The City of Saint John
Shared Risk Plan

Actuarial Valuation Report as at January 1, 2020

Report prepared November 2020

Registration Number: Canada Revenue Agency #0269209
NB Superintendent of Pensions #0269209

Table of Contents

Introduction

The City of Saint John Pension Plan ("Former CSJ Plan") was converted to the City of Saint John Shared Risk Plan ("CSJ SRP Plan") effective January 1, 2013.

This report was prepared for the CSJ SRP Plan Board of Trustees ("Trustees") and the New Brunswick Superintendent of Pensions ("Superintendent") for the following purposes:

- to document the results of the funding policy valuation, as required under subsection 100.61(1) of the New Brunswick *Pension Benefits Act* ("PBA") and subsections 14(5) to 14(7) of Regulation 2012-75, and provide the related actuarial opinion;
- to document the results of the risk management procedures as required under paragraph 100.7(1)(e) of the PBA; and
- to document the results of a hypothetical wind-up valuation of the CSJ SRP Plan as required under the Canadian Institute of Actuaries Standards of Practice, and provide the related actuarial opinion.

The Board of Trustees is also seeking the approval of the Superintendent for the following items, as required under the PBA and Regulation:

- approval of the generational mortality table used in the funding policy valuation as required under sub-paragraph 14(7)(c)(ii) of Regulation 2012-75;
- approval of the asset liability model used, as described in Section 2, including the stochastic projection assumptions found under Appendix C, as required under subsection 15(1) of Regulation 2012-75; and
- approval of the economic assumptions used in the asset liability model, as described under Appendix C, as required under subsection 15(3) of Regulation 2012-75.

The Trustees for the CSJ SRP Plan retained the services of Morneau Shepell Ltd ("Morneau Shepell") to prepare this report.

The last actuarial valuation report prepared for the CSJ SRP Plan was performed as at January 1, 2019, in accordance with the requirements of subsection 100.61(1) of the PBA.

The next actuarial valuation report for the CSJ SRP Plan will be due no later than one year following the effective date of this report.

Changes Since Last Valuation

The hypothetical wind-up basis has been updated to reflect market conditions as at the valuation date.

The funding policy valuation assumptions have been updated as follows:

- The long-term inflation assumption is 2.10% per annum, which is 0.15% per annum lower than the assumption used for the actuarial valuation as at January 1, 2019. Correspondingly, the assumed future salary increases are 2.85% per annum which is also 0.15% per annum lower than the assumption used for the actuarial valuation as at January 1, 2019.
- The assumption for age difference between spouses has been updated from 3 years to 2 years this valuation.
- The retirement assumption is the "rule of 88" or one year later but not greater than age 65 for all active members. In the previous valuation, this assumption only applied to active members, while disabled members were assumed to retire at age 65.

These changes are described in more detail in Section 1 of this report.

The following four amendments were filed with the Office of the Superintendent of Pensions during the last year and their impact is included in this valuation.

- The first amendment documents a cost-of-living adjustment effective on January 1, 2020 and is in accordance with Step 1 under the heading "Other Actions" of Section VI – Funding Excess Utilization Plan of the Funding Policy.
- The second amendment, effective January 1, 2020, allows members who were receiving a disability pension under the Former CSJ Plan at Conversion Date to be eligible to receive a pension from the Plan at any time after a member's 55th birthday.
- The third amendment, effective March 1, 2020, documents the treatment of a salary deferral leave program under the Plan. The amendment also adds a new optional form of pension available to retiring members. The amendment has no material impact on the valuation results.
- The fourth amendment, effective March 1, 2020, clarifies the treatment of re-employed pensioners and deferred vested members with respect to vesting and the calculation of the "85 points rule". The amendment has no material impact on the valuation results.

Disclosure Related to CIA Standards

In May 2019, the Canadian Institute of Actuaries ("CIA") added subsection 3270 to its standards of practice. This section, titled "Disclosure for Stochastic Models Used to Comply with Specific Regulatory Pension Plan Funding Requirements", applies to any funding valuation that specifically requires the use of stochastic models to comply with pension plan funding requirements in accordance with the law or any regulatory policy or guideline. The disclosure of model inputs and outputs are meant to:

- Assist the users of the report or work product to understand the assumptions and methods used in the model and the distribution of outcomes from the model; and

- Enable another actuary to assess whether the assumptions and methods used in the model and the distribution of outcomes from the model are reasonable.

The new standards of practice came into effect on July 1, 2019. Our understanding is that this subsection would apply for any registered pension plan identified as a Shared Risk Plan in New Brunswick. The disclosures applicable to this Plan are provided in Appendix C of this report.

In addition to the stochastic models disclosures mentioned above, the CIA also made revisions to the standards of practice subsection 3260 – Advice on the Funded Status or Funding of a Pension Plan. Effective for funding valuations on or after March 1, 2019, the plan actuary is required to select plausible adverse scenarios for various risks underlying the Plan, and disclose in the report the impact such scenarios would have on the funded status and risk management test results of the Plan. The disclosure applicable to the Plan is provided in Section 5.

Subsequent Events

On March 11, 2020, the World Health Organization declared that COVID-19 was a pandemic. This public health crisis caused significant economic and social disruptions worldwide.

- The COVID-19 pandemic resulted in higher deaths for the population in general as measured by public health officials. The effect of the outbreak on the mortality incidence for the Plan is unknown at this time and no adjustments to the mortality assumption have been made in this report. The effect on the Plan if any, will be recognized in the gains or losses of future reports as the experience emerges.

- Economic conditions have also changed with a significant reduction in asset values and strained liquidity occurring in the month of March. Sustained lowered economic activity could also impact the Plan's economic assumptions. No adjustments on the Plan assets nor to any of the economic assumptions have been made or anticipated in this report.

On January 24, 2020, the Actuarial Standards Board of the Canadian Institute of Actuaries ("CIA") released its changes to the standards of practice for calculating the commuted values of pension plans. The revised standards are to take effect on December 1, 2020 for calculating commuted values for plans that are not target pension arrangements. These changes do not impact the financial situation of the Plan other than potentially the hypothetical wind-up liability. As the revised standards do not take effect until after the valuation date of this report, the new standards do not impact the results of this valuation report. Its impact will be reflected in a future report.

In 2020, the City of Saint John has undertaken an Organizational Restructuring in order to reduce its expenditures. Understanding that such an exercise could have an impact on the number of Plan members in the future, the Board has communicated with the City in order to get an account of the expected impact that the Organizational Restructuring would have on the number of Plan members, and therefore the amount of contributions that can be expected to be deposited to the Plan in the future. In August 2020, the City responded to the Board's inquiry with their estimated reduction in full-time equivalent positions that the restructuring is expected to produce, but that any impact related to the Police Department would have to be gathered from the Police Commission. Therefore, in September 2020, the Board communicated with the Police Commission to request similar information. The response from the Police Commission was received in October 2020. The Board is currently examining the responses and is preparing a report in order to satisfy the requirements of subsections 100.61(2) and 100.7(3) of the *Pension Benefits Act*. Any impacts on the financial position of the Plan and the risk management tests will be identified in this upcoming report. Impacts related to the Organizational Restructuring are therefore not included in this valuation report.

The recommendations and opinions are given exclusively from a financial viewpoint. This valuation report does not constitute a legal opinion on the rights and duties of the Trustees or the members of the plan over the pension fund.

Actuarial valuation results are only estimates. Actuarial valuations are performed based on assumptions and methods that are in accordance with sound actuarial principles. Emerging experience differing from these assumptions will result in gains or losses, which may affect future open group funded ratios of the Plan and future risk management procedure results, which in turn will impact the types and timing of any actions to be taken by the Trustees in accordance with the Funding Policy. These gains and losses will be revealed in future actuarial valuations.

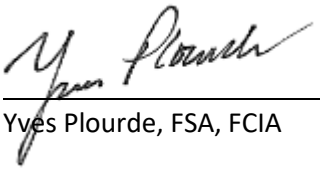
We are not aware of any subsequent event, other than those identified in this report, which would have a material impact on the results of the valuation.

Restriction on use of this report

This report was prepared for the Trustees. It will also be filed with the New Brunswick Office of the Superintendent of Pensions. This report and any of its content may not be distributed, published, made available or relied upon by any other person, without the express written permission of Morneau Shepell, unless and only to the extent otherwise provided by applicable law.

The undersigned is available to provide supplementary information and explanation as appropriate, concerning this report.

Respectfully submitted,



Yves Plourde, FSA, FCIA

December 3, 2020
Date

This report has been peer reviewed by Daniel Dine, FSA, FCIA, CERA.

Section 1 – Funding Policy Valuation

A funding policy valuation is required annually under subsection 100.61(1) of the PBA and subsections 14(5) to 14(7) of Regulation 2012-75. The results of the funding policy valuation of the CSJ SRP Plan as at January 1, 2020 are found below.

The funding policy valuation results presented in this section are based on asset information found in Appendix A, membership data found in Appendix B, plan provisions summarized in Appendix D, and the Funding Policy summarized in Appendix E of the report. The methods and assumptions used in the funding policy valuation are described later in this section.

Funding Policy Valuation Funded Status

The funding policy valuation funded status of the CSJ SRP Plan is determined by comparing the fair market value of the assets to the funding policy actuarial liabilities. The funding policy actuarial liabilities are based on the benefits earned up to the valuation date assuming the CSJ SRP Plan continues indefinitely.

The funding policy valuation funded status of the CSJ SRP Plan as at January 1, 2020, along with the results in the previous valuation as at January 1, 2019, are found below:

Table 1.1 – Funding Policy Valuation Funded Status

	January 1, 2020	January 1, 2019
Market Value of Assets	$M	$M
• Fair market value of assets (including receivables / payables)	$663.9	$595.9
Funding Policy Actuarial Liabilities		
• Active and disabled members	$225.9	$226.9
• Terminated deferred vested members	2.6	2.0
• Retired members and survivors	447.8	432.7
• Outstanding refunds and withholding amounts	0.1	0.2
• Contingent indexing reserve established in a prior year (Step 6)	0.3	1.0
• Total funding policy valuation actuarial liabilities	676.7	662.8
Funding policy valuation excess (unfunded liability)	($12.8)	($66.9)
Termination value funded ratio [calculated in accordance with paragraph 14(6)(e)] of Reg. [2012 – 75]	98.1%	89.9%

The termination value funded ratio is used in the calculation of the “termination value” of any individual’s pension benefits at termination of employment, death, marriage breakdown, or retirement, as the case may be, in accordance with the terms of the CSJ SRP Plan and subsection 18(1) of Regulation 2012-75. It is calculated in accordance with paragraph 14(6)(e) of Regulation 2012-75.

Funding Policy Valuation Normal Cost and Excess Contributions

The table below provides the funding policy valuation normal cost, which is the value of the pension benefits being earned in the twelve-month period after the valuation date. It compares the funding policy valuation normal cost to the level of member and employer contributions in order to determine the level of contributions being made to the CSJ SRP Plan in excess of the funding policy valuation normal cost. Results for the calendar year 2020 are presented below, along with the results for 2019 found in the previous valuation as at January 1, 2019.

Table 1.2 – Funding Policy Valuation Normal Cost and Excess Contributions

	Year Following January 1, 2020		Year Following January 1, 2019	
	$M	% of payroll	$M	% of payroll
A. Member initial contributions	$6.9	10.4%	$6.9	10.4%
B. City initial contributions	8.8	13.1%	8.8	13.2%
C. City temporary contributions	11.3	17.0%	11.3	17.0%
D. Funding policy valuation normal cost	9.6	14.4%	9.9	14.8%
E. Excess contributions (A. + B. +C. – D.)	17.4	26.1%	17.1	25.8%
Estimated payroll for following year	$66.7		$66.3	

Determination of 15-Year Open Group Funded Ratio

The table below provides the 15-year open group funded ratio as calculated in accordance with the requirements of paragraph 14(6)(f) of Regulation 2012-75. This ratio is used extensively in the Funding Policy to determine the actions to be undertaken by the Trustees under the funding deficit recovery plan and the funding excess utilization plan. The 15-year open group funded ratio is calculated as follows:

Table 1.3 – 15-Year Open Group Funded Ratio

	January 1, 2020	January 1, 2019
	$M	$M
A. Market value of assets (including receivables / payables)	$663.9	$595.9
B. Present value of excess contributions over next 15 years [calculated in accordance with Reg. 14(6)(c)]	163.3	168.4
C. Funding policy valuation actuarial liabilities	676.7	662.8
D. 15-year open group funded ratio [(A. + B.) / C.]	122.2%	115.3%

Reconciliation of Funding Policy Valuation Funded Status with Previous Valuation

The table below describes the change in the Plan's funded status between the last funding policy valuation as at January 1, 2019 and this funding policy valuation as at January 1, 2020:

Table 1.4 – Reconciliation of Funded Status

	$M	$M
Funding policy valuation excess (unfunded liability) as at January 1, 2019		($66.9)
Expected changes in funded status:		
• Interest on funding excess (unfunded liability)	(3.0)	
• Contributions in excess of normal cost	17.2	
• Cost of CPI indexing awarded as at January 1, 2020 at 2.30% (Step 1), including impact on contingent indexing reserve	(15.1)	
Total		(0.9)
Expected funding policy valuation excess (unfunded liability) as at January 1, 2020		($67.8)
Actuarial gains (losses) due to the following factors:		
• Investment return on actuarial value of assets	48.0	
• Retirements	1.2	
• Mortality	5.9	
• Terminations	(0.2)	
• Other factors	0.8	
Total		55.7
Impact of change in Plan provisions for disabled members		(3.9)
Impact of change in actuarial assumptions		3.2
Funding policy valuation excess (unfunded liability) as at January 1, 2020		($12.8)

The references to Step 1 in the above table are related to the corresponding step found in the Funding Excess Utilization Plan under the Funding Policy for the Plan.

Reconciliation of Total Normal Cost

The factors contributing to the change in the total normal cost from the last funding policy valuation as at January 1, 2019 and this funding policy valuation as at January 1, 2020 are shown below:

Table 1.5 – Reconciliation of Total Normal Cost

	% of payroll
Total normal cost as at January 1, 2019:	14.8 %
Impact of changes in demographics:	(0.3 %)
Impact of changes in Plan provisions:	(0.1%)
Impact of changes in actuarial assumptions:	0.0 %
Total normal cost as at January 1, 2020 (see Table 1.2 D.):	14.4 %

Funding Policy Actuarial Methods

Asset Valuation Method

The assets used under the funding policy valuation are equal to the fair market value of the assets. This is a requirement of paragraph 14(6)(d) of Regulation 2012-75.

Actuarial Cost Method

The funding policy valuation actuarial liabilities and normal cost were calculated using the accrued benefit (or unit credit) actuarial cost method in accordance with the requirement of paragraph 14(7)(a) of Regulation 2012-75.

The funding policy valuation actuarial liabilities are equal to the actuarial present value of benefits earned by members for services prior to the valuation date, taking into account the actuarial assumptions as indicated hereafter. For greater certainty, it does not take into account the impact of any future salary increases, and the impact of any future increases in accrued pensions due to cost-of-living adjustments as may be granted from time to time by the Trustees in accordance with the plan documents and the Funding Policy.

The funding policy valuation normal cost is equal to the actuarial present value of benefits expected to be earned by members in the year following the valuation date. A salary increase estimate has been made to calculate the estimated normal cost and estimated member and employer contributions for the year following the valuation date.

The disabled members are valued as active members; however, we assumed that there would be no contributions from them or from the City on their behalf.

The ratio of the total normal cost to the covered payroll for the period will tend to stabilize over time if the demographic characteristics of the active and disabled members remain stable. All other things being equal, an increase in the average age of the active and disabled members will result in an increase in this ratio.

For valuation purposes, to determine eligibility for benefits and for any other use, the age used is the age on the date of the nearest birthday.

Funding Policy Actuarial Assumptions

The main actuarial assumptions employed for the funding policy actuarial valuation are summarized in the following table. Some assumptions used in this valuation are different from those used in the previous valuation.

Emerging experience differing from these assumptions will result in gains or losses, which will be revealed in future funding policy actuarial valuations. Experience gains and losses emerging in future funding policy actuarial valuations will impact the open group funded ratio of the CSJ SRP Plan, which in turn will impact the types and timing of any actions to be taken by the Trustees in accordance with the Funding Policy. All rates and percentages are annualized unless otherwise noted.

Table 1.6 – Funding Policy Actuarial Valuation Assumptions

	January 1, 2020		
Discount rate	4.50% per annum		
Salary increase for year following valuation (for normal cost purposes only, and inclusive of promotional increases)	2.85%		
Mortality	70% CPM Priv 2014, 30% CPM Publ 2014 weighted table, projected with improvement scale B with adjustment factors of 105% for males and 102% for females		
Retirement Age	All members will retire upon reaching "88 points", or in one year from the valuation date for those who have already reached the "88 points", but no later than age 65		
Termination of employment (Sample rates of termination other than by death or retirement)	**Age**	**Male**	**Female**
	22	9.0%	13.1%
	27	5.3%	10.9%
	32	2.6%	7.1%
	37	1.4%	4.5%
	42	0.9%	2.6%
	47	0.5%	0.8%
	52+	0.0%	0.0%
Disability	None explicitly assumed. Current disabled members included in normal cost (no contributions assumed) – resulting in an increase in normal cost of 0.25% of contributory payroll at valuation date		
Proportion with a spouse or common-law partner at retirement	85%		
Spousal age difference	Males 2 years older than females		
Expenses	Implicit in discount rate		

Rationale for Material Actuarial Assumptions

The assumptions have been reviewed in light of current economic and demographic conditions.

Inflation

Given the historical increases in consumer prices in Canada, the rates expected by the market, the portfolio managers' expectation, the Bank of Canada policy and the long-term forecasts of the Conference Board of Canada, Morneau Shepell believes that the expected long-term rate of inflation should be between 1.75% and 2.25%.

Consistent with this range, we have used an inflation assumption of 2.10% per annum. Canadian inflation has remained near the Bank of Canada's target during a sustained period of economic growth and stimulus following the 2008 economic downturn which has provided some evidence of the Bank of Canada's ability to control inflation. This is a change from the previous valuation, in which the expected rate of inflation was 2.25% per annum.

Discount Rate Development

The elements considered in the development of the discount rate assumption for purposes of the funding policy valuation are summarized in the table below.

Table 1.7 – Development of Funding Policy Valuation Discount Rate

	%
Expected long-term nominal return based on the results of our stochastic analysis (using long-term target asset mix, and including the impact of rebalancing and diversification)	5.9%
Value added for active management (not exceeding the additional fees paid for active management over passive management)	0.3%
Assumed margin for adverse deviation (originally set to achieve a high probability of exceeding the discount rate over the next 20 years)	(1.2%)
Expected expenses paid from the fund	(0.5%)
Discount rate	4.5%

The expected long-term nominal return by asset class is provided in Appendix C. The target asset mix reflects changes to the SIPG up to and including the changes that were adopted effective February 26, 2020 by the Board of Trustees.

Expenses Paid From the Fund

The allowance for investment and administrative expenses to be paid from the fund as built into the discount rate is 0.50% of assets on a long-term basis. The allowance reflects the current level of expenses paid from the fund.

Rate of Salary Increase

We assumed salary increases of 2.85% per year for the year following January 1, 2020, and on a long term basis. This rate is based on assumed inflation of 2.10% per year, and an additional 0.75% on account of productivity and general merit and promotion increases, considering current economic and financial market conditions. We assumed salary increases of 3.00% per year at the previous valuation.

Mortality

In order to take into account the improvements in life expectancy substantiated by the Canadian Institute of Actuaries in its report on Canadian Pensioners Mortality (published on February 13, 2014), we used 70% of the CPM-2014Priv Mortality Table and 30% of the CPM-2014Publ Mortality Table, and the CPM-B Improvement Scale, which varies by gender, age and calendar year. We believe that the use of a combination of the private and public tables above better reflect the nature of existing occupation types at the Employer compared to using solely the public sector table. Adjustment factors of 105% and 102% for males and females, respectively, were also applied to the mortality table to take into account the mortality experience in New Brunswick. This assumption remains unchanged from the previous valuation.

We will continue to monitor this assumption for reasonableness.

Termination

We have used the same termination rates as used in the previous valuation. We will continue to monitor this assumption for reasonableness.

Retirement

The Board of Trustees under Step 4 of the Funding Excess Utilization Plan has awarded unreduced early retirement at “85 points rule” on pensions accrued from January 1, 2013 to December 31, 2017. We believe the Board will continue to award future Step 4 increases as long as the funded status of the Plan allows them to do so and that this will influence members to retire earlier. As such, we have assumed that all members will retire upon reaching “88 points”, or age 65.

Furthermore, we also used the same assumption for disabled members, in light of the recent plan amendment allowing disabled members to receive a pension from the Plan as early as age 55.

We will continue to monitor this assumption for reasonableness.

Opinion on Funding Policy Valuation

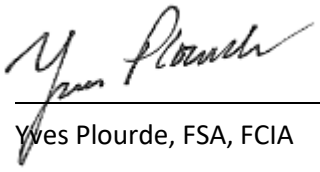
In my opinion, for the purposes of the funding policy valuation section of the report:

- The membership data on which the valuation is based are sufficient and reliable for the purposes of the valuation.
- The assumptions are appropriate for the purposes of the valuation.
- The methods employed in the valuation are appropriate for the purposes of the valuation.

This funding policy valuation report has been prepared, and my opinions given, in accordance with accepted actuarial practice in Canada.

The assumptions used under the funding policy valuation of this report were reasonable and consistent with the objectives of the CSJ SRP Plan at the time this actuarial valuation report was prepared. The funding policy valuation assumptions are consistent with the stochastic model inputs.

Respectfully submitted,



Yves Plourde, FSA, FCIA

December 3, 2020

Date

Section 2 – Risk Management Goals and Procedures

Meeting Risk Management Goals

The CSJ SRP Plan was designed to achieve or exceed the risk management goals prescribed under the PBA and Regulation 2012-75. Certain procedures were developed to test whether these goals can be achieved given the contribution rules and benefits defined in the CSJ SRP Plan. These goals and procedures are described separately below, along with the results of the stochastic analysis that are relevant under the PBA as at January 1, 2020.

Risk Management Goals

The primary risk management goal is to achieve a 97.5% probability that base benefits will not be reduced over the 20 years following the valuation.

The goal is measured by taking into account the following funding management plans:

1. the funding deficit recovery plan except for reduction in past or future base benefits, and
2. the funding excess utilization plan excluding permanent benefit changes.

The funding deficit recovery plan and the funding excess utilization plan are described in Sections V and VI of the Funding Policy, respectively.

There are two secondary risk management goals under the PBA. These are:

- On average provide contingent indexing on base benefits of active members that are in excess of 75% of the Consumer Price Index (CPI) over the next 20 years, and provide contingent indexing on base benefits of retirees and deferred vested terminated members that are in excess of 75% of the average Pre-Conversion Indexation over the next 20 years.
- On average be expected to at least provide 75% of the value of the ancillary benefits described in the plan documents at conversion over the next 20 years.

For the purposes of meeting these goals, base benefits include the accrual of extra service of members and any contingent indexing provided based on the financial performance represented by each scenario tested.

If as a result, through the testing process, a scenario allows for indexing in a given future year, then this contingent indexing amount becomes part of the base benefits that is to be protected. In other words, the base benefit is dynamically adjusted based on the stochastic results for each economic scenario tested.

Risk Management Procedures

The risk management goals are measured using an asset liability model with future economic scenarios developed using a stochastic process.

The risk management goals were tested as at January 1, 2020. The results of these tests combined with the results of the funding policy actuarial valuation at the same date will assist in determining the actions the Board of Trustees is required to take, or can consider, as applicable, under the terms of the Funding Policy.

The primary risk management goal must be achieved or exceeded:

- At January 1, 2013 (i.e. the Conversion Date);
- At the date a permanent benefit change as defined in the Regulations is made;
- At the date a benefit improvement as defined in the Regulations is made; or
- At the date contribution adjustments that exceed those provided under Section IV of the Funding Policy are implemented; and
- At the date temporary contributions are reduced before March 31, 2028 under the conditions provided for under Section IV of the Funding Policy.

The secondary risk management goals must be achieved or exceeded:

- At January 1, 2013 (i.e. the Conversion Date); or
- At the date a permanent benefit change as defined in the Regulations is made.

The definitions of “permanent benefit change” and “benefit improvement” are as follows:

“permanent benefit change” means a change that is intended to permanently change the formula for the calculation of the base benefits or ancillary benefits after the date of the change, including a change made in accordance with the funding excess utilization plan.

“benefit improvement” means an escalated adjustment for past periods or an increase in other ancillary benefits allowed under the Funding Policy.

Additional Assumptions on a Funding Policy Basis for Purposes of the Stochastic Analysis

Additional assumptions are required to determine the level of future cash flows to and from the CSJ SRP Plan, such as member and employer contributions, normal costs, benefit payments and expenses. These cash flows are calculated on a deterministic basis for each year following the valuation date for a period of 20 years, and allows the determination of the funding policy actuarial liability and assets at each future date, as well as the determination of the present value of 15-year excess contributions in accordance with paragraph 14(6)(c) of Regulation 2012-75. Furthermore, all this information is used in the stochastic analysis required under the risk management procedures for the CSJ SRP Plan.

Table 2.1 – Additional Funding Policy Actuarial Valuation Assumptions for Purpose of Calculating Future Year Cash Flows and Actuarial Liability

	January 1, 2020		
New entrants	Each active member is replaced at termination, death or retirement by a new entrant with no net increase in the active plan membership		
Distribution of new entrants and salary at entry	**Regular Members**		
	Age	**Distribution**	**Average Salary at Entry**
	27	33 ⅓%	$54,000
	34	33 ⅓%	
	41	33 ⅓%	
	35% female / 65% male		
	Police and Fire		
	Age	**Distribution**	**Average Salary at Entry**
	23	33 ⅓%	$91,000
	29	33 ⅓%	
	35	33 ⅓%	
	10% female / 90% male		
Inflation	2.10% per annum		
Salary increases	2.85% per annum		

Rationale for Material Actuarial Assumptions

The assumptions have been reviewed in light of current economic and demographic conditions.

Average Salary at Entry

The starting salary assumption for a new regular member was updated from $52,000 per annum in the previous valuation to $54,000 per annum, reflecting actual experience of new hires in the Plan.

The starting salary assumption for a new Police and Fire member was maintained at $91,000 per annum, consistent with the previous valuation, reflecting limited salary increases among the police and fire group since the last valuation.

This starting salary for both groups is updated every year in the projection period with our assumption for salary increases.

Male/Female Proportion

The assumption for the proportion of male and female future new entrants was updated to reflect experience over the last five years. The previous valuation assumed 75% males for regular new members and 80% males for police and fire new members.

Entry Age distribution

We maintained the assumption for age of future new entrants used in the last valuation, following a review of experience over the last five years. We will continue to monitor this assumption for reasonableness.

Results of Stochastic Analysis as at January 1, 2020

The stochastic analysis undertaken as at January 1, 2020, took into account the main following items:

- Membership Data as at January 1, 2020 summarized in Appendix B;
- Economic and demographic assumptions as at January 1, 2020 for the funding policy valuation summarized in Section 1;
- Pension fund long-term target asset mix as summarized in Table A.4 of Appendix A;
- Stochastic projection assumptions as summarized in Appendix C;
- Risk management procedures described above;
- CSJ SRP Plan provisions summarized in Appendix D;
- Funding deficit recovery plan found under Section V of the Funding Policy (except for reduction in past or future base benefits);
- Funding excess utilization plan found under Section VI of the Funding Policy (excluding permanent benefit changes).

Based on the above, the results of the stochastic analysis for the various risk management goals as at January 1, 2020 are as follows:

Table 2.2 – Results of Stochastic Analysis for the Various Risk Management Goals

Risk Management Goal	Minimum Requirement under PBA	Result for CSJ SRP Plan as at January 1, 2020
Primary Goal [Regulation 7(1)] There is at least a 97.5% probability that the past base benefits at the end of each year will not be reduced over a 20-year period	97.5%	98.7% **PASSED**
Secondary Goal 1 [Regulation 7(3)(a)] Expected contingent indexing of base benefits of active members for service before the conversion date shall, on average over the next 20-year period, exceed 75% of the increase in the Consumer Price Index; or Expected contingent indexing of base benefits of retirees and deferred vested members for service rendered before the conversion date shall, on average over the next 20-year period, exceed 75% of the escalated adjustments specified in the pension plan immediately before it was converted to a shared risk plan	We estimated that the combined impact of the Secondary Goal 1 for active members, retirees and deferred vested member was a Minimum Requirement under the PBA of about **56% of the assumed increase in the Consumer Price Index.** This is the weighted average of 75% of CPI for active members, and 47% of CPI for retirees and deferred vested members.	95.7% of the assumed increase in the Consumer Price Index **PASSED**
Secondary Goal 2 [Regulation 7(3)(b)] The amount of ancillary benefits (other than contingent indexing) that are expected to be provided shall, on average over the next 20-year period, exceed 75% of the value of the ancillary benefits specified in the plan text	75% of ancillary benefit will be provided	At or above 98.2% (*See Note below*) **PASSED**

Note: The Funding Policy only provides for the reduction of one type of ancillary benefit under the funding deficit recovery plan at step 2. This is the replacement of early retirement reductions for post conversion service by full actuarial reductions for members not yet eligible to retire. We expect this ancillary benefit would be reduced in about 1.8% of our 10,000 20-yr scenarios. If this is the only ancillary benefit reduced, and it was eliminated completely, then we can expect that 98.2% of the value of ancillary benefits will be provided over the 20-year period.

Section 3 – Going-Concern Valuation

The going-concern actuarial valuation is conducted in accordance with paragraph 14(1) of Regulation 2012-75 in order to determine the maximum eligible employer contribution for the CSJ SRP Plan under paragraph 147.2(2) of the ITA and provide the required actuarial opinion.

The going concern valuation is required to be performed at least once every three years. As there was a going concern valuation conducted as at January 1, 2019, the next going concern valuation is due no later than January 1, 2022. As such, we have not performed a going concern valuation of the Plan as at January 1, 2020.

Based on the January 1, 2019 going concern valuation of the CSJ SRP Plan, the average employer initial contribution requirements under the terms of the CSJ SRP Plan of 13.2% of payroll plus the employer temporary contribution of 17.0% of payroll, for a total employer contribution of 30.2% of payroll, are eligible contributions under the ITA. Furthermore, should employer contributions be increased to 32.7% of payroll as would be required under the Funding Policy if the 15-year open group funded ratio of the CSJ SRP Plan dropped below 100% for two years in a row, those higher employer contributions would also be eligible contributions under the ITA up to the date of the next going-concern valuation scheduled no later than January 1, 2022. As Police and Fire employees make contributions to the CSJ SRP Plan of 12.0% of pensionable earnings, the Board of Trustees has applied for, and been awarded, a waiver to the 9.0% employee contribution limit under the ITA.

For additional details on the January 1, 2019 going concern valuation of the CSJ SRP Plan, please refer to the January 1, 2019 actuarial valuation report of the CSJ SRP Plan.

Section 4 – Hypothetical Wind-up Valuation

A hypothetical wind-up valuation assumes that a pension plan is wound-up on the valuation date and member's benefit entitlements are calculated as of that date. Although this type of valuation is not required under Part 2 of the PBA for a shared risk plan, the Standards of Practice of the Canadian Institute of Actuaries require that actuarial valuation reports provide information with respect to hypothetical wind-up situations.

Subsection 16(3) of Regulation 2012-75 prescribes that if a shared risk plan is wound-up by the persons who established the plan within 5 years of its conversion date, the conversion of the plan is void and the plan has to be wound-up as a defined benefit plan under Part 1 of the PBA. In addition, effective January 1, 2018, subsection 16(3.1) of Regulation 2012-75 provides that if the wind-up occurs between 5 and 10 years after the Plan conversion date, the Superintendent may determine that the conversion is void and may require that the Plan be wound-up as a defined benefit plan under Part 1 of the PBA.

In conducting the hypothetical wind-up valuation as at January 1, 2020, we made the assumption that the conversion would be void, and that the CSJ SRP Plan would be wound-up as at January 1, 2020 in accordance with rules found under Part 1 of the PBA.

We have valued the wind-up liability using discount rates consistent with the requirements of the PBA for plan wind-ups under Part 1. The PBA requires that benefits paid out to each member upon wind-up be not less than the cost to purchase an annuity for that member. Accordingly, we have followed the Canadian Institute of Actuaries' recommendations for the estimated cost of annuity purchases as at January 1, 2020.

Hypothetical Wind-Up Funded Status

The hypothetical wind-up funded status under the scenario postulated above, including the results of the last hypothetical wind-up valuation, is as follows:

Table 4.1 – Hypothetical Wind-Up Funded Status

	January 1, 2020	January 1, 2019
	$M	$M
Assets		
• Market value of assets	$663.9	$595.9
• Provision for expenses	(0.7)	(0.7)
• Total	$663.2	$595.2
Hypothetical wind-up liabilities		
• Active members	$485.8	$430.7
• Terminated deferred vested members	7.0	5.0
• Retired members, survivors and disabled	638.7	600.7
• Outstanding refunds and withholding amounts	0.1	0.2
• Total	$1,131.6	$1,036.6
Assets less liabilities on the hypothetical wind-up basis	($468.4)	($441.4)

The hypothetical wind-up funded status is presented for information purposes. There is no requirement under the PBA to fund the hypothetical wind-up deficit of the CSJ SRP Plan while it is not in a wind-up state.

Hypothetical Wind-up Asset Valuation Method

Wind-up assets are equal to the market value of assets less an allowance for wind-up expenses. This valuation method is the same as the one used in the last valuation.

Hypothetical Wind-up Actuarial Cost Method

The hypothetical wind-up liabilities are determined using the accrued benefit (or unit credit) actuarial cost method. The hypothetical wind-up liabilities are equal to the actuarial present value of all benefits earned by members for services prior to the valuation date assuming the CSJ SRP Plan is wound up on the valuation date under Part 1 of the PBA. This method is the same as the one used in the last valuation. We also assumed that the disabled members who ceased to receive a disability pension from the pension plan as a result of the conversion would be re-instated as disabled pensioners under the wind-up scenario.

For valuation purposes, to determine eligibility for benefits and for any other uses, the age used is the age on the date of the nearest birthday.

Hypothetical Wind-up Actuarial Assumptions

The main actuarial assumptions used in the hypothetical wind-up valuation correspond to those prescribed by the PBA.

We have valued the hypothetical wind-up liability using discount rates consistent with the requirements of the PBA if the pension plan were to be wound up. The PBA requires that benefit paid out to each member upon wind-up be not less than the cost to purchase an annuity for that member. Accordingly, we have followed for

that purpose the Canadian Institute of Actuaries' recommendations for the estimated cost of annuity purchases as at January 1, 2020.

The primary actuarial assumptions employed for the hypothetical wind-up actuarial valuation are summarized in the following table. All rates and percentages are annualized unless otherwise noted.

Table 4.2 – Hypothetical Wind-Up Actuarial Assumptions

	January 1, 2020	January 1, 2019
Discount rate		
• Discount rate for active members and deferred vested members not eligible for early retirement	2.5% per annum for 10 years, 2.6% per annum thereafter; or 2.96% per annum, if it produces a higher liability	2.8% per annum for 10 years, 3.2% per annum thereafter; or 3.23% per annum, if it produces a higher liability
• Discount rate for other members	2.96% per annum	3.23% per annum
Salary increases	None	None
Mortality	CPM 2014 Table, projected with improvement scale CPM-B	CPM 2014 Table, projected with improvement scale CPM-B
Termination of employment	None	None
Provisions for wind-up expenses	$700,000	$700,000
Retirement	Age that maximizes the value of the pension	Age that maximizes the value of the pension

Post-retirement indexing is also included in accordance with the terms of the Former CSJ Plan which provided for certain fixed rates of indexing dependent on the period of service.

Allowance has been made for administrative, actuarial and legal costs which would be incurred if the CSJ SRP Plan were to be wound up in full or in part. No allowance has been made for costs which may be incurred in respect of resolving surplus or deficit issues on plan wind up or the costs in respect of assets which cannot be readily realized.

The Canadian Institute of Actuaries (CIA) collects data annually from insurance companies and annually determines interest rates suitable for estimating the cost of single premium group annuities in hypothetical wind-up valuations. For pensioners and for active members and deferred vested members eligible for immediate retirement at the valuation date, the interest rate used in the present hypothetical wind-up valuation is an estimate of the rate that would be used by insurance companies in pricing single premium group annuities for annuitants already retired, based on the suggested rates for such annuitants published by the CIA.

Choice of Assumptions

Discount Rate

The discount rate used for valuing benefits for transferring members was updated to be in accordance with the recommendations of the Canadian Institute of Actuaries' (CIA) and is based on the rates of return for long-term bonds issued by the Government of Canada in December 2019.

The discount rate for non-indexed annuities is 2.96% per year. This rate is based on the CIA recommendations [the long term Government of Canada bonds' yield (series V39062) for December 2019 of 1.76% plus an adjustment of 1.20% based on the liability duration of 13.3 years for liabilities assumed to be settled as annuities under the solvency assumption]. This is a reasonable estimate of the discount rate, which when used in conjunction with the CPM-2014 mortality rates, approximated the cost of purchasing immediate non-indexed annuities as at the valuation date.

The discount rate used for active members and deferred vested members not eligible for immediate retirement is the rate used for pensioners without adjustment, as suggested by the CIA as an appropriate estimate of the cost of deferred annuities based on their survey data from insurance companies.

Benefits are assumed to be settled by a single annuity purchase regardless of any limitation of capacity in the market for group annuity contracts.

Emerging experience differing from these assumptions will result in gains or losses, which will be revealed in future hypothetical wind-up actuarial valuations.

Termination Scenario

The termination scenario used in the hypothetical wind-up valuation includes the following assumptions:

- Plan wind-up would not result from employer insolvency.
- All assets could be realized at their reported market value.
- CSJ SRP Plan conversion would be void and the pension plan would be wound-up under Part 1 of the PBA.

Margin for Adverse Deviations

As specified by the Standards of Practice of the Canadian Institute of Actuaries, the hypothetical wind-up assumptions do not include a margin for adverse deviations.

Provision for Fees

Allowance has been made for administrative, actuarial and legal costs which would be incurred if the CSJ SRP Plan were to be wound up, based on sufficient and reliable data. It is assumed that the wind-up date, the calculation date and the settlement date are coincident, and as such, expenses related to investment policy reviews, investment and custodial fees are not included. Expenses related to the resolution of surplus and deficit issues are not taken into account. The amount of expenses is only an approximation and may differ significantly from real expenses incurred on plan wind-up, for example, in case of litigation, bankruptcy and/or eventual replacement by a third-party administrator.

Hypothetical Wind-up Incremental Cost

The method used to calculate the hypothetical wind-up incremental cost may be described as follows:

1. Present value of expected benefit payments between January 1, 2020 and January 1, 2021, discounted to January 1, 2020;

   Plus

2. Projected hypothetical wind-up liabilities as at January 1, 2021, discounted to January 1, 2020;

   Less

3. Hypothetical wind-up liabilities as at January 1, 2020.

Opinion on Hypothetical Wind-up Valuation

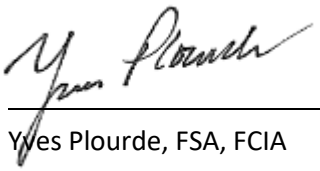
In my opinion, for the purposes of the hypothetical wind-up valuation section of the report:

- The membership data on which the valuation is based are sufficient and reliable for the purposes of the valuation.
- The assumptions are appropriate for the purposes of the valuation.
- The methods employed in the valuation are appropriate for the purposes of the valuation.

This hypothetical wind-up valuation report has been prepared, and my opinions given, in accordance with accepted actuarial practice in Canada.

The assumptions used under the hypothetical wind-up valuation of this report were reasonable at the time this actuarial valuation report was prepared.

Respectfully submitted,



Yves Plourde, FSA, FCIA

December 3, 2020

Date

Section 5 – Plausible Adverse Scenarios

Effective for funding valuations on or after March 31, 2019, the plan actuary is required to select Plausible Adverse Scenarios for various risks underlying the Plan, and disclose in the report the impact such scenarios would have on the funded status and risk management test results of the Plan. The results of this analysis are contained in this Section 5.

The Standards of Practice of the CIA continue to require that valuation reports disclose the sensitivity of the liabilities to changes in the discount rate assumption. Previously, the discount rate sensitivity results for the funding policy, going concern, and hypothetical wind-up bases would have been found in Sections 1, 3, and 4 of the actuarial valuation report, respectively. As these sensitivities are also a form of stress test, we have included them in this Section 5 for completeness.

Description of the Plausible Adverse Scenarios

The Standards of Practice of the CIA require valuation reports to disclose the results of stress tests on Plausible Adverse Scenarios. A Plausible Adverse Scenario would be a scenario of adverse but plausible assumptions relative to the best estimate assumptions outlined in Section 1 of this report. As a result, these scenarios are stress tests on a selection of risks to which the Plan is subject. This selection is not meant to consider all of the risks to which the Plan is subject.

The following is a description of the four scenarios analyzed.

Scenario I - Interest Rate Risk

In this Scenario, we will model the impact of a sudden drop in fixed income yield, which will impact the level of the discount rate, and the value of the fixed income assets in the Fund. The magnitude of the drop will be such that there is a 1 in 10 likelihood of such a reduction happening in accordance with our economic model underlying our stochastic analysis.

Based on the outcome with a 1 in 10 likelihood of occurrence under our economic model, yields on fixed income assets are assumed to decrease by 1.11% immediately, leading to a 0.30% decrease in the expected return of the Plan's investments. We have not reflected any change of the assumed margin for adverse deviation to compensate for the decrease in expected return and have therefore reflected a decrease in the discount rate to 4.20% per annum for this valuation. While the Funding Policy states that the intent of the discount rate is to remain stable over time, we have illustrated the impact should the Board of Trustees change the discount rate.

In valuing the effect of this change on the Plan assets, the impact of the interest rate risk was restricted to the asset classes deemed to be fixed income investments, and results in a 10.27% increase on the market value of the affected asset classes, which translates into a 4.42% increase on the market value of the Fund as a whole.

All other assumptions and methods used for this valuation were maintained, and no other compensating adjustments were made.

Scenario II - Deterioration of Asset Values

In this Scenario, we will model the impact of a sudden drop in the value of assets other than fixed income assets, with no change in the level of the discount rate or any other assumptions. The magnitude of the drop will be

such that there is a 1 in 10 likelihood of such a reduction happening for such asset classes in accordance with our economic model underlying our stochastic analysis.

Based on the outcome with a 1 in 10 likelihood of occurrence under our economic model, all assets other than fixed income assets were assumed to decrease by 9.52% immediately, resulting in a 6.19% decrease on the market value of the total Fund. No changes to funding valuation actuarial liabilities and normal cost were considered under this scenario. All assumptions and methods used for this valuation were maintained.

Scenario III - Longevity Risk

In this Scenario, we will model the impact of an increase in the average life expectancy of all plan members relative to our assumption used in our valuation. The magnitude of the increase will be such that the life expectancy is increased by 10% from the underlying mortality table assumption used in our valuation.

To test the impact of an average life expectancy increase of 10% for all ages over the current assumption on the funding policy actuarial liabilities and normal cost, a 3-year setback was applied to all mortality rates used for this valuation. All other assumptions and methods used for this valuation were maintained.

Scenario IV - Decrease in Contribution Base

In this Scenario, we will model the impact of a decrease in contribution base, where an undefined event triggers an immediate 10% reduction in active members contributing and accumulating benefits under the plan.

A decrease of 10% in payroll for the year following the valuation date is assumed. We assume that the demographic profile of the active membership is unchanged from the decrease in payroll. For purposes of this scenario, we assume that the market value of assets and funding policy actuarial liabilities are unchanged, and due to the decrease in payroll we assume a 10% reduction in contributions and normal cost for each year following the valuation date. All other assumptions and methods used for this valuation were maintained.

Plausible Adverse Scenarios - Funding Policy Valuation

The following table illustrates the impact of the above four plausible adverse scenarios on the funding policy liabilities and corresponding funded statuses and legislated risk management tests. The scenarios have been applied and reported on separately.

Table 5.1 – Plausible Adverse Scenarios Impact on the Funding Policy Valuation Results

	Funding Policy Valuation Results as at January 1, 2020	Plausible Adverse Scenario Results as at January 1, 2020			
		Scenario I Interest Rate Risk	Scenario II Deterioration of Asset Values	Scenario III Longevity Risk	Scenario IV Decrease in Contribution Base
	$M	$M	$M	$M	$M
Market value of assets	663.9	693.2	622.8	663.9	663.9
Funding policy actuarial liabilities	676.7	702.2	676.7	719.2	676.7
Funding policy valuation excess (unfunded liability)	(12.8)	(9.0)	(53.9)	(55.3)	(12.8)
Termination value funded ratio	98.1%	98.7%	92.0%	92.3%	98.1%
Present value of excess contributions over the next 15 years	163.3	158.2	163.3	158.7	146.3
Open group funded ratio	122.2%	121.3%	116.2%	114.4%	119.7%
Funding policy valuation normal cost	9.6	10.2	9.6	10.0	8.6
Results of stochastic analysis for risk management goal					
Primary Goal [Regulation 7(1)]	98.7% PASS	98.8% PASS	97.9% PASS	96.8% FAIL	97.9% PASS
Secondary Goal 1 [Regulation 7(3)(a)]	95.7% PASS	98.0% PASS	89.4% PASS	84.6% PASS	92.1% PASS
Secondary Goal 2 [Regulation 7(3)(b)]	98.2% PASS	98.3% PASS	97.2% PASS	95.8% PASS	97.4% PASS

Discount Rate Sensitivity Results

The Standards of the CIA require that valuation reports disclose the sensitivity of the liabilities to changes in the discount rate assumption. The discount rate sensitivity results for the funding policy, going concern, and hypothetical wind-up bases are presented below.

Sensitivity Analysis on the Funding Policy Valuation Basis

The table below illustrates the effect of 1% decrease in the discount rate on the funding policy valuation actuarial liabilities. With the exception of the discount rate, all other assumptions and methods used for this valuation were maintained.

Table 5.2 – Sensitivity of Actuarial Liabilities on the Funding Policy Basis

	January 1, 2020	Discount rate 1% lower
	$M	$M
Actuarial liabilities		
• Active and disabled members	$225.9	$269.6
• Terminated deferred vested members	2.6	3.4
• Retired members and survivors	447.8	495.3
• Outstanding refunds and withholding amounts	0.1	0.1
• Contingent Indexing Reserve (Step 6)	0.3	0.3
• Total	$676.7	$768.7
Increase in actuarial liabilities		$92.0

Sensitivity Analysis on the Funding Policy Valuation Total Normal Cost

The table below illustrates the effect on the total normal cost of using a discount rate 1% lower than the one used for the funding policy valuation. All other assumptions and methods, as used for this valuation, were maintained.

Table 5.3 – Sensitivity of Funding Policy Total Normal Cost

	As at January 1, 2020		Discount rate 1% lower	
	M$	% of payroll	M$	% of payroll
Total normal cost	$9.6	14.4%	$11.8	17.8%
Increase in total normal cost			$2.2	3.4%

Sensitivity Analysis on the Hypothetical Wind-Up Basis

The table below illustrates the effect on the actuarial liabilities of using discount rates 1% lower than those used for the hypothetical wind-up valuation. All other assumptions and methods, as used in this valuation, were maintained.

Table 5.4 – Sensitivity of Actuarial Liabilities on the Hypothetical Wind-Up Basis

	January 1, 2020	Discount Rates 1% lower
	$M	$M
Actuarial liabilities		
• Active members	$485.8	$634.0
• Terminated vested members	7.0	9.5
• Retired members, survivors and disabled	638.7	726.7
• Outstanding refunds and withholding amounts	0.1	0.1
• Total	$1,131.6	$1,370.3
Increase in actuarial liabilities		$238.7

Incremental Cost on the Hypothetical Wind-up Basis

The incremental cost on the hypothetical wind-up basis represents the present value of the expected aggregate change in the actuarial liabilities from January 1, 2020 to January 1, 2021, adjusted for expected benefit payments in the inter-valuation period. This incremental cost is estimated to be $29,652,000 as at January 1, 2020.

Appendix A – Assets

Description of Plan Assets

The assets of the CSJ SRP Plan are held in custody by RBC Investor & Treasury Services and are invested by various professional investment management firms in accordance with the provisions of the Statement of Investment Policies and Goals (SIPG).

Statement of Market Value

The following table shows the asset mix as at December 31, 2019 and, for comparison, the asset mix as at December 31, 2018, extracted from audited financial statements prepared by Deloitte:

Table A.1 – Assets at Market Value

	December 31, 2019	December 31, 2018
Market value of assets	$	$
• Cash and short term	18,943,689	42,561,251
• Bonds and fixed income pooled funds	285,046,996	247,395,398
• Equities	277,483,712	236,582,025
• Real estate	80,330,716	67,332,231
• Accrued interest and dividends	466,957	530,060
• Due from the City of Saint John	1,628,871	1,504,118
Total market value of assets	663,900,941	595,905,083

Changes to Plan Assets

The following table shows changes to the CSJ SRP Plan assets during the inter-valuation period, based on market values. The reconciliation is based on the audited financial statements prepared by Deloitte.

Table A.2 – Reconciliation of Market Value of Assets

	2019
	$
Market value of assets at beginning of year	595,905,083
Receipts	
• Member contributions	6,749,204
• City contributions	19,712,340
• Investment income plus realized and unrealized capital appreciation and depreciation	77,408,764
Total receipts	103,870,308
Disbursements	
• Pensions paid	32,524,332
• Transfers and refunds	645,694
• Expenses (fees)	2,704,424
Total disbursements	35,874,450
Market value of assets at end of year	663,900,941

Return on Assets

The CSJ SRP Plan's assets earned the following rate of return, net of investment management fees and other expenses charged to the fund, based on our calculations which assume cash flow occurred in the middle of the period:

Table A.3 – Net Investment Return

Year	Rate of Return
	%
2019	12.6
2018	(0.6)
2017	11.0
2016	9.0
2015	3.3

Actuarial Value of Assets

We have used the fair market value of assets as provided in the audited financial statements produced by Deloitte. The actuarial value of assets as at January 1, 2020 was $663.9M.

Target Asset Mix

The statement of investment policy and goals for the CSJ SRP Plan, as last amended by the Board of Trustees on February 26, 2020, provides for the following long-term target asset mix.

Table A.4 – Long-term Target Asset Mix

Asset classes	Target
Short term	1.0%
Equities	
• Domestic equity	15.0%
• US equity	7.5%
• International equity	7.5%
Fixed income	
• Domestic long-term corporates	9.5%
• Domestic long-term provincials	9.5%
• Domestic corporates	10.0%
• Global high yield	5.0%
Alternative investments	
• Real Estate and Mortgages	15.0%
• Infrastructure	8.0%
• Private equity	4.0%
• Private debt	8.0%
Total	100.0%

This long-term target asset mix was used to determine the real rate of return assumption under the funding policy valuation and to conduct the stochastic analysis required under the PBA to assess the various risk management goals.

Appendix B – Membership Data

Description of Membership Data

Data on the CSJ SRP Plan membership was obtained from Aon and the City of Saint John. The data was provided as at January 1, 2020.

The data was matched and reconciled with data provided for the previous valuation as at January 1, 2019. Basic data checks were performed to ensure that age, salary and service data were reasonable for the purposes of the valuation and to ensure that the data was accurate, complete and consistent with previous data.

Summary of Membership Data

The following tables summarize the data used for the valuations. These tables show the following:

B.1 Summary of Membership Data

B.2 Changes in Plan Membership

B.3 Age/Service Distribution for Active Members as at January 1, 2020

B.4 Age/Service Distribution for Disabled Members as at January 1, 2020

B.5 Distribution of Retired members and survivors by Age Groups as at January 1, 2020

Table B.1 - Summary of Membership Data

		January 1, 2020	January 1, 2019
Active members	Number	826	816
	Average salary	$80,818	$81,686
	Average age	44.8 years	45.0 years
	Average pensionable service	14.3	14.6
	Average annual accrued pension	$21,588	$21,634
Disabled members	Number	29	39
	Average annual accrued pension	$36,421	$36,178
	Average age	57.8 years	57.7 years
Terminated deferred vested members	Number	32	26
	Average annual pension	$11,148	$10,743
	Average age	45.5 years	45.5 years
Retired members and survivors	Number	893	898
	Average annual lifetime pension	$37,802	$36,055
	Average age	72.3 years	72.2 years

There were also 1 other inactive member and outstanding payment as at January 1, 2020, for a total amount owed of $0.1M.

Table B.2 – Changes in Plan Membership

	Active members	Disabled members	Deferred vested members	Retirees and survivors
Members at January 1, 2019	816	39	26	898
New members	47	---	---	---
Returned to Active Status	4	(3)	---	(1)
Retirements	(30)	(7)	---	37
Terminations:				
• with refunds or transfers out	(2)	---	(1)	---
• with deferred pensions	(5)	---	7	---
• with outstanding payments	---	---	---	---
Deaths or cessation of pension	(1)	(1)	---	(59)
New survivor pensions	---	---	---	18
Transferred to Disabled	(1)	1	---	---
Data Adjustment	(2)	---	---	---
Members at January 1, 2020	826	29	32	893

Table B.3 – Age/Service Distribution for Active Members as at January 1, 2020

Years of Service		Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60 and Over	Total
0 - 4	Num.	16	44	30	29	20	13	8	7	5	172
	Avg. Sal.	54,932	61,654	68,163	71,864	61,764	67,878	74,405	80,187	91,200	66,575
	Avg. Pen.	856	2,248	2,944	2,742	2,281	2,984	4,117	2,396	17,337	2,914
5 - 9	Num.	0	7	65	39	29	23	5	4	1	173
	Avg. Sal.	0	70,720	74,472	80,140	65,420	73,895	71,046	90,437	*****	74,172
	Avg. Pen.	0	7,173	9,052	10,163	7,771	9,768	8,862	11,397	*****	9,139
10 - 14	Num.	0	0	10	33	42	24	13	11	2	135
	Avg. Sal.	0	0	91,028	78,656	85,021	93,680	89,849	72,836	*****	84,759
	Avg. Pen.	0	0	17,985	16,649	17,762	19,128	17,960	15,421	*****	17,550
15 - 19	Num.	0	0	0	7	35	29	12	2	2	87
	Avg. Sal.	0	0	0	99,069	91,592	88,859	84,193	*****	*****	89,354
	Avg. Pen.	0	0	0	27,161	26,542	28,516	25,515	*****	*****	26,942
20 - 24	Num.	0	0	0	0	10	25	29	13	6	83
	Avg. Sal.	0	0	0	0	103,117	98,791	86,012	82,619	55,686	89,198
	Avg. Pen.	0	0	0	0	36,618	36,571	34,393	30,606	25,922	34,111
25 - 29	Num.	0	0	0	0	0	6	45	42	16	109
	Avg. Sal.	0	0	0	0	0	97,961	90,678	82,706	69,846	84,949
	Avg. Pen.	0	0	0	0	0	44,259	43,635	40,130	34,996	41,050
30 +	Num.	0	0	0	0	0	0	16	34	17	67
	Avg. Sal.	0	0	0	0	0	0	96,857	101,832	93,057	98,417
	Avg. Pen.	0	0	0	0	0	0	52,407	56,865	56,395	55,681
Total number		16	51	105	108	136	120	128	113	49	826
Avg. Sal.		54,932	62,898	74,246	78,691	80,443	87,206	87,917	*****	78,512	80,818
Avg. Pen.		856	2,924	8,157	11,254	17,001	22,744	34,503	*****	37,613	21,588

Average age: 44.8

Average number of years of service: 14.3

Notes: The age is computed at the nearest birthday.

Years of service means the number of years credited for pension plan purposes, fractional parts being rounded to the nearest integer.

Membership for active members is composed of 651 males and 175 females.

Table B.4 – Age/Service Distribution for Disabled Members as at January 1, 2020

Years of Service		Under 50	50-54	55-59	60 and Over	Total
Under 20	Num.	2	1	1	0	4
	Avg. Sal.	*****	*****	*****	0	57,547
	Avg. Pen.	*****	*****	*****	0	15,322
20 - 24	Num.	0	0	3	0	3
	Avg. Sal.	0	0	60,599	0	60,599
	Avg. Pen.	0	0	26,789	0	26,789
25 - 29	Num.	0	2	4	3	9
	Avg. Sal.	0	*****	85,014	59,165	*****
	Avg. Pen.	0	*****	42,248	31,400	*****
30 +	Num.	0	0	5	8	13
	Avg. Sal.	0	0	79,088	79,920	79,600
	Avg. Pen.	0	0	42,836	45,427	44,430
Total number		2	3	13	11	29
Avg. Sal.		*****	84,435	*****	74,260	73,198
Avg. Pen.		*****	34,898	*****	41,602	36,421

Average age: 57.8

Notes: The age is computed at the nearest birthday.

Years of service means the number of years credited for pension plan purposes, fractional parts being rounded to the nearest integer.

Membership for active disabled members is composed of 24 males and 5 females.

Table B.5 – Distribution of Retired Members and Survivors by Age Groups as at January 1, 2020

Age Group	Number	Total Annual Pension
Under 60	60	$2,641,058
60-64	161	7,374,105
65-69	185	8,101,108
70-74	173	6,801,715
75-79	122	3,996,601
80-84	97	2,850,838
85-89	52	1,263,540
90 and over	43	728,447
Total	893	$33,757,412

Average age: 72.3

Notes:

Age groups are based on exact age.

The pension used is the pension payable as at January 1, 2020.

Membership for pensioners is composed of 623 males and 270 females.

Appendix C – Stochastic Projection Assumptions and Disclosures

The model inputs for our stochastic analysis are built each year using Conference Board of Canada (CBoC) forecasts, internal research, inflation expectations and by surveying the asset manager universe. This ensures we are not using inputs that are out of touch with broader expectations. We strive for accuracy in our assumptions, as high or low expectations can lead to biased results. However, when deciding between equally reasonable modeling choices, we err on the side of conservatism.

The methodology used to develop key assumptions used within the model is described below.

Economic Assumptions

Economic stochastic projection assumptions are updated annually by Morneau Shepell Asset and Risk Management using a multi-stage process.

Inflation

We select a long-term inflation rate assumption based primarily on the current Bank of Canada Monetary Policy. Volatility for inflation is based on historical data since the early 1990's when the current monetary policy was introduced. Historical volatility is used to estimate consumer price index volatility for future years. We also develop an assumption for market implied inflation which is used to determine fixed-income yields in any given year. We use current market data for the initial rate and then use an autoregressive time-series model to determine the market implied inflation assumption rates over the first ten projection years, at which point the rate remains stable, such that the long-term implied market inflation is consistent with our assumption for the change in the consumer price index.

Table C.1 – Market Implied Inflation

December 31	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029 and after
Market implied inflation (%)	1.35	1.44	1.53	1.62	1.71	1.80	1.90	1.99	2.08	2.17	2.26

Interest Rates

We use a building block approach to estimate the long-term interest rates for government bonds and Canadian bond indices. The three components that make up the long-term interest rate estimate are: Inflation, real return, and credit spread. After careful consideration, we assume that both real yields and credit spreads revert to projected long-term rates. Although some research papers suggest that the possibility that interest rates follow a random walk process (that is, they do not mean-revert) cannot be rejected, mean reversion is intuitive and increases the likelihood that rates will remain within a reasonable range. Therefore, we assume each building block moves from the value in the market as of the valuation date towards its long-term level over a projected period of 10 years (and remains at the long-term level thereafter). Each of the building blocks follow a

modified discrete version of the Vasicek model, using an instantaneous volatility determined from historical data.

Canadian Bond Indices

We generate expected return levels and standard deviations for Canadian bond indices in a stochastic simulation approach. We assume that the only components needed to model the returns are: yield and variation of interest rates. We make the assumption that interest rates follow a Vasicek model. To determine the impact of yield variation on return we extract the duration and convexity as of the valuation date for the FTSE Canadian bond indices and assume that it will remain constant in the future. Using the Vasicek model, we simulate 10,000 interest rate paths which we use to create 10,000 return series for various Canadian bond indices. The geometric average of the 10,000 simulated returns is taken as the return level assumption. The mean annual standard deviation of returns is taken as the standard deviation of returns.

Fixed income asset classes that were used in our modeling include, but are not limited to Canadian federal, provincial, and corporate bond indices. The following initial and ultimate average credit spreads and average nominal yields were used as at January 1, 2020.

Table C.2 – Credit Spreads and Yields by Bond Index

Asset Class	Initial Credit Spread *	Ultimate Credit Spread *	Initial Yield	Ultimate Yield
FTSE Canada Federal Bonds	n/a	n/a	1.80%	3.17%
FTSE Canada Federal Short Term Bonds	n/a	n/a	1.77%	2.81%
FTSE Canada Federal Mid Term Bonds	n/a	n/a	1.85%	3.40%
FTSE Canada Federal Long Term Bonds	n/a	n/a	1.82%	3.90%
FTSE Canada Corporate Bonds	1.01%	1.14%	2.80%	4.31%
FTSE Canada Short Term Corporate Bonds	0.64%	0.83%	2.41%	3.64%
FTSE Canada Mid Term Corporate Bonds	1.14%	1.22%	2.99%	4.62%
FTSE Canada Long Term Corporate Bonds	1.57%	1.62%	3.39%	5.53%
FTSE Canada Universe Provincial Bonds	0.54%	0.86%	2.33%	4.02%
FTSE Canada Short Term Provincial Bonds	0.16%	0.23%	1.92%	3.04%
FTSE Canada Mid Term Provincial Bonds	0.38%	0.48%	2.24%	3.87%
FTSE Canada Long Term Bonds	0.72%	0.74%	2.54%	4.64%

** The credit spread reflects the excess average yield for the index over the federal bond index of similar maturity.*

Fixed income asset classes' returns and standard deviations must be consistent. We perform a check on the relationships between indices and sub-indices, and make adjustments if necessary.

Equity

The process for determining the nominal equity return assumptions uses a forward-looking building block approach. We utilize multiple sources of information, including our inflation assumptions, historical data, GDP and other economic data, growth forecasts and dividend information.

The building blocks are the change in the consumer price index assumptions determined above, the expected dividend yield for the index (adjusted for share issues and buy-backs), and Consensus Economics' GDP forecasts.

The building block approach results in equity return assumptions in the local currency of the asset classes. For foreign equity, we used Consensus Economics' estimates for purchasing power parity between the local currency and the Canadian dollars. We assume that the current exchange rate will trend linearly towards purchasing power parity over a period of 10 years.

Standard deviations and correlations of equity returns are mainly derived from historical data. To ensure consistency between indices covering different regions, we use an iterative calibration process.

We also consider differences in capitalization levels and investment styles. Small-cap equities and large-cap equities have different risk-return profiles. We use historical data to measure the return and volatility spreads between small-cap and large-cap equities.

Alternative Asset Classes

Alternative asset classes include real estate, infrastructure, hedge funds, private equity, foreign fixed income, private debt, and high yield bonds.

Real estate indices do not include leverage; however, some real estate funds and strategies use leverage. Moreover, some real estate indices are only updated quarterly, resulting in an appraisal lag. Other indices are transaction based rather than appraisal based. Therefore, we must exercise some subjective judgement to estimate return levels, standard deviations and correlations.

Hedge fund indices usually include survivorship and backfill biases. Moreover, hedge fund strategies can differ from the index due to their characteristics. Most hedge funds have an absolute return target that can guide in the selection of the assumption.

Private equity may be viewed as public equity, adjusted with a liquidity risk premium. Private equity managers usually target a spread of 3% to 5% over public equities.

Infrastructure return level assumption is based on the 10-year Government of Canada bond returns, plus a spread. The spread varies on whether the investment is in infrastructure debt or in infrastructure equity.

For foreign fixed income, we utilize the same model used for Canadian fixed income except that the credit spread and real yield components are not separated due to a lack of reliable data.

Correlations & Standard Deviations

Correlations and standard deviations are mainly derived from historical data. However, recent trends and experience can potentially lead us to perform modifications on the historical correlations. Although exchange rates have little impact on long-term equity return levels, they do have an impact on correlations.

Correlations between certain pairs of asset classes are unstable through time, particularly for alternative asset classes. Historical correlations may show a large diversifying advantage for certain assets, which may not be properly supported by theoretical evidence. In cases of a strong negative correlation, we consider whether this correlation should be trended back towards zero.

The correlation matrix must be consistent. Consistency is required for theoretical accuracy and in stochastic simulations. We use an algorithmic approach to ensure consistency of the correlation matrix.

Returns, Volatility, and Correlations by Asset Class

The following expected return and volatility by asset class were used as at January 1, 2020. For reference, we have also included the return and volatility as at the date of the previous valuation, January 1, 2019.

Table C.3 – Expected Nominal Return and Volatility (standard deviation of return) by Asset Class

	January 1, 2020		January 1, 2019	
	Expected Annualized Long-term Return	Volatility of Annual Return	Expected Annualized Long-term Return	Volatility of Annual Return
Inflation (change in the consumer price index)	2.10%	1.30%	2.25%	1.25%
Asset Classes				
Fixed income:				
• Short term assets (ST)	2.10%	1.1%	2.20%	1.2%
• Domestic Long-Term Corporate (DLTC)	3.95%	9.8%	4.50%	8.8%
• Domestic Long-Term Provincial (DLTP)	2.95%	9.7%	3.50%	11.0%
• Domestic Corporate (DC)	3.60%	4.9%	3.95%	5.7%
• Global High Yield (GHY)	5.35%	12.0%	6.20%	11.8%
Public equities:				
• Canadian equities (CE)	6.80%	16.4%	7.25%	16.3%
• US equities (USE)	6.45%	17.3%	6.70%	17.1%
• International equities (IE)	7.15%	15.2%	7.55%	15.1%
Alternative Investments:				
• Real Estate and Mortgages (RE & M)	6.05%	9.0%	6.25%	9.9%
• Infrastructure (I)	6.30%	13.0%	6.85%	13.0%
• Private Equity (PE)	9.85%	23.5%	10.25%	23.8%
• Private Debt (PD)	4.35%	4.9%	6.20%	8.8%

For every year in the 20-year projection, expenses of 10 basis points to reflect the cost of passive management is deducted from the assets (the additional cost of active management is expected to be achieved in addition to the expected returns shown above and therefore are not included in the analysis). In addition, we included a flat expense of $700,000 (in 2020, and increased with assumed inflation thereafter), to cover all other administrative expenses paid from the fund other than passive management.

The following is the correlation among the various asset classes identified in Table C.3 used as at December 31, 2019. For fixed income asset classes, the correlations are based on the real yields of the assets, whereas for non-fixed income asset classes, the correlations are based on the assets returns:

Table C.4 - Simulation Correlations Among Asset Classes and Fixed Income Yields

Asset Classes	ST	DLTC	DLTP	DC	GHY	CE	USE	IE	RE & M	I	PE	PD
ST	1.00	-0.05	0.02	0.45	-0.22	0.24	0.17	0.29	0.51	0.02	0.19	0.45
DLTC		1.00	0.95	0.72	0.55	-0.23	-0.16	-0.09	-0.21	0.20	-0.19	0.70
DLTP			1.00	0.73	0.37	-0.05	-0.02	0.08	-0.15	0.20	-0.04	0.71
DC				1.00	0.24	-0.01	-0.01	0.10	0.17	0.19	-0.02	0.98
GHY					1.00	-0.61	-0.41	-0.58	-0.28	0.00	-0.49	0.23
CE						1.00	0.40	0.56	0.23	0.08	0.55	-0.01
USE							1.00	0.74	0.10	-0.07	0.62	0.00
IE								1.00	0.24	-0.07	0.59	0.11
RE & M									1.00	0.11	0.14	0.16
I										1.00	-0.01	0.19
PE											1.00	-0.02
PD												1.00

The correlations are assumed to remain constant over the entire projection period.

Forecasted Funding Policy Valuation Liabilities

As required under paragraph 15(2)(c) of Regulation 2012-75, the projection of the liability and future cash flows under the stochastic analysis uses the same demographic assumptions as used for the calculation of the funding policy valuation liability. As such, the funding policy valuation assumptions are used to project the demographics of the Plan on a deterministic basis 20 years into the future. Both the economic and demographic assumptions in Table 1.6 and Table 2.1 are used to project the number of members and their salaries, with each active member being replaced at death or retirement by a new entrant, resulting in the membership profile outlined herein. The following table contains the results of the deterministic projection, in particular the number of active and disabled members, along with their average pensionable service, average age, and average pensionable earnings for the year for each of the 20 years in the projection period.

Note that Table C.5 below includes 29 members on disability at the valuation date. Future disabled members are modeled through the use of a 0.25% loading on the annual normal cost. Future new entrants are modeled to replace true active members only, and not members on disability. For this reason, a decreasing active and disabled population is shown below reflecting the expected retirement of disabled members without new entrants, with a stable underlying active population when including new entrants.

Table C.5 – Projection Statistics for Active and Disabled Members

Date	Number of Active and Disabled Members	Average Age (years)	Average Pensionable Service (years)	Average Salary *
31-Dec-20	855	45.3	14.8	$80,560
31-Dec-21	838	45.9	15.4	$82,791
31-Dec-22	838	43.4	12.4	$82,503
31-Dec-23	836	43.3	12.1	$83,879
31-Dec-24	833	43.6	12.3	$85,769
31-Dec-25	831	43.6	12.2	$87,571
31-Dec-26	830	43.9	12.4	$89,375
31-Dec-27	830	44.2	12.7	$91,211
31-Dec-28	830	44.5	13.0	$93,242
31-Dec-29	830	45.0	13.3	$95,445
31-Dec-30	828	45.2	13.6	$97,699
31-Dec-31	828	45.3	13.7	$100,063
31-Dec-32	828	45.6	13.9	$102,185
31-Dec-33	828	45.7	14.0	$104,318
31-Dec-34	828	45.7	14.0	$106,601
31-Dec-35	828	45.9	14.2	$108,958
31-Dec-36	828	46.0	14.4	$111,126
31-Dec-37	827	45.7	14.1	$112,942
31-Dec-38	826	45.8	14.0	$115,373
31-Dec-39	826	45.9	14.0	$118,214

** These are average salaries in each year reflecting the expected salary increase.*

The following table contains the results of the deterministic projection, in particular the number of inactive members, along with the total expected benefits in payment to inactive members over the projection period. Note that inactive members include all members who are not active or disabled members (including but not limited to deferred vested members and pensioners). The benefit payments outlined in the table below do not include any future cost-of-living adjustments which may be granted.

Table C.6 – Projection Statistics for Inactive Members

Date	Number of Inactive Members	Inactive Benefits in Payment ($,000)
31-Dec-20	944	34,632
31-Dec-21	1,046	38,828
31-Dec-22	1,084	39,881
31-Dec-23	1,108	40,419
31-Dec-24	1,140	41,034
31-Dec-25	1,163	41,427
31-Dec-26	1,183	41,558
31-Dec-27	1,203	41,761
31-Dec-28	1,217	41,889
31-Dec-29	1,236	42,121
31-Dec-30	1,256	42,391
31-Dec-31	1,271	42,578
31-Dec-32	1,291	42,788
31-Dec-33	1,313	43,122
31-Dec-34	1,330	43,190
31-Dec-35	1,346	43,124
31-Dec-36	1,377	43,591
31-Dec-37	1,398	43,737
31-Dec-38	1,417	43,498
31-Dec-39	1,433	43,140

The following table contains the results of the deterministic projection, in particular the total liability at the beginning of each year. The total liability is further split by actives and inactives. The liabilities outlined in the table below are all calculated using the funding policy valuation discount rate and do not include the value of any future cost-of-living adjustments which may be granted.

Table C.7 – Projection of Funding Policy Actuarial Liabilities

Year	Total Liability ($M)	Active Liability ($M)	Inactive Liability ($M)
2021	681	232	449
2022	681	167	514
2023	680	157	523
2024	678	156	523
2025	676	152	524
2026	674	152	522
2027	672	157	515
2028	670	159	511
2029	668	164	504
2030	666	166	500
2031	664	167	497
2032	662	169	493
2033	660	171	490
2034	658	170	488
2035	656	172	484
2036	654	177	477
2037	652	171	480
2038	649	170	479
2039	648	175	473
2040	646	182	465

Stochastic Model Projection Methodology

The economic assumptions and forecasted funding policy valuation liabilities outlined above are combined together to form an asset-liability model and used in a Monte Carlo simulation technique to model 10,000 series of alternative economic scenarios over 20 years (this exceeds the minimum requirements under the PBA of 1,000 series of economic scenarios for 20 years). This model is used to measure whether the Plan achieves its risk management goals.

For each of these scenarios and for each year, the financial position of the CSJ SRP Plan is measured. For each of these measurements, a decision consistent with the funding deficit recovery plan or the funding excess utilization plan, as applicable, is modeled. When modeling the funding deficit recovery plan actions over the 20-

year period of each of the 10,000 economic scenarios, each of the four steps identified in the funding deficit recovery plan under Section V of the Funding Policy is implemented in sequence until such time as the open group funded ratio of the plan reaches 100% or higher. A "past benefit reduction trial" is recorded (for purposes of the primary risk management goal calculation) when step 4 of the funding deficit recovery plan found in Section V of the Funding Policy is triggered (i.e. a reduction in past base benefits) at any point in the 20-year period of an economic scenario. The primary risk management measure is therefore the proportion of those 10,000 scenarios that do not lead to a "past benefit reduction trial" over a 20-year period. In order to pass the primary risk management goal, at least 9,750 of those 10,000 scenarios must not trigger a "past benefit reduction trial" as described above at any point over the 20-year period.

For every year in the 20-year projection, passive investment management and non-investment expenses are deducted from the expected return to account for the payment of expenses from the Plan. We assume the additional cost of any active management activities is expected to be offset by additional returns over the expected returns shown above, and it is therefore not included in the analysis. The amount of annual expenses deducted from the expected return are outlined the following table.

Table C.8 – Annual Expenses Deducted From Projected Stochastic Returns

Expenses type	Annual expense
Passive investment management	0.10% of assets
Non-investment	$700,000 in first year, increased with inflation in subsequent years

For the purpose of the stochastic analysis, the funding policy valuation discount rate remains fixed at 4.50% per annum throughout the projection period. The funding policy valuation discount rate is used to project the funding policy valuation liability and determine the present value of excess contributions throughout the projection period. The projection of the liability and future cash flows under the stochastic analysis uses the same demographic assumptions as used for the calculation of the funding policy valuation liability, as required under paragraph 15(2)(c) of Regulation 2012-75.

Stochastic Model Projection Outputs

The following tables were prepared using the outputs of the stochastic projection model. They represent key portfolio statistics of return on assets net of investment expenses, total funding policy valuation liabilities, total market value of assets, and open group funded ratio. The distribution of results is summarized by the use of percentiles, mean, standard deviation, and Conditional Tail Expectation ("CTE"). The CTE reflects the average result of the worst-case scenarios for the indicated percentile.

The summary statistics shown in Table C.9 below for the Fund return are shown for each year as well as over a 20-year period.

Table C.9 – Distribution of Projected Fund Return (Net of Passive Investment Expenses)

Plan Year (January 1 / December 31)	2.5% CTE	5% CTE	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile	Mean	Standard Deviation
2020	-9.52%	-7.93%	-5.43%	0.37%	4.81%	9.19%	15.46%	4.86%	6.40%
2021	-9.80%	-8.05%	-5.34%	0.73%	5.10%	9.47%	15.94%	5.14%	6.50%
2022	-10.01%	-8.24%	-5.63%	0.54%	4.97%	9.48%	15.97%	5.09%	6.56%
2023	-9.63%	-7.84%	-5.12%	1.11%	5.36%	9.69%	16.10%	5.41%	6.47%
2024	-9.82%	-8.11%	-5.44%	0.87%	5.21%	9.59%	15.97%	5.25%	6.50%
2025	-9.41%	-7.63%	-4.90%	1.05%	5.47%	9.77%	16.24%	5.50%	6.47%
2026	-9.42%	-7.67%	-4.99%	1.09%	5.30%	9.83%	16.24%	5.45%	6.44%
2027	-9.18%	-7.45%	-4.74%	1.35%	5.68%	9.93%	16.23%	5.67%	6.41%
2028	-9.02%	-7.35%	-4.87%	1.30%	5.70%	9.99%	16.24%	5.73%	6.42%
2029	-9.05%	-7.32%	-4.71%	1.31%	5.53%	10.03%	16.26%	5.69%	6.41%
2030	-7.93%	-6.32%	-3.83%	2.29%	6.61%	10.88%	17.10%	6.61%	6.39%
2031	-8.20%	-6.50%	-3.88%	2.37%	6.63%	10.91%	17.10%	6.65%	6.38%
2032	-8.29%	-6.59%	-4.03%	2.17%	6.56%	10.89%	17.18%	6.57%	6.42%
2033	-8.32%	-6.52%	-3.82%	2.33%	6.70%	10.86%	17.34%	6.66%	6.41%
2034	-7.99%	-6.28%	-3.68%	2.44%	6.69%	10.94%	17.30%	6.70%	6.32%
2035	-7.88%	-6.33%	-3.95%	2.35%	6.58%	10.83%	16.98%	6.59%	6.33%
2036	-8.03%	-6.33%	-3.64%	2.20%	6.49%	10.88%	17.03%	6.59%	6.35%
2037	-7.99%	-6.28%	-3.69%	2.28%	6.56%	10.94%	17.26%	6.65%	6.38%
2038	-8.19%	-6.46%	-3.84%	2.36%	6.56%	10.91%	17.17%	6.62%	6.38%
2039	-8.34%	-6.56%	-3.83%	2.38%	6.61%	10.99%	17.38%	6.67%	6.39%
Annualized average over 20 years	2.96%	3.31%	3.83%	4.99%	5.81%	6.64%	7.82%	5.81%	1.21%

The stochastic model projects a distribution of the total funding policy valuation liabilities for the portfolio over the projection period. The liabilities include the value of cost-of-living adjustments granted up to each respective valuation year, and exclude any reduction in past base benefits.

Table C.10 – Distribution of Projected Total Funding Policy Valuation Liability ($ thousands)

Date	2.5% CTE*	5% CTE*	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile	Mean	Standard Deviation
31-Dec-20	682,716	683,666	685,772	692,846	698,045	703,102	704,975	697,352	6,266
31-Dec-21	685,018	687,044	690,454	700,713	709,465	718,832	728,481	709,527	11,842
31-Dec-22	686,619	689,226	693,453	707,647	719,351	732,137	748,257	720,065	16,824
31-Dec-23	687,489	690,727	695,890	714,010	729,673	744,920	766,789	729,997	21,686
31-Dec-24	687,650	691,437	697,678	719,949	738,565	757,616	784,849	739,561	26,356
31-Dec-25	687,550	691,550	698,488	726,276	747,787	769,386	802,214	748,628	30,926
31-Dec-26	687,024	691,722	701,096	732,019	756,867	781,533	818,470	757,824	35,405
31-Dec-27	684,584	691,601	702,264	738,384	766,846	793,925	834,688	767,025	40,091
31-Dec-28	685,560	692,359	703,430	744,342	776,722	807,009	851,124	776,708	44,601
31-Dec-29	685,181	692,702	705,084	751,742	786,603	820,414	866,399	786,439	48,892
31-Dec-30	684,435	692,604	706,412	758,666	796,471	832,497	882,373	795,808	53,013
31-Dec-31	684,311	693,003	707,794	766,706	807,498	845,881	899,613	806,094	57,247
31-Dec-32	683,857	693,719	710,773	774,804	818,658	859,445	915,931	816,753	61,303
31-Dec-33	683,174	694,320	713,901	783,342	829,535	872,756	931,472	827,410	65,080
31-Dec-34	683,363	696,308	717,779	792,835	841,603	885,436	947,443	838,480	68,824
31-Dec-35	684,065	698,102	721,339	802,847	853,946	898,889	964,699	850,077	72,322
31-Dec-36	684,750	700,005	726,178	812,490	864,637	911,662	979,862	860,663	75,321
31-Dec-37	685,855	702,200	730,922	822,008	875,361	923,625	994,999	871,054	78,163
31-Dec-38	687,208	705,237	735,415	831,065	886,393	936,288	1,009,537	881,809	80,658
31-Dec-39	689,102	709,242	743,277	841,696	898,274	949,452	1,023,744	893,327	83,200

**Note that the CTE is calculated on the lowest liability scenarios, since scenarios where the liability is reduced due to the funding deficit recovery plan represent scenarios that have had more negative investment returns.*

The stochastic model produces a distribution of the market value of assets over the projection period. The following table shows a summary of the projected distribution for each year.

Table C.11 – Distribution of Projected Market Value of Assets ($ thousands)

Date	2.5% CTE	5% CTE	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile	Mean	Standard Deviation
31-Dec-20	592,091	602,502	618,980	657,283	686,438	715,317	756,533	686,750	42,135
31-Dec-21	579,950	593,700	614,634	666,204	705,972	745,233	804,759	706,992	57,774
31-Dec-22	570,117	588,737	615,913	676,125	724,335	773,339	847,286	726,448	71,135
31-Dec-23	570,059	588,966	617,769	691,473	743,931	801,817	892,782	748,437	83,238
31-Dec-24	571,324	590,749	623,304	703,556	764,680	829,866	931,848	769,510	94,403
31-Dec-25	573,259	596,102	629,558	717,623	786,256	860,045	981,037	793,012	106,561
31-Dec-26	573,721	598,411	637,124	734,373	809,970	889,801	1,025,102	816,916	117,842
31-Dec-27	581,162	607,816	650,620	751,397	834,840	924,119	1,069,957	843,343	128,830
31-Dec-28	578,170	606,061	647,551	764,153	849,942	947,721	1,112,181	861,700	141,246
31-Dec-29	577,833	605,589	648,737	768,101	862,396	968,562	1,153,438	876,669	153,888
31-Dec-30	577,815	608,880	655,908	781,951	882,413	1,000,103	1,203,526	899,651	168,144
31-Dec-31	581,344	612,108	661,760	794,063	903,377	1,031,094	1,258,860	923,694	183,027
31-Dec-32	583,392	615,357	666,280	807,609	924,303	1,060,511	1,309,292	947,484	197,316
31-Dec-33	585,879	619,467	673,962	822,171	944,646	1,098,072	1,359,831	972,420	211,640
31-Dec-34	588,263	622,808	678,714	837,281	969,191	1,132,340	1,421,874	998,681	227,532
31-Dec-35	591,613	628,860	687,124	851,355	988,449	1,160,662	1,487,704	1,025,013	245,335
31-Dec-36	595,121	633,161	693,168	863,715	1,010,713	1,198,400	1,543,609	1,051,501	263,762
31-Dec-37	599,451	640,132	703,366	880,770	1,031,119	1,232,826	1,608,445	1,078,841	281,384
31-Dec-38	602,854	645,737	711,032	892,983	1,055,500	1,271,757	1,673,995	1,107,406	300,566
31-Dec-39	610,254	652,934	720,403	908,197	1,080,438	1,311,106	1,753,145	1,138,320	322,483

The stochastic model produces a distribution of the open group funded ratio over the projection period. The following table shows a summary of the projected distribution for each year, before any corrective action required under the funding deficit recovery plan of the Funding Policy.

Table C.12 – Distribution of Projected Open Group Funded Ratio

Date	2.5% CTE	5% CTE	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile	Mean	Standard Deviation
31-Dec-20	107%	109%	111%	117%	121%	125%	131%	121%	6%
31-Dec-21	104%	106%	108%	115%	121%	126%	135%	121%	8%
31-Dec-22	101%	103%	107%	114%	120%	127%	137%	121%	9%
31-Dec-23	100%	102%	105%	114%	120%	127%	140%	121%	10%
31-Dec-24	98%	101%	104%	113%	120%	127%	142%	121%	11%
31-Dec-25	97%	100%	104%	113%	120%	128%	145%	121%	12%
31-Dec-26	96%	99%	103%	113%	120%	129%	147%	122%	13%
31-Dec-27	95%	98%	103%	113%	120%	130%	149%	122%	14%
31-Dec-28	95%	98%	102%	113%	121%	130%	152%	123%	15%
31-Dec-29	95%	98%	103%	113%	121%	131%	155%	124%	16%
31-Dec-30	95%	98%	103%	114%	122%	133%	159%	125%	17%
31-Dec-31	95%	99%	104%	115%	123%	135%	164%	127%	18%
31-Dec-32	96%	99%	104%	116%	124%	137%	168%	128%	20%
31-Dec-33	96%	100%	105%	116%	125%	139%	173%	130%	21%
31-Dec-34	97%	100%	106%	117%	126%	141%	176%	132%	22%
31-Dec-35	97%	101%	106%	118%	127%	143%	182%	133%	24%
31-Dec-36	98%	101%	107%	118%	127%	145%	188%	135%	26%
31-Dec-37	99%	102%	107%	118%	128%	148%	193%	137%	27%
31-Dec-38	99%	103%	108%	119%	129%	150%	197%	138%	29%
31-Dec-39	100%	103%	108%	119%	130%	153%	204%	140%	31%

The following table provides the projected cumulative indexing (or cost-of-living adjustments) granted over the years as a percentage of total cumulative inflation, as produced by the stochastic simulation.

Table C.13 - Projected Cumulative Indexing Granted as a Percentage of Cumulative Inflation

Date	2.5% CTE	5% CTE	5th Percentile	25th Percentile	50th Percentile	75th Percentile	95th Percentile	Mean	Standard Deviation
31-Dec-20	74%	79%	88%	112%	116%	124%	164%	120%	27%
31-Dec-21	36%	41%	49%	96%	112%	119%	145%	107%	32%
31-Dec-22	24%	30%	39%	81%	110%	116%	135%	100%	31%
31-Dec-23	20%	25%	36%	75%	108%	115%	130%	95%	31%
31-Dec-24	17%	23%	33%	72%	107%	114%	126%	93%	31%
31-Dec-25	15%	21%	31%	69%	103%	113%	124%	91%	31%
31-Dec-26	12%	19%	30%	67%	101%	113%	122%	89%	31%
31-Dec-27	11%	17%	28%	65%	100%	113%	121%	88%	32%
31-Dec-28	10%	17%	27%	65%	99%	112%	120%	88%	31%
31-Dec-29	9%	16%	26%	65%	99%	112%	120%	87%	31%
31-Dec-30	8%	15%	26%	65%	98%	112%	119%	87%	31%
31-Dec-31	7%	14%	26%	66%	100%	112%	119%	88%	31%
31-Dec-32	7%	14%	27%	68%	102%	113%	118%	88%	31%
31-Dec-33	7%	14%	27%	70%	104%	113%	119%	90%	30%
31-Dec-34	6%	15%	29%	71%	107%	113%	118%	91%	30%
31-Dec-35	6%	15%	30%	74%	108%	113%	118%	92%	30%
31-Dec-36	6%	16%	32%	76%	109%	113%	118%	93%	29%
31-Dec-37	6%	17%	34%	79%	109%	113%	118%	94%	29%
31-Dec-38	7%	18%	35%	81%	110%	113%	118%	95%	28%
31-Dec-39	7%	18%	37%	83%	110%	113%	118%	96%	27%

The following table is the average correlation matrix for the asset classes outlined in Table C.3. The matrix represents the correlations between asset classes produced by the stochastic simulation.

Table C.14 – Average Correlation Among Asset Classes

Asset Classes	Inflation	ST	DLTC	DLTP	DC	GHY	CE	USE	IE	RE & M	I	PE	PD
Inflation	1.00	0.16	0.09	0.12	0.03	0.01	0.07	-0.34	-0.20	0.28	0.15	-0.14	0.03
ST		1.00	-0.07	-0.02	0.29	-0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.29
DLTC			1.00	0.92	0.61	0.43	0.28	0.18	0.10	0.25	-0.24	0.22	0.57
DLTP				1.00	0.61	0.17	0.06	0.02	-0.10	0.19	-0.25	0.05	0.59
DC					1.00	0.06	0.01	0.01	-0.10	-0.18	-0.20	0.02	0.98
GHY						1.00	0.48	0.32	0.46	0.22	-0.01	0.39	0.06
CE							1.00	0.40	0.56	0.23	0.08	0.55	0.01
USE								1.00	0.74	0.10	-0.07	0.62	0.00
IE									1.00	0.24	-0.07	0.59	-0.12
RE & M										1.00	0.11	0.14	-0.17
I											1.00	-0.01	-0.20
PE												1.00	0.02
PD													1.00

The disclosures in this report have been prepared in compliance with the Canadian Institute of Actuaries Standard of Practice, subsection 3270 - Disclosure for Stochastic Models Used to Comply with Specific Regulatory Pension Plan Funding Requirements.

Limitations of Analysis for Risk Management Tests

This report contains analysis and results that rely on assumptions about future events. While we believe that the model inputs and assumptions are reasonable at the time this report has been prepared, other reasonable model inputs and assumptions could be used, resulting in potentially very different distributions of forecasted outcomes.

Future events and actual experience will vary from the simulated outcomes produced with this analysis. As these differences arise, contribution levels and benefits payable under the Plan will be adjusted in accordance with the priorities set out under the Funding Policy. It is not possible or practical to reflect every variable in a model that is based in the real world. Therefore, we use summary information, estimates, and simplifications to facilitate the modeling of future events. We also exclude factors or data that we consider immaterial.

The results presented in this report are not intended nor should they be interpreted to represent a guarantee or warranty with respect to the future financial condition of the Plan. Furthermore, any determination of probabilities based on the model represent simulated outcomes and should not be interpreted as being actual probabilities.

Appendix D – Summary of Plan Provisions

The following is a brief summary of the main provisions of the City of Saint John Shared Risk Plan ("CSJ SRP Plan") effective January 1, 2020. For an authoritative statement of the precise provisions of the CSJ SRP Plan, reference must be made to the official CSJ SRP Plan documents.

Introduction

Effective January 1, 2013, the Former CSJ Plan was converted to the CSJ SRP Plan. The administration of the CSJ SRP Plan continues to be the responsibility of an independent Board of Trustees.

The primary purpose of the CSJ SRP Plan is to provide pensions to eligible employees after retirement and until death in respect of their service as employees. The purpose of the CSJ SRP Plan is to provide secure benefits to members of the plan without an absolute guarantee but with a risk focused management approach delivering a high degree of certainty that Base Benefits can be met in the vast majority of potential future economic scenarios.

All future cost of living adjustments for current and future retirees and other ancillary benefits under the CSJ SRP Plan shall be provided only to the extent that funds are available for such benefits, as determined by the Board of Trustees in accordance with applicable laws and the CSJ SRP Plan's Funding Policy.

Base and ancillary benefits can also be reduced. Therefore, they are not "guaranteed" benefits. The benefits can only be met if contributions and plan experience, most importantly investment performance, allow this to happen. The triggers and timing of any potential benefit reductions would be administered by Board of Trustees, subject to applicable laws and the CSJ SRP Plan's Funding Policy.

Eligibility and Participation

Each member of the Former CSJ Plan joins the CSJ SRP Plan on January 1, 2013.

Each employee who commences full-time employment on or after January 1, 2013 is required to join the CSJ SRP Plan from the first day of the month coincident with or next following the date of employment. Each part-time employee is eligible to join when they meet the minimum requirements under the PBA. However, such part-time employees are now required to join when they meet the eligibility requirements effective January 1, 2015.

Required Contributions

Effective January 1, 2013, each regular member is required to contribute 9.0% of earnings. Each police and fire member is required to contribute 12.0% of earnings. The City of Saint John contributes 11.4% of earnings on behalf of regular members, and 15.2% on behalf of police and fire members. In addition, the City of Saint John contributes additional temporary contributions of 17.0% of earnings from April 1, 2013 to March 31, 2028.

Contributions are waived for periods during which a member is in receipt of long term disability benefits from a long-term disability plan sponsored by the City until recovery or age 65. Pensionable service continues to accrue in respect of such periods, using pensionable earnings earned by other employees in the same employment classification as the member, subject to limits on deemed earnings imposed under the Income Tax Act.

Contribution rates are subject to change in accordance with triggers found under the Funding Policy for the CSJ SRP Plan.

Normal Retirement

The normal retirement date is the first day of the month coincident with or next following the member's sixty-fifth birthday.

A member's annual normal retirement pension is equal to the sum of:

(A) In respect of service before January 1, 2013, the product of:

(i) the number of years of the member's pensionable service before January 1, 2013, and

(ii) 2.0% of the annual average of the best three (3) consecutive years of earnings at January 1, 2013;

and

(B) In respect of service from January 1, 2013, 1.8% of the member's earnings for each calendar year.

Pensions accrued above are subject to cost-of-living adjustments, before and after retirement, every January 1st following January 1, 2013, subject to approval by the Board of Trustees, and in accordance with the trigger requirements found under the Funding Policy for the CSJ SRP Plan.

The cost-of-living adjustments granted up to and including January 1, 2020 under "Other Actions", Steps 1 and 2, of the Funding Excess Utilization Plan of the Funding Policy are related to increases in the Consumer Price Index and are as follows:

Effective Date	Applicable To Benefits Accrued As Of	COLA Granted
January 1, 2014	January 1, 2013	0.40%
January 1, 2015	January 1, 2013	1.05%
January 1, 2015	January 1, 2014	0.90%
January 1, 2016	January 1, 2013	0.05%
January 1, 2016	January 1, 2015	1.95%
January 1, 2017	January 1, 2016	1.12%
January 1, 2018	January 1, 2017	1.42%
January 1, 2019	January 1, 2018	1.56%
January 1, 2020	January 1, 2019	2.30%

Further cost-of-living adjustments to accrued pensions of active and disabled members granted up to and including January 1, 2020 under "Other Actions", Step 3, of the Funding Excess Utilization Plan of the Funding Policy are related to increases in average wage that are in excess of increases in the Consumer Price Index and are as follows:

Effective Date	Applicable To Benefits Accrued As Of	COLA Granted
January 1, 2016	January 1, 2013	1.00%
January 1, 2016	January 1, 2014	0.88%
January 1, 2016	January 1, 2015	0.69%
January 1, 2017	January 1, 2016	0.66%

Normal, Automatic and Optional Forms of Pension

The normal form of pension is a pension payable in equal monthly installments commencing on the member's pension commencement date and continuing thereafter during the lifetime of the member, subject to a guarantee that the member's contributions with interest will at least be paid in total.

For a member with a spouse or common-law partner, the automatic form of pension is a joint and survivor pension which is payable in equal monthly installments for the life of the member and payable to the member's spouse or common-law partner after the member's death at 60% of the amount paid to the member.

A member can also elect to receive an optional form of pension providing a survivor pension of 100% to his/her spouse on an actuarially equivalent basis.

Any form of pension in effect before the Conversion Date for individuals who retired before the Conversion Date will remain in effect.

Vesting Date

A member is considered vested when he/she has reached five (5) years of continuous employment or two (2) years of plan membership. Those who had reached their vesting date under the Former CSJ Plan at January 1, 2013 were grandfathered under the CSJ SRP Plan.

Early Retirement

Early retirement is permitted on or after age 55 if the member has reached his/her vesting date. For those who were members of the Former CSJ Plan, they can also retire early when the sum of age and pensionable service (counting also pensionable service after the Conversion Date) reaches 85, if earlier.

The portion of the lifetime pension accrued for service before January 1, 2013 is reduced as follows:

- if the member is eligible for an immediate pension at termination of employment:
    - 5/12% per month (5.0% per year) that pension commences before attainment of age 65, or if earlier when the member would have reached 85 points had he continued in employment.
- if the member is not eligible for an immediate pension at termination of employment:
    - 5/12% per month (5.0% per year) that pension commences before attainment of age 65.

The portion of the lifetime pension accrued for service between January 1, 2013 and December 31, 2017 is reduced as follows:

- if the member's age and pensionable service index at the date of termination of employment is less than 85 points:
    - 5/12% per month (5.0% per year) that the pension commences before the date the Member would have reached 85 Points had the Member continued in employment after the Member's termination of employment and until pension commencement date, or attainment of age 65 (or age 60 for members in public safety occupations).
- if the member's age and pensionable service index at the date of termination of employment is 85 points or higher:
    - no early reduction applicable for this period of service

The portion of the lifetime pension accrued for service on and after January 1, 2018 is reduced by 1/2% per month (6.0% per year) that the pension commences before attainment of age 65 (or age 60 for members in public safety occupations).

Benefits on Termination of Employment

If a member terminates employment prior to his/her vesting date, the member is entitled to a refund of the total amount of his/her own contributions with interest.

If a member terminates employment before being eligible for an immediate pension, but after his/her vesting date, the member may elect to receive:

(i) a deferred lifetime pension payable from normal retirement date equal to the accrued pension to which the member is entitled as at his/her date of termination in accordance with the formula specified above for the normal retirement pension; or

(ii) to transfer the termination value of the deferred lifetime pension calculated in accordance with the PBA, to another pension plan, a prescribed retirement savings arrangement, or an insurance company, as allowed under the PBA.

The Termination Value will not be less than a member's own contributions with interest.

Death Benefits

If a member dies prior to his/her vesting date, the benefit payable is a refund of the member's own contributions with interest.

If the member dies after his/her vesting date but before pension commencement, the following benefits will be paid:

- for service before January 1, 2013:
- 60% of the accrued pension for such service at death is first payable to the surviving spouse or common-law partner; dependent pensions for such service may also be payable to eligible dependents, if there is no spouse; and additional benefits may be payable if the death is as a result of an accident, pro-rated for such

service. The value of the death benefits is not to be less than the Termination Value of the accrued pension for such service at death.

- for service on and after January 1, 2013:

- the Termination Value, as defined under the PBA, will be refunded to the member's spouse or common law partner, or to the beneficiary if there is no spouse or common law partner. The Termination Value will not be less than a member's own contributions with interest.

In the event of death after pension commencement, the benefit payable is determined in accordance with the form of pension selected by the member at retirement.

Appendix E – Summary of Funding Policy

The following is a brief summary of the main provisions of the Funding Policy for the City of Saint John Shared Risk Plan ("CSJ SRP Plan") effective January 1, 2020. For an authoritative statement of the precise provisions of the Funding Policy, reference must be made to the official document.

Purpose of Plan and Funding Policy

The purpose of the CSJ SRP Plan is to provide secure pension benefits to members and former members without an absolute guarantee, but with a risk focused management approach delivering a high degree of certainty that base benefits can be met in the vast majority of potential future economic scenarios.

The primary focus is to provide a highly secure lifetime pension at normal retirement age. However, the intention is that additional benefits may be provided depending on the financial performance of the Plan.

The Funding Policy is the tool used by the Board of Trustees to manage the risks inherent in a shared risk plan. The Funding Policy provides guidance and rules regarding decisions that must, or can, be made by the Board of Trustees around funding levels, contributions and benefits.

Benefit Objectives

Upon conversion, accrued pension for all members are maintained. Benefits to retirees and survivors continue at the same level, but future indexing becomes contingent on the ability of the CSJ SRP Plan to pay such benefits. Accrued benefits for active members are calculated at conversion date and are increased on a contingent basis similar to retirees rather than continuing to use a final average earnings formula. Early retirement rules for service before the conversion date are maintained.

Benefit accruals under the Plan after the conversion is at 1.8% of earnings (not including overtime) and are payable at normal retirement age of 65 (age 60 for police and fire employees) with a 6% per year reduction for early retirement. This change reflects anticipated continued increases in life expectancy. The overall plan design objective with respect to retirement age is to provide each cohort of plan members with about the same expected number of years of pension payments for a similar amount of pension in current dollars at retirement. None of the above are guarantees.

Risk Management

In accordance with legislation on shared risk plans, the primary risk management goal is to achieve a 97.5% probability that base benefits will not be reduced over the following 20 years.

In addition, secondary risk management goals are to provide, on average, contingent indexing on base benefits (for all members) in excess of 75% of CPI over the next 20 years, and to achieve at least a 75% probability that the ancillary benefits described in the Plan text at conversion can be provided over the next 20 years.

Contributions

The initial employee contribution rate shall be 9% of earnings for all employees other than police and fire employees in Public Safety Occupations. The initial Employee contribution rate shall be 12% of earnings for police and fire Employees in Public Safety Occupations (provided that Employees who were formerly employed in a Public Safety Occupation before accepting a non-unionized position may elect to contribute at this rate in accordance with the Plan text), subject to the ITA.

Contribution adjustments may be made by the Board of Trustees. The Board of Trustees must trigger an increase in the Initial Employee contribution rate of 25% (capped at 2.75% of earnings) if the open group funded ratio of the Plan, as defined by the PBA, falls below 100% for two successive year ends (before taking into account any initial contribution rates increase), until such time as the open group funded ratio reaches 105% without considering the effect of the contribution increase and the primary risk management goal is met.

A reduction in employee contributions of up to a total of 1.5% of earnings can be triggered by the Board of Trustees if the conditions set forth in the funding excess utilization plan are met.

All employee increases and decreases described above are also applied to the initial employer contributions.

Commencing April 1, 2013, the Employer is required to make temporary contributions at the rate of 17% of earnings of all Employees. The temporary contributions shall cease on April 1, 2028 or when the Plan achieves an open group funded ratio, as defined in the PBA, of 150%, provided that such temporary contributions shall not cease before April 1, 2023, subject to the ITA.

Funding Deficit Recovery Plan

The funding deficit recovery plan must be implemented by the Board of Trustees if the open group funded ratio of the Plan falls below 100% for two successive plan year ends.

The funding deficit recovery plan consists of the following actions in the order of priority as listed below:

1. Increase initial contribution rates as stipulated in Section IV of the Funding Policy;
2. Change early retirement rules for post-conversion service for members who are not yet eligible to retire and receive an immediate pension under the terms of the Plan to a full actuarial reduction for retirement before age 65 for all Employees other than police and fire Employees who are employed in Public Safety Occupations and for retirement before age 60 for police and fire Employees who are employed in Public Safety Occupations;
3. Reduce base benefit accrual rates for future service after the date of implementation of the deficit recovery plan by not more than 5%;
4. In addition to the reduction in step 3 above, reduce base benefits on a proportionate basis for all members regardless of membership status for both past and future service in equal proportions.

The above actions shall be taken one by one until such time as the funding goals under the Regulation are met.

The base benefit reduction in point 4, if required, shall be such that the funding goals under the Regulation for such purposes are achieved.

Action items under steps 1 to 3 shall take effect no later than 12 months following the date of the funding policy valuation report that triggered the need for the change, and actions under step 4 shall take effect no later than 18 months following the date of the funding policy valuation report that triggered the need for the actions.

Funding Excess Utilization Plan

The funding excess utilization plan describes the actions the Board of Trustees must take or consider when the open group funding levels exceeds 105%. If the open group funding level is at 105% or less or initial contribution rate increases are in effect, there are no actions that can be taken under the funding excess utilization plan.

The excess available for utilization is as follows:

- 1/5th of the funds that make up the excess of the open group funding level at the valuation date (to a maximum of 140%) over 105%; PLUS
- 100% of the excess above 140%.

If base benefits and/or ancillary benefits have been reduced, all excess available for utilization must first be used to reinstate those reductions. Afterwards, the following actions are to be taken in the following order of priority and no action can be taken until the immediately preceding action in the list below has been fully implemented:

1. Provide indexing of base benefits up to the increase in the average Consumer Price Index (CPI) for Canada for the 12-month period preceding the date of the funding policy valuation report over the average of the CPI for the immediately preceding 12-month period. The indexation percentage applied to base benefits shall be the same for all members.
2. Provide indexing of base benefits for all members for every year that was missed or only partially covered since the Conversion Date, starting with the oldest period for which less than the full increase in the average CPI was provided up to the most recent in chronological order.
3. Provide a further increase to benefits of members for a period while they were not in receipt of a pension that is before the funding policy valuation date that triggered the action up to the rate of increase in the average wage as determined under the ITA and subject to Section 8504 of the regulations to the ITA; provided that no such increase would result in a requirement to calculate Past Service Pension Adjustments.
4. Provide for unreduced early retirement benefits not more generous than the Pre-Conversion Plan unreduced early retirement rules.
5. Provide for other ancillary benefits up to those that are comparable to the ancillary benefits under the Pre-Conversion Plan.
6. Establish a reserve to cover the next 10 years of potential contingent indexing based on CPI.
7. Apply contribution adjustments of up to 3%, as allowed under Section IV of the Funding Policy.

Actions 1 to 6 can be applied with excess funds available. If all improvements from 1 through 6 above have been made and the open group funded ratio is still in excess of 150%, then action 7 can be undertaken. After such

actions have been undertaken, the Trustees may consider permanent benefit changes subject to the approval of the Employer and Unions and subject to most members being able to benefit from the changes.

Except for the timing of contribution reductions, the timing of the above actions shall be the first of the year that is 12 months after the date of the funding policy valuation report that triggered the actions.

Actuarial Assumptions

A funding policy actuarial valuation shall be conducted by the Plan's actuary at January 1st of each year. The discount rate is 4.5% per year. The discount rate can be changed at a future valuation with the consent of the City and the Unions. Other assumptions may be changed as experience evolves.

Appendix F – Plan Administrator Confirmation Certificate

With respect to the Actuarial Valuation Report as at January 1, 2020 of the City of Saint John Shared Risk Plan (CSJ SRP Plan), I hereby confirm that to the best of my knowledge:

- the data regarding the CSJ SRP Plan members and beneficiaries provided to Morneau Shepell as at January 1, 2020 constitutes a complete and accurate description of the information in the plan files;
- copies of the official CSJ SRP Plan documents, Funding Policy, Statement of Investment Policies and Goals and all amendments to date were provided to Morneau Shepell; and
- there are no events subsequent to January 1, 2020, other than those already identified in this report, which would materially affect the results of the valuation.

The CSJ SRP Plan Board of Trustees

DocuSigned by:
Fred Slipp
B7A3CBBFF43049E...
Signature

Name: Fred Slipp

Title: Chair of Board of Trustees

Date: 11/28/2020

Morneau Shepell is the only human resources consulting and technology company that takes an integrated approach to employee well-being to meet health, benefits and retirement needs. The Company is the largest administrator of retirement and benefits plans and the largest provider of integrated absence management solutions in Canada. LifeWorks by Morneau Shepell is the leading total well-being solution that combines employee assistance, wellness, recognition and incentive programs. As a leader in strategic HR consulting and innovative pension design, the Company also helps clients solve complex workforce problems and provides integrated productivity, health and retirement solutions.

Established in 1966, Morneau Shepell serves approximately 24,000 clients, ranging from small businesses to some of the largest corporations and associations. With more than 4,500 employees in offices across North America, the United Kingdom and Australia, Morneau Shepell provides services to organizations around the globe. Morneau Shepell is a publicly-traded company on the Toronto Stock Exchange (TSX:MSI). For more information, visit morneaushepell.com.

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