Ensuing Year)

	<b>December 31, 2021</b>	
Employer normal actuarial cost	\$	0
Greater of the unfunded actuarial liability and the unfunded hypothetical windup liability		0
Estimated maximum employer contribution	\$	0

**Comment:**

- In general terms, the employer may contribute its total normal actuarial cost plus the largest of the going concern and hypothetical windup deficits and accrued interest. This amount shall be reduced by any excess actuarial surplus and any contributions made since the valuation date. The provincial Pension Legislation may require that certain minimum contributions be nevertheless remitted.

### 3.3 Timing of Contributions

Employer normal cost and member contributions: monthly and within 30 days of the month to which they pertain.

Amortization payments: monthly before the end of the month to which they pertain (or replaced by an equivalent letter of credit), if applicable.

Adjustment to contributions made since the valuation date: within 60 days from the date that this report is filed with the Pension Authorities.

Onetime special improvement contribution: upon filing of this report plus interest accrued since the valuation date.

Contributions that are remitted to the plan in the taxation year or within 120 days after the end of such taxation year are deductible in such taxation year provided they were made to fund benefits in respect of periods preceding the end of the taxation year.



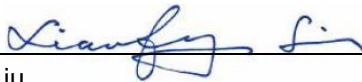
## Section 4: Actuarial Opinions

In our opinion, for the purposes of the going concern, solvency and hypothetical windup valuations:

- the membership data on which the actuarial valuations are based are sufficient and reliable,
- the assumptions are appropriate based on the confirmation that the plan administrator is taking corrective measures to ensure the asset mix will be in compliance with the asset allocation range identified in the investment policy, and
- the methods employed in the actuarial valuations are appropriate.

This report has been prepared, and our opinions have been given, in accordance with accepted actuarial practice in Canada. The actuarial valuations have been conducted in accordance with our understanding of the funding and solvency standards prescribed by the Pension Legislation.

Towers Watson Canada Inc.



Bill Liu

Fellow of the Canadian Institute of Actuaries



Philip A. Morse

Fellow of the Canadian Institute of Actuaries

Toronto, Ontario  
September 22, 2022

# Appendix A: Significant Terms of Engagement and Certificate of the Plan Administrator

## A.1 Significant Terms of Engagement

For purposes of preparing this actuarial valuation report, the plan administrator has directed that:

- The actuarial valuation is to be prepared as at December 31, 2021.
- No margins for adverse deviations are to be used.
- For the purpose of determining the going concern discount rate, the investment policy dated December 15, 2021, which is the most up-to-date version, should be considered. The current investment policy does not provide for any changes to the target asset class distribution in the future.
- For purposes of determining the provision for adverse deviations level as at December 31, 2021, the target asset allocation should be that contained in the investment policy statement in effect at December 15, 2021.
- For purposes of determining the provision for adverse deviations level, the plan is to be considered closed to new entrants.
- The going concern value of assets is to be determined using the market value of assets described in the Asset Valuation Method section in Appendix C.
- The going concern valuation should use the projected unit credit cost method.
- For purposes of determining the solvency liabilities of the plan, certain benefits are to be excluded without requiring an election from the employer.
- The solvency and hypothetical windup valuation results are to be determined under a scenario where the employer continues to operate and certain expenses are paid from the pension fund (consistent with past practice) while the employer pays other plan expenses.
- This report is to be prepared on the basis that the employer is entitled to apply the available actuarial surplus, if any, to meet its contribution requirements under the plan.

Should these directions from the plan administrator be amended or withdrawn, WTW reserves the right to amend or withdraw this report.

## A.2 Certificate of the Plan Administrator

I hereby certify that to the best of my knowledge and belief:

- the significant terms of engagement contained in Appendix A of this report are accurate and reflect the plan administrator's judgement of the plan provisions and/or an appropriate basis for the actuarial valuation of the plan;
- the information on plan assets, including the information on the investment policy and intended changes to the asset mix distribution after the valuation date, if any, forwarded to Towers Watson Canada Inc. and summarized in Appendix B of this report is complete and accurate;
- as December 31, 2021, the Plan was not in compliance with the asset allocation range identified in the investment policy and the plan administrator is making corrective measures to fix the problem;
- the data forwarded to Towers Watson Canada Inc. and summarized in Appendix E of this report are a complete and accurate description of all persons who are members of the plan, including beneficiaries who are in receipt of a retirement income, in respect of service up to the date of the actuarial valuation;
- the summary of plan provisions contained in Appendix F of this report is accurate;
- for purposes of determining the provision for adverse deviations level, the fixed income allocation for each asset class shown in Appendix G is appropriate; and
- except as noted in the introduction of the report, there have been no events which occurred between the actuarial valuation date and the date this actuarial valuation was completed that may have a material financial effect on the actuarial valuation.

Shelley Hesmer  
Signature

September 30, 2022  
Date

Shelley Hesmer  
Name

Acting Director - Financial Services, Taxation  
and Corporate Controller  
Title

## Appendix B: Assets

### B.1 Statement of Market Value

	December 31, 2021	December 31, 2019
Invested assets:		
■ Canadian equities	\$ 20,127,246	\$ 22,910,445
■ Foreign equities	12,087,624	13,466,602
■ Fixed income	40,771,470	34,102,866
■ Cash and short-term investments	727,310	946,932
■ Total invested assets	\$ 73,713,650	\$ 71,426,845
Net outstanding amounts:		
■ Investment income receivable	\$ 79,589	\$ 66,040
■ Expenses and other payables	(71,674)	(47,595)
■ Total net outstanding amounts	\$ 7,915	\$ 18,445
Total assets	\$ 73,721,565	\$ 71,445,290

#### Comments:

- The data relating to the invested assets and net outstanding amounts are based on the audited financial statements issued by KPMG.

## B.2 Asset Class Distribution

The following table shows the target asset allocation stipulated by the plan's investment policy in respect of major asset classes and the actual asset allocation as at December 31, 2021.

	Target asset allocation	Actual asset allocation as at December 31, 2021
Canadian equities	8.0%	27.3%
Foreign equities	7.0%	16.4%
Fixed Income	85.0%	55.3%
Cash and short-term investments	0.0%	1.0%
Total	100.0%	100.0%

### Comments:

- The Plan is invested in a master trust with two other City of Hamilton pension plans with a common Statement of Investment Policies and Procedures (SIPP). For purposes of determining the target asset mix for this valuation (and for the determination of the Provision for Adverse Deviation), the SIPP has been applied solely based on the funded status of the Plan.
- As at December 31, 2021, the Plan was not in compliance with the asset allocation range identified in the investment policy and the plan administrator is making corrective measures to fix the problem.

### B.3 Reconciliation of Total Assets (Market Value)

Assets as at December 31, 2019		\$	71,426,845
Receipts:			
■ Contributions:			
– Employer normal actuarial cost	\$	0	
– Employer amortization payments		0	
– Provision for non-investment expenses		0	\$ 0
■ Investment return			14,198,653
■ Total receipts		\$	14,198,653
Disbursements:			
■ Benefit payments:			
– Pension payments	\$	(11,391,183)	
– Lump sum settlements		0	
– Other benefit payments		0	\$ (11,391,183)
■ Expenses			(520,665)
■ Total disbursements		\$	(11,911,848)
Assets as at December 31, 2021		\$	73,713,650

#### Comments:

- The data relating to the invested assets and net outstanding amounts are based on the audited financial statements issued by KPMG.
- The rate of return earned on the market value of assets, net of all expenses, from December 31, 2019 to December 31, 2021 is approximately 9.9% per annum.

# Appendix C: Actuarial Basis – Going Concern Valuation

## C.1 Methods

### **Asset Valuation Method**

The going concern value of assets was calculated as the market value of invested assets at the actuarial valuation date, adjusted for net outstanding amounts.

### **Actuarial Cost Method**

The actuarial liability was calculated using the unit credit cost method.

The terminated vested members are unlocated and are at advanced ages. The actuarial liability has been estimated as the members' contributions with interest at the valuation date.

## C.2 Actuarial Assumptions

	December 31, 2021	December 31, 2019
<b>Economic Assumptions (per annum)</b>		
Liability discount rate	3.00%	3.30%
Rate of inflation	2.00%	2.00%
Post-retirement pension increases	2.00%	2.00%
<b>Demographic Assumptions</b>		
Mortality	2014 Public Sector Canadian Pensioners' Mortality Table (CPM2014Pub), projected generationally using MI-2017	2014 Public Sector Canadian Pensioners' Mortality Table (CPM2014Pub), projected generationally using MI-2017
<b>Other</b>		
Years male spouse older than female spouse	3	3
Provision for non-investment expenses	None; return on plan assets is net of all expenses	None; return on plan assets is net of all expenses



### C.3 Rationale for Actuarial Assumptions

The rationale for the material actuarial assumptions used in the going concern valuation is summarized below.

The going concern assumptions do not include margins for adverse deviations as a separate provision for adverse deviations has been applied to the actuarial liability and normal actuarial cost.

#### Liability discount rate

Actuarial valuation economic assumptions used for establishing the liability discount rate have been developed based on WTW's capital market model which simulates economic variables and asset class returns. For purposes of calculating the expected long-term returns for each asset class, it has been assumed that key economic variables (such as price inflation and bond yields) transition over time from initial conditions to long-term normative assumptions. Long-term normative assumptions are established based on a blend of historical capital market data and future expectations and do not change frequently. In current capital market conditions, the normative assumptions reflect the expectation that bond yields will increase in the long-term.

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■ Best estimate long-term nominal rate of return before adjustments based on the plan target asset allocation (actual and including anticipated changes)	3.22%
■ Adjustment for investment expenses paid by the plan (excluding active management fees)	(0.05)
■ Adjustment for non-investment expenses paid by the plan	(0.20)
■ Rounding effect	0.03
■ Net discount rate	3.00%

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#### Rate of inflation

Estimate of future rates of inflation considering economic and financial market conditions at the valuation date.

#### Post-retirement pension increases

The assumption has been determined by applying the post-retirement increase provision specified in the plan to the inflation assumption.

#### Mortality

Base mortality rates from the CPM2014Public table are considered reasonable for the actuarial valuation of the plan because the plan membership consists mainly of employees formerly employed in the public

sector, and there is no reason to expect the mortality experience of the plan to differ significantly from that of other public sector pension plans.

Applying improvement MI-2017 generationally provides allowance for improvements in mortality after 2014 and is considered reasonable for projecting mortality experience into the future.

### **Years male spouse older than female spouse**

When provided, the actual data on the spouse were used for retired members. For other members, the assumption is based on surveys of the age difference in the general population and an assessment of future expectations for members of the plan.

### **Provision for non-investment expenses**

The liability discount rate is net of all expenses (with the exception of any fees associated with employing an active investment management strategy). The assumed level of expenses reflected in the liability discount rate is based on recent experience of the plan and an assessment of future expectations.

# Appendix D: Actuarial Basis – Solvency and Hypothetical Windup Valuations

## D.1 Methods

### Asset Valuation Method

The market value of invested assets, adjusted for net outstanding amounts, has been used for the solvency and hypothetical windup valuations. The resulting value has been reduced by a provision for plan windup expenses.

### Liability Calculation Method

The solvency and hypothetical windup liabilities for members were calculated using the unit credit cost method.

The terminated vested members are unlocated and are at advanced ages. The actuarial liability has been estimated as the members' contributions with interest at the valuation date.

### Other Considerations

The solvency and hypothetical windup valuations have been prepared on a hypothetical basis. In the event of an actual plan windup, the plan assets may have to be allocated between various classes of plan members or beneficiaries as required by applicable Pension Legislation. Such potential allocation has not been performed as part of these solvency and hypothetical windup valuations.

## D.2 Solvency Incremental Cost Actuarial Method

To calculate the Solvency Incremental Cost ("SIC"), we used the same method as for the solvency valuation.

No new entrants have been considered on the basis that the plan is closed to new entrants and there are no current active members in the plan. The benefits were projected using the going concern valuation assumptions and the plan provisions.

We assumed that the same settlement method would apply at the end of the projection period as at the valuation date for each plan member.

The liability discount rates are assumed to remain at their current level over the projection period.

### D.3 Actuarial Assumptions

	December 31, 2021	December 31, 2019
<b>Economic Assumptions (per annum)</b>		
Liability discount rate		
■ Annuity purchase (solvency)	2.50%	2.80%
■ Annuity purchase (windup)	(0.50)%	(0.30)%
<b>Demographic Assumptions</b>		
Mortality		
	CPM2014 Canadian Pensioners' Mortality Table, projected generationally using Scale CPM-B	CPM2014 Canadian Pensioners' Mortality Table, projected generationally using Scale CPM-B
<b>Other</b>		
Years male spouse older than female spouse	3	3
Provision for expenses		
■ Solvency	\$150,000	\$150,000
■ Hypothetical windup	\$150,000	\$150,000

## D.4 Rationale for Actuarial Assumptions

The rationale for the material actuarial assumptions used in the solvency and hypothetical windup valuations is summarized below.

The actuarial assumptions used in the solvency and hypothetical windup valuations do not include margins for adverse deviations.

### Liability discount rate

*Portion of the solvency and hypothetical windup liabilities expected to be settled by a group annuity purchase*

Based on the CIA annuity purchase guidance applicable at the valuation date which corresponds to an approximation of the annuity purchase rate. The duration of the liabilities assumed to be settled through the purchase of non-indexed annuities is 6.5. As this duration is below the range of durations covered in the guidance, we have extrapolated downwards the spreads from the medium and low durations to determine the approximate annuity purchase rate.

*Portion of the solvency and hypothetical windup liabilities expected to be settled by commuted value transfer*

Not applicable.

### Mortality

*For the benefits that are expected to be settled by a group annuity purchase*

Based on CIA annuity purchase guidance.

*For benefits that are expected to be settled by commuted value transfer*

Not applicable.

### Years male spouse older than female spouse

See rationale for going concern assumptions in Appendix C.

**Provision for expenses**

Allowance was made for normal administrative, actuarial, legal and other costs which would be incurred if the plan were to be wound up (excluding costs relating to the resolution of surplus or deficit issues). The actuarial valuation is premised on a scenario in which the employer continues to operate after the windup date. In establishing the allowance for plan windup costs, certain administrative costs were assumed to be paid from the pension fund (consistent with past practice) while other costs were assumed to be borne directly by the employer.

## Appendix E: Membership Data

### Active and Disabled Members

There are no remaining active members.

### Retired Members

	Fire December 31, 2021		Others December 31, 2021	
■ Number		75		5
■ Average age		84.1		92.9
■ Average Annual Lifetime Pension	\$	43,954	\$	29,087

### Comment:

The lifetime pension as at December 31, 2021 includes the January 1, 2022 pension increase of 2.74%.

Age Group	Fire		Others	
	December 31, 2021		December 31, 2021	
	Number	Monthly Pension	Number	Monthly Pension
<75	0	\$ 0	0	\$ 0
75-79	14	56,029	0	0
80-84	24	88,743	0	0
85-90	31	108,905	0	0
90+	6	21,038	5	12,119
TOTAL	75	\$ 274,715	5	\$ 12,119



## Beneficiaries

	<b>Fire</b> <b>December 31, 2021</b>	<b>Others</b> <b>December 31, 2021</b>
■ Number	58	10
■ Average age	81.8	86.7
■ Average Annual Lifetime Pension	\$ 29,559	\$ 19,754

Age Group	Fire		Others	
	December 31, 2021		December 31, 2021	
	Number	Monthly Pension	Number	Monthly Pension
60-64	1	*	0	0
65-69	2	*	0	0
70-74	4	11,719	0	0
75-79	11	27,630	1	*
80-84	24	56,363	2	*
85-90	8	18,415	3	817
90+	8	21,879	4	5,681
<b>TOTAL</b>	<b>58</b>	<b>\$ 142,866</b>	<b>10</b>	<b>\$ 16,462</b>

\* Suppressed to preserve confidentiality.

### Comment:

The lifetime pension as at December 31, 2021 includes the January 1, 2022 pension increase of 2.74%.

### Terminated Vested Members

	December 31, 2021		December 31, 2019	
■ Number		3		3
■ Average age		100.2		98.2
■ Average Annual Pension	\$	1,339	\$	1,291
■ Average Accumulated Employee Contributions	\$	43,990	\$	43,162

### Comment:

The lifetime pension as at December 31, 2021 includes the January 1, 2022 pension increase of 2.74%.

## Review of Membership Data

The membership data were supplied by The Corporation of the City of Hamilton as at December 31, 2021.

Elements of the data review included the following:

- ensuring that the data were intelligible (i.e., that an appropriate number of records was obtained, that the appropriate data fields were provided and that the data fields contained valid information);
- preparation and review of membership reconciliations to ascertain whether the complete membership of the plan appeared to be accounted for;
- review of consistency of individual data items and statistical summaries between the current actuarial valuation and the previous actuarial valuation;
- review of reasonableness of individual data items, statistical summaries and changes in such information since the previous actuarial valuation date; and
- comparison of the membership data and the plan's financial statements for consistency.

However, the tests conducted as part of the membership data review may not have captured certain deficiencies in the data. We have also relied on the certification of the plan administrator as to the quality of the data.

### Membership Reconciliation

	Active	Terminated vested	Retired	Beneficiaries	Total
As at December 31, 2019	0	3	96	78	177
■ Deceased (without beneficiary)			(11)		(11)
■ Deceased (with beneficiary)			(5)	5	0
■ Deceased survivors				(15)	(15)
■ Data correction					
■ Net change	0	0	(16)	(10)	(26)
As at December 31, 2021	0	3	80	68	151

## Appendix F: Summary of Plan Provisions

The following is an outline of the principal features of the plan which are of financial significance to valuing the plan benefits. This summary is based on the plan document as at December 31, 2021, as provided by The Corporation of the City of Hamilton and does not make any provisions for the possibility that a change or action (retroactive or otherwise) could be imposed by order of a regulatory body or a court. As the plan consists entirely of pensioners and deferred vested members, plan provisions relating to active members have not been included. It is not a complete description of the plan terms and should not be relied upon for administration or interpretation of benefits. For detailed description of the benefits, please refer to the plan document.

### **Normal Retirement Age**

Age 60 for Fire employees other than Fire Chief, age 65 for all others.

### **Amounts of Annual Pension**

Normal and Disability Retirement: 2% of average annual earnings in best 5 years before retirement for each year of credited service up to 35 years reduced by 0.675% of the 5-year average earnings up to the average YMPE over the last five years for each year of contributory service after January 1, 1966. Reduction suspended from date of retirement to age 65 for CPP benefit.

### **Death Benefit**

After retirement: Based on election made within range of allowable options.

### **Withdrawal Benefit**

Deferred pensions commence at the normal retirement age.

### **Inflation Protection**

Pension benefits, pensions and deferred pensions shall be indexed beginning on January 1, 2006, by an inflation related adjustment formula equal to the inflation related adjustment formula used to increase pension benefits, pensions and deferred pensions under the Ontario Municipal Employees Retirement Systems Act, 2006, as amended from time to time, subject to the Income Tax Act.

# Appendix G: Sensitivity Analysis and Other Disclosures

## G.1 Sensitivity Information

Amounts determined with a discount rate 1% lower:

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Going concern actuarial liability (prior to application of PfAD)	\$	59,344,521
■ As percent increase		7.63%
Solvency actuarial liability	\$	52,387,276
■ As percent increase		7.00%

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## G.2 Past-Service Benefit Restriction

The pension benefits provided under the plan are not subject to the limitation imposed under Section 8504(6) of the Regulations to the Income Tax Act (Canada).

## G.3 Solvency Incremental Cost

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Solvency incremental cost (up to next valuation date)	\$	2,499,893
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## G.4 Provision for Adverse Deviations Level

### Target Asset Allocation for Fixed Income Assets

The information below as at December 31, 2021 has been used to determine the provision for adverse deviations level. The fixed income investments listed below meet the minimum credit rating prescribed by the Pension Legislation.

	Target asset allocation	Fixed income allocation	Non-fixed income allocation	Fixed income weight
Asset classes				
– Canadian equities	8.0%	0.0%	8.0%	0.0%
– Foreign equities	7.0%	0.0%	7.0%	0.0%
– Fixed income	85.0%	85.0%	0.0%	100.0%
– Cash and accrued income	0.0%	0.0%	0.0%	0.0%
Total	100%	85.0%	15.0%	

### Benchmark Discount Rate

Components	Rate
CANSIM V39056	1.68%
Risk premium on non-fixed income assets <sup>1</sup>	0.75%
Risk premium on fixed income assets <sup>2</sup>	1.28%
Diversification allowance	<u>0.50%</u>
<b>Benchmark discount rate</b>	<b>4.21%</b>

#### Notes:

<sup>1</sup> 5.00% of the non-fixed proportion of the assets.

<sup>2</sup> 1.50% of the fixed proportion of the assets.

### Provision for Adverse Deviations Level

Components	Provision for adverse deviations level
Fixed	5.0%
Asset mix based	1.5%
Benchmark discount rate based <sup>1</sup>	<u>0.0%</u>
<b>Provision for adverse deviations level <sup>2</sup></b>	<b>6.5%</b>

#### Notes:

- <sup>1</sup> Reflects going concern discount rate less benchmark discount rate (subject to a minimum of zero), multiplied by the going concern liabilities duration (refer to sub-section G.1)
- <sup>2</sup> The provision for adverse deviations is applied to the going concern actuarial liability and total normal cost, excluding any portion for future indexation.



## G.5 Effects of Plausible Adverse Scenarios

In accordance with CIA Standards of Practice, the risk assessments below have been performed only for the going concern valuation of the plan.

### Interest Rate Risk

Yields on the plan's fixed income investments have been assumed to decline immediately by 78 basis points on a weighted average basis, resulting in a reduction in the going concern discount rate of 66 basis points. For this purpose, fixed income investments have been deemed to include only Canadian government and corporate bonds. The market values and expected returns for equities have been assumed to be unaffected by the bond yield changes.

The provision for adverse deviations (PfAD) has been assumed to remain at 6.5%.

The adverse scenario for interest rate risk is based on the capital market assumptions from WTW's capital market model, with a 10th percentile scenario used for each relevant asset class independently.

No allowance has been made for any other effects on the going concern actuarial liability due to the change in bond yields.

### Deterioration of Asset Values

Market values of equities have been assumed to decline immediately by 20.60% on a weighted average basis. Market values of Canadian government and corporate bonds, expected future returns for all asset classes, as well as the going concern discount rate, have been assumed to be unaffected by this deterioration of asset values.

No allowance has been made for any other effects of the deterioration of asset values.

The adverse scenario for a deterioration of asset values is based on the capital market assumptions from WTW's capital market model, with a 10th percentile scenario used for each relevant asset class independently.

### Longevity Risk

Longevity risk has been assessed by applying a multiplier of 87.5% to the mortality rates disclosed in Appendix C while leaving the assumed mortality improvement rates unchanged.

No allowance has been made for any effects on asset values or any effects on the going concern actuarial liability or total normal cost other than the mortality assumption change.

## Effects

The effects of the plausible adverse scenarios above on the funded status of the plan and on the total normal cost is shown in the following table. For this purpose, the going concern actuarial liability and total normal cost reflect application of the PfAD.

Scenario	Baseline	Interest Rate Risk	Deterioration of Asset Values	Longevity Risk
Going concern discount rate	3.00%	2.34%	3.00%	3.00%
Weighted average fixed income yield change	N/A	(0.78)%	N/A	N/A
Fixed income asset value change	N/A	12.21%	N/A	N/A
Non-fixed income asset value deterioration	N/A	N/A	(20.60)%	N/A
Market value of assets	\$ 73,721,565	\$ 78,698,806	\$ 66,933,865	\$ 73,721,565
Going concern actuarial liability (including PfAD)	\$ 58,278,888	\$ 61,176,871	\$ 58,278,888	\$ 61,965,240
Actuarial surplus (unfunded actuarial liability) after PfAD	\$ 15,442,677	\$ 17,521,935	\$ 8,654,977	\$ 11,756,325