

New Brunswick Municipal Employees Pension Plan

Actuarial Valuation as at December 31, 2019 for Funding Purposes

Report prepared October 2020

Registration number:
New Brunswick and Canada Revenue Agency #0418723

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Introduction

This report presents the results of the actuarial valuation as at December 31, 2019 of New Brunswick Municipal Employees Pension Plan (“Plan”). The Pension Board retained the services of Morneau Shepell Ltd. (“Morneau Shepell”) to perform this actuarial valuation. The last complete valuation that was filed with the New Brunswick Office of the Superintendent of Pensions and the Canada Revenue Agency was performed as at December 31, 2018.

This report was prepared for the Pension Board, the New Brunswick Office of the Superintendent of Pensions and the Canada Revenue Agency for the following purposes:

- to determine the funded status of the Plan on the going-concern basis;
- to determine the funded status of the Plan on both solvency and hypothetical wind-up bases;
- to estimate the employer contributions required under the Plan during the period from this valuation date up to the next valuation in accordance with the New Brunswick *Pension Benefits Act*; and
- to provide the information and the actuarial opinion required by the New Brunswick *Pension Benefits Act* and the *Income Tax Act* (Canada).

Changes since last valuation

There have been no amendments to the Plan since the last valuation.

The solvency and hypothetical wind-up bases have been updated to reflect market conditions as at the valuation date. In addition, changes were made to the actuarial assumptions on the going-concern basis.

Subsequent Events

The Canadian Institute of Actuaries Actuarial Standards Board (“ASB”) released new Standards for Pension Commuted Values on January 24, 2020. While the effective date was initially set for August 1, 2020, the ASB has postponed the adoption to December 1, 2020. Early adoption is not permitted and, as such, the new standards do not impact the results of this valuation report. Its impact will be reflected in a future report.

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

- The COVID-19 pandemic resulted in higher deaths for the population in general as measured by public health officials. The effect of the outbreak on the mortality incidence for the Plan is unknown at this time and no adjustments to the mortality assumption have been made in this report. The effect on the Plan if any, will be recognized in the gains or losses of future reports as the experience emerges.
- Economic conditions have also changed with a significant reduction in asset values and strained liquidity occurring in the month of March. Sustained lowered economic activity could also impact the Plan’s economic assumptions. No adjustments on the Plan assets nor to any of the economic assumptions have been made or anticipated in this report.

In October 2020, the New Brunswick government adopted changes to the Pension Benefits Regulations (the “Regulation”) relating to the funding framework for defined benefit pension plans.

Highlights of the changes to the funding framework include:

- Funding on a reduced solvency basis (85% as opposed to 100%);
- Requiring funding on enhanced going concern basis with the addition of a Provision for Adverse Deviation or PfAD funding requirement that varies based on a plan's asset mix;
- Shortening the going concern amortization period from 15 years to 10 years;
- Permitting letters of credit (LOCs) for up to 15% of solvency liabilities;
- Restricting the use of going concern excess for contribution holiday purposes; and
- Pension plans already exempt from funding solvency deficiencies are also exempt from all the above changes to the funding framework.

The proposed rules would also require plan administrators to establish a governance policy, which broadly follows the governance principles established by the Canadian Association of Pension Supervisory Authorities ("CAPSA") in its guideline no. 4.

NBMEPP is exempt from funding solvency deficiencies, and therefore is also exempt from all the changes to the funding framework contained in these changes to the Regulation. The changes in Regulation therefore have no impact on the results of our actuarial valuation as at December 31, 2019.

Restriction on use of this report

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

Section 1 – Actuarial Opinion

This opinion is given with respect to New Brunswick Municipal Employees Pension Plan, registration number 0418723 (New Brunswick). We performed a valuation of the Plan as at December 31, 2019, based on the Plan provisions and data as at that date. The Pension Board has confirmed that, between December 31, 2019 and the date of this report, no subsequent events, modifications or extraordinary changes to the membership or the Plan that would materially affect the results of this actuarial valuation have occurred, except as indicated in this report.

I hereby certify that, in my opinion, as at December 31, 2019:

- The Plan is not fully funded on the going-concern basis. The actuarial liabilities exceed the actuarial value of assets by \$641,800.
- The Plan is not fully funded on the solvency basis. The actuarial liabilities exceed the value of assets by \$54,785,600.
- The Plan assets would have been less than the actuarial liabilities by \$59,532,400 if the Plan had been wound up on the valuation date.
- The solvency ratio of the Plan, as defined under the New Brunswick *Pension Benefits Act*, is equal to 0.708.
- The transfer ratio of the Plan, as defined under the New Brunswick *Pension Benefits Act*, is equal to 0.683.
- The transfer ratio of the Plan is less than 100% and the New Brunswick *Pension Benefits Act* restricts the amount that may be paid out of the Plan in respect of a terminating member. Specifically, since the Plan's transfer ratio is 68.3%, an amount equal to 31.7% of a terminating member's entitlement (the "transfer deficiency") is required to remain in the Plan for a 5-year period from his or her termination from the Plan.
- The residual normal cost (i.e. the normal cost less employee required contributions) is equal to 5.00% of payroll.
- The minimum employer contribution is equal to 5.00% of payroll plus amortization payments equal to a level percentage of payroll of 2.55% for a total contribution of 7.55% of payroll. However, the Plan terms require that employer contributions be at least equal to employee required contributions, which are currently equal to approximately 8.00% of payroll. Higher employer contributions are acceptable under the *Income Tax Act (Canada)* but they cannot exceed the residual normal cost plus \$59,532,400 plus interest in aggregate. The Plan actuary should be consulted if employer contributions in any year are greater than the minimum requirement to match employee required contributions.

These contributions conform to the eligibility requirements of the *Income Tax Act (Canada)* if contributed within the fiscal year or remitted within 120 days after the end of the fiscal year. They also conform to the New Brunswick *Pension Benefits Act*. This Act requires that the residual normal cost and the employee contributions be remitted to the fund monthly, within 30 days of the month to which they pertain. It also requires that amortization payments be made at least monthly.

In my opinion, for the purposes of this 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 report has been prepared, and my opinion given, in accordance with accepted actuarial practice in Canada.

The assumptions that form the going-concern basis used in this report were reasonable at the time this actuarial valuation report was prepared and contributions were determined.

This actuarial valuation was performed in accordance with the going-concern and solvency standards prescribed under the New Brunswick *Pension Benefits Act*.

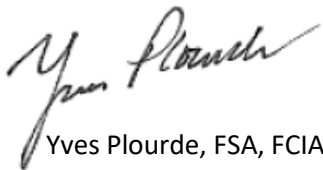
The calculations in the actuarial valuation report have been prepared in accordance with subsection 147.2(2) of the *Income Tax Act (Canada)*.

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 Plan administrator, the Employer or the members 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 may result in gains or losses, which may affect future contribution levels. These gains or losses will be revealed in future actuarial valuations.

The next actuarial valuation will have to be performed not later than as at December 31, 2020.

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



Yves Plourde, FSA, FCIA
Partner

MORNEAU SHEPELL LTD.
40 Crowther Lane, Suite 300
Knowledge Park
Fredericton, NB E3C 0J1

October 2020

This valuation report has been peer reviewed by Don Charlton, FCIA

Section 2 – Going-Concern Funded Status

Going-Concern Funded Status

The funded status of the 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.

Table 2.1 – Going-Concern Funded Status

	December 31, 2019	December 31, 2018
	\$	\$
Actuarial value of assets		
Market value	128,576,700	115,252,400
Actuarial liabilities		
Active members	71,765,600	67,058,700
Terminated vested members	4,127,500	5,491,500
Retired members and beneficiaries	51,986,000	48,580,600
Members with transfer deficiencies payable	1,295,800	922,100
Members with outstanding payments	43,600	737,500
Total	129,218,500	122,790,400
Actuarial surplus (unfunded liability)	(641,800)	(7,538,000)
Funding ratio	99.5%	93.9%

Reconciliation of Going-Concern Funded Status

The table below describes the change in the Plan's going-concern funded status since the last valuation:

Table 2.2 – Reconciliation of Going-Concern Funded Status

	\$	\$
Actuarial surplus (unfunded liability) as at December 31, 2018		(7,538,000)
Expected changes in funded status		
Interest on surplus (unfunded liability)	(444,700)	
Contribution Excess (Shortfall)	1,019,100	
Total		574,400
Expected surplus (unfunded liability) as at December 31, 2019		(6,963,600)
Actuarial gains (losses) due to the following factors		
Investment return on actuarial value of assets	6,377,400	
Salary increases	118,300	
Retirements	200,000	
Terminations	(306,900)	
Mortality	190,000	
Other factors	(117,400)	
Total		6,461,400
Other gains (losses)		
Changes in actuarial assumptions		(139,600)
Actuarial surplus (unfunded liability) as at December 31, 2019		(641,800)

Section 3 – Solvency and Hypothetical Wind-up Funded Status

Solvency Funded Status

A solvency valuation is a hypothetical valuation prescribed by the New Brunswick *Pension Benefits Act*. It imposes a floor on required contributions and a ceiling on what may be transferred out of the pension fund upon termination of membership. A solvency valuation may differ from the valuation required on plan wind-up.

Table 3.1 – Solvency Funded Status

	December 31, 2019	December 31, 2018
	\$	\$
Solvency assets		
Market value of assets	128,576,700	115,252,400
Provision for expenses	(400,000)	(400,000)
Total wind-up assets	128,176,700	114,852,400
Solvency Asset Adjustment	4,746,800	4,798,200
Total	132,923,500	119,650,600
Solvency liabilities		
Active members	107,985,700	93,582,700
Terminated vested members	7,894,300	8,239,100
Retired members and beneficiaries	70,411,800	64,064,500
Members with transfer deficiencies payable	1,373,700	982,200
Members with outstanding payments	43,600	737,500
Total	187,709,100	167,606,000
Assets less liabilities on the solvency basis	(54,785,600)	(47,955,400)
Solvency ratio	0.708	0.714
Wind-up surplus (deficiency)	(59,532,400)	(52,753,600)
Transfer ratio	0.683	0.685

The Plan has been granted an exemption from the solvency deficiency funding requirements of the New Brunswick *Pension Benefits Act* effective December 31, 2006.

Solvency Asset Adjustment

As defined under the New Brunswick *Pension Benefits Act*, the solvency asset adjustment represents the present value of amortization payments established at the preceding valuation, adjusted to take into account the current going-concern valuation, and due to be paid during the prescribed period following the valuation date.

The solvency asset adjustment as at December 31, 2019 is determined as follows:

Table 3.2 – Solvency Asset Adjustment

Nature of liability or deficiency	Start date	End date	Annual amortization payment		Balance solvency ¹
	mm-dd-yyyy	mm-dd-yyyy	% of payroll	\$	\$
Going-concern unfunded liability	12-31-2006	12-31-2021	0.61	268,500	529,300
Going-concern unfunded liability	12-31-2009	12-31-2024	1.12	493,000	2,431,000
Going-concern unfunded liability	12-31-2018	12-31-2033	0.82	362,300	1,786,500
Total			2.55	1,123,800	4,746,800

¹ Value of amortization payments over at most 5 years following December 31, 2019 discounted as at December 31, 2019 (at a discount rate of 2.96% per year)

Hypothetical Wind-up Funded Status

Since all benefits have been valued, if the Plan had been liquidated as at December 31, 2019 and assuming that the asset liquidation value had been equal to the market value, the hypothetical wind-up funded status would have been similar to the solvency funded status shown in table 3.1 if the solvency asset adjustment was excluded from the solvency status.

Solvency Ratio

The solvency ratio is equal to the ratio of the assets to the liabilities on the solvency basis as indicated in table 3.1.

Transfer Ratio

The transfer ratio is equal to the ratio of the assets to the liabilities on the solvency basis as indicated in table 3.1.

Section 4 – Normal Cost and Amortization Payments

Normal Cost

The table below summarizes the estimated going-concern cost of pension benefits being earned in the twelve-month period after the valuation date (the normal cost).

Table 4.1 – Normal Cost

	As at December 31, 2019		As at December 31, 2018	
	\$	% of payroll	\$	% of payroll
Normal cost	5,726,400	13.00	5,450,300	12.85
Less employee contributions	3,523,800	8.00	3,393,800	8.00
Residual normal cost	2,202,600	5.00	2,056,500	4.85
Residual normal cost as a % of employee contributions	62.5%	—	60.6%	—

The total estimated covered payroll for 2020 is \$44,014,400. The total estimate covered payroll for 2019 was \$42,399,600.

The normal actuarial cost includes a 9.0% loading to cover expected non-investment, non-custodial administration expenses which are paid out of the Plan's assets. The expense loading makes appropriate provision for these expenses.

Reconciliation of Normal Cost

The factors contributing to the change in the normal cost are shown below:

Table 4.2 – Reconciliation of Normal Cost

	% of payroll
Normal cost as at December 31, 2018	12.85
Demographic changes	0.12
Changes in actuarial assumptions	0.03
Normal cost as at December 31, 2019	13.00

Amortization Payments

The amortization schedule as determined in the previous actuarial report is as follows:

Table 4.3 – Amortization Payments – Previous Valuations

Nature of liability or deficiency	Start date	End date	Annual amortization payment		Balance solvency ¹	Balance going-concern ²
	mm-dd-yyyy	mm-dd-yyyy	% of payroll	\$	\$	\$
Going-concern unfunded liability	12-31-2006	12-31-2021	0.61	258,600	762,000	733,500
Going-concern unfunded liability	12-31-2009	12-31-2024	1.12	474,900	2,326,500	2,586,000
Going-concern unfunded liability	12-31-2018	12-31-2033	0.82	349,000	1,709,700	4,218,500
Total			2.55	1,082,500	4,798,200	7,538,000

¹ Value of amortization payments over at most 5 years from December 31, 2018 discounted as at December 31, 2018 (at a discount rate of 3.23% per year)

² Value of amortization payments discounted as at December 31, 2018 (at a rate of 5.90% per year)

Based on the funded status of the Plan shown in Sections 2 and 3, the previous amortization schedule as a percentage of payroll does not have to be amended, however the estimated amounts in dollars for the current year are adjusted to take into account the change in payroll from last year.

The employer minimum required contributions to finance deficiencies as of this valuation date are thus as follows:

Table 4.4 – Amortization Payments – Current Valuation

Nature of liability or deficiency	Start date	End date	Annual amortization payment		Balance solvency ¹	Balance going-concern ²
	mm-dd-yyyy	mm-dd-yyyy	% of payroll	\$	\$	\$
Going-concern unfunded liability	12-31-2006	12-31-2021	0.61	268,500	529,300	514,700
Going-concern unfunded liability	12-31-2009	12-31-2024	1.12	493,000	2,431,000	2,267,500
Going-concern unfunded liability	12-31-2018	12-31-2033	0.82	362,300	1,786,500	4,140,500
Total			2.55	1,123,800	4,746,800	6,922,700

¹ Value of amortization payments over at most 5 years from December 31, 2019 discounted as at December 31, 2019 (at a discount rate of 2.96% per year)

² Value of amortization payments discounted as at December 31, 2019 (at a rate of 5.90% per year)

The Plan is not fully funded on the going-concern basis. The present value of going-concern amortization payments at December 31, 2019 is greater than the going-concern unfunded liability. Therefore no new amortization schedule as at December 31, 2019 is required.

The annual amortization payments above are calculated as level % of pay and these are the resulting dollar amounts in the upcoming year. These amortization payments are in addition to amounts required to cover the residual normal cost. Higher amortization payments are acceptable but they cannot exceed the greater of the excess of the actuarial liabilities over the assets on the going-concern basis and the excess of the actuarial liabilities over the assets on a hypothetical wind-up basis, plus interest in aggregate.

Contributions

The table below summarizes the total minimum annual contributions necessary to meet the funding requirements of the New Brunswick *Pension Benefits Act* taking into account that the Plan is exempt from the solvency deficiency funding requirements. The minimum special payments to amortize past going-concern unfunded liabilities have been calculated as a level percentage of payroll and the estimated annual payments are all in 2020 dollars based on the estimated 2020 payroll data used in this valuation.

The employer minimum required contributions to finance deficiencies as of this valuation date are thus as follows:

Table 4.5 – Minimum Annual Funding Requirements Table

	Level % of Payroll	Amount in 2020 Dollars
Total annual normal actuarial cost	13.00	5,726,400
Plus amortization payments to December 31, 2021	0.61	268,500
Plus amortization payments to December 31, 2024	1.12	493,000
Plus amortization payments to December 31, 2033	0.82	362,300
Minimum total amount of contributions	15.55	6,850,200
Less employee contributions	(8.00)	(3,523,800)
Balance of contributions needed to cover minimum required	7.55	3,326,400
Less employer contributions	(8.00)	(3,523,800)
2020 contributions in shortfall (excess) of required contributions	(0.45)	(197,400)

Section 5 – Additional Disclosures

Plausible Adverse Scenarios on the Going-Concern Basis

The following table illustrates the impact of certain plausible adverse scenarios on the going-concern liabilities and corresponding funded status. The scenarios have been applied and reported on separately.

Table 5.1 – Plausible Adverse Scenarios Impact on the Going-Concern Basis

	December 31, 2019	Scenario I Interest Rate Risk	Scenario II Deterioration of asset values	Scenario III Longevity risk
	\$	\$	\$	\$
Actuarial value of assets	128,576,700	136,098,400	118,882,000	128,576,700
Actuarial liabilities	129,218,500	135,396,900	129,218,500	135,718,600
Assets less liabilities on the going-concern basis (funded status)	(641,800)	701,500	(10,336,500)	(7,141,900)
Impact on funded status	—	1,343,300	(9,694,700)	(6,500,100)
Normal cost	5,726,400	6,137,500	5,726,400	5,951,400
Increase in the normal cost	—	411,100	—	225,000

Description of the Plausible Adverse Scenarios

Scenario I - Interest rate risk

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

Based on the outcome with a 1 in 10 likelihood of occurrence under our economic model, yields on fixed income assets are assumed to decrease by 1.98% immediately, leading to a 32 basis-point decrease in 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 16.73% increase on the market value of the affected portfolio, which translates into a 5.85% increase on the market value of the portfolio as a whole.

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

Scenario II - Deterioration of asset values

In this scenario, we 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 is such that there is a 1 in 10 likelihood of such a reduction happening for such asset classes in accordance with our economic model.

Based on the outcome with a 1 in 10 likelihood of occurrence under our economic model, equity values were assumed to decrease by 11.61% immediately, resulting in a 7.54% decrease on the market value of the total portfolio. No changes to going-concern actuarial liabilities and normal cost were considered under this scenario. All other assumptions and methods used for this valuation were maintained.

Scenario III - Longevity risk

In this scenario, we 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 is such that the life expectancy is increased by approximately 5-10% from the underlying mortality table assumption used in our valuation.

To test the impact of a life expectancy increase of 5-10% for all ages over the current assumption on the going-concern actuarial liabilities and normal cost, a 3-year setback was applied to all mortality rates. All other assumptions and methods used for this valuation were maintained.

Sensitivity Analysis on the Going-Concern Basis

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 5.2 – Sensitivity of Actuarial Liabilities on the Going-Concern Basis

	December 31, 2019	Discount rate 1% lower
	\$	\$
Actuarial liabilities		
Active members	71,765,600	85,478,400
Terminated vested members	4,127,500	4,925,500
Retired members and beneficiaries	51,986,000	56,760,800
Members with transfer deficiencies payable	1,295,800	1,317,700
Members with outstanding payments	43,600	43,600
Total	129,218,500	148,526,000
Increase in actuarial liabilities		19,307,500

Sensitivity Analysis of the Normal Cost on the Going-Concern Basis

The table below illustrates the effect on the 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 in this valuation, were maintained.

Table 5.3 – Sensitivity of Normal Cost on the Going-Concern Basis

	As at December 31, 2019		Discount rate 1% lower	
	\$	% of payroll	\$	% of payroll
Normal cost	5,726,400	13.00	7,010,800	15.93
Increase in normal cost			1,284,400	2.93

Sensitivity Analysis on the Solvency Basis

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

Table 5.4 – Sensitivity of Actuarial Liabilities on the Solvency Basis

	December 31, 2019	Discount rate 1% lower
	\$	\$
Actuarial liabilities		
Active members	107,985,700	134,210,000
Terminated vested members	7,894,300	9,956,800
Retired members and beneficiaries	70,411,800	78,604,100
Members with transfer deficiencies payable	1,373,700	1,399,300
Members with outstanding payments	43,600	43,600
Total	187,709,100	224,213,800
Increase in actuarial liabilities		36,504,700

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 hypothetical wind-up liabilities from December 31, 2019 to December 31, 2020, adjusted for expected benefit payments in the inter-valuation period. This incremental cost is \$8,085,800 as at December 31, 2019.

Appendix A – Going-Concern Actuarial Basis

Asset Valuation Method

The actuarial value of the assets used to determine the going-concern funded status is equal to the market value. This method is the same as the one used in the last valuation.

Actuarial Cost Method

The actuarial liabilities and the normal cost on the going-concern basis were calculated using the projected accrued benefit (or projected unit credit) actuarial cost method.

The 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 assumptions as indicated hereafter.

The normal cost is equal to the actuarial present value of benefits expected to be earned by members in the year following the valuation date. The residual normal cost is the excess of the normal cost over employees' required contributions.

The valuation method for determining the actuarial liabilities and the normal cost is the same as the one used in the last valuation.

Members who have reached the retirement age assumption and are still in service are presumed to accumulate pension credits for the following year for normal cost calculation purposes (up to the maximum pensionable service). For normal cost calculation purposes, we included the actuarial present value of the benefits that were vested in the year following the valuation date. This method is the same as the one used in the last valuation.

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 members remain stable. All other things being equal, an increase in the average age of the active 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. This method is the same as the one used in the last valuation.

Actuarial Assumptions

The main actuarial assumptions used in the going-concern valuation are summarized in the following table. Some assumptions used in this valuation are different from those used in the previous valuation. For comparison purposes, the assumptions used in the last valuation are also included in the table. All rates and percentages are annualized unless otherwise noted.

Table A.1 – Going-Concern Actuarial Assumptions

	December 31, 2019	December 31, 2018
Discount rate	5.90%	Same
Inflation	2.10%	2.25%
Indexation	0.0% per annum	Same
Salary increases	3.00%	Same
Increases in maximum pensionable earnings	2.75%	3.00%
Increases in maximum pension	At January 1, 2020, the annual defined benefit limit is \$3,092.22 and is assumed to increase by 2.75% per annum starting on January 1, 2021	At January 1, 2019, the annual defined benefit limit is \$3,025.56 and is assumed to increase by 3.0% per annum starting on January 1, 2020
Interest credited on employee contributions	5.90%	Same
Mortality	CPM2014 with full generational mortality improvement, using Scale CPM-B, adjusted by 115% in males and 110% in females	Same
Termination (membership)	No allowance	Same
Disability	No allowance	Same

Table A.1 – Going-Concern Actuarial Assumptions (continued)

	December 31, 2019	December 31, 2018
Retirement		
Regular employees	5% retire at ages 55 to 59, 9% retire at ages 60 to 64 and 30% retire at age 65; those already meeting the calculated retirement age are assumed to retire one year after the valuation date	Same
Police and Fire	5% retire at ages 50 to 54, 9% retire at ages 55 to 59 and 30% retire at age 60; those already meeting the calculated retirement age are assumed to retire one year after the valuation date	Same
Members on long-term disability	Retire at earliest unreduced age; those already meeting the calculated retirement age are assumed to retire one year after the valuation date	Same
Provision for expenses	A 9% loading is added to the total annual normal actuarial cost to cover the expenses of operating the plan, other than expenses which are implicitly recognized in the investment earnings rate.	Same
Actuarial cost method	Projected Unit Credit prorated on service	Same

Choice of Assumptions

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

Inflation rates

As stated in its monetary policy, the Bank of Canada aims to keep inflation at the 2% target, i.e. the midpoint of the 1% to 3% inflation-control target range. Given historical increases in consumer prices in Canada, the rates expected by the market, portfolio managers' expectations and the Bank of Canada policy, an expected rate of inflation of 2.10% per annum has been assumed. The actuarial valuation as at December 31, 2018 assumed a rate of inflation of 2.25% per annum.

Discount rate

The elements considered in the development of the discount rate assumption for going-concern purposes are summarized in the table below:

Table A.2 – Discount Rate

	%
Expected inflation	2.10
Expected real return	3.70
Value added for rebalancing and diversification effect	0.50
Value added for active management	0.45
Margin for adverse deviation	(0.25)
Expected expenses	(0.60)
Discount rate	5.90

The following table shows the expected real return by asset class for a passive management, before adjustment for portfolio rebalancing and diversification. It should be noted that the return assumptions for bonds has been determined mainly (but not totally) on current market conditions while the return assumptions for equities are based more on long term expectations.

Table A.3 – Expected Real Return by Asset Class (Passive Management)

Asset classes	Target asset mix	Expected real return
	%	%
Domestic bonds (long-term)	12.5	0.85
Domestic bonds (long-term corporates)	12.5	1.75
Global high yield bonds	10.0	3.25
Canadian equity	10.0	4.60
Global equity	25.0	4.30
Emerging markets equity	10.0	7.00
Global real estate	10.0	3.90
Global infrastructure	10.0	4.15
Expected average real return	100.0	3.70

Portfolio rebalancing will affect the portfolio's expected long-term return. In other words, realigning portfolio's weightings to the target determined in the investment policy from time to time will have an impact on the long-term return. The impact of portfolio rebalancing depends on its frequency, the weightings between asset classes, the level of diversification in the portfolio and the investment horizon. The expected return is also influenced by the level of diversification of the portfolio (this is independent of rebalancing). The expected impact of rebalancing and diversification on the portfolio's return (weighted average of returns of asset classes) was estimated on the basis of stochastic projections and estimated at 0.50%.

A provision has been considered in the discount rate to take into account the added value associated with active management. Note that this provision has been limited to the estimated fees corresponding to active management.

Also, a margin for adverse deviation 0.25% has been included this year in the discount rate assumption. The inclusion of the margin is such that the fund's total return minus the margin is expected to be achieved with a probability of at least 56% over a period of 25 years. A margin for adverse deviation was not used in the December 31, 2018 valuation.

Increases in maximum pensionable earnings

The assumption for the increase in maximum pensionable earnings reflects an assumed rate of inflation of 2.10% per annum, plus an allowance of 0.65% per annum for the effect of real economic growth and productivity gains in the Canadian economy, which is consistent with historical real economic growth, for a total increase in maximum pensionable earnings of 2.75% per annum. The actuarial valuation as at December 31, 2018 assumed an increase in maximum pensionable earnings of 3.00% per annum.

Salary increases (productivity)

The assumption for the salary increase reflects an assumed rate of inflation of 2.10% per annum, plus an allowance of 0.90% in the long-term for the effect of real economic growth and productivity gains in the economy, including merit and promotion.

Mortality

The mortality assumption adopted for this valuation is the CPM-2014 Table projected with improvement scale CPM-B with adjustment factors of 115% for males and 110% for females as at December 31, 2019. The mortality assumption remains unchanged from the December 31, 2018 valuation. There is not sufficient experience data to conduct a credible mortality experience study given the size of the Plan.

Termination (membership)

No allowance has been made for termination of employment prior to retirement on the basis that the impact of including such an assumption would not have a material impact on the valuation results. The Plan has experienced limited gains and losses on termination experience over the last three valuations suggesting that this assumption remains reasonable.

Retirement

The retirement rates have been determined based on our expectation of the best-estimate retirement rates pursuant to Plan provisions and the experience of other similar plans. The Plan has not experienced significant gains or losses on retirement experience suggesting that this assumption remains reasonable.

Provision for expenses

Explicit provision has been made in the normal cost for the non-investment and non-custodial related expenses expected to be paid from the pension fund. The 9% loading added to the total annual normal actuarial cost for this purpose has been maintained in the current valuation.

Custodial and investment expenses

We have reviewed investment related expenses for the recent past and determined the total custodial and investment expenses of 0.60% is a reasonable estimate of such future expenses.

Appendix B – Solvency and Hypothetical Wind-Up Actuarial Basis

Asset Valuation Method

The actuarial value of the assets used to determine the solvency and hypothetical wind-up funded status is equal to the market value of assets, adjusted for amounts payable and receivable. This valuation method is the same as the one used in the last valuation.

Actuarial Cost Method

The solvency liabilities are determined using the accrued benefit (or unit credit) actuarial cost method. The solvency 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, the age used is the age on the date of the nearest birthday. However, to determine eligibility for benefits, the exact age was used. These methods are the same as those used in the last valuation.

Actuarial Assumptions

The main actuarial assumptions used in the solvency and hypothetical wind-up valuations correspond to those prescribed by the applicable legislation.

These assumptions are summarized in the following table. For comparison purposes, the assumptions used in the last valuation are also included. All rates and percentages are annualized unless otherwise noted.

Table B.1 – Solvency and Hypothetical Wind-Up Actuarial Assumptions

	December 31, 2019	December 31, 2018
Discount rates (settlement by transfer of values)	2.96% per annum, or, 2.40% per annum for 10 years, 2.50% per annum thereafter, if this provides a higher liability	3.23% per annum, or, 3.20% per annum for 10 years, 3.40% per annum thereafter, if this provides a higher liability
Discount rates (settlement by purchase of annuities)	2.96% per annum	3.23% per annum
Indexation	0.00% per annum	Same
Mortality	CPM-2014 with full generational mortality improvement, using Scale CPM-B (gender distinct)	Same
Retirement	Age that maximizes the value of the pension	Same
Provision for expenses	\$400,000	Same

Termination scenario

The termination scenario used in the solvency and hypothetical wind-up valuations includes the following assumptions:

- Plan wind-up would not result from employer insolvency.
- All assets could be realized at their reported market value.

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

Discounted value of payments

The rates used to discount the amortization payments for the purposes of calculating the solvency balance correspond to the discount rates chosen for the valuation of the members' benefits settled by the purchase of non-indexed annuities with an insurance company.

Margin for adverse deviations

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

Choice of Assumptions

Settlement of benefits

The assumptions used to value the members' benefits settled by a lump sum transfer are in accordance with the Plan provisions, the applicable legislation as well as the Canadian Institute of Actuaries' standards of practice for pension commuted values.

The assumptions used to value the benefits of members and beneficiaries settled by the purchase of annuities with an insurance company are in conformity with the educational note dated April 24, 2020 prepared by the Canadian Institute of Actuaries. These assumptions are based on an estimate of the premium that would be required by an insurer to guarantee payment of the pensions. The duration of the liabilities expected to be settled through the purchase of non-indexed annuities is equal to 13.08 years.

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. Expenses related to the resolution of surplus and deficit issues are not taken into account. The amount of expenses is only an approximation and may differ significantly from real expenses incurred on plan wind-up, for example, in case of litigation, bankruptcy and eventual replacement by a third-party administrator.

Incremental Cost

The incremental cost on the hypothetical wind-up basis is based on the actuarial method and assumptions described below.

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

1. Present value of expected benefit payments between December 31, 2019 and December 31, 2020, discounted to December 31, 2019;

Plus

2. Projected hypothetical wind-up liabilities as at December 31, 2020, discounted to December 31, 2019;

Less

3. Hypothetical wind-up liabilities as at December 31, 2019.

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 correspond to those used in the going-concern valuation as at December 31, 2019.
- The assumptions used to calculate the projected hypothetical wind-up liabilities as at December 31, 2020 in item 2. above correspond to those used for the hypothetical wind-up valuation as at December 31, 2019, taking into account the method of settlement applicable to each member as at December 31, 2020.

However, we assume that the discount rates remain at the levels applicable as at December 31, 2019 and that the select period is reset as at December 31, 2020 for discount rate assumptions that are select and ultimate.

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, 2019 remain in effect as at December 31, 2020.

- The projected hypothetical wind-up liabilities as at December 31, 2020 in item 2. above is calculated using the same postulated scenario as is used for the hypothetical wind-up valuation as at December 31, 2019.
- The rates used to discount items 1. and 2. above from December 31, 2020 to December 31, 2019 correspond to those used for the hypothetical wind-up valuation as at December 31, 2019. However, these rates are adjusted to take into account the applicable method of settlement applicable to each member as at December 31, 2020.
- No new entrants were considered between December 31, 2019 and December 31, 2020 as the impact on the incremental cost is not material.

Appendix C – Assets

Source of Information

All information pertaining to the assets has been extracted from the financial statements prepared by CIBC Mellon. There was no indication of any problem with the assets in the financial statements.

Tests have been performed to ensure that contributions, benefits payments and investment earnings were reasonable.

Statement of Net Assets (Market Value)

The following table shows the asset allocation as at December 31, 2019. For comparison purposes, the asset allocation as at December 31, 2018 is also shown.

Table C.1 – Net Assets (Market Value)

	December 31, 2019	December 31, 2018
	\$	\$
Assets		
Invested assets		
– Cash	5,244,763	3,551,908
– Bonds, debentures and mortgages	69,250,964	58,416,171
– Canadian equity	12,015,934	18,819,636
– Foreign equity	41,670,309	33,651,224
Total	128,181,970	114,438,939
Net assets in the financial statements	128,181,970	114,438,939
Adjustments		
Other assets		
– Contributions receivable	427,814	590,846
– Investment sales receivable	9,665	350,251
– Accounts payable	(42,795)	(127,587)
Benefits payable	—	—
Total	394,684	813,509
Net assets (after adjustments)	128,576,654	115,252,448

Changes in Net Assets

The following table shows changes affecting the assets during the inter-valuation period, based on market values.

Table C.2 – Reconciliation

	2019
	\$
Net assets – beginning of period	115,252,448
Increase in assets	
Contributions	
– Employee contributions	3,324,314
– Employer contributions	3,287,968
– Transfer in	—
– Total	6,612,282
Investment income	13,751,263
Total	20,363,545
Decrease in assets	
Benefits paid	
– Pensions in payment	4,313,317
– Transfer and refunds	1,437,092
– Total	5,750,409
Expenses	
– Investment fees	598,180
– Custodial fees	117,193
– Administration fees	573,558
– Total	1,288,931
Total	7,039,340
Net assets – end of period	128,576,654

The employers match the regular, ongoing contributions of plan members. However, members who purchase past service pay the full actuarial cost of that service and this results in total employee contributions being higher than employer contributions by varying amounts in each year, depending on the level of past service purchases in each year.

Return on Assets

The annual rates of return achieved on assets, after investment management fees and custodial fees charged to the fund, are as follows:

Table C.3 – Return on Assets after expenses

Year	Market Value Basis
	%
2019	11.30
2018	(1.86)
2017	7.26

Appendix D – Membership Data

Description of Membership Data

The data as at December 31, 2019 was taken from the files which we maintain on an ongoing basis as day-to-day administrators of the Plan and which are based on data supplied to us by the various participating employers in the Plan. We have taken the following steps to review the data to ensure sufficiency and reliability:

- the records of each member were reconciled with the data of the previous valuation;
- individual benefit statements were distributed to the members, who were instructed to report any errors;
- the contributions and pensions paid since the last valuation shown in the financial statements were compared with the equivalent values drawn from the data;
- a reconciliation was performed in order to follow the changes in the number of active members, retirees and vested members; and
- basic data checks were performed to ensure that age, salary and service data were reasonable for the purposes of the valuation.

Summary of Membership Data

The following tables were prepared using data provided by regarding its active members, retirees and former members.

Table D.1 – Summary of Membership Data

	December 31, 2019	December 31, 2018
Active members		
Number	713	699
Total payroll for following year ⁽¹⁾	\$44,014,400	\$42,399,575
Average payroll for following year ⁽¹⁾	\$61,700	\$60,744
Average contributions with interest ⁽¹⁾	\$64,771	\$64,808
Average age in years	47.1	47.0
Average pensionable service in years	11.2	11.0
Terminated vested members		
Number	86	83
Total annual pensions at normal retirement age	\$604,574	\$596,548
Average annual pension at normal retirement age	\$7,030	\$7,187
Average age in years	50.4	52.0
Retired members and beneficiaries		
Number	277	258
Total annual pensions	\$4,543,237	\$4,148,957
Average annual pension	\$16,402	\$16,081
Average age in years	71.0	70.9

⁽¹⁾ Excluding members on long-term disability

Table D.2 – Changes in Plan Membership

	Active members	Terminated vested members	Retired members and beneficiaries	Total
Members as at December 31, 2018	699	83	258	1,040
New members	61	—	—	61
Return to active from deferred	—	—	—	—
Terminations:				
Deferred pensions	(15)	15	—	—
Non-vested or lump-sum transfers	(21)	—	—	(21)
Deaths:				
With no further payment	(1)	—	(5)	(6)
With continuing payment	—	—	(4)	(4)
Survivor pension	—	—	4	4
Retirements	(10)	(14)	24	—
Data Adjustments	—	2	—	2
Members as at December 31, 2019	713	86	277	1,076

In addition to the above membership counts, there are 19 terminated members with outstanding refunds at December 31, 2019 and 66 terminated employees for whom a portion of their lump sum commuted value remains in the plan to be paid at a later date in accordance with the plan's policy to withhold a portion of all commuted value payments for a period up to 5 years as required by the *Pension Benefits Act* of New Brunswick.

Table D.3 – Summary of Active Members as at December 31, 2019

Age Group (age nearest)	Number	Total Salary	Average Salary	Average Pensionable Service in Years
Under 25	13	505,934	38,918	0.6
25 – 29	30	1,611,382	53,713	2.8
30 – 34	51	3,288,769	64,446	4.8
35 - 39	86	5,200,220	60,468	6.1
40 - 44	111	6,622,005	59,658	8.8
45 - 49	115	7,384,420	64,212	10.2
50 - 54	117	7,672,852	65,580	14.3
55 - 59	122	7,765,747	63,654	17.1
60 and over	68	3,965,034	58,309	17.6
Total	713	44,014,363	61,731	11.2

Of the total, 519 are male and 194 are female.

Table D.4 – Summary of Terminated Vested Members as at December 31, 2019

Age Group (age nearest)	Number	Total Annual Pension at NRD	Average Annual Pension at NRD
Under 35	6	11,666	1,944
35 - 39	8	117,651	14,706
40 - 44	10	32,409	3,241
45 - 49	12	51,475	4,290
50 - 54	18	106,963	5,942
55 - 59	19	146,741	7,723
60 and over	13	137,668	10,590
Total	86	604,574	7,030

Of the total, 47 are male and 39 are female.

Table D.5 – Summary of Retired Members and Beneficiaries as at December 31, 2019

Age Group (age nearest)	Number	Total Annual Pension	Average Annual Pension
55 – 59	5	35,504	7,101
60 - 64	49	1,091,643	22,278
65 - 69	74	1,199,637	16,211
70 - 74	82	1,508,284	18,394
75 - 79	40	519,402	12,985
80 - 84	16	128,037	8,002
85 and over	11	60,730	5,521
Total	277	4,543,237	16,402

Of the total, 182 are male and 95 are female.

Table D.6 – Summary of Members with Outstanding Payments as at December 31, 2019

Number	Total Outstanding Payments	Average Outstanding Payments
19	43,597	2,295

Table D.7 – Summary of Members with Transfer Deficiencies Payable as at December 31, 2019

Number	Total Transfer Deficiencies Payable	Average Transfer Deficiencies Payable	Average Years Remaining until Payment
66	1,065,159	16,139	2.2

Appendix E – Summary of Plan Provisions

The Plan was established effective March 1, 1979 to make available to municipalities in New Brunswick a uniform contributory pension plan for their permanent employees and to provide certain retirement and related benefits for and on behalf of all eligible Employees who become Members of the Plan.

In 2007, the *Municipalities Act* was amended to allow the detailed provisions of the Plan to be removed from Regulation 81-34 and put in a separate document which the Pension Board has full authority to change. Accordingly, the Pension Board was formally given authority to administer and revise the Plan as granted by the New Brunswick Regulation 2010-23 of the *Municipalities Act* as filed on March 15, 2010.

The Plan provisions upon which the present valuation was done are summarized below.

The Plan is registered in New Brunswick (registration number NB.0418723) and with the Canada Revenue Agency (registration number 0418723).

Effective Date

March 1, 1979.

Eligibility and Participation

Regular, full-time employees are eligible on the first of the month coincident with or next following the date they become a permanent employee or, if later, the date their employer adopts the Plan. The New Brunswick *Pensions Benefits Act* requires that part-time employees become eligible if they have completed 24 months of employment and earned at least 35% of the Year's Maximum Pensionable Earnings (YMPE) under the Canada Pension Plan in each of two consecutive calendar years.

Member Contributions

Effective January 1, 2013, the contribution rates for regular employees are equal to 7.41% of earnings up to the YMPE and 9.88% of earnings in excess of the YMPE, while the corresponding contribution rates for police and firefighters equal to 8.20% and 10.92%, respectively.

Employer Contributions

Each participating employer must contribute such amounts as are, in the opinion of the actuary, necessary, in addition to member contributions and accumulated assets, to provide the benefits defined in the Plan. In practice, each participating employer has always matched the required member contributions since the inception of the Plan and continues to do so.

Normal Retirement

The normal retirement date of a member is the first of the month coincident with or next following his or her sixty-fifth birthday for regular employees and the sixtieth birthday for police and firefighters.

For retirements and terminations on or after January 1, 1998, the annual amount of a member's normal retirement pension is equal to:

1. the product of:
 - a) the number of years of the member's pre-1998 pensionable service, and
 - b) 1.8% of the annual average earnings up to the average YMPE plus 2% of the annual average earnings in excess of the average YMPE,plus
2. the product of:
 - a) the number of years of the member's post-1997 pensionable service, and
 - b) 1.5% of the annual average earnings up to the average YMPE plus 2% of the annual average earnings in excess of the average YMPE.

The average annual earnings are calculated as the average during any five years in the last ten years prior to retirement or termination which produces the highest average. The average YMPE is calculated over the final three years, including the year of retirement or termination.

The pension is subject to the maximum pension rules established from time to time by the *Income Tax Act* (Canada).

Ad hoc increases to pensions may be granted in the future, up to 2% per annum, depending on the financial position of the Plan and at the full discretion of the Pension Board.

Forms of Pension Payment

The normal form of payment is a single life annuity with a minimum of 120 monthly payments guaranteed. Optional forms are available on an actuarial equivalent basis. Under the New Brunswick *Pension Benefits Act*, pensioners who have a spouse or common-law partner at retirement must elect a reduced joint and last survivor form under which at least 60% continues to the spouse or common-law partner, unless the spouse or common-law partner waives his or her rights to the joint and survivor form.

Early Retirement

A member who has completed five years of employment may retire at any time after attaining age 55 (50 for police officers and firefighters).

For members who were age 55 and over (age 50 for police and firefighters) at January 1, 2010, the reduction factor is calculated as 0.25% times the number of months by which the age at retirement precedes age 65 (age 60 for police and firefighters).

For members who attained age 55 and over (age 50 for police and firefighters) between January 1, 2010 and January 1, 2013, the reduction factor has increased annually on each January 1, starting January 1, 2011, at a rate of 0.025% per year until January 1, 2015 when the reduction factor was set at 0.375% times the number of months by which the age at retirement precedes age 65 (age 60 for police and firefighters).

For members under age 55 (age 50 for police and firefighters) at January 1, 2013, the reduction factor has increased annually on each January 1, starting January 1, 2011, at a rate of 0.025% per year until January 1, 2018

when the reduction factor hit 0.450% times the number of months by which the age at retirement precedes age 65 (age 60 for police and firefighters).

Late Retirement

A member who remains in employment beyond the normal retirement age continues to contribute to the Plan and accrue benefits. Retirement cannot be postponed beyond December 31st of the calendar year in which the member reaches age 71.

Effective January 1, 2014, the late retirement provisions were amended to provide members who retire after age 65 with a late retirement equalization of up to 5.4% per annum (0.45% per month) after age 65, subject to limits under the *Income Tax Act*.

For every month that a member's age at retirement is over age 65, the pension will increase by the percentage indicated:

Retirement Date	%
On or Before December 31, 2013	0.000
On or after January 1, 2014 but on or before December 31, 2014	0.350
On or after January 1, 2015 but on or before December 31, 2015	0.375
On or after January 1, 2016 but on or before December 31, 2016	0.400
On or after January 1, 2017 but on or before December 31, 2017	0.425
On or after January 1, 2018	0.450

Benefits on Termination of Employment

A member who terminates employment prior to completing both two years of continuous Plan membership and five years of continuous employment is entitled to a refund of the total amount of his or her own contributions to the Plan, with interest.

If a member terminates employment after completing two or more years of continuous Plan membership or five or more years of continuous employment the member is entitled to his or her accrued normal retirement pension. The pension will be available on an unreduced basis at age 65 or 60, depending on whether the member is a regular employee or a police officer or firefighter.

The locking-in and portability requirements of the New Brunswick *Pension Benefits Act* apply.

In addition, if the accumulated amount of the member's post-1991 contributions exceeds one-half of the lump-sum value of the member's post-1991 benefit, the excess is refundable to the member.

Pre-retirement Death Benefits

In the event of the death of a member prior to retirement and prior to completing both two years of continuous Plan membership and five years of continuous employment, the benefit payable is a refund of the member's own contributions with interest.

On death before retirement but after completing two or more years of continuous Plan membership or five years of continuous employment, the benefit payable to the spouse, common-law partner, or beneficiary, as

applicable, is 100% of the lump-sum value of the member's accrued normal retirement pension or, if greater, the member's own contributions with interest.

Disability Benefits

For disabilities occurring after January 1, 2010, a disabled member can continue accumulating pensionable service if he or she elects to continue contributing to the Plan during the period in which the employee is disabled. Employees deemed totally and permanently disabled prior to January 1, 2010 receive pensionable service without having to make contributions to the Plan.

Purchase of Past Service

The purchase of certain periods of past service with municipalities is allowed, with the member paying the full actuarial cost of the additional service on a valuation liability basis.

Appendix F – Employer Certification

With respect to the actuarial valuation report of New Brunswick Municipal Employees Pension Plan as at December 31, 2019, we hereby confirm that to the best of our knowledge:

- the contributions have been paid to the fund in conformity with the previous actuarial report;
- the data regarding Plan members and beneficiaries provided to Morneau Shepell constitutes a complete and accurate description of the information contained in our files;
- the data regarding Plan assets provided to Morneau Shepell are complete and accurate;
- copies of the official text of the Plan and all amendments to date were provided to Morneau Shepell and the summary of Plan provisions contained in this report adequately reflects the Plan provisions for the purposes of this actuarial valuation;
- there are no subsequent events nor any extraordinary changes to the membership other than those listed in this actuarial report on the Plan, which would materially affect the results.



Signature

NADINE LÉGER

Name (printed)

Chairperson of the Pension Board

Title

October 29, 2020

Date

Appendix G – Terms of Engagement

October 29, 2020

CONFIDENTIAL

Ms. Nadine Léger
Chairperson, NBMEPP Pension Board

Re: Terms of Engagement for New Brunswick Municipal Employees Pension Plan Actuarial Valuation as at December 31, 2019

Dear Nadine,

Standards from the Canadian Institute of Actuaries (CIA) encourage advance discussion and acknowledgment for the terms of engagement of a particular valuation. Below you will find a summary of our understanding of assumptions and methods to be used for the December 31, 2019 actuarial funding valuation of the New Brunswick Municipal Employees Pension (the "Plan"), which has been requested by the Plan's Pension Board:

1. The valuation is to be conducted in accordance with the *New Brunswick Pension Benefits Act* ("NBPPBA") and the *Income Tax Act* ("ITA") and, as such, should include a Going-Concern valuation and a Solvency valuation. In accordance with Standards of Practice for the Canadian Institute of Actuaries ("CIA Standards"), the position of the Plan, was it to be wound up on the valuation date, should also be disclosed. The measurement date for the valuation will be December 31, 2019.
2. Assets should be measured at market value, plus any net amounts in transit for receivables and payables.
3. Data on Plan membership will be extracted from the Plan's administration system maintained by Morneau Shepell Ltd. The data will be extracted at December 31, 2019.
4. The going-concern valuation basis used is described in detail in Appendix A.
 - a) The discount rate used in the going-concern valuation will be 5.90% per annum (unchanged from the actuarial valuation as at December 31, 2018).
 - b) The inflation rate will be 2.10% per annum. The inflation rate in actuarial valuation as at December 31, 2018 was 2.25% per annum.
 - c) The increase in the YMPE and CRA maximum pension after 2020 is reduced to 2.75% per annum from 3.00% per annum in the actuarial valuation as at December 31, 2018.
 - d) All other economic and demographic assumptions for the going-concern valuation are consistent with the previous going-concern actuarial valuation as at December 31, 2018 and the CIA Standards to the extent that they remain reasonable and appropriate in the professional opinion of Morneau Shepell Ltd.

Ms. Nadine Léger
October 29, 2020

5. Economic and demographic assumptions for the solvency and hypothetical wind-up valuations as outlined in Appendix B are consistent with the requirements of the NBPBA and the CIA Standards to the extent that they are reasonable and defensible in the professional opinion of Morneau Shepell Ltd.
6. With respect to the solvency and hypothetical wind-up valuations, pensioners, deferred vested members and active members who are eligible to retire immediately are assumed to have an annuity purchased on their behalf upon wind-up. For active members not eligible to retire, they are assumed to elect the greater of the commuted value or annuity purchase value.
7. The solvency discount rate with respect to those assumed to purchase an annuity will be 2.96% per annum compared to 3.23% per annum as at the last valuation. The solvency discount rates with respect to those assumed to elect a commuted value will be 2.40% for the first 10 years and 2.50% thereafter, compared to 3.20% for the first 10 years and 3.40% thereafter as at the last valuation.
8. The actuarial cost method to be used for the going-concern valuation is the projected unit credit method pro-rated on service and remains unchanged from December 31, 2018.
9. The valuation report should state the minimum employer contribution requirement as per the NBPBA as well as the maximum allowable employer contribution as per the ITA.
10. If the transfer ratio remains below 0.90 as at December 31, 2019, then the next actuarial valuation is to be conducted as at December 31, 2020 as per the NBPBA. If the transfer ratio is at or above 0.90 as at December 31, 2019, then the next actuarial valuation is to be conducted no later than December 31, 2022.
11. As of the date of this letter, the world is still in the midst of the COVID-19 health pandemic which started after the effective date of this valuation. Although the pandemic could have a material impact on the financial status of the Plan discussed herein, there is currently insufficient information to determine the extent of the short-term impact nor the long-term impact of this pandemic on the Plan. As such, the results of our valuation as at December 31, 2019 do not reflect the impact of the COVID-19 pandemic. Any impact on the Plan will result in gains and losses to be revealed in future valuations and reflected in future disclosures.
12. In October 2020, the New Brunswick government adopted changes to the Pension Benefits Regulations (the "Regulation") relating to the funding framework for defined benefit pension plans. However, pension plans exempted from funding solvency deficiencies are also exempt from the changes to the Regulation. Therefore, such changes do not impact the results of the December 31, 2019 actuarial valuation.
13. Neither the Pension Board nor Morneau Shepell are aware of any events subsequent to December 31, 2019 other than those already discussed in this letter that would materially affect the results of this valuation.
14. Any items that require deviation from the decisions contained herein are to be discussed with representatives from New Brunswick Municipal Employees Pension Plan.

Ms. Nadine Léger
October 29, 2020

If you agree with our understanding as summarized above, please sign a copy of this letter and return it to our attention. If you require additional information or wish to discuss further the content of this letter, please do not hesitate to contact us.

Regards,



Yves Plourde, FSA, FCIA
Partner

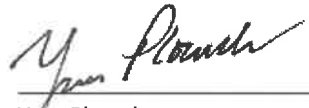
This letter has been peer reviewed by Don Charlton, FSA, FCIA.

We, the undersigned, agree that the summary set forth in this letter is an accurate representation of both parties' understanding of the terms of engagement for the December 31, 2019 actuarial valuation of the New Brunswick Municipal Employees Pension Plan.



Nadine Léger
Chairperson
NBMEPP Pension Board

October 29, 2020
Date



Yves Plourde
Morneau Shepell Ltd.

October 29, 2020
Date

Appendix A – Going Concern Actuarial Assumptions

Table A.1 - Going Concern Actuarial Assumptions

Discount rate/ Interest on employee contributions (net of custodial and investment expenses)	5.90% per annum	
Salary increases	3.0% per annum	
YMPE increases	2.75% per annum	
Inflation	2.10% per annum	
Pensioner cost-of-living increases	0.0% per annum	
Mortality tables	CPM2014 with full generational mortality improvement, using Scale CPM-B, adjusted by 115% in males and 110% in females, on a sex-distinct basis	
Retirement age	Regular employees	5% retire at ages 55 to 59, 9% retire at ages 60 to 64 and 30% retire at age 65; those already meeting the calculated retirement age are assumed to retire one year after the valuation date
	Police and Fire	5% retire at ages 50 to 54, 9% retire at ages 55 to 59 and 30% retire at age 60; those already meeting the calculated retirement age are assumed to retire one year after the valuation date.
	Members on long-term disability	Retire at earliest unreduced age; those already meeting the calculated retirement age are assumed to retire one year after the valuation date
Rates of termination	No allowance	
Disability incidence	No allowance	
Actuarial cost method	Projected Unit Credit prorated on service	
Expenses	A 9% loading is added to the total annual normal actuarial cost to cover the expenses of operating the plan, other than expenses which are implicitly recognized in the discount rate.	
Income Tax Act defined benefit limit	At January 1, 2020, the annual defined benefit limit is \$3,092.22 and is assumed to increase by 2.75% per annum starting on January 1, 2020	

Appendix B – Solvency/Hypothetical Wind-up Actuarial Assumptions

Table B.1 – Solvency/Hypothetical Wind-up Actuarial Assumptions

Discount rate for active and deferred members not eligible for immediate retirement	The scenario which maximizes the individual liabilities, either: 2.96% per annum; or 2.40% per annum for the first 10 years, and 2.50% per annum thereafter
Discount rate for retired members, and active and deferred members eligible for immediate retirement	2.96% per annum
Indexation	0.0% per annum
Salary increases	None
Merit and promotional scale	None
Mortality Tables	CPM2014 with full generational mortality improvement, using Scale CPM-B, on a sex-distinct basis
Termination of employment	None
Disability	None
Retirement	Age that maximizes the value of the pension
Wind-up expenses	\$400,000

Morneau Shepell is the leading provider of technology-enabled HR services that delivers an integrated approach to well-being through our cloud-based platform. Our focus is providing everything our clients need to support the mental, physical, social and financial well-being of their people. By improving lives, we improve business. Our approach spans services in employee and family assistance, health and wellness, recognition, pension and benefits administration, retirement consulting, actuarial and investment services. Morneau Shepell employs approximately 6,000 employees who work with some 24,000 client organizations that use our services in 162 countries. Morneau Shepell is a publicly traded company on the Toronto Stock Exchange (TSX: MSI). For more information, visit morneaushepell.com.

