# Shared Risk Plan for Certain Bargaining Employees of New Brunswick Hospitals

## Actuarial Valuation Report as at December 31, 2020

Report prepared in September 2021

Registration number: Canada Revenue Agency: #0385856
NB Superintendent of Pensions: #0385856

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## Notice of confidentiality

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# Introduction

The Pension Plan for Certain Bargaining Employees of New Brunswick Hospitals ("Former CBE Plan") was converted to the Shared Risk Plan for Certain Bargaining Employees of New Brunswick Hospitals ("CBE SRP Plan" or "Plan") effective July 1, 2012.

This valuation is conducted as at December 31, 2020 for the Board of Trustees ("Trustees"), the Canada Revenue Agency ("CRA"), and the Superintendent of Pensions ("Superintendent") for the following purposes:

- to document the results of a 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;

- to document the results of a going concern actuarial valuation required under subsection 14(1) of Regulation 2012-75 in order to determine the maximum eligible employer contribution for the CBE SRP Plan under subsection 147.2(2) of the *Income Tax Act (Canada)* ("ITA") and provide the related actuarial opinion; and

- to document the results of a hypothetical wind-up valuation of the CBE SRP Plan as required under the Standards of Practice of the Canadian Institute of Actuaries, 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 Regulations:

- 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 Appendix C, 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 CBE SRP Plan retained the services of LifeWorks Ltd (“LifeWorks”) to prepare this report.

The last actuarial valuation report prepared for the CBE SRP Plan was performed as at December 31, 2019.

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

The primary funding policy valuation assumptions have been updated as follows:

- The new discount rate is 4.50% per annum, which is 0.25% per annum lower than the discount rate used for the actuarial valuation as at December 31, 2019.

- The mortality adjustment factor for males is 115% which is 9% higher than the adjustment factor used for the actuarial valuation as at December 31, 2019. The mortality adjustment factor for females is 115% which is 1% lower than the adjustment factor used for the actuarial valuation as at December 31, 2019.

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

The next actuarial valuation report for the CBE SRP Plan will be due no later than one year following the effective date of this report in accordance with the requirements of subsection 100.61(1) of the PBA.

# 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 relation to this effect 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 been impacted by both the market response and the public health responses to COVID-19 during 2020. Our economic assumptions take into account the market conditions as of December 31, 2020, without any attempt to make special adjustments to soften the impact that COVID-19 may have had on these market conditions.

Following a May 31, 2021 Labour Board decision, and effective June 1, 2021, New Brunswick paramedics started paying union dues to the New Brunswick Union (“NBU”) instead of the Canadian Union of Public Employees (“CUPE”). It is our understanding that an application for judicial review of that decision has been made; however, we are not aware of the timeline for such a process to unfold. As a result, of the change in union affiliation, we understand that paramedics will become members of this Plan for future service. While paramedics joining the Plan will likely improve the open group funded ratio and risk management tests, the valuation results as of December 31, 2020 were prepared without including the impact of such a transfer of members. The impact will be included in the next actuarial valuation report.

To our knowledge, there are no other events subsequent to the valuation date, which would materially impact the results of the valuation.

# Changes since last valuation

The following benefit improvements under the Funding Excess Utilization Plan were awarded following the December 31, 2019 valuation, are effective 12 months after the valuation date and are included in this valuation:

- Step 1 – A cost of living increase of 1.46% was applied to all accrued pensions and pensions in payment.
- Step 2 – An additional increase necessary to provide all active members an accrued lifetime benefit calculated using a 5-year final average benefit formula at December 31, 2019.
- Step 3 – An additional increase necessary to provide all members receiving a pension at December 31, 2019 a lifetime benefit calculated using a 5-year final average benefit formula at their individual date of retirement, with the payment of such an increased pension starting at January 1, 2021.
- Step 4 – A retroactive lump sum payment necessary to provide all members receiving a pension at December 31, 2019 a lifetime benefit calculated using a 5-year final average benefit formula at their individual date of retirement, retroactive to their pension start date.

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.

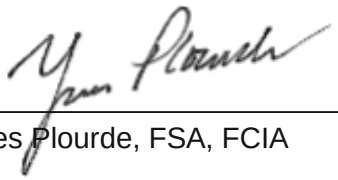
Actuarial valuation results are only estimates. Actuarial valuations are performed based on assumptions and methods that are in accordance with sound actuarial principles. Emerging experience differing from these assumptions will result in gains or losses, which may affect future open group funded ratios of the plan and future risk management procedures 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.

# 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 and the CRA. 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 Lifeworks, 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

September 30, 2021
Date

*This report was peer reviewed by Eric Ouellette, FSA, FCIA.*

# 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 CBE SRP Plan as at December 31, 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 funding policy summarized in Appendix E of this report. The methods and assumptions used in the funding policy actuarial valuation are described later in this section.

## Funding Policy Valuation Funded Status

The funding policy valuation funded status of the CBE 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 Plan continues indefinitely. The funding policy valuation funded status of the CBE SRP Plan as at December 31, 2020, along with the results in the previous valuation as at December 31, 2019, are found below:

**Table 1.1 – Funding Policy Valuation Funded Status**

| | December 31, 2020 | December 31, 2019 |
|---|---|---|
| Market Value of Assets | $M | $M |
| • Fair market value of assets (including receivables / payables) | 2,577.8 | 2,413.4 |
| Funding Policy Actuarial Liabilities | | |
| • Active members | 1,113.5 | 1,049.1 |
| • Retirees and beneficiaries | 1,049.3 | 935.4 |
| • Deferred vested and suspended members | 191.9 | 168.1 |
| • Outstanding refunds | 0.1 | 0.3 |
| • Total funding policy valuation actuarial liabilities | 2,354.8 | 2,152.9 |
| Funding Policy Valuation Excess (unfunded liability) | 223.0 | 260.5 |
| Termination value funded ratio [calculated in accordance with paragraph 14(6)(e) of Reg. 2012-75] | 109.5% | 112.1% |

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 CBE 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, being 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 Plan in excess of the funding policy valuation normal cost. Results for the year following December 31, 2020 are presented below, along with the results found in the previous valuation as at December 31, 2019:

**Table 1.2 – Funding Policy Valuation Normal Cost and Excess Contributions**

| | Year Following December 31, 2020 | | Year Following December 31, 2019 | |
|---|---|---|---|---|
| | $M | % of payroll | $M | % of payroll |
| A. Member and employer contributions | 92.2 | 15.6 | 92.2 | 15.6 |
| B. Funding policy valuation normal cost | 65.5 | 11.1 | 63.3 | 10.7 |
| C. Excess contributions (A. – B.) | 26.7 | 4.5 | 28.9 | 4.9 |
| Estimated payroll for following year | $590.8M | | $590.5M | |

# 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 under the Funding Policy to determine the actions to be undertaken by the Trustees under the funding policy deficit recovery plan and the funding policy excess utilization plan. The 15-year open group funded ratio is calculated as follows:

### Table 1.3 – 15-Year Open Group Funded Ratio

| | December 31, 2020 | December 31, 2019 |
|---|---|---|
| | $M | $M |
| A. Market value of assets (including receivables / payables) | 2,577.8 | 2,413.4 |
| B. Present Value of Excess Contributions over next 15 years [calculated in accordance with Reg. 14(6)(c)] | 355.6 | 382.5 |
| C. Funding policy valuation actuarial liabilities | 2,354.8 | 2,152.9 |
| D. 15-Year Open Group Funded Ratio [(A. + B.) / C.] | 124.6% | 129.9% |

# 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 December 31, 2019 and this funding policy valuation as at December 31, 2020:

### Table 1.4 – Reconciliation of Funded Status

| | $M | $M |
|---|---|---|
| Funding policy valuation excess (unfunded liability) as at December 31, 2019 | | 260.5 |
| Expected changes in funded status | | |
| • Interest on funding excess (unfunded liability) | 12.4 | |
| • Contributions in excess of normal cost (shortfall) | 29.5 | |
| • Cost of implementation of Steps 1 to 4 effective January 1, 2021 | (39.5) | |
| • Total | | 2.4 |
| Expected funding policy valuation excess (unfunded liability) as at December 31, 2020 | | 262.9 |
| Actuarial gains (losses) due to the following factors | | |
| • Investment return on actuarial value of assets | 43.1 | |
| • Retirements | 3.2 | |
| • Terminations | 0.2 | |
| • Mortality | (0.8) | |
| • Miscellaneous factors | (6.0) | |
| • Total | | 39.7 |
| Funding policy valuation excess (unfunded liability) as at December 31, 2020 (prior to changes in assumptions | | 302.6 |
| • Impact of change in assumptions | | (79.6) |
| Funding policy valuation excess (unfunded liability) as at December 31, 2020 | | 223.0 |

The reference to Steps 1 to 4 in the above table is 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 December 31, 2019 to this funding policy valuation as at December 31, 2020 are shown below:

**Table 1.5 – Reconciliation of Total Normal Cost**

| | % of payroll |
|---|---|
| Total normal cost as at December 31, 2019: | 10.7% |
| Impact of changes in demographics: | (0.1%) |
| Impact of changes in economic assumptions | 0.5% |
| Total normal cost as at December 31, 2020: | 11.1% |

# Funding Policy Valuation 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 total 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 or other adjustments as may be granted from time to time by the Trustees in accordance with the plan terms 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 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 Valuation Actuarial Assumptions

The main actuarial assumptions employed for the funding policy actuarial valuation are summarized in the following table. 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 among other things the open group funded ratio of the 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

| | December 31, 2020 |
|---|---|
| Discount rate | 4.50% per annum<br>(4.75% per annum as of December 31, 2019) |
| Salary increase for year following valuation (for normal cost purposes only) | 3.10% per annum |
| Seniority and promotional salary increases | 3.00% of salary at attainment of age 50 |
| YMPE increase for year following valuation (for normal cost purposes only) | 2.85% per annum |
| Mortality | 2014 Public Sector Mortality Table (CPM 2014 Publ) projected using Improvement Scale B (CPM-B) with size adjustment factors of 115% for males (was 106% as of December 31, 2019) and 115% for females (was 116% as of December 31, 2019) |

**Retirement**

| Retirement Age | | Age at Conversion | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Under 25 or joined Plan after conversion date | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60+ |
| 55 | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 10.0% | 20.0% |
| 56 | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 10.0% | 20.0% | 15.0% | 10.0% |
| 57 | 0.0% | 0.0% | 0.0% | 10.0% | 20.0% | 15.0% | 10.0% | 10.0% | 10.0% |
| 58 | 0.0% | 10.0% | 20.0% | 15.0% | 10.0% | 10.0% | 10.0% | 10.0% | 10.0% |
| 59 | 20.0% | 15.0% | 10.0% | 10.0% | 10.0% | 10.0% | 10.0% | 10.0% | 10.0% |
| 60 | 10.0% | 10.0% | 10.0% | 10.0% | 10.0% | 10.0% | 10.0% | 17.5% | 25.0% |
| 61 | 10.0% | 10.0% | 10.0% | 10.0% | 10.0% | 17.5% | 25.0% | 15.0% | 5.0% |
| 62 | 10.0% | 10.0% | 10.0% | 17.5% | 25.0% | 15.0% | 5.0% | 4.5% | 4.0% |
| 63 | 10.0% | 17.5% | 25.0% | 15.0% | 5.0% | 4.5% | 4.0% | 3.5% | 3.0% |
| 64 | 25.0% | 15.0% | 5.0% | 4.5% | 4.0% | 3.5% | 3.0% | 2.5% | 2.0% |
| 65 | 15.0% | 12.5% | 10.0% | 8.0% | 6.0% | 4.5% | 3.0% | 2.0% | 1.0% |

| Termination (membership) | Age | Rate |
|---|---|---|
| (Sample rates of termination other than by death, disability or retirement) | 20 | 7.4% |
| | 25 | 5.0% |
| | 30 | 3.0% |
| | 35 | 1.9% |
| | 40 | 1.4% |
| | 45 | 1.0% |
| | 50 | 0.6% |
| | 55 | 0.0% |

# 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, LifeWorks believes that the expected long-term rate of inflation should be between 1.75% and 2.25%.

The long-term inflation assumption is 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 manage inflation. Despite a recent increase in inflation in 2021, we believe that our long-term assumption remains appropriate. This rate remains unchanged from the previous valuation.

## 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 impact of rebalancing and diversification) | 5.10 |
| Value added for active management (not exceeding the additional fees paid for active management [active management fees estimated at 0.15%] over passive management [passive management fees estimated at 0.10%]) | 0.05 |
| Assumed margin for adverse deviation | (0.40) |
| Expected expenses paid from the fund | (0.25) |
| Discount rate | 4.50 |

The expected long-term nominal return by asset class is provided in Appendix C. It should be noted that the return assumptions for bonds has been determined mainly on current market conditions while the return assumptions for equities and alternative investments are based more on long-term expectations. The discount rate of 4.50% per annum was adopted by the Board of Trustees at their September 23, 2021 meeting. This represents a reduction of 0.25% per annum when compared to the discount rate used for the previous valuation.

## Expenses

The allowance for investment and administrative expenses paid from the fund as built into the discount rate is 0.25% of assets based on recent Plan history and our expectation for future expenses.

# Rate of Salary Increase

The salary increase assumption has three components, an inflationary salary increase, an allowance for general increases in productivity and merit and promotion, and a one-time seniority increase for nurses with 25 years as a registered nurse.

The long-term salary increase assumption is based on the level of inflation of 2.10% per annum, plus an allowance for general increases in productivity, merit, and promotion of 1.00% per annum, bringing the long-term rate of salary increase to 3.10% per annum.  This was unchanged from the salary increase assumption used in the previous valuation, consistent with the long-term rate of inflation assumption.

The nurses' seniority adjustment is a 3.00% one-time salary increase payable to all nurses who have been a registered nurse for 25 or more years. We have assumed that all nurses would receive the 3.00% increase at attainment of age 50. This adjustment is in addition to the regular assumed rate of salary increase shown above.

# 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 the CPM-2014Publ Mortality Table, and the CPM-B Improvement Scale, which varies by gender, age and calendar year. A mortality study was completed this year using Plan experience from 2012 to 2019. The study revealed that plan mortality remained higher than those produced by the above standard mortality table and projection scale with male mortality being higher than previously assumed and female mortality being slightly lower than previously assumed. As a result, and after considering the statistical credibility of the experience, equal adjustment factors of 115% are now being used for males and females. The same adjustments were used for all participants before and after retirement. This is a change from the adjustment factor of 106% for males and 116% for females used in the previous valuation.

The mortality rates described above result in the following life expectancies for females and males.

**Table 1.8 - Life Expectancy for Females and Males**

| Females | | | | | Life expectancy by Age in Year… |
|---|---|---|---|---|---|
| Age | 2021 | 2026 | 2031 | 2036 | 2041 |
| 55 | 33.3 | 33.6 | 33.8 | 34.1 | 34.3 |
| 60 | 28.5 | 28.7 | 29.0 | 29.2 | 29.5 |
| 65 | 23.8 | 24.0 | 24.3 | 24.5 | 24.7 |
| 70 | 19.3 | 19.5 | 19.7 | 20.0 | 20.2 |
| 75 | 15.1 | 15.3 | 15.4 | 15.6 | 15.8 |
| 80 | 11.1 | 11.3 | 11.5 | 11.6 | 11.8 |
| **Males** | | | | | **Life expectancy by Age in Year…** |
| Age | 2021 | 2026 | 2031 | 2036 | 2041 |
| 55 | 31.2 | 31.5 | 31.7 | 32.0 | 32.3 |
| 60 | 26.5 | 26.8 | 27.1 | 27.3 | 27.6 |
| 65 | 22.0 | 22.3 | 22.5 | 22.7 | 23.0 |
| 70 | 17.6 | 17.8 | 18.1 | 18.3 | 18.5 |
| 75 | 13.4 | 13.7 | 13.9 | 14.0 | 14.2 |
| 80 | 9.7 | 9.9 | 10.0 | 10.2 | 10.3 |

# Termination

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

# Rate of Increase in YMPE

We assume that the YMPE would increase at a rate that is 0.75% per annum higher than the inflation rate. We therefore assume a rate of increase in the YMPE of 2.85% per annum. This was unchanged from the YMPE increase assumption used in the previous valuation, consistent with the long-term rate of inflation. The YMPE is automatically updated to its revised base level at each valuation date.

# Retirement

Given the changing early retirement subsidies for service after July 1, 2012 (“Conversion Date”), we estimate that Plan members will slowly start to delay retirement as we move away from the Conversion Date. As a result, we adopted retirement assumptions that vary depending on the member’s age at conversion, and an ultimate retirement assumption for new members after conversion. A younger member at the valuation date will be expected to retire later on average than an older worker at the same date. This assumption was adopted at the initial conversion to the shared risk plan and did not change for this valuation. We will continue to monitor this assumption for reasonableness.

# Opinion on Funding Policy Valuation

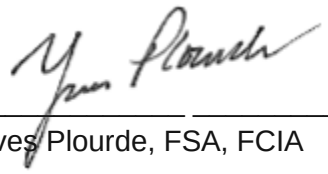
In our opinion, for the purposes of the funding policy valuation section of the report:

- The membership data on which the valuation is based is 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 our opinions given, in accordance with accepted actuarial practice in Canada.

The assumptions used under the funding policy valuation of this report were reasonable 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

September 30, 2021
Date

# Section 2 – Risk Management Goals and Procedures

## Meeting Risk Management Goals

The 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 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 December 31, 2020.

## Risk Management Goals

The primary risk management goal under the PBA 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 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 (all members) that are in excess of 75% of CPI over the next 20 years.

- On average be expected to provide at least 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 December 31, 2020, the effective date of this report. The results of these tests combined with the results of the funding policy actuarial valuation at the same date will determine the actions the Board of Trustees is required to take, or can consider, under the terms of the Funding Policy.

The primary risk management goal must be achieved or exceeded:

- At July 1, 2012 (i.e. the Conversion Date), based on the results found in the initial actuarial valuation report as at that 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 the Regulations are implemented.

The secondary risk management goals must be achieved or exceeded:

- At July 1, 2012 (i.e. the Conversion Date), based on the results found in the initial actuarial valuation report as at that 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 Purpose of the Stochastic Analysis

Additional assumptions are required to determine the level of future cash flows to and from the pension 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 allow 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 Plan.

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

| | | | December 31, 2020 |
|---|---|---|---|
| New entrants | Each active member is replaced at termination, death or retirement by a new entrant (with no net increase in the active membership of the plan) | | |
| Distribution of new entrants and salary at entry | Age | Distribution | Average Salary at Entry |
| | 23 | 35%<br>(25% at 23, as of December 31, 2019) | $68,200 |
| | 27 | 35%<br>(25% at 26, as of December 31, 2019) | $68,200 |
| | 35 | 20%<br>(25% at 30, as of December 31, 2019) | $68,200 |
| | 45 | 10%<br>(25% at 40, as of December 31, 2019) | $68,200 |
| | 90% female / 10% male | | |
| Work percentage | 85.0% | | |
| Inflation | 2.10% per annum | | |
| Salary increases | 3.10% per annum | | |
| YMPE increases | 2.85% per annum | | |

# Results of Stochastic Analysis as at December 31, 2020

The stochastic analysis undertaken as at December 31, 2020, took into account the main following items:

- Membership Data as at December 31, 2020 summarized in Appendix B;
- Economic and demographic assumptions as at December 31, 2020 for the funding policy valuation summarized in Section 1;

- Pension fund 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;
- CBE SRP Plan provisions as summarized in Appendix D;
- Funding deficit recovery plan found under Section V of the CBE SRP Plan's Funding Policy (except for reduction in past base benefits); and
- Funding excess utilization plan found under Section VI of the CBE SRP Plan's Funding Policy (excluding permanent benefit changes).

Based on the above, the results of the stochastic analysis for the various risk management goals as at December 31, 2020 are as follows:

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

| Risk Management Goal | Goal under PBA | Result for CBE SRP Plan as at December 31, 2020 |
|---|---|---|
| Primary Goal [Regulation 7(1)] -<br><br>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% | 98.80%<br><br>PASSED |
| Secondary Goal 1 [Regulation 7(3)(a)] -<br><br>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;<br>or<br>Expected contingent indexing of base benefits of retirees, deferred vested and suspended 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 (i.e. CPI to a maximum of 4.0% in any one year) | 75.0% of the assumed increase in CPI | 75.4% of the assumed increase in CPI<br><br>PASSED |
| Secondary Goal 2 [Regulation 7(3)(b)] -<br><br>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 the value of ancillary benefits will be provided | At or above 96.50%% (See Note below)<br><br>PASSED |

*Note: The Funding Policy provides for the reduction of one type of ancillary benefit under the Funding Deficit Recovery Plan at actions 2 and 3. This is the replacement of early retirement reductions for post conversion service under action 2, and for pre-conversion service at action 3, by a full actuarial reduction for members not yet eligible to receive an immediate pension. We expect these two ancillary benefits would be reduced in about 3.50% of our 10,000 20-yr scenarios. If those were the only two ancillary benefits reduced, and they were eliminated completely, then we can expect that 96.50% of the value of ancillary benefits will be provided over the 20-year period. Given that there are other ancillary benefits under the plan that will not be touched (because they are not mentioned as a benefit that can be reduced under the Funding Policy), the percentage for this test is expected to be higher than 96.50%, which is well above minimum required under the PBA of 75%.*

# Section 3 – Going Concern Valuation

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

The going concern actuarial valuation results presented in this section are based on asset information found in Appendix A, membership data found in Appendix B, and plan provisions summarized in Appendix D. The methods and assumptions used in the going concern valuation are described later in this section.

## Going Concern Funded Status

The funded status of the CBE SRP Plan on the going concern basis is determined by comparing the actuarial value of the assets to the actuarial liabilities. The actuarial liabilities are based on the benefits earned up to the valuation date assuming the Plan continues indefinitely. It also has a provision for future cost-of-living adjustments to be provided by the Trustees in accordance with the plan terms and the funding policy. Such a provision is acceptable under paragraph 147.2(2)(c) of the ITA.

The table below provides the going concern funded status at December 31, 2020 along with the comparative results of the last going concern valuation conducted as at December 31, 2017.

**Table 3.1 – Going Concern Funded Status**

| | December 31, 2020 | December 31, 2017 |
|---|---|---|
| | $M | $M |
| Market Value of Assets | | |
| • Fair market value of assets (including receivable/payables) | 2,577.8 | 2,079.2 |
| Going Concern liabilities | | |
| • Active members | 1,958.1 | 1,746.2 |
| • Retirees and beneficiaries | 1,306.2 | 1,007.2 |
| • Deferred vested and suspended members | 328.6 | 253.0 |
| • Outstanding refunds | 0.1 | 1.6 |
| • Total going concern liabilities | 3,593.0 | 3,008.0 |
| Going concern valuation excess (unfunded liability) | (1,015.2) | (928.8) |
| Going concern funded ratio | 71.7% | 69.1% |

# Going Concern Residual Normal Cost

The table below summarizes the estimated going concern residual normal cost of pension benefits being earned in the twelve-month period after the valuation date (the normal cost), along with the same information as at the date of the last going concern valuation, December 31, 2017.

**Table 3.2 –Going Concern Residual Normal Cost**

| | As at December 31, 2020 | | As at December 31, 2017 | |
|---|---|---|---|---|
| | $M | % of payroll | $M | % of payroll |
| Total normal cost | 129.8 | 22.0 | 119.4 | 20.8 |
| Less Member contributions | (46.1) | (7.8) | (44.8) | (7.8) |
| Residual Normal Cost | 83.7 | 14.2 | 74.6 | 13.0 |
| Estimated payroll for following year | | $590.8M | | $573.8M |

# Maximum Eligible Employer Contribution under the Income Tax Act

The maximum eligible employer contribution in accordance with the ITA is equal to the residual normal cost, plus the greater of the going concern unfunded liability and the hypothetical wind-up deficiency. Under a shared risk plan, the hypothetical wind-up liability will typically be nil. However, the anti-avoidance rule under Section 16 of Regulation 2012-75 may be triggered if a wind-up occurs in the first ten years following the conversion of the shared risk plan. For purposes of calculating the maximum eligible employer contribution, we have ignored the hypothetical wind-up deficiency that could exist for the first ten years after conversion.

On the basis of the methods and assumptions in this report, the maximum eligible employer contribution for the year following December 31, 2020 is equal to $1,098.9M (representing $83.7M of residual normal cost and $1,015.2M of going concern unfunded liability).

When spreading the going concern unfunded liability over the next three years (period for which this going concern valuation is valid under the PBA), the maximum eligible employer contribution for the three years following December 31, 2020 (ignoring interest and salary increases) would be as follows:

**Table 3.3 – Maximum Eligible Employer Contributions Spread Over Three Years**

| | As at December 31, 2020 | | | |
|---|---|---|---|---|
| Year Following | Going Concern Unfunded Liability | Residual Normal Cost | Total | |
| | $M | $M | $M | % of payroll |
| December 31, 2020 | 338.4 | 83.7 | 422.1 | 71.4% |
| December 31, 2021 | 338.4 | 83.7 | 422.1 | 71.4% |
| December 31, 2022 | 338.4 | 83.7 | 422.1 | 71.4% |

Based on the above, the employer contribution requirements under the terms of the Plan of 7.8% of payroll are eligible contributions under the ITA. Furthermore, should employer contributions be increased to 8.3% of payroll as would be required under the Funding Policy if the 15-year open group funded ratio of the 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 December 31, 2023.

# Going Concern Actuarial Methods and Assumptions

The asset valuation method and the actuarial cost method under the going concern valuation are identical to the asset valuation method and the actuarial cost method under the funding policy valuation. The going concern valuation assumptions are also identical, except for the addition of a provision for future cost-of-living adjustments.

## Discount Rate

In order to balance the need to fund intended benefits in a secure and responsible manner, while recognizing the necessity for CRA to monitor the impact of over-conservatism in assumptions, we developed a methodology to select an appropriate discount rate, which we believe will balance those concerns. The discount rate selected is determined by using the nominal investment return that can be expected to be achieved from the long-term asset mix of the CBE SRP Plan over the next 20 years at least 2/3 of the time, minus 1.0% (to account for inclusion of any margins for adverse deviation and any and all expenses to be paid from the fund), with the caveat that the going concern valuation discount rate cannot be lower than the funding policy valuation discount rate. This leads to a discount rate of 4.50% per year, which is the same discount rate as used in the funding policy valuation. In the previous going concern valuation as at December 31, 2017, a discount rate of 4.75% per year was used when applying the same methodology.

## Assumed Contingent Indexing On Accrued Pensions and Pensions in Payment

A provision for future cost-of-living adjustments on the amount of the accrued pensions of active members, and terminated deferred vested members, and on the amounts of current and future pension payments is made. This provision satisfies the requirements of paragraph 147.2(2)(c) of the ITA.

The funding policy clearly states that the benefit intention (benefit target) is a benefit based on a best 5-year average earnings formula with indexation to full CPI after retirement (subject to a maximum of 4%); the same as existed prior to the conversion. While this is by no means a guaranteed outcome, the contributions have been set at a level such that there is a high likelihood of achieving these benefit intentions (or targets).

As a result, and in accordance with the PBA, we have conducted the going concern valuation based on these benefit intentions, which would provide for indexing of accrued pensions before assumed retirement at 3.10% per annum (similar to the long-term salary increase assumption in our funding policy valuation), and indexing of pensions after retirement of 2.10% per annum (reflecting the inflation assumption in our funding policy valuation).

## Other Going Concern Actuarial Assumptions

All other assumptions in our going concern valuation are identical to the assumptions used under the funding policy actuarial valuation detailed in Table 1.6 of Section 1 of this report, and the rationale for the choice of those assumptions also applies for the going concern valuation.

The additional assumptions detailed in Table 2.1 of Section 2 are not required under the going concern actuarial valuation, and therefore do not apply.

Emerging experience differing from these assumptions will result in gains or losses, which will be revealed in future going concern actuarial valuations.

# Opinion on Going Concern Valuation

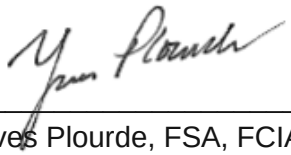
In our opinion, for the purposes of the going concern valuation section of the report:

- 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 going concern valuation report has been prepared, and our opinions given, in accordance with accepted actuarial practice in Canada.

The assumptions used under the going concern valuation of this report were reasonable at the time this actuarial valuation report was prepared.

Respectfully submitted,



Yves Plourde, FSA, FCIA

September 30, 2021
Date

# Section 4 – Hypothetical Wind-Up Valuation

A hypothetical wind-up valuation assumes that the 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 New Brunswick Pension Benefits Act 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 Regulations 2012-75 under the Pension Benefits Act 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 under the PBA prescribes that if a shared risk plan is wound-up by the persons who established the plan more than 5 years but less than 10 years after the conversion date, the plan conversion may be declared void at the discretion of the Superintendent. This may require the plan to be wound-up as a defined benefit plan under Part 1 of the PBA.

It is important to note that the Former CBE Plan was not subject to the PBA and the procedures to be followed if a wind-up occurred were not defined within the Former CBE Plan. As a result, the procedures for payments at wind-up were not defined. In conducting the hypothetical wind-up valuation as at December 31, 2020, we therefore made the assumption that the conversion to a shared risk plan would be void, and that the CBE SRP Plan would be wound-up as at December 31, 2020 in accordance with rules found under Part 1 of the PBA. This assumption has been made solely on the basis that subsection 16(3.1) would apply on December 31, 2020, and does not represent a legal opinion on the validity of this scenario.

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 fully indexed annuity purchases as at December 31, 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**

| | December 31, 2020 | December 31, 2019 |
|---|---|---|
| | | $M |
| Assets | | |
| • Market value of assets | 2,577.8 | 2,413.4 |
| • Provision for wind-up expenses | (1.5) | (1.5) |
| • Total | 2,576.3 | 2,411.9 |
| Hypothetical wind-up liabilities | | |
| • Active members | 4,281.1 | 3,674.1 |
| • Retirees and beneficiaries | 2,014.3 | 1,711.8 |
| • Deferred vested and suspended members | 678.5 | 538.5 |
| • Outstanding refunds | 0.1 | 0.3 |
| • Total hypothetical wind-up liabilities | 6,974.0 | 5,924.7 |
| Assets less liabilities on the hypothetical wind-up basis | (4,397.7) | (3,512.8) |

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 CBE SRP Plan while it is not in a wind-up state.

# 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 December 31, 2020 to December 31, 2021, adjusted for expected benefit payments in the inter-valuation period. This incremental cost is estimated to be $305.8M at December 31, 2020.

# 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 Plan is wound up on the valuation date. This method is the same as the one used in the last valuation.

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. This method is the same as the one used in the last valuation.

# Hypothetical Wind-Up Actuarial Assumptions

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

Although the Former CBE Plan was not subject to the PBA before it was converted to the CBE SRP Plan, in the absence of specific direction to the contrary in the Former CBE Plan, we have valued the hypothetical wind-up liability using discount rates consistent with the requirements of the PBA if the Plan were to be wound up. 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 fully indexed annuity purchases as at December 31, 2020.

The main 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**

| | December 31, 2020 | December 31, 2019 |
|---|---|---|
| Interest rate | | |
| • Interest rate for active members, deferred vested and suspended members under 55 | -0.81% net per annum (rate net of inflation for fully indexed annuities) | -0.29% net per annum (rate net of inflation for fully indexed annuities) |
| • Interest rate for all other members | -0.81% net per annum (rate net of inflation for fully indexed annuities) | -0.29% net per annum (rate net of inflation for fully indexed annuities) |
| Salary increases | None | None |
| Mortality | CPM2014 Composite table projected with Scale CPM-B | CPM2014 Composite table projected with Scale CPM-B |
| Termination (membership) | None | None |
| Wind-up expenses | $1,500,000 | $1,500,000 |
| Retirement | Age that maximizes the value of the pension | Age that maximizes the value of the pension |

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, deferred vested and suspended 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 fully indexed group annuities for annuitants already retired, based on the suggested rates for such annuitants published by the CIA.

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

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.

- CBE SRP Plan conversion would be void and the pension plan would be wound-up under Part 1 of the PBA.

- Fully indexed annuities would be purchased for all plan members.

# 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 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 or bankruptcy.

# 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 December 31, 2020 and December 31, 2021, discounted to December 31, 2020;

   Plus

2. Projected hypothetical wind-up liabilities as at December 31, 2021, discounted to December 31, 2020;

   Less

3. Hypothetical wind-up liabilities as at December 31, 2020.

The projected liabilities as at December 31, 2021 take into account:

- expected decrements and related changes in membership status between December 31, 2020 and December 31, 2021;

- accrual of service to December 31, 2021;
- expected changes in benefits to December 31, 2021; and
- projection of pensionable earnings to December 31, 2021.

The actuarial assumptions used to calculate the incremental cost may be described as follows:

- The assumptions used to calculate the expected benefit payments in item 1. above and service accruals, projected changes in benefits and projected changes in the pensionable earnings in item 2. above correspond to those used in the funding policy valuation as at December 31, 2020.
- The assumptions used to calculate the projected solvency liabilities as at December 31, 2021 in item 2. above correspond to those used for the solvency valuation as at December 31, 2020, taking into account the method of settlement applicable to each member as at December 31, 2021.
- The rates used to discount items 1. and 2. above from December 31, 2021 to December 31, 2020 correspond to those used for the solvency valuation as at December 31, 2020.

We also assume that the standards of practice for the calculation of commuted values and the guidance for estimated annuity purchase costs in effect as at December 31, 2020 remain in effect as at December 31, 2021.

Note that no new entrants were considered between December 31, 2020 and December 31, 2021 as the impact on the incremental cost is not material.

# Opinion on Hypothetical Wind-up Valuation

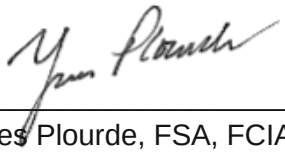
In our opinion, for the purposes of the hypothetical wind-up valuation section of the report:

- 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 our 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

September 30, 2021
Date

# Section 5 – Plausible Adverse Scenarios

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 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. 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 0.5% immediately, leading to a 0.2% 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 4.30% 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 8.1% increase on the market value of the affected asset classes, which translates into a 3.4% 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 9.4% immediately, resulting in a 5.4% 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 approximately 10% from the underlying mortality table assumption used in our valuation.

To test the impact of an average life expectancy increase of approximately 10% for all ages over the current assumption on the funding policy actuarial liabilities and normal cost, a multiplier of 0.7 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 December 31, 2020 | Plausible Adverse Scenario Results as at December 31, 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 | 2,577.8 | 2,665.4 | 2,438.6 | 2,577.8 | 2,577.8 |
| Funding policy actuarial liabilities | 2,354.8 | 2,425.2 | 2,354.8 | 2,485.1 | 2,354.8 |
| Funding policy valuation excess (unfunded liability) | 223.0 | 240.2 | 83.8 | 92.7 | 223.0 |
| Termination value funded ratio | 109.5% | 109.9% | 103.6% | 103.7% | 109.5% |
| Present value of excess contributions over the next 15 years | 355.6 | 322.4 | 355.6 | 316.6 | 320.0 |
| Open group funded ratio | 124.6% | 123.2% | 118.7% | 116.5% | 123.1% |
| Funding policy valuation normal cost | 65.5 | 68.5 | 65.5 | 68.6 | 59.0 |

| Results of stochastic analysis for risk management goal | | | | | |
|---|---|---|---|---|---|
| Primary Goal [Regulation 7(1)] | 98.80% PASS | 98.70% PASS | 98.20% PASS | 96.25% FAIL | 98.20% PASS |
| Secondary Goal 1 [Regulation 7(3)(a)] | 75.4% PASS | 76.5% PASS | 67.8% FAIL | 59.4% FAIL | 72.9% FAIL |
| Secondary Goal 2 [Regulation 7(3)(b)] | At least 96.50% PASS | At least 96.35% PASS | At least 95.05% PASS | At least 91.35% PASS | At least 95.30% 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 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 Valuation Basis

| | December 31, 2020 | Discount rate 1% lower |
|---|---|---|
| | $M | $M |
| Actuarial liabilities | | |
| • Active members | 1,113.5 | 1,340.8 |
| • Retirees and beneficiaries | 1,049.3 | 1,156.9 |
| • Deferred vested and suspended members | 191.9 | 231.7 |
| • Outstanding refunds | 0.1 | 0.1 |
| • Total | 2,354.8 | 2,729.5 |
| Increase in actuarial liabilities | | 374.7 |

# 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 Valuation Total Normal Cost**

| | As at December 31, 2020 | | Discount Rate 1% lower | |
|---|---|---|---|---|
| | $M | % of payroll | $M | % of payroll |
| Total normal cost | 65.5 | 11.1% | 82.4 | 13.9% |
| Increase in total normal cost | | | 16.9 | 2.8% |

# Sensitivity Analysis on the Going Concern Basis

The Standards of Practice of the Canadian Institute of Actuaries require valuation reports to disclose the sensitivity of the liabilities to changes in the discount rate assumption. The table below illustrates the effect of 1% decrease in the discount rate on the going concern actuarial liabilities. With the exception of the discount rate, all other assumptions and methods used for this valuation were maintained.

**Table 5.4 – Sensitivity of Actuarial Liabilities on the Going Concern Basis**

| | December 31, 2020 | Discount Rates 1% lower |
|---|---|---|
| | $M | $M |
| Actuarial liabilities | | |
| • Active members | 1,958.1 | 2,504.0 |
| • Retirees and beneficiaries | 1,306.2 | 1,460.3 |
| • Deferred vested and suspended members | 328.6 | 417.6 |
| • Outstanding refunds | 0.1 | 0.1 |
| • Total | 3,593.0 | 4,382.0 |
| Increase in actuarial liabilities | | 789.0 |

# Sensitivity Analysis on the Going Concern Residual Normal Cost

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

### Table 5.5 – Sensitivity of Going Concern Residual Normal Cost

| | As at December 31, 2020 | | Discount Rate 1% lower | |
|---|---|---|---|---|
| | $M | % of payroll | $M | % of payroll |
| Total normal cost | 129.8 | 22.0% | 177.0 | 30.0% |
| Less Member contributions | (46.1) | (7.8%) | (46.1) | (7.8%) |
| Residual Normal Cost | 83.7 | 14.2% | 130.9 | 22.2% |
| Increase in residual normal cost | | | 47.2 | 8.0% |

# 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 5.6 – Sensitivity of Actuarial Liabilities on the Hypothetical Wind-Up Basis

| | December 31, 2020 | Discount Rates 1% lower |
|---|---|---|
| | $M | $M |
| Actuarial liabilities | | |
| • Active members | 4,281.1 | 5,715.8 |
| • Retirees and beneficiaries | 2,014.3 | 2,325.1 |
| • Deferred vested and suspended members | 678.5 | 911.2 |
| • Outstanding refunds | 0.1 | 0.1 |
| • Total | 6,974.0 | 8,952.2 |
| Increase in actuarial liabilities | | 1,978.2 |

# Appendix A – Assets

## Description of Plan Assets

The assets of the CBE SRP Plan are held in trust and are being managed by Vestcor Inc.

## Statement of Market Value

The following table shows the asset mix as at December 31, 2020 extracted from the audited financial statements produced by Grant Thornton, and for comparison, the asset mix as at December 31, 2019 extracted from the actuarial valuation report:

**Table A.1 – Assets at Market Value**

| | December 31, 2020 | December 31, 2019 |
|---|---|---|
| | $M | $M |
| Invested assets | | |
| • Short Term | 4.5 | 15.7 |
| • Equities | 697.7 | 650.1 |
| • Fixed Income | 1,079.5 | 1,010.2 |
| • Real Estate and Infrastructure | 572.3 | 529.8 |
| • Alternatives | 207.4 | 189.3 |
| • Other | 16.4 | 18.3 |
| Total assets | 2,577.8 | 2,413.4 |

## Changes to Plan Assets

The following table shows changes to the Plan assets during the inter-valuation period, based on market values. The reconciliation from January 1, 2020 to December 31, 2020 is based on the audited financial statements issued by Grant Thornton for the full calendar year 2020.

### Table A.2 – Reconciliation

| | 2020 |
|---|---|
| | $M |
| Assets at beginning of period | 2,413.4 |
| Receipts | |
| • Contributions | 93.7 |
| • Investment income plus realized and unrealized capital appreciation and depreciation | 162.8 |
| Total receipts | 256.5 |
| Disbursements | |
| • Pensions paid and refunds | 87.1 |
| • Expenses (fees) | 5.0 |
| Total disbursements | 92.1 |
| Assets at end of period | 2,577.8 |

# Return on Assets

The CBE SRP Plan assets earned the following rate of return, net of all 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 |
|---|---|
| 2020 | 6.5 |
| 2019 | 11.1 |
| 2018 | 2.9 |
| 2017 | 6.9 |
| 2016 | 5.8 |

# Actuarial Value of Assets

We have used the market value of assets (including receivables / payables) without adjustment. The actuarial value of assets as at December 31, 2020 was $2,577.8M.

# Target Asset Mix under Shared Risk Plan

The statement of investment policy and goals for the CBE SRP Plan provides for the long term target asset mix shown in the table below.

### Table A.4 – Target Asset Mix

| | |
|---|---|
| Asset classes | |
| • Domestic Fixed Income | |
| • Corporate Bonds | 20.0% |
| • Government Bonds | 17.5% |
| • Foreign Fixed Income | |
| • Global High Yield Bonds | 5.0% |
| • Equities | |
| • Canadian Equities | 4.0% |
| • Canadian Low Volatility Equities | 4.0% |
| • Global Developed Markets (ex Canada) Equities | 8.0% |
| • Global Developed Markets (ex Canada) Low Volatility Equities | 8.0% |
| • Emerging Market Low Volatility Equities | 4.0% |
| • Alternatives | |
| • Real estate | 11.0% |
| • Infrastructure | 11.0% |
| • Absolute return | 7.5% |
| Total | 100.0% |

This target asset mix was used to determine the expected rate of return under the Plan, 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

The data as of December 31, 2020 was extracted from LikeWorks' Ariel administration system and was reviewed by Vestcor.

The data was matched and reconciled with the data provided for the previous valuation as at December 31, 2019. Basic data checks were performed to ensure that age, salary, service and accrued pensions data were reasonable for the purposes of the valuation and to ensure that the data was accurate, complete and consistent with previous data.

In very limited cases where the credibility of the data received this year for certain individuals was questioned in light of a comparison with the data received as part of the previous valuation, the data from the previous valuation was used.

## Summary of Membership Data

The following tables were prepared using data provided by Vestcor regarding its active members, retirees and former members. Accrued pensions, in payment or not, for all members reflect all cost-of-living and benefit improvement adjustments granted by the Board of Trustees effective January 1, 2021.

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 December 31, 2020
- B.4 Distribution of Retirees and Beneficiaries by Age Groups as at December 31, 2020
- B.5 Distribution of Deferred Vested and Suspended Members by Age Groups as at December 31, 2020

## Table B.1 – Summary of Membership Data

| | | December 31, 2020 | December 31, 2019 |
|---|---|---|---|
| Active members[1] | Number | 8,762 | 8,870 |
| | Average salary | $71,289 | $70,638 |
| | Average age | 42.7 years | 42.8 years |
| | Average accrued lifetime pension | $13,649 | $13,122 |
| | Average accrued bridge benefit | $4,202 | $4,079 |
| | Average credited service | 11.3 years | 11.2 years |
| Retirees and beneficiaries | Number | 3,695 | 3,429 |
| | Average annual lifetime pension | $20,776 | $20,338 |
| | Average annual bridge benefit[2] | $6,753 | $6,640 |
| | Average age | 68.7 years | 68.5 years |
| Deferred vested and suspended members | Number | 2,636 | 2,389 |
| | Average annual lifetime pension | $7,449 | $7,410 |
| | Average annual bridge benefit[2] | $2,535 | $2,467 |
| | Average age | 44.2 years | 44.5 years |

*[1] Includes all actively contributing members, members on long-term disability, and members participating in the phased retirement program at valuation date. Any non-contributing members such as on a leave of absence, members who have signed an intra-provincial agreement, or suspended are grouped under Deferred vested and suspended members.*

*[2] Average for those entitled to or receiving a bridging benefit.*

## Table B.2 – Changes in Plan Membership

| | Active Members | Retirees and Beneficiaries | Deferred Vested and Suspended Members | Total |
|---|---|---|---|---|
| Members at December 31, 2019 | 8,870 | 3,429 | 2,389 | 14,688 |
| New members | 561 | --- | --- | 561 |
| Retirements | (241) | 308 | (67) | --- |
| Returned to active status | 446 | (6) | (440) | --- |
| Terminations: | | | | --- |
| • with refunds or transfers out | (69) | --- | (45) | (114) |
| Moved to a suspended status | (800) | --- | 800 | --- |
| Deaths: | | | | --- |
| • with no continuing benefits | (5) | (38) | (1) | (44) |
| • with survivors | --- | (11) | --- | (11) |
| New survivor pensions | --- | 11 | --- | 11 |
| Guarantee periods expired | --- | --- | --- | --- |
| Data adjustments | --- | 2 | --- | 2 |
| Members at December 31, 2020 | 8,762 | 3,695 | 2,636 | 15,093 |

## Table B.3 – Age/Service Distribution for Active Members as at December 31, 2020

| | | Age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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. | 333 | 927 | 503 | 257 | 158 | 132 | 126 | 104 | 61 | 2,601 |
| | Tot. Sal. | 20,671,597 | 60,139,307 | 32,180,220 | 16,279,679 | 9,951,343 | 7,956,464 | 6,162,256 | 4,667,520 | 2,409,135 | 160,417,522 |
| | Avg. Sal. | 62,077 | 64,875 | 63,977 | 63,345 | 62,983 | 60,276 | 48,907 | 44,880 | 39,494 | 61,675 |
| 5 - 9 | Num. | - | 100 | 583 | 453 | 244 | 217 | 186 | 132 | 62 | 1,977 |
| | Tot. Sal. | - | 7,400,686 | 42,307,076 | 32,982,006 | 16,897,395 | 14,948,633 | 12,531,538 | 8,829,738 | 4,092,463 | 139,989,535 |
| | Avg. Sal. | - | 74,007 | 72,568 | 72,808 | 69,252 | 68,888 | 67,374 | 66,892 | 66,007 | 70,809 |
| 10 - 14 | Num. | - | - | 98 | 493 | 394 | 271 | 216 | 131 | 67 | 1,670 |
| | Tot. Sal. | - | - | 7,285,309 | 37,351,337 | 29,458,032 | 20,690,519 | 15,724,707 | 9,402,913 | 4,740,614 | 124,653,432 |
| | Avg Sal. | - | - | 74,340 | 75,763 | 74,767 | 76,349 | 72,800 | 71,778 | 70,755 | 74,643 |
| 15 - 19 | Num. | - | - | - | 62 | 301 | 317 | 234 | 135 | 56 | 1,105 |
| | Tot. Sal. | - | - | - | 5,032,121 | 23,939,869 | 24,596,356 | 18,126,255 | 10,247,463 | 4,397,703 | 86,339,767 |
| | Avg. Sal. | - | - | - | 81,163 | 79,534 | 77,591 | 77,463 | 75,907 | 78,530 | 78,136 |
| 20 - 24 | Num. | - | - | - | - | 20 | 135 | 220 | 133 | 40 | 548 |
| | Tot. Sal. | - | - | - | - | 1,579,657 | 10,913,417 | 17,464,759 | 10,335,941 | 3,271,982 | 43,565,756 |
| | Avg. Sal. | - | - | - | - | 78,983 | 80,840 | 79,385 | 77,714 | 81,800 | 79,500 |
| 25 - 29 | Num. | - | - | - | - | - | 11 | 244 | 156 | 28 | 439 |
| | Tot. Sal. | - | - | - | - | - | 975,504 | 19,823,194 | 12,521,758 | 2,136,814 | 35,457,270 |
| | Avg. Sal. | - | - | - | - | - | 88,682 | 81,243 | 80,268 | 76,315 | 80,768 |
| 30 - 34 | Num. | - | - | - | - | - | - | 96 | 225 | 29 | 350 |
| | Tot. Sal. | - | - | - | - | - | - | 7,846,123 | 18,137,795 | 2,340,810 | 28,324,729 |
| | Avg. Sal. | - | - | - | - | - | - | 81,730 | 80,612 | 80,718 | 80,928 |
| 35 + | Num. | - | - | - | - | - | - | - | 35 | 37 | 72 |
| | Tot. Sal. | - | - | - | - | - | - | - | 2,902,769 | 2,987,094 | 5,889,863 |
| | Avg. Sal. | - | - | - | - | - | - | - | 82,936 | 80,732 | 81,804 |
| Total number | | 333 | 1,027 | 1,184 | 1,265 | 1,117 | 1,083 | 1,322 | 1,051 | 380 | 8,762 |
| Total salaries | | 20,671,597 | 67,539,992 | 81,772,605 | 91,645,143 | 81,826,296 | 80,080,894 | 97,678,833 | 77,045,898 | 26,376,614 | 624,637,872 |
| Average of salaries | | 62,077 | 65,764 | 69,065 | 72,447 | 73,255 | 73,944 | 73,887 | 73,307 | 69,412 | 71,289 |

*Average age: 42.7*

*Average number of years of service: 11.3*

*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.*

*The salary used is the estimated salary rate as of January 1, 2021.*

*Membership for active members is composed of 812 males and 7,950 females.*

## Table B.4 – Distribution of Retirees and Beneficiaries by Age Groups as at December 31, 2020

| Age Group | Number | Total Annual Payments | |
|---|---|---|---|
| | | Lifetime | Bridge |
| Under 60 | 321 | 6,607,328 | 2,017,035 |
| 60-64 | 930 | 20,652,975 | 6,322,550 |
| 65-69 | 1,077 | 23,721,589 | |
| 70-74 | 739 | 14,628,632 | |
| 75-79 | 317 | 5,715,119 | |
| 80-84 | 174 | 3,147,918 | |
| 85-89 | 95 | 1,666,764 | |
| 90 and over | 42 | 628,569 | |
| Total | 3,695 | 76,768,894 | 8,339,585 |

*Average age: 68.7*

*Notes: Age groups are based on exact age.*

*The pension used is the pension payable as at January 1, 2021.*

*Membership for retired members and beneficiaries is composed of 256 males and 3,439 females.*

## Table B.5 – Distribution of Deferred Vested and Suspended Members by Age Groups as at December 31, 2020

| Age Group | Number | Total Annual Payments | |
|---|---|---|---|
| | | Lifetime | Bridge |
| Under 25 | 22 | 16,046 | 7,595 |
| 25 - 29 | 278 | 679,463 | 264,929 |
| 30 - 34 | 415 | 1,885,005 | 680,762 |
| 35 - 39 | 389 | 2,197,503 | 792,887 |
| 40 - 44 | 324 | 2,003,491 | 709,631 |
| 45 - 49 | 279 | 2,184,522 | 770,214 |
| 50 - 54 | 343 | 3,773,197 | 1,291,962 |
| 55 - 59 | 338 | 4,308,576 | 1,357,468 |
| 60 and over | 248 | 2,588,822 | 807,078 |
| Total | 2,636 | 19,636,626 | 6,682,525 |

*Average age: 44.2*

*Notes: Age groups are based on exact age.*

*The pension used is the pension payable as at January 1, 2021.*

*Membership for deferred vested and suspended members is composed of 255 males and 2,381 females.*

In addition, there is a total of $0.1M in outstanding refunds for 28 individuals at December 31, 2020.

# 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 LifeWorks Investment and Risk 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 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 and after |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Market implied inflation (%) | 1.48% | 1.56% | 1.63% | 1.71% | 1.78% | 1.86% | 1.93% | 2.01% | 2.08% | 2.16% | 2.23% |

# 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 December 31, 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 Universe Federal Bonds | n/a | n/a | 0.55% | 2.91% |
| FTSE Canada Federal Short Term Bonds | n/a | n/a | 0.32% | 2.55% |
| FTSE Canada Federal Mid Term Bonds | n/a | n/a | 0.70% | 3.15% |
| FTSE Canada Federal Long Term Bonds | n/a | n/a | 1.15% | 3.67% |
| FTSE Canada Universe Corporate Bonds | 1.16% | 1.18% | 1.71% | 4.09% |
| FTSE Canada Short Term Corporate Bonds | 0.61% | 0.85% | 0.92% | 3.40% |
| FTSE Canada Mid Term Corporate Bonds | 1.12% | 1.25% | 1.82% | 4.40% |
| FTSE Canada Long Term Corporate Bonds | 1.69% | 1.66% | 2.84% | 5.33% |
| FTSE Canada Universe Provincial Bonds | 0.87% | 0.88% | 1.42% | 3.80% |
| FTSE Canada Short Term Provincial Bonds | 0.17% | 0.24% | 0.48% | 2.79% |
| FTSE Canada Mid Term Provincial Bonds | 0.39% | 0.49% | 1.08% | 3.63% |
| FTSE Canada Long Term Provincial Bonds | 0.83% | 0.75% | 1.97% | 4.43% |

** 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 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 December 31, 2020. For reference, we have also included the return and volatility as at the date of the previous valuation, December 31, 2019.

**Table C.3 – Expected Long-Term Return and Volatility (Standard Deviation) by Asset Class**

| | December 31, 2020 | | December 31, 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% | 2.10% | 1.30% |
| Asset Classes | | | | |
| Fixed income: | | | | |
| • Domestic Government Bonds (DGB) | 2.05% | 6.2% | 2.75% | 6.4% |
| • Domestic Corporate Bonds (DCB) | 2.95% | 4.9% | 3.60% | 4.9% |
| • Global High Yield (GHY) | 4.90% | 11.8% | 5.35% | 12.0% |
| Public equities: | | | | |
| • Canadian Equities (CE) | 7.05% | 16.4% | 6.80% | 16.4% |
| • Canadian equities low vol (CE LV) [2] | 6.55% | 13.1% | 6.30% | 13.1% |
| • US equities (UE) [1] | 6.25% | 16.7% | 6.45% | 17.3% |
| • US equities low vol (UE LV) [1, 2] | 5.75% | 13.4% | 5.95% | 13.9% |
| • International Equities (IE) [1] | 6.30% | 15.2% | 7.15% | 15.2% |
| • International equities low vol (IE LV) [1, 2] | 5.80% | 12.2% | 6.65% | 12.2% |
| • Emerging market low vol equities (EM LV) [2] | 7.85% | 18.3% | 8.70% | 18.6% |
| Alternative Investments: | | | | |
| • Canadian Real Estate (CRE) | 6.15% | 10.8% | 6.05% | 9.0% |
| • Infrastructure (I) | 6.05% | 12.7% | 6.30% | 13.0% |
| • Absolute Return (AR) | 5.55% | 9.9% | 6.10% | 10.1% |

*[1] Note that a 5% US equity allocation and a 3% International equity allocation were selected as a proxy for the 8% allocation to Global Developed Markets (ex Canada) Equities for both regular and low volatility strategies*

*[2] For purposes of our stochastic analysis at December 31, 2020, specific assumptions were made for the public equities (low volatility) strategies. The methodology for deriving assumptions for such strategies was approved by the Superintendent of Pensions in a letter dated August 18, 2015. The conditions ultimately imposed by the Superintendent of Pensions for such strategies are as follows:*

- *Expected long term rate of return of 0.25% to 0.5% lower than regular market capitalization index.*
- *Volatility of 80% of the regular market capitalization index*
- *Correlation of 30% lower than regular market capitalization index*

- *Maximum of 25% of the funds in such strategies for modeling purposes, with any excess modeled using the regular market capitalization index assumptions*

The following is the correlation among the various asset classes identified in Table C.3 used as at December 31, 2020. 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 asset returns:

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

| | DGB | DCB | GHY | CE | CE LV | UE | UE LV | IE | IE LV | EM LV | CRE | I | AR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DGB | 1.00 | 0.92 | 0.14 | 0.28 | 0.19 | 0.17 | 0.12 | 0.29 | 0.20 | 0.20 | 0.33 | 0.16 | 0.34 |
| DCB | | 1.00 | 0.42 | 0.03 | 0.02 | 0.01 | 0.01 | 0.09 | 0.06 | 0.05 | 0.23 | 0.20 | 0.09 |
| GHY | | | 1.00 | -0.62 | -0.43 | -0.46 | -0.32 | -0.53 | -0.37 | -0.37 | -0.19 | 0.10 | -0.54 |
| CE | | | | 1.00 | 0.70 | 0.39 | 0.27 | 0.56 | 0.39 | 0.51 | 0.24 | 0.08 | 0.79 |
| CE LV | | | | | 1.00 | 0.27 | 0.19 | 0.39 | 0.28 | 0.36 | 0.17 | 0.05 | 0.55 |
| UE | | | | | | 1.00 | 0.70 | 0.76 | 0.53 | 0.11 | 0.05 | -0.09 | 0.41 |
| UE LV | | | | | | | 1.00 | 0.53 | 0.37 | 0.08 | 0.04 | -0.07 | 0.29 |
| IE | | | | | | | | 1.00 | 0.70 | 0.38 | 0.22 | -0.08 | 0.47 |
| IE LV | | | | | | | | | 1.00 | 0.26 | 0.15 | -0.06 | 0.33 |
| EM LV | | | | | | | | | | 1.00 | 0.13 | 0.01 | 0.45 |
| CRE | | | | | | | | | | | 1.00 | 0.11 | 0.29 |
| I | | | | | | | | | | | | 1.00 | 0.04 |
| AR | | | | | | | | | | | | | 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.

The following table contains the results of the deterministic projection, in particular the number of active 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.

### Table C.5 – Projection Statistics for Active Members

| Date | Number of Active Members | Average Age | Average Pensionable Service (years) | Average Salary ($) * |
|---|---|---|---|---|
| 31-Dec-21 | 8,762 | 43.6 | 11.7 | 70,980 |
| 31-Dec-22 | 8,762 | 43.1 | 11.9 | 72,390 |
| 31-Dec-23 | 8,762 | 43.2 | 12.1 | 74,042 |
| 31-Dec-24 | 8,762 | 43.1 | 12.2 | 75,637 |
| 31-Dec-25 | 8,762 | 43.0 | 12.4 | 77,337 |
| 31-Dec-26 | 8,762 | 43.0 | 12.5 | 79,127 |
| 31-Dec-27 | 8,762 | 43.0 | 12.7 | 81,008 |
| 31-Dec-28 | 8,762 | 43.1 | 12.8 | 82,992 |
| 31-Dec-29 | 8,762 | 43.2 | 13.0 | 85,030 |
| 31-Dec-30 | 8,762 | 43.3 | 13.1 | 87,098 |
| 31-Dec-31 | 8,762 | 43.4 | 13.3 | 89,226 |
| 31-Dec-32 | 8,762 | 43.5 | 13.5 | 91,431 |
| 31-Dec-33 | 8,762 | 43.6 | 13.7 | 93,702 |
| 31-Dec-34 | 8,762 | 43.9 | 13.9 | 96,134 |
| 31-Dec-35 | 8,762 | 44.0 | 14.1 | 98,541 |
| 31-Dec-36 | 8,762 | 44.2 | 14.2 | 101,015 |
| 31-Dec-37 | 8,762 | 44.3 | 14.4 | 103,559 |
| 31-Dec-38 | 8,762 | 44.5 | 14.5 | 106,201 |
| 31-Dec-39 | 8,762 | 44.6 | 14.6 | 108,938 |
| 31-Dec-40 | 8,762 | 44.8 | 14.7 | 111,721 |

** 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 members (including but not limited to deferred vested and suspended members as well as 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 ($M) |
|---|---|---|
| 31-Dec-21 | 6,052 | 88.3 |
| 31-Dec-22 | 6,458 | 97.1 |
| 31-Dec-23 | 6,743 | 104.4 |
| 31-Dec-24 | 7,058 | 112.3 |
| 31-Dec-25 | 7,361 | 119.8 |
| 31-Dec-26 | 7,639 | 126.6 |
| 31-Dec-27 | 7,912 | 132.9 |
| 31-Dec-28 | 8,155 | 138.0 |
| 31-Dec-29 | 8,404 | 143.1 |
| 31-Dec-30 | 8,646 | 147.6 |
| 31-Dec-31 | 8,871 | 151.8 |
| 31-Dec-32 | 9,088 | 155.8 |
| 31-Dec-33 | 9,286 | 159.4 |
| 31-Dec-34 | 9,445 | 161.8 |
| 31-Dec-35 | 9,622 | 165.5 |
| 31-Dec-36 | 9,789 | 169.4 |
| 31-Dec-37 | 9,953 | 173.6 |
| 31-Dec-38 | 10,105 | 177.5 |
| 31-Dec-39 | 10,242 | 181.1 |
| 31-Dec-40 | 10,377 | 185.3 |

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 inactive members. 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

| Date | Total Liability ($M) | Active Liability ($M) | Inactive Liability ($M) |
|---|---|---|---|
| 31-Dec-21 | 2,437.3 | 1,215.5 | 1,221.8 |
| 31-Dec-22 | 2,514.4 | 1,176.3 | 1,338.1 |
| 31-Dec-23 | 2,589.2 | 1,178.9 | 1,410.2 |
| 31-Dec-24 | 2,660.3 | 1,169.1 | 1,491.2 |
| 31-Dec-25 | 2,728.5 | 1,161.6 | 1,566.9 |
| 31-Dec-26 | 2,794.3 | 1,158.7 | 1,635.6 |
| 31-Dec-27 | 2,858.3 | 1,161.1 | 1,697.2 |
| 31-Dec-28 | 2,922.1 | 1,178.8 | 1,743.3 |
| 31-Dec-29 | 2,985.5 | 1,194.8 | 1,790.8 |
| 31-Dec-30 | 3,049.2 | 1,213.2 | 1,836.0 |
| 31-Dec-31 | 3,113.7 | 1,237.7 | 1,875.9 |
| 31-Dec-32 | 3,179.2 | 1,266.0 | 1,913.2 |
| 31-Dec-33 | 3,246.6 | 1,301.8 | 1,944.8 |
| 31-Dec-34 | 3,317.7 | 1,356.1 | 1,961.6 |
| 31-Dec-35 | 3,391.0 | 1,398.6 | 1,992.4 |
| 31-Dec-36 | 3,466.5 | 1,443.7 | 2,022.8 |
| 31-Dec-37 | 3,544.0 | 1,487.5 | 2,056.5 |
| 31-Dec-38 | 3,624.0 | 1,535.5 | 2,088.5 |
| 31-Dec-39 | 3,707.3 | 1,589.5 | 2,117.8 |
| 31-Dec-40 | 3,793.1 | 1,638.5 | 2,154.6 |

# 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 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 modelled. Notably, only steps 1 through 4 of the funding excess utilization plan and steps 1 through 5 of the funding deficit recovery plan are 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 five 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 “benefit reduction trial” is recorded (for purposes of the primary risk management goal calculation) when step 5 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 base benefit reduction 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 “benefit reduction trial” 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 |
|---|---|
| Non-investment related expenses | 0.10% of liabilities |
| Passive investment management expenses | 0.10% of assets |

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 |
|---|---|---|---|---|---|---|---|---|---|
| 2021 | -5.12% | -4.07% | -2.50% | 1.32% | 3.99% | 6.64% | 10.63% | 4.00% | 3.99% |
| 2022 | -5.53% | -4.43% | -2.75% | 1.23% | 4.09% | 6.86% | 10.95% | 4.06% | 4.16% |
| 2023 | -5.57% | -4.43% | -2.66% | 1.36% | 4.16% | 7.00% | 11.14% | 4.19% | 4.20% |
| 2024 | -5.55% | -4.40% | -2.61% | 1.49% | 4.29% | 7.15% | 11.21% | 4.30% | 4.23% |
| 2025 | -5.06% | -3.97% | -2.31% | 1.62% | 4.38% | 7.24% | 11.14% | 4.42% | 4.11% |
| 2026 | -5.24% | -4.13% | -2.48% | 1.61% | 4.45% | 7.30% | 11.53% | 4.47% | 4.23% |
| 2027 | -5.19% | -4.02% | -2.24% | 1.78% | 4.63% | 7.48% | 11.62% | 4.63% | 4.23% |
| 2028 | -5.15% | -3.92% | -2.08% | 1.89% | 4.71% | 7.55% | 11.67% | 4.73% | 4.22% |
| 2029 | -4.95% | -3.84% | -2.13% | 2.05% | 4.84% | 7.71% | 11.76% | 4.86% | 4.21% |
| 2030 | -4.77% | -3.62% | -1.81% | 2.12% | 4.90% | 7.74% | 11.84% | 4.94% | 4.15% |
| 2031 | -3.89% | -2.80% | -1.07% | 2.92% | 5.76% | 8.56% | 12.65% | 5.77% | 4.17% |
| 2032 | -3.83% | -2.74% | -1.09% | 2.84% | 5.66% | 8.43% | 12.67% | 5.69% | 4.16% |
| 2033 | -4.10% | -2.94% | -1.17% | 2.94% | 5.76% | 8.54% | 12.59% | 5.73% | 4.19% |
| 2034 | -3.81% | -2.69% | -1.09% | 2.87% | 5.63% | 8.54% | 12.56% | 5.70% | 4.15% |
| 2035 | -3.88% | -2.79% | -1.14% | 2.98% | 5.74% | 8.56% | 12.66% | 5.77% | 4.18% |
| 2036 | -3.95% | -2.80% | -0.99% | 3.01% | 5.81% | 8.63% | 12.52% | 5.80% | 4.14% |
| 2037 | -3.69% | -2.63% | -0.98% | 2.93% | 5.79% | 8.58% | 12.59% | 5.78% | 4.13% |
| 2038 | -3.73% | -2.58% | -0.87% | 3.03% | 5.80% | 8.65% | 12.87% | 5.86% | 4.17% |
| 2039 | -3.82% | -2.72% | -1.09% | 2.86% | 5.70% | 8.61% | 12.67% | 5.73% | 4.18% |
| 2040 | -3.86% | -2.77% | -1.09% | 2.86% | 5.76% | 8.59% | 12.74% | 5.75% | 4.20% |
| Annualized average over 20 years | 2.78% | 3.05% | 3.45% | 4.37% | 5.01% | 5.69% | 6.64% | 5.03% | 0.97% |

The stochastic model projects a distribution of the total funding policy valuation liabilities and assets 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 ($ millions)

| Date | 2.5% CTE* | 5% CTE* | 5th Percentile | 25th Percentile | 50th Percentile | 75th Percentile | 95th Percentile | Mean | Standard Deviation |
|---|---|---|---|---|---|---|---|---|---|
| 31-Dec-21 | 2,444 | 2,449 | 2,457 | 2,484 | 2,502 | 2,517 | 2,517 | 2,497 | 20 |
| 31-Dec-22 | 2,537 | 2,546 | 2,562 | 2,602 | 2,634 | 2,655 | 2,677 | 2,628 | 36 |
| 31-Dec-23 | 2,628 | 2,641 | 2,660 | 2,712 | 2,749 | 2,790 | 2,830 | 2,748 | 53 |
| 31-Dec-24 | 2,711 | 2,720 | 2,740 | 2,804 | 2,859 | 2,914 | 2,978 | 2,860 | 72 |
| 31-Dec-25 | 2,787 | 2,800 | 2,823 | 2,899 | 2,962 | 3,030 | 3,122 | 2,966 | 91 |
| 31-Dec-26 | 2,855 | 2,871 | 2,898 | 2,984 | 3,062 | 3,145 | 3,260 | 3,068 | 112 |
| 31-Dec-27 | 2,924 | 2,939 | 2,969 | 3,064 | 3,161 | 3,259 | 3,398 | 3,167 | 133 |
| 31-Dec-28 | 2,989 | 3,007 | 3,037 | 3,146 | 3,258 | 3,372 | 3,535 | 3,267 | 154 |
| 31-Dec-29 | 3,055 | 3,074 | 3,106 | 3,228 | 3,357 | 3,489 | 3,673 | 3,366 | 176 |
| 31-Dec-30 | 3,120 | 3,141 | 3,172 | 3,310 | 3,452 | 3,604 | 3,814 | 3,466 | 198 |
| 31-Dec-31 | 3,187 | 3,208 | 3,240 | 3,395 | 3,551 | 3,723 | 3,957 | 3,569 | 221 |
| 31-Dec-32 | 3,256 | 3,277 | 3,311 | 3,486 | 3,662 | 3,849 | 4,111 | 3,678 | 246 |
| 31-Dec-33 | 3,326 | 3,348 | 3,385 | 3,577 | 3,777 | 3,984 | 4,267 | 3,793 | 271 |
| 31-Dec-34 | 3,400 | 3,423 | 3,465 | 3,679 | 3,901 | 4,124 | 4,430 | 3,916 | 299 |
| 31-Dec-35 | 3,476 | 3,500 | 3,547 | 3,787 | 4,032 | 4,274 | 4,599 | 4,045 | 327 |
| 31-Dec-36 | 3,553 | 3,581 | 3,634 | 3,900 | 4,167 | 4,430 | 4,784 | 4,179 | 354 |
| 31-Dec-37 | 3,634 | 3,666 | 3,720 | 4,017 | 4,305 | 4,591 | 4,965 | 4,317 | 382 |
| 31-Dec-38 | 3,719 | 3,755 | 3,819 | 4,142 | 4,448 | 4,757 | 5,152 | 4,462 | 409 |
| 31-Dec-39 | 3,810 | 3,848 | 3,923 | 4,273 | 4,599 | 4,928 | 5,343 | 4,611 | 436 |
| 31-Dec-40 | 3,900 | 3,945 | 4,031 | 4,409 | 4,751 | 5,099 | 5,534 | 4,765 | 463 |

**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 ($ millions)

| Date | 2.5% CTE | 5% CTE | 5th Percentile | 25th Percentile | 50th Percentile | 75th Percentile | 95th Percentile | Mean | Standard Deviation |
|---|---|---|---|---|---|---|---|---|---|
| 31-Dec-21 | 2,445 | 2,472 | 2,513 | 2,611 | 2,680 | 2,748 | 2,851 | 2,680 | 103 |
| 31-Dec-22 | 2,441 | 2,477 | 2,534 | 2,675 | 2,774 | 2,878 | 3,036 | 2,779 | 152 |
| 31-Dec-23 | 2,447 | 2,494 | 2,565 | 2,743 | 2,871 | 3,006 | 3,206 | 2,878 | 194 |
| 31-Dec-24 | 2,464 | 2,518 | 2,605 | 2,813 | 2,966 | 3,131 | 3,380 | 2,976 | 235 |
| 31-Dec-25 | 2,487 | 2,547 | 2,640 | 2,887 | 3,062 | 3,252 | 3,547 | 3,074 | 274 |
| 31-Dec-26 | 2,493 | 2,569 | 2,682 | 2,956 | 3,159 | 3,369 | 3,711 | 3,171 | 311 |
| 31-Dec-27 | 2,523 | 2,606 | 2,732 | 3,030 | 3,257 | 3,489 | 3,865 | 3,271 | 347 |
| 31-Dec-28 | 2,552 | 2,639 | 2,774 | 3,111 | 3,352 | 3,615 | 4,038 | 3,374 | 384 |
| 31-Dec-29 | 2,584 | 2,681 | 2,829 | 3,196 | 3,455 | 3,745 | 4,203 | 3,481 | 419 |
| 31-Dec-30 | 2,622 | 2,730 | 2,894 | 3,272 | 3,566 | 3,876 | 4,389 | 3,592 | 457 |
| 31-Dec-31 | 2,697 | 2,810 | 2,977 | 3,392 | 3,703 | 4,040 | 4,601 | 3,733 | 496 |
| 31-Dec-32 | 2,768 | 2,881 | 3,059 | 3,505 | 3,842 | 4,206 | 4,814 | 3,876 | 537 |
| 31-Dec-33 | 2,845 | 2,960 | 3,141 | 3,620 | 3,987 | 4,380 | 5,033 | 4,024 | 582 |
| 31-Dec-34 | 2,924 | 3,045 | 3,230 | 3,739 | 4,137 | 4,562 | 5,289 | 4,178 | 627 |
| 31-Dec-35 | 3,005 | 3,132 | 3,330 | 3,870 | 4,284 | 4,746 | 5,513 | 4,338 | 670 |
| 31-Dec-36 | 3,085 | 3,219 | 3,439 | 4,000 | 4,438 | 4,938 | 5,774 | 4,503 | 718 |
| 31-Dec-37 | 3,164 | 3,317 | 3,552 | 4,139 | 4,598 | 5,132 | 6,032 | 4,672 | 763 |
| 31-Dec-38 | 3,261 | 3,423 | 3,675 | 4,284 | 4,767 | 5,329 | 6,309 | 4,849 | 812 |
| 31-Dec-39 | 3,348 | 3,518 | 3,774 | 4,427 | 4,935 | 5,522 | 6,593 | 5,026 | 865 |
| 31-Dec-40 | 3,443 | 3,623 | 3,900 | 4,585 | 5,108 | 5,733 | 6,842 | 5,207 | 913 |

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-21 | 112% | 113% | 115% | 119% | 122% | 125% | 129% | 122% | 4% |
| 31-Dec-22 | 108% | 109% | 111% | 116% | 120% | 123% | 130% | 120% | 6% |
| 31-Dec-23 | 105% | 106% | 109% | 114% | 118% | 122% | 130% | 118% | 6% |
| 31-Dec-24 | 103% | 104% | 107% | 113% | 117% | 122% | 130% | 117% | 7% |
| 31-Dec-25 | 101% | 103% | 106% | 112% | 116% | 121% | 129% | 117% | 7% |
| 31-Dec-26 | 99% | 101% | 104% | 111% | 116% | 120% | 129% | 116% | 8% |
| 31-Dec-27 | 98% | 100% | 103% | 111% | 116% | 120% | 129% | 116% | 8% |
| 31-Dec-28 | 96% | 99% | 103% | 111% | 115% | 120% | 129% | 116% | 8% |
| 31-Dec-29 | 95% | 98% | 102% | 111% | 115% | 120% | 129% | 116% | 8% |
| 31-Dec-30 | 95% | 98% | 102% | 111% | 115% | 120% | 129% | 116% | 9% |
| 31-Dec31 | 95% | 98% | 102% | 111% | 116% | 121% | 130% | 116% | 9% |
| 31-Dec-32 | 95% | 98% | 103% | 112% | 117% | 122% | 131% | 117% | 9% |
| 31-Dec-33 | 96% | 99% | 103% | 112% | 117% | 122% | 132% | 118% | 9% |
| 31-Dec-34 | 96% | 99% | 104% | 113% | 118% | 123% | 133% | 118% | 9% |
| 31-Dec-35 | 96% | 100% | 104% | 113% | 118% | 123% | 134% | 118% | 9% |
| 31-Dec-36 | 97% | 100% | 105% | 113% | 118% | 123% | 135% | 119% | 10% |
| 31-Dec-37 | 97% | 100% | 105% | 114% | 119% | 123% | 136% | 119% | 10% |
| 31-Dec-38 | 98% | 101% | 106% | 114% | 119% | 124% | 136% | 120% | 10% |
| 31-Dec-39 | 98% | 101% | 106% | 114% | 119% | 124% | 137% | 120% | 10% |
| 31-Dec-40 | 98% | 101% | 106% | 114% | 119% | 125% | 138% | 120% | 11% |

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-21 | 70% | 74% | 83% | 109% | 127% | 140% | 213% | 133% | 49% |
| 31-Dec-22 | 45% | 52% | 63% | 97% | 123% | 138% | 186% | 122% | 45% |
| 31-Dec-23 | 33% | 40% | 50% | 83% | 112% | 133% | 170% | 111% | 42% |
| 31-Dec-24 | 27% | 32% | 40% | 71% | 101% | 128% | 159% | 101% | 41% |
| 31-Dec-25 | 22% | 26% | 34% | 62% | 91% | 123% | 152% | 93% | 40% |
| 31-Dec-26 | 18% | 22% | 29% | 56% | 85% | 119% | 146% | 87% | 39% |
| 31-Dec-27 | 15% | 19% | 25% | 51% | 79% | 113% | 142% | 82% | 38% |
| 31-Dec-28 | 13% | 17% | 23% | 47% | 74% | 108% | 138% | 78% | 38% |
| 31-Dec-29 | 11% | 14% | 21% | 44% | 70% | 104% | 135% | 75% | 38% |
| 31-Dec-30 | 8% | 12% | 18% | 42% | 68% | 101% | 134% | 72% | 37% |
| 31-Dec-31 | 7% | 11% | 17% | 40% | 66% | 98% | 132% | 70% | 37% |
| 31-Dec-32 | 6% | 10% | 16% | 40% | 66% | 98% | 131% | 70% | 37% |
| 31-Dec-33 | 6% | 10% | 16% | 40% | 66% | 98% | 130% | 70% | 37% |
| 31-Dec-34 | 5% | 9% | 15% | 40% | 67% | 99% | 130% | 70% | 37% |
| 31-Dec-35 | 4% | 8% | 14% | 41% | 68% | 99% | 129% | 70% | 37% |
| 31-Dec-36 | 4% | 8% | 14% | 42% | 69% | 100% | 129% | 71% | 37% |
| 31-Dec-37 | 4% | 8% | 14% | 43% | 71% | 101% | 129% | 72% | 37% |
| 31-Dec-38 | 4% | 8% | 15% | 45% | 72% | 102% | 128% | 73% | 36% |
| 31-Dec-39 | 3% | 8% | 15% | 47% | 73% | 103% | 128% | 74% | 36% |
| 31-Dec-40 | 3% | 8% | 16% | 48% | 74% | 103% | 128% | 75% | 36% |

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**

| | DGB | DCB | GHY | CE | CE LV | UE | UE LV | IE | IE LV | EM LV | CRE | I | AR |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DGB | 1.00 | 0.86 | -0.23 | -0.33 | -0.23 | -0.20 | -0.14 | -0.35 | -0.24 | -0.24 | -0.40 | -0.20 | -0.41 |
| DCB | | 1.00 | 0.17 | -0.05 | -0.03 | -0.02 | -0.01 | -0.10 | -0.07 | -0.07 | -0.28 | -0.25 | -0.11 |
| GHY | | | 1.00 | 0.51 | 0.35 | 0.38 | 0.26 | 0.43 | 0.31 | 0.31 | 0.16 | -0.09 | 0.45 |
| CE | | | | 1.00 | 0.70 | 0.39 | 0.27 | 0.56 | 0.39 | 0.51 | 0.24 | 0.08 | 0.79 |
| CE LV | | | | | 1.00 | 0.27 | 0.19 | 0.39 | 0.28 | 0.36 | 0.17 | 0.05 | 0.55 |
| UE | | | | | | 1.00 | 0.70 | 0.76 | 0.53 | 0.11 | 0.05 | -0.09 | 0.41 |
| UE LV | | | | | | | 1.00 | 0.53 | 0.37 | 0.08 | 0.04 | -0.07 | 0.29 |
| IE | | | | | | | | 1.00 | 0.70 | 0.38 | 0.22 | -0.08 | 0.47 |
| IE LV | | | | | | | | | 1.00 | 0.26 | 0.15 | -0.06 | 0.33 |
| EM LV | | | | | | | | | | 1.00 | 0.13 | 0.01 | 0.45 |
| CRE | | | | | | | | | | | 1.00 | 0.11 | 0.29 |
| I | | | | | | | | | | | | 1.00 | 0.04 |
| AR | | | | | | | | | | | | | 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 analyses 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 Shared Risk Plan for Certain Bargaining Employees of New Brunswick Hospitals (“CBE SRP Plan”) effective December 31, 2020. For an authoritative statement of the precise provisions of the CBE SRP Plan, reference must be made to the official CBE SRP Plan documents.

## Introduction

The Pension Plan for Certain Bargaining Employees of New Brunswick Hospitals (“Former CBE Plan”) became effective on January 1, 1975. At that time, the Former CBE Plan provided for continuation and improvement of benefits accrued under the Hospital Employees Pension Plan which came into effect on October 1, 1971.

The Former CBE Plan was amended at various times throughout its history. As at January 1, 1988, the responsibility for Plan management was transferred to a Pension Committee.

Effective July 1, 2012, the Former CBE Plan was converted to the CBE SRP Plan. The administration of the CBE SRP Plan is the responsibility of an independent Board of Trustees.

## Eligibility and Participation

Each Member of the Former CBE Plan joins the CBE SRP Plan on July 1, 2012. Active members of the Pension Plan for Part-Time and Seasonal Employees of the Province of New Brunswick who are eligible to join the CBE SRP Plan cease active membership in the said plan and are required to join the CBE SRP Plan as of July 1, 2012.

Each employee who commences full-time employment on or after July 1, 2012 is required to join the Plan from the first day of the month coincident with or next following the date of employment.

## Required Contributions

Effective July 1, 2012, each member is required to contribute 7.8% of earnings.  Participating employers also contribute 7.8% of earnings from the same date.

Contributions are waived for periods during which a member is in receipt of long term disability benefits or periods where a member is participating in the plan's phased retirement program. However, pensionable service continues to accrue in respect of such periods.

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

# Normal Retirement

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

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

(A) In respect of service before January 1, 1990, the product of:
- (i) the number of years of the member's pensionable service before January 1, 1990, and
- (ii) 2.0% of the annual average of the member's earnings during the period of five (5) consecutive years before July 1, 2012 during which such earnings are highest

and

(B) In respect of service from January 1, 1990 to July 1, 2012, the product of:
- (i) the number of years of the member's pensionable service during that period, and
- (ii) the difference between:
  - (a) 2.0% of the annual average of the Member's earnings during the period of five (5) consecutive years before July 1, 2012 during which such earnings are highest; and
  - (b) 0.7% of the annual average of her earnings up to the average YMPE during the period referred to in (a) above that is before July 1, 2012

and

(C) In respect of service from July 1, 2012, the sum of (i) and (ii) for each calendar year (or portion thereof):
- (i) 1.4% of the Member's annualized earnings for the calendar year, up to the YMPE for the calendar year; and
- (ii) 2.0% of the portion of the Member's annualized earnings for the calendar year that are in excess of the YMPE for the calendar year.

Pensions accrued above are subject to cost-of-living adjustments, before and after retirement, every January 1st following July 1, 2012, subject to approval by the Board of Trustees, and in accordance with the trigger requirements found under the Funding Policy for the CBE SRP Plan.

The following cost-of-living adjustments have been granted by the Board of Trustees based on the results of the actuarial valuation preceding the effective date of the adjustments and the terms of the Funding Policy.

### Table D.1 – Cost of Living Adjustments

| Effective Date | Cost of Living Adjustment |
|---|---|
| January 1, 2013 | 2.40% (pro-rated by 50% for active members) |
| January 1, 2014 | 0.96% |
| January 1, 2015 | 1.43% |
| January 1, 2016 | 1.49% |
| January 1, 2017 | 1.40% |
| January 1, 2018 | 1.47% |
| January 1, 2019 | 1.88% |
| January 1, 2020 | 2.12% |
| January 1, 2021 | 1.46% |

Further increases to accrued pensions for active members may be awarded under the terms of the Funding Policy once cost-of-living adjustments have been awarded and the results of the actuarial valuation preceding the effective date of the adjustments allow the Board of Trustees to spend additional funds on pension increases.

The following increases have been granted by the Board of Trustees based on the results of the actuarial valuation preceding the effective date of the adjustments and the terms found under “Other Actions”, Step 2, of the Funding Excess Utilization Plan of the Funding Policy.

### Table D.2 – Step 2 Pension Adjustments

| Effective Date | Step 2 Pension Increase (active members only) |
|---|---|
| January 1, 2017 | 100% of additional increase necessary to provide all active members a lifetime benefit calculated using a 5-year final average benefit formula at December 31, 2015 |
| January 1, 2018 | 100% of additional increase necessary to provide all active members a lifetime benefit calculated using a 5-year final average benefit formula at December 31, 2016 |
| January 1, 2019 | 100% of additional increase necessary to provide all active members a lifetime benefit calculated using a 5-year final average benefit formula at December 31, 2017 |
| January 1, 2021 | 100% of additional increase necessary to provide all active members a lifetime benefit calculated using a 5-year final average benefit formula at December 31, 2019 |

The following increases have been granted by the Board of Trustees based on the results of the actuarial valuation preceding the effective date of the adjustments and the terms found under “Other Actions”, Step 3, of the Funding Excess Utilization Plan of the Funding Policy.

### Table D.3 – Step 3 Pension Adjustments

| Effective Date | Step 3 Pension Increase (pensioners only) |
|---|---|
| January 1, 2017 | 100% of additional increase necessary to provide all members receiving a pension at December 31, 2015 a lifetime benefit calculated using a 5-year final average benefit formula at their individual date of retirement. |
| January 1, 2018 | 100% of additional increase necessary to provide all members receiving a pension at December 31, 2016 a lifetime benefit calculated using a 5-year final average benefit formula at their individual date of retirement. |
| January 1, 2019 | 100% of additional increase necessary to provide all members receiving a pension at December 31, 2017 a lifetime benefit calculated using a 5-year final average benefit formula at their individual date of retirement. |
| January 1, 2021 | 100% of additional increase necessary to provide all members receiving a pension at December 31, 2019 a lifetime benefit calculated using a 5-year final average benefit formula at their individual date of retirement. |

The following increases have been granted by the Board of Trustees based on the results of the actuarial valuation preceding the effective date of the adjustments and the terms found under “Other Actions”, Step 4, of the Funding Excess Utilization Plan of the Funding Policy.

### Table D.4 – Step 4 Pension Adjustments

| Effective Date | Step 4 Pension Increase (pensioners only) |
|---|---|
| January 1, 2017 | Retroactive lump sum payment necessary to provide all members receiving a pension at December 31, 2015 a lifetime benefit calculated using a 5-year final average benefit formula at their individual date of retirement, retroactive to their pension start date. |
| January 1, 2018 | Retroactive lump sum payment necessary to provide all members receiving a pension at December 31, 2016 a lifetime benefit calculated using a 5-year final average benefit formula at their individual date of retirement, retroactive to their pension start date. |
| January 1, 2019 | Retroactive lump sum payment necessary to provide all members receiving a pension at December 31, 2017 a lifetime benefit calculated using a 5-year final average benefit formula at their individual date of retirement, retroactive to their pension start date. |
| January 1, 2021 | Retroactive lump sum payment necessary to provide all members receiving a pension at December 31, 2019 a lifetime benefit calculated using a 5-year final average benefit formula at their individual date of retirement, retroactive to their pension start date. |

# 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 or for sixty months, whichever is the longer.

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.  Such automatic form of pension is actuarially equivalent to the normal form of pension.

Optional forms of pension are also available on an actuarially equivalent basis.

# Early Retirement and Bridge Benefit

Early retirement is permitted on or after age 55 if the member has at least 5 years of employment or 2 years of plan membership.

On early retirement, a bridge benefit of $27 per month per year of pensionable service is payable in addition to the lifetime pension found under “Normal Retirement”. The bridge benefit is payable to age 65 or to the death of the member, if earlier.

The portions of the lifetime pension and bridge benefit accrued for service before July 1, 2012 are unreduced if the pension and bridge commence to be paid at age 60 or later. If such pension and bridge commence to be paid before age 60, they are each reduced by 1/4% per month (3% per year) that the pension and bridge commencement date precedes age 60.

The portions of the lifetime pension and bridge benefit accrued for service on and after July 1, 2012 are reduced by 5/12% per month (5% per year) that the pension and bridge commencement date precedes age 65.

# Benefits on Termination of Employment

If a member terminates employment prior to completing five years of continuous employment and prior to completing two years of plan membership, the member is entitled to a refund of the total amount of his/her contributions to the plan, with interest.

If a member terminates employment before age 55 but after completing at least five years of continuous employment or two years of plan membership, 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 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 a registered retirement savings arrangement as allowed under the PBA.

Members electing a deferred lifetime pension will also be entitled to retire early in accordance with the "Early Retirement" section, and will also be eligible for a bridge benefit.

# Death Benefits

If a member dies prior to completing five years of continuous employment and prior to completing two years of plan membership, the benefit payable is a refund of the member's own contributions to the plan, with interest.

If the member dies after completing at least five years of continuous employment or two years of plan membership, but before pension commencement, the death benefit payable is the termination value of the deferred pension determined in accordance with the PBA.

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.

# Phased Retirement Option

A member must have at least 5 years of service, and be at least age 55 to participate. The member must select their ultimate retirement date in advance, between 1 to 5 years of the start of phase-in period. The member must continue to work 50% or 60% of full-time equivalent hours.

The pensionable service credited during the phase-in period is as if the member was a full-time employee (subject to ITA limits). Annual lump sums from the plan are payable on January 1st to top-up employment earnings to 85% of full-time equivalent earnings at the start of the phase-in period.

The lifetime pension and bridge benefit at the ultimate retirement date is calculated as if there was no phase-in period, and then reduced by lifetime pension offsets calculated for each lump sum payment made during the phase-in period.

Phased retirement participants are considered active members until full retirement.

Required member and employer contributions are waived during phase-in period.

# Primary Purpose, Benefit Security and Cost-of-living Adjustments

The primary purpose of the CBE SRP Plan is to provide pensions to eligible employees after retirement and until death in respect of their service as employees. A further purpose of the CBE SRP Plan is to provide secure pension benefits to members, without an absolute guarantee, but with a risk-focused management approach delivering a high degree of certainty that full base benefits will be payable in the vast majority of potential future economic scenarios. As a shared risk plan, all future cost-of-living adjustments and other ancillary benefits under the CBE 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 Funding Policy.

# Appendix E – Summary of Funding Policy

The following is a brief summary of the main provisions of the Funding Policy for the Shared Risk Plan for Certain Bargaining Employees of New Brunswick Hospitals ("CBE SRP Plan") effective December 31, 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 CBE 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

The primary benefit objective for the Plan is to deliver benefits that closely replicate, to the extent possible, the benefits provided under the Plan prior to the conversion, including inflation protection.

Furthermore, benefit accruals under the Plan after the conversion are based on a normal retirement age of 65 with a 5% 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 total contribution rate is equal to 15.6% of earnings (members at 7.8% of earnings and employers matching the same).

Contribution adjustments may be made by the Board of Trustees. A total contribution increase of up to 1% of earnings is to be triggered by the Board of Trustees if the open group funded ratio of the Plan, as defined by the PBA, falls below 100% for two successive year ends 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 contributions of up to a total of 2% of earnings can be triggered by the Board of Trustees if the conditions set forth in the funding excess utilization plan are met.

# 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 contributions by up to a total of 1.0% of earnings.

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;

3. Change early retirement rules for pre-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 60;

4. Reduce base benefit accrual rates for future service after the date of implementation of the deficit recovery plan by not more than 5%;

5. In addition to the reduction in step 4 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 and when the primary risk management goal is met, no further actions are required at that time.

The base benefit reduction in point 5, if required, shall be such that both goals below are achieved:

- 105% open group funding level; and

- Primary risk management goal of 97.5% probability that base benefits need not be further reduced over the next 20 years.

Contribution increases shall take effect no later than 12 months following the date of the funding policy valuation report that triggered the need for contribution increases, and all other actions shall take effect no later than 18 months following the date of the funding policy valuation report that triggered the need for the action.

# 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, there are no actions that can be taken under the funding excess utilization plan.

The amount available for utilization is as follows:

- 1/6th of the excess funds that make up the difference between the open group funding level at the valuation date to a maximum of 140% and 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 full CPI since the last date where full CPI was achieved.

2. Provide further increases in base benefits of members not in receipt of a pension such that the base benefits are upgraded to a final five year average.

3. Provide a further increase to retired members such that a final average formula is reasonably replicated for each retired member at their retirement date and indexed to full CPI thereafter.

4. Provide a lump sum payment representing a reasonable estimate of missed past increased payments up to the levels of benefits arising out of steps 2 and 3.

5. Establish a reserve to cover the next 10 years of potential contingent indexing.

6. Apply contribution reduction adjustment of up to 2%.

7. Improve the normal form of pension for all members who are not in receipt of a pension.

8. Improve the bridge pension for all members eligible for a bridge pension whether or not in pay.

9. Improve the early retirement rules for service after June 30, 2012, provided that the Board of Trustees considers life expectancy experience as it develops.

Actions 1 to 4 can be applied with excess funds available when the open group funded ratio is below 140%. If all improvements from 1 through 4 above have been made and the open group funded ratio is still in excess of 140%, then actions 5 through 9 can be undertaken in sequence. After such actions have been undertaken, the Trustees may consider permanent benefit changes subject to the approval of the Province and Union 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.

Notwithstanding the above, with respect to actions taken by the Board of Trustees further to the actuarial valuation reports with effective dates from July 1, 2012 to December 31, 2014 inclusive, where the discount rate is 5.75% per annum, the Board of Trustees shall be prohibited from providing any increases in benefits other than as described in 1 above.

# Actuarial Assumptions

A funding policy actuarial valuation shall be conducted by the Plan's actuary at December 31st of each year. Since December 31, 2015, the discount rate had been 4.75% per annum however, the Board of Trustees, at their September 23, 2021 meeting, adopted a discount rate of 4.50% per annum effective December 31, 2020. The intention is to keep the discount rate stable over time. On the advice of the plan's actuary, the Board of Trustees may consider a change in the discount rate for subsequent funding policy actuarial valuations provided it is required by the Superintendent, standards published by the Canadian Institute of Actuaries, applicable laws or if there are changes in the economy that in the plan's actuary's opinion warrant a change in the discount rate.

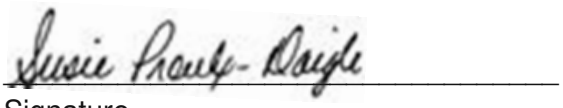
Other assumptions may be changed by the Board of Trustees as experience evolves.

# Appendix F – Plan Administrator Confirmation Certificate

With respect to the Actuarial Valuation Report of the Shared Risk Plan for Certain Bargaining Employees of New Brunswick Hospitals as at December 31, 2020, I hereby confirm that to the best of my knowledge:

- the data regarding CBE SRP Plan members and beneficiaries provided to Lifeworks as at December 31, 2020 constitutes a complete and accurate description of the information contained in the files;
- copies of the official plan text and funding policy of the CBE SRP Plan and all amendments to date were provided to Lifeworks; and
- there are no subsequent events other than those described in this valuation report, or any extraordinary changes to the plan membership from December 31, 2020 to the date of this valuation report, which would materially affect the results.

**The CBE SRP Plan Board of Trustees**



Signature

Name: Susie Proulx-Daigle

Title: Chairperson

Date: September 28, 2021

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