

value over a period which cannot exceed five years. For purposes of the solvency valuation the assets have been smoothed over four years.

FILING REQUIREMENTS

The last filed actuarial report was effective December 31, 2017. This report outlines the movements of the Plan's financial position since the previous valuation and is to be filed with the Office of the Superintendent – Pension Commission (Manitoba) and Canada Revenue Agency. It is to be used by the University to determine its funding requirements for the period following the valuation.

Section 3. DATA

The valuation was based on data as of the valuation date, December 31, 2018, supplied to us by Brandon University. This data is summarized in Appendix C.

We subjected the data to a number of tests of reasonableness and consistency, including the following:

- a member's (and partner's as applicable) age is within a reasonable range;
- all dates remained unchanged from the data used in the previous actuarial valuation of the Plan;
- accrued pensions changed by a reasonable amount;
- the form of pension payment did not change (other than resulting from the death of a retired member); and
- we examined the additions to, and deletions from, each of the data files (i.e., the files for active employees, pensioners and terminated members entitled to a deferred vested pension) since the previous valuation to determine whether all Plan members were accounted for in this valuation, to check for duplicate records and to confirm pension amounts.

Data was corrected as appropriate. The results of our tests were satisfactory.

Assets of the Plan are held in trust with CIBC Mellon. The funds are invested in a number of pooled funds operated by Connor, Clark & Lunn Investment Management Limited. We have relied on the financial statements for the fund prepared by Brandon University for the December 31, 2018 year-end.

Section 4. GOING CONCERN VALUATION

VALUATION BALANCE SHEET

The following is the going concern valuation balance sheet as at December 31, 2018 based on:

- the Plan provisions (summarized in Appendix A);
- the going concern valuation assumptions (described in Appendix B);
- the membership data (summarized in Appendix C);
- the actuarial value of assets (summarized in Appendix D), and

Going Concern Valuation	12.31.2018	12.31.2017
<u>Going Concern Assets</u>		
Actuarial value of Plan assets	\$182,206,000	\$177,292,000
<u>Going Concern Liabilities</u>		
Retired members and survivors	\$101,767,000	\$101,835,000
Terminated vested members	\$4,229,000	\$5,075,000
Active members – Div 1 - Academic and non-union members	\$61,092,000	\$56,018,000
Active members – Div 2 – Non-Academic union members	\$14,862,000	\$14,527,000
Other benefits outstanding	\$252,000	\$779,000
Additional voluntary contributions	\$143,000	\$168,000
Total going concern liabilities	\$182,345,000	\$178,402,000
Surplus / (unfunded liability)	(\$139,000)	(\$1,110,000)
Funded Ratio	0.999	0.994

The liability as at December 31, 2018 for Other Benefits Outstanding includes:

- \$216,000 for sessional employees with no pensionable earnings in 2018,
- Small benefit payouts to terminated members that are pending settlements.

The present value at December 31, 2018 of previously established special payments is \$1,011,000, which exceeds the going concern unfunded liability at December 31, 2018 of \$139,000. Due to the going concern actuarial gain and in accordance with Pension Benefits Act of Manitoba and Regulations, special payments may be reduced, beginning with the earliest established special payment. As such, the annual going-concern special payment established effective December 31, 2011 may be reduced from \$156,000 to \$21,000.

Required special payments, for the applicable periods, are outlined in the following table.

Effective Date	Amortization Period	Annual Special Payment
December 31, 2011	Jan 2012 – Dec 2026	\$21,000



EXPERIENCE GAIN AND LOSS

The Plan has a going concern unfunded liability of \$139,000 at December 31, 2018. Our previous valuation of the Plan showed the Plan had an unfunded liability of \$1,110,000. The approximate derivation of the going concern unfunded liability at December 31, 2018 is as follows:

Going concern surplus (unfunded liability) at Dec. 31, 2017	(\$1,110,000)
Special payments to eliminate the unfunded liability	\$156,000
Interest on surplus (unfunded liability), special payments and transfers in for 2018 at 5.55%	(\$57,000)
Expected surplus (unfunded liability) at Dec. 31, 2018	(\$1,011,000)
Plus actuarial gains(losses) due to experience differing from the actuarial assumptions in 2018:	
▪ Gain/(loss) on terminations other than assumed	\$94,000
▪ Gain/(loss) on active and deferred member retirements other than assumed	\$1,004,000
▪ Gain/(loss) on mortality other than assumed	(\$143,000)
▪ Gain/(loss) on salaries and the YMPE increasing at different rates than assumed	\$57,000
▪ Gain/(loss) attributable to net investment experience	(\$749,000)
▪ Gain/(loss) attributable to pension increases other than assumed	\$943,000
▪ Gain/(loss) attributable to service accrued different than expected*	(\$364,000)
Net actuarial experience gain/(loss)	\$842,000
Gain/ (loss) due to data corrections	34,000
Other experience resulted in a net gain/(loss) of approximately	(\$4,000)
Going concern surplus (unfunded liability) at Dec. 31, 2018	(\$139,000)

* Includes increase in the going concern liability for one member that was retroactively enrolled in 2018 back to an earlier date, and three additional members that may be retroactively enrolled in 2019 back to an earlier date.

The following summarizes the largest sources of gains and losses to the Plan since the previous valuation:

- There were less retirements than assumed, resulting in a gain of \$872,000.
- The actual net investment return earned by the Plan in 2018, based on smoothed asset values, was 5.10% compared to an expected return of 5.55% per year resulting in a loss of \$749,000.
- The July 1, 2019 pension increase (0.00%) is lower than assumed (0.75%).



INTEREST RATE SENSITIVITY OF THE GOING CONCERN LIABILITY

The effect of decreasing the interest rate used to determine the going concern liability by 1% from 5.55% to 4.55% is an increase in the total going concern liability of \$22,063,000.

CURRENT SERVICE COST

Employees are required to contribute 8.0% of pensionable earnings less 1.8% of pensionable earnings for which Canada Pension Plan (CPP) contributions are required. Pensionable earnings for this purpose are subject to an annual limit related to the maximum benefit accrual in a year. For 2019, the Yearly Maximum Contributory Earnings (YMCE) is \$115,970.

Based on the assumptions and membership data described herein, we estimate that the University's current service cost from December 31, 2018, until the effective date of the next valuation, is 7.95% of pensionable earnings. Unlike member contributions, pensionable earnings for this purpose are not limited to the YMCE. The current service cost determined as at December 31, 2017 was also 7.95% of pensionable earnings.

In accordance with the Plan provisions, the University shall pay additional contributions equal to the normal actuarial cost of the benefit improvements effective November 10, 2008 and April 1, 2009.

The table below summarizes the development of the University's estimated required current service contribution and additional contribution for 2019. The actual dollar amount of the current service contribution and additional contribution for 2019 may be higher or lower than the amount indicated below if the actual pensionable earnings are different than estimated.

2019	Dollar	% of Earnings
Estimated 2019 pensionable earnings	\$39,530,000	
Current service cost		
Total current service cost	\$5,712,000	14.45%
Estimated employee contributions	(\$2,569,000)	(6.50%)
Employer current service cost (A)	\$3,143,000	7.95%
Total special payments (B)	\$21,000	0.05%
Total minimum contribution required by the Act and Regulations	3,164,000	8.00%
Plan Provision Contribution		
Employer formula contribution	\$2,758,000	6.98%
Additional current service cost	\$655,000	1.65%
Total minimum contribution required by the Plan provisions (C)	\$3,413,000	8.63%
Employer current service cost (A)	\$3,143,000	7.95%
Total special payments (B)	\$21,000	0.05%
Employer additional contribution (C - A - B)	\$249,000	0.63%
Total Employer required contribution	3,413,000	8.63%

INTEREST RATE SENSITIVITY OF THE CURRENT SERVICE COST

The effect of decreasing the interest rate used to determine the regular current service cost by 1% from 5.55% to 4.55% is an increase in the total current service cost of \$494,000, or an increase in the 2019 employer current service cost as a percent of pensionable earnings from 7.95% to 9.20%.



Section 5. WIND-UP VALUATION

The purpose of the wind-up valuation is to determine the financial position of the Plan if it were wound up on the valuation date. The circumstances in which the plan wind-up occurs is that both Brandon University and the Plan wind-up, giving rise to termination benefits to members not eligible for retirement on the wind-up date and retirement benefits to all other members. There are no benefits on plan wind-up that were excluded from our valuation. The liability for all active members with 15 years or more of service on the valuation date includes the value of the early retirement subsidy as provided by the Plan.

Accordingly, the following approach was used:

1. The Plan assets were valued at market value.
2. The benefits valued are those which members would be entitled to under applicable legislation if the Plan were wound up on the valuation date. All Plan members become fully vested on Plan wind-up, regardless of age or service.
3. The actuarial assumptions are developed in accordance with the Canadian Institute of Actuaries' (CIA's) Standard of Practice for determining Pension Commuted Values and the CIA Educational Note – *Assumptions for Hypothetical Wind-up and Solvency Valuations with Effective Dates Between December 31, 2018 and December 30, 2019* dated March 2019. These assumptions are described in detail in Appendix B.
4. In accordance with the CIA Educational Note, the spread above the unadjusted CANSIM series V39062 was determined to be 108 basis points based on a duration of 10.5 for the portion of the liability assumed to be settled through the purchase of annuities. Accordingly, the discount rate assumed for the purchase of non-indexed annuities is 3.20%.

Based on the Plan provisions in effect on December 31, 2018, the wind-up valuation assumptions and the membership data supplied by the University, the following is the wind-up position of the Plan as at December 31, 2018:

Wind-up Valuation	12.31.2018	12.31.2017
<u>Wind-up Assets</u>		
Market value of Plan assets	\$176,274,000	\$185,434,000
Allowance for wind-up expenses	(\$310,000)	(\$300,000)
Total wind-up assets	\$175,964,000	\$185,134,000
<u>Wind-up Liabilities</u>		
Retired members and survivors	\$117,188,000	\$117,590,000
Terminated vested members	\$5,296,000	\$6,436,000
Active members – Div 1 - Academic and non-union members	\$81,413,000	\$76,188,000
Active members – Div 2 – Non-Academic union members	\$19,255,000	\$19,483,000
Other benefits outstanding	\$252,000	\$779,000
Additional voluntary contributions	\$143,000	\$168,000
Total wind-up liabilities	\$223,547,000	\$220,644,000
Wind-up excess/ (shortfall)	(\$47,583,000)	(\$35,510,000)

As shown above, if the Plan had been wound-up as at December 31, 2018, the wind-up liabilities would have exceeded the wind-up assets by \$47,583,000.



Section 6. SOLVENCY VALUATION

The table below shows the solvency position of the Plan as at December 31, 2018. The circumstances in which the plan wind-up occurs is that both Brandon University and the Plan wind-up giving rise to termination benefits to members not eligible for retirement on the wind-up date and retirement benefits to all other members. There are no benefits on Plan wind-up that were excluded from our valuation. The liability for all active members with 15 years or more of service on the valuation date includes the value of the early retirement subsidy as provided by the Plan.

The calculations are based on the Plan provisions in effect on the valuation date, the solvency valuation assumptions described in Appendix B, and the membership data supplied by the University.

Solvency Valuation	12.31.2018	12.31.2017
<u>Solvency Assets</u>		
Actuarial value of Plan assets (A)	\$182,206,000	\$177,292,000
Present value of the first five years of special payments to eliminate the going concern unfunded actuarial liability	\$99,000	\$726,000
Allowance for wind-up expenses (B)	(\$310,000)	(\$300,000)
Total solvency assets	\$181,995,000	\$177,718,000
<u>Solvency Liabilities</u>		
Retired members and survivors	\$117,188,000	\$117,590,000
Terminated vested members	\$5,296,000	\$6,436,000
Active members – Div 1 - Academic and non-union members	\$81,413,000	\$76,188,000
Active members – Div 2 – Non-Academic union members	\$19,255,000	\$19,483,000
Other benefits outstanding	\$252,000	\$779,000
Additional voluntary contributions	\$143,000	\$168,000
Total solvency liabilities (C)	\$223,547,000	\$220,644,000
Solvency excess/ (shortfall)	(\$41,552,000)	(\$42,926,000)
Solvency ratio [(A + B) ÷ C]	0.814	0.802

INTEREST RATE SENSITIVITY OF THE SOLVENCY LIABILITY

The effect of decreasing the interest rates used to determine the solvency liability by 1%, i.e. reducing the annuity purchase rate from 3.20% p.a. to 2.20% and a corresponding decrease in the commuted value rates, is an increase in the liability of approximately \$29,567,000.

SOLVENCY INCREMENTAL COST

The incremental cost represents the present value on the valuation date of the expected aggregate change in the solvency liability between valuations, adjusted upward for expected benefit payments between the valuation dates.



The total estimated incremental cost between the valuation date, December 31, 2018 and the date of the next valuation, December 31, 2019, is \$8,666,000.

SPECIAL PAYMENTS

This plan is subject to the funding requirements of the Pension Benefits Act of Manitoba. As such, it is required that a solvency valuation is prepared and any solvency deficiency is required to be funded over a five-year period. However, the University is eligible and has made an election to be exempt from certain solvency funding and other requirements in accordance with the *Solvency Exemption for Public Sector Pension Plans Regulation* (“Solvency Exemption”). As a result of the election, the University is exempt from making special payments for solvency deficiencies. The election was filed with the Office of the Superintendent – Pension Commission (Manitoba) on January 19, 2009.

The Plan has a solvency deficiency (i.e., an excess of solvency liabilities over solvency assets including the present value of five years previously established special payments) of \$41,552,000. In the absence of the Solvency Exemption the requirement would be to liquidate the solvency deficiency by equal monthly payments over the period beginning on the valuation date and ending on December 31, 2023. Accordingly, the minimum solvency special payment would be \$8,994,000 per year, payable monthly from 2019 to 2023 inclusive.

The following schedule summarizes the special payments that would normally be required to liquidate both the unfunded liability and solvency deficiency as at December 31, 2018. The payments to liquidate the unfunded liability must be made regardless of the solvency exemption. Payments to liquidate the solvency deficiency are not required.

Effective Date	Annual Special Payment (payable monthly)	End of Liquidation Period	Present Value of Payments on December 31, 2018 for purposes of*	
			Solvency Valuation (Next 5 Years)	Going Concern Valuation
<u>Unfunded Liability</u>				
12.31.2011	\$21,000	12.31.2026	\$99,000	\$139,000
<u>Solvency Deficiency</u>				
12.31.2018	\$8,994,000	12.31.2023	\$41,552,000	-
Total	\$9,093,000		\$41,651,000	\$139,000

**The present value of payments for the Solvency Valuation reflects only the next five years of payments, discounted at the weighted average solvency interest rate of 3.20% per year. The present value of payments for the Going Concern Valuation reflects all years of payments, discounted at the going concern interest rate of 5.55% per year.*



Section 7. ELIGIBLE CONTRIBUTIONS

MINIMUM CONTRIBUTIONS

Members and the University are each required to contribute at the rate of 8.0% of salary up to the Year's Basic Earnings (YBE) under the Canada Pension Plan, 6.2% between the YBE and the Year's Maximum Pensionable Earnings (YMPE) and 8.0% in excess of the YMPE. Members contribute only on the amount earned up to the Year's Maximum Contributory Earnings (YMCE).

Notwithstanding, the University may be required to make additional contributions in excess of the contributions described above in order to satisfy the negotiated funding of certain benefit improvements or requirements of the Pension Benefits Act of Manitoba and Regulations.

Accordingly, the University is required to make current service cost contributions equal to 7.95% and additional contributions of 0.63% of pensionable earnings for the period from January 1, 2019 to the effective date of the next valuation, as well as special payments for the unfunded liability as at December 31, 2018.

The minimum University contributions required under the Pension Benefits Act of Manitoba and in accordance with the *Solvency Exemption for Public Sector Pension Plans Regulation* are as follows:

	Total
Total current service cost	\$5,712,000
Estimated employee contributions	\$2,569,000
Employer current service cost	\$3,143,000
Estimated 2019 pensionable earnings	\$39,530,000
Employer current service cost as a percentage of earnings	7.95%
Total special payments	\$21,000
Total minimum University contribution	\$3,164,000

The minimum University contributions required under the Plan are as follows:

	Total
Employer current service cost	\$3,143,000
Employer additional contribution	\$249,000
Total employer contribution for current service	\$3,392,000
Estimated 2019 Pensionable Earnings	\$39,530,000
Employer current service cost as a percentage of Earnings	8.58%
Total special payments	\$21,000
Total estimated employer contribution	\$3,413,000



The minimum University contribution required to be made in accordance with the provisions of the Plan provisions exceeds the minimum University contribution required by the Pension Benefits Act.

MAXIMUM CONTRIBUTIONS

The University may choose to fund at a higher level than the minimum required by the Pension Benefits Act shown above. In accordance with the Income Tax Act, the maximum permitted contribution the University could make is equal to the sum of:

1. A lump sum equal to \$47,583,000 – the greater of the unfunded actuarial liability of \$139,000 and the windup deficiency of \$47,583,000 as of December 31, 2018; plus
2. The current service contributions of 7.95% of pensionable earnings for the period ending December 31, 2019, until the effective date of the next valuation.

In accordance with the Pension Benefits Act of Manitoba, all contributions due to the Plan must be remitted monthly. Employee and Employer contributions are due within 30 days following the end of the month to which they apply.

Section 8. ACTUARIAL OPINION

With respect to the Brandon University Retirement Plan forming part of the actuarial report on a valuation of the Plan at December 31, 2018:

The recommendations for funding are in accordance with an agreement regarding the University's funding obligations by the signatories to the collective agreement between the University and BUFA that provides for the funding of certain benefit improvements.

We hereby certify that,

- a. The purpose of this report is to provide actuarial estimates of the funding payments required to be made by Brandon University for the period from December 31, 2018 to the date of the next valuation. The effective date of the next valuation must be no later than December 31, 2019 in order to comply with applicable legislation.
- b. Based on the projected unit credit accrued benefit funding method the Plan has an unfunded liability of \$139,000.
- c. In order to satisfy the funding requirements of the Pension Benefits Act, the University must amortize the unfunded liability according to the following schedule:

	Effective Date	End of Amortization Period	Annual Special Payment (payable monthly)
Unfunded Liability	12.31.2011	12.31.2026	\$21,000

- d. Based on the projected unit credit accrued benefit funding method, to satisfy the funding requirements of the Pension Benefits Act the University is required to contribute 7.95% of pensionable earnings for the period from January 1, 2019 to the date of the next valuation. The estimated cost of benefits for 2019 is \$5,712,000 of which \$2,569,000 will be paid by the members and \$3,413,000 will be paid by the University.
- e. The University is required to contribute an additional 0.63% of pensionable earnings for current service in order to satisfy the provisions of the Plan.
- f. The minimum University contribution required by the Plan exceeds the University contribution otherwise required by the provisions of the Pension Benefits Act of Manitoba.
- g. In our opinion, the value of the Plan assets would be less than the actuarial liabilities if the Plan were to be wound up as at December 31, 2018. The estimated shortfall would be approximately \$47,583,000.
- h. After taking into account the present value of the next five years of special payments to amortize the unfunded liability, the Plan has a solvency shortfall at December 31, 2018 of \$41,552,000 and the solvency ratio is 0.814. Excluding the present value of five years special payments (\$99,000), the shortfall is \$41,651,000.



Notwithstanding the foregoing opinion, emerging experience differing from the assumptions will result in gains or losses which will be revealed in future valuations.

In our opinion,

- a. the membership data on which the valuation is based are sufficient and reliable, for the purposes of the valuation,
- b. the assumptions used are appropriate for the purposes of the valuation, and
- c. the methods employed in the valuation are appropriate for the purposes of the valuation.

This report has been prepared and this opinion given in accordance with accepted actuarial practice in Canada.

DRAFT

Andrew Kulyk

Fellow of the Canadian Institute of Actuaries

May 16, 2019

Date

DRAFT

Shannon Tesluck

Fellow of the Canadian Institute of Actuaries

May 16, 2019

Date

Appendix A. SUMMARY OF PLAN PROVISIONS

There have been no amendments to Plan since the date of the previous valuation that would have a material effect on the results of our valuation.

ELIGIBILITY

New staff must join the Plan when employed.

MEMBER CONTRIBUTIONS

Members are required to contribute at the rate of 8.0% of salary up to the YBE, 6.2% between the YBE and the YMPE, and 8% in excess of the YMPE. Members contribute only on the amount earned up to the YMCE.

The YMCE is the sum of \$86,111 prior to April 1, 2009 or \$98,750 thereafter, and 30% of the YMPE for the year.

UNIVERSITY CONTRIBUTIONS

Basic Contributions

The University is required to contribute at the rate of 8.0% up to the YBE, 6.2% between the YBE and the YMPE and 8.0% in excess of the YMPE with no salary limitation applied, plus any special payments required under the Pension Benefits Act of Manitoba.

Additional Contributions

As a result of amendments to improve benefits effective November 10, 2008 and April 1, 2009 and the collective bargaining agreement between the University and BUFA, the provision for University contributions was amended for additional contributions. The University shall pay additional contributions equal to the normal actuarial cost of the benefit improvements made effective on the above dates but excluding the effect of the increase in the member contribution rate effective April 1, 2009.

Further, additional University contributions of 1.15% of salary effective November 10, 2008, increasing to 2.25% of salary effective April 1, 2009, are required for members who joined the Plan prior to January 1, 2008 with an Initial Amount, as defined in amendment 10/01, having a present value as at December 31, 2007 of \$5,107,000. Additional contributions under this provision shall cease when the outstanding balance on the Initial Amount is reduced to zero by any University contributions that are in excess of the University's portion of the normal actuarial cost of current service. The requirement under this provision had been fully satisfied previous to the date of this valuation.

Contributions Required to Satisfy Requirements of the Pension Benefits Act

The University is required to contribute the amounts required to satisfy the Pension Benefits Act of Manitoba and Regulations ("Act and Regulations"). If the University contributions required to satisfy the Act and Regulations exceed those amounts above (Basic and Additional), the University is required to make additional contributions to satisfy those requirements.



NORMAL RETIREMENT

The normal retirement date of all members is the first of the month following their 65th birthday.

EARLY RETIREMENT

A member may retire on the first day of any month within the ten-year period prior to his normal retirement date. If the member is age 60 or over and his age plus years of service equals 85 or more, there is no reduction on early pension commencement, otherwise the reduction is 1/3% for each month by which his early retirement date precedes the first date that he would have satisfied the "rule of 85, minimum age 60", had employment continued, but not later than age 65.

LATE RETIREMENT

A member who continues in employment after his normal retirement date continues to make contributions to the Plan and his pension does not commence until his actual retirement date or the end of the year in which the member attains age 71, if earlier.

PENSION

At retirement, the member is entitled to an annual pension equal to 2% of his final average earnings multiplied by the member's years of credited service less 0.6% of his CPP average earnings multiplied by the member's years of service since January 1, 1990. Final average earnings are the average of the best 5 years earnings in the last 12 prior to retirement. CPP average earnings are the member's average earnings up to the YMPE in the 5 years prior to retirement. For members who retired prior to April 1, 2009, the maximum annual pension was \$1,722.22 per year of credited service. Effective April 1, 2009, the maximum was increased to \$1,975.00 per year of credited service for members who retired on or after April 1, 2009.

FORMS OF PENSION

For members who retired prior to November 10, 2008, the normal form of pension at retirement was payable for life with a guarantee of 5 years' payments. Effective November 10, 2008, members retiring with a spouse at retirement receive a pension in the form of joint and survivor with 2/3 continuing to the surviving spouse. Other options are available on an actuarially equivalent basis.

PENSION INCREASES

For increases provided prior to December 31, 2013, pensions in payment and deferred pensions are increased automatically on July 1 by the same percentage as the investment return on the fund in the previous year, based on actuarial values, exceeds 6%, subject to a maximum increase of the CPI in that year. If the increase in any year is limited by the CPI increase and there was a previous year, or years, when the increase was less than the CPI, the University, on the advice of the Plan trustees, may provide a higher increase so that some or the entire shortfall may be made up.

The Plan was amended for increases provided after December 31, 2013 to revise the method of calculating supplemental pension increases. The amendment changes the calculation of the excess fund return to be the excess over 6% of the previous four-year geometric average rather than the excess over 6% of the actuarial return of smoothed assets in the previous year.



DEATH BENEFITS PRIOR TO RETIREMENT

The death benefit is the commuted value of the pension earned to the date of death.

BENEFITS ON TERMINATION OF EMPLOYMENT

A member who terminates employment is entitled to a deferred pension payable from normal retirement date.

50% of the deferred pension in respect of service after January 1, 1985 must be paid for by University contributions.

Members not eligible to commence an immediate pension upon termination of employment may transfer the commuted value of their accrued pension to a locked-in retirement account.

GREAT-WEST LIFE PENSIONERS

Those members who retired prior to May, 1989 had their pensions provided by an annuity purchased from Great-West Life. Each year additional amounts of annuities had been purchased to provide pension increases but beginning in 1999 any additional pensions for these members are paid from the fund.

Appendix B. ACTUARIAL ASSUMPTIONS AND METHODS

Going Concern Valuation

These assumptions are the same as those used at the previous valuation, except where noted.

Interest:

In order to determine the expected investment return on the investments of the Plan our model determined expected long-term capital market returns, standard deviations and correlations for each major asset class noted in Appendix E (universe bonds, Canadian equities, global equities, etc.) by using historic returns, current yields and forecasts. We then stochastically generated projected asset class returns for 5,000 paths over 30 years to create expected returns for each asset class. The simulated going concern discount rate was the return at the median of each asset class weighted by the asset mix percentages of the benchmark fund in the Managed Account Agreement between Connor, Clark and Lunn and the Pension Trustees.

We have assumed that there will be no added-value returns from the active management strategy employed in excess of the associated additional investment management fees.

Based on the methodology described above, the going concern discount rate assumption was developed as follows:

	Expected Return
Simulated gross investment return before margin and expenses	6.35%
Provision for investment management and administration expenses	(0.50%)
Provision for adverse deviations	(0.30%)
Going concern discount rate	5.55%

Expenses:

The interest rate assumption includes an implicit provision for investment and administration expenses paid from the Plan based on recent experience in the Plan.

Inflation:

We have assumed increases in the Consumer Price Index for Canada ("CPI") equal to 2.0% per year. We have based our assumed inflation rate on our estimate of future inflation considering the Bank of Canada's inflation target of 1% to 3% per annum. Our chosen rate is consistent with the implied market rate based on long term Government of Canada nominal bonds and long-term Government of Canada real return bonds.

Salary Increases:

Salaries are assumed to increase from 2018 levels as follows:

- i. General - 3.0% per year. This rate is based on an allowance for market implied inflation at December 31, 2018 of 2.0% per year plus real salary increases of 1.0% per year which is consistent with historical increases in the Canadian economy.
- ii. Promotional & Merit - Academic and non-union members – we have used a promotional and merit scale, extracts of which are shown below:

Age	Average Annual Increase over next 5 years	Average Annual Increase to age 65
30	3.1%	1.9%
35	2.9%	1.8%
40	2.7%	1.6%
45	2.6%	1.5%
50	2.4%	1.5%
55	2.4%	1.7%
60	2.3%	2.3%

Scheduled rate increases according to collective bargaining agreements are reflected in our valuation. A summary of the annual increases are as follows:

Year	Academic and non-union members	Non-Academic union members
2018	2.50%	3.00%
2019	0.00%	3.50%
2020	0.00%	1.00%
2021	0.75%	1.00%
2022	1.00%	1.75%
2023	*	2.00%

* increase rates as per our assumption above

Mortality:

The 2014 Public Sector Mortality Table without size adjustments (CPM2014Publ), projected with full generational improvements in mortality using CPM improvement Scale B (CPM-B), was used to estimate the incidence of death before and after retirement.

Termination:

Considering the size of the Plan, there is not adequate termination experience data appropriate for developing a table of termination probabilities. We have continued to assume termination probabilities in accordance with three times the probabilities from the Ontario Light Table, with zero probability for ages greater than or equal to 55. Sample rates are as follows:



Age	Probability of Termination
30	16.8%
35	9.6%
40	6.6%
45	5.1%
50	3.6%
55	0%

We have assumed that 75% of members terminating prior to becoming eligible for retirement will elect to receive their pension as a lump sum commuted value. The commuted values are calculated using an assumed rate of 4.0% per year. The remaining terminating members are assumed to receive a deferred pension from the Plan.

The assumed future commuted value discount rate is based on:

- Assumed current bond yields with an expectation that yields will rise in future years, and
- The inflation assumption of 2.0% per year

Retirement:

The retirement age of members has a financial impact on the Plan. We have developed the following table based on 5 years of retirement experience in the Plan from 2011 to 2016. This table will be re-evaluated as more experience is revealed and updated as appropriate when future valuations are performed.

Age	Probability of Retirement
55 - 57	5.0%
58	7.5%
59 - 61	10.0%
62 - 63	15.0%
64	25.0%
65	35.0%
66 - 69	25.0%
70+	100.0%

Deferred plan members are assumed to retire at age 55.

Year's Maximum Pensionable Earnings:

We have assumed that the CPP Year's Maximum Pensionable Earnings (YMPE) will increase annually based on average general increases in wages in Canada. For this valuation we have



assumed that the YMPE will increase from its 2019 level of \$57,400 by 3.0% per year. This is consistent with the general salary increase assumption.

For the previous valuation it was assumed that the YMPE would increase from its 2018 level of \$55,900 by 3.0% per year.

Future Pension Increases:

Pensions in pay and deferred pensions are increased annually by an amount equal to the excess of the four-year average investment return of the fund over a base rate of 6.0%, limited by the increase in the Consumer Price Index for Canada. Despite assuming that the fund will earn 5.55% per year on average over the long term, based on the asset mix of the fund we expect that there will be years where the fund return will exceed 6.0% and increases in pensions will be granted. Pensions for retired and deferred members will not be increased in 2019. We have assumed that pensions will subsequently increase following 2019 by 0.75% per year thereafter.

Future increases in respect of pensions paid by Great-West Life:

Pension for retired and deferred members will not be increase in 2019. We have assumed pensions will subsequently increase following 2019 by 0.75% per year. We have included in our valuation a provision for the full amount of pension increases to be paid out of the Plan with respect to pensions paid by Great-West Life.

Actuarial value of assets:

For this valuation, we have continued to use an actuarial value of assets that smooths excess investment returns over a four-year period relative to the assumed investment return. The assumed investment return is the rate applicable from the prior actuarial valuation for each year during the smoothing period. The applicable assumed investment returns are shown below:

Year	Assumed Investment Return
2015	5.65%
2016	5.55%
2017	5.55%
2018	5.55%

We further restrict the actuarial value of assets to be within 5% of the market value of assets, if required.

Family composition:

Because members who are married at the time of retirement receive a joint and survivor pension with 2/3rds of the pension continuing to the spouse and single members receive a lifetime pension guaranteed for five years, the marital status at retirement can have a financial impact on the Plan. Reliable data on family composition at retirement is unavailable for this Plan. We have assumed that 85% of male members and 70% of female members have a spouse at retirement and the male spouse is three years older than the female spouse which is typical for pension plans in general.



GOING-CONCERN VALUATION METHOD

We have used a projected unit credit actuarial cost method. This values the benefits for accrued service to the valuation date by projecting salaries to retirement, determining the pension at retirement and discounting the value back to the valuation date. We compare the value of the liabilities in respect of service after 1984 to the contributions plus interest in respect of the same period to determine if the 50% test is applicable. If it is, we make the appropriate adjustment to the liability. Ancillary benefits on death or termination of employment are valued in a similar manner.

The liability for sessional employees who had no pensionable earnings in 2018 is determined to be two times their accumulated contributions with interest as at December 31, 2018.

The University's current service cost under this method is the excess of the cost of benefits which will arise in the year following the valuation over the member's contributions in that year.

Solvency and Wind-up Valuation

The following summarizes the actuarial assumptions used for the Solvency and Wind-up Valuations:

Actuarial value of assets:	Solvency: Smoothed value based on four-year smoothing relative to an expected return of: <ul style="list-style-type: none">• 2015: 5.65% per year• 2016: 5.55% per year• 2017: 5.55% per year• 2018: 5.55% per year
	Wind-up: Market value
Interest:	3.20% per year for annuity purchase ¹ 3.20% per year for 10 years and 3.40% per year thereafter for lump sum transfer.
Future increases in Pensionable Earnings:	None
Mortality:	CPM2014 (Combined) Mortality Table with mortality improvement projected generationally in accordance with Scale CPM-B.

¹ In accordance with the CIA Educational Note, the spread above the unadjusted CANSIM series V39062 was determined to be 108 basis points based on a duration of 10.5 for the portion of the liability assumed to be settled through the purchase of annuities. Accordingly, the discount rate assumed for the purchase of non-indexed annuities is 3.20%.



Marital Status	85% of male members are married, 70% of female members are married, with male spouse 3 years older than female spouse.
Proportion electing annuity purchase	100% of retirees and 100% of active and deferred members age 55 & older. All others elect a lump sum transfer of the commuted value.
Allowance for wind-up expenses:	\$310,000 (approximately \$50,000 plus \$275 per member). Excludes costs related to surplus/deficit distribution issues on plan wind-up. Assumes all expenses will be paid from the Plan in the event of wind-up.
Pension Increase	We have made no allowance for any assumed future pension increases.

The liability for sessional employees who had no pensionable earnings in 2018 is determined to be two times their accumulated contributions with interest as at December 31, 2018.

Incremental Cost

The incremental cost is the present value, at the valuation date, of the expected aggregate change in the hypothetical wind-up or solvency liability between the valuation date and the next valuation date. It also reflects expected benefit payments between the valuation date and the calculation date.

In our report we have determined the incremental cost under the solvency basis. The incremental cost was determined as the sum of (a) and (b) minus (c)

- (a) the projected solvency liability at the next valuation date for those members at the current valuation date, allowing for expected decrements and change in membership status, service accrual and increase in earnings between the current valuation date and the next valuation date. An adjustment was made for new entrants between the two valuation dates. The demographics and earnings of the new entrants are consistent with the new entrants hired over the past year. An adjustment was also made for the cost of living increase to be granted to retired and deferred members prior to the end of the year, if any. The resulting projected solvency liability was then discounted with interest to the current valuation date;
- (b) the present value of the benefit payments expected to be paid between current valuation date and the next valuation date, discounted with interest to the current valuation date;
- (c) the solvency liability as at the current valuation date.

For purposes of calculating the solvency incremental cost, the expected decrements, as well as the expected benefit payments between the current valuation date and the next, were determined using the going concern demographic assumptions. The projected solvency liability at the next valuation date was determined using the same method and assumptions as disclosed in this Appendix. In particular, we have assumed that the discount rates will remain the same



throughout the projection period and the Standards of Practice for determining commuted value rates in effect at the valuation date will remain unchanged, as will the current educational guidance on the estimation of annuity purchase costs.



Appendix C. MEMBERSHIP DATA

This section provides a summary of membership data used in the valuation. Eckler provides membership record keeping and administration services for the Plan, updated based on an annual report provided by the University. The data was compiled from our records as at December 31, 2018. We have reconciled the data with that used in the previous valuation and are satisfied that the data are sufficient and reliable for the purposes of the valuation.

Active Members^{2,3}	12.31.2018	12.31.2017
Number of Members	486	455
Average Pensionable Earnings ⁴	\$78,641	\$77,406
Average Credited Service	10.1	10.3
Average Age	49.0	49.0
Total Required Contributions with Interest	\$23,950,015	\$22,444,288
Total Additional Voluntary Contributions with Interest	\$142,766	\$167,514

Deferred Pensioners	12.31.2018	12.31.2017
Number of Members	73	78
Average Age	54.3	53.0
Average Annual Deferred Pension Payable at 65	\$5,749	\$5,833

² Active Members includes sessional employees with earnings in the calendar year prior to the valuation date.

³ For December 31, 2018, the date includes three members that may be retroactively enrolled in 2019 for whom we have included an liability as at December 31, 2019.

⁴ Earnings shown represent the actual earnings in the year prior to the valuation date. Earnings for new entrants have been annualized.

Pensioners and Survivors	12.31.2018	12.31.2017
Number of Lifetime Pensions	331	328
Average Age (Lifetime Pensions)	74.9	74.8
Average Annual Lifetime Pension ⁵	\$26,347	\$25,792
Number of Certain Only Pensions	1	1
Average Annual Certain Only Pension	\$11,393	\$11,189
Number of Great-West Life Pensions	10	11
Average Age (Great-West Life Pensions)	93.2	92.7
Average Annual Great-West Life Pension	\$10,047	\$9,379
Sessional Employees⁶	12.31.2018	12.31.2017
Number of Members	47	43
Total Required Contributions with Interest	\$108,045	\$107,795

⁵ Includes one member who returned to work and has suspended pension payments

⁶ Sessional Members includes sessional employees that did not have any pensionable earnings in the calendar year prior to the valuation date.



Distribution of Active Membership

The following tables summarize the distribution of active membership by age and credited service. We have included the count of members in each group and shown their average pensionable earnings for 2018.

Academic and Non-Union Members

Age Group	Credited Service								Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35+	
25 - 29	5								5
	42,358								42,358
30 - 34	20	4							24
	60,820	91,142							65,874
35 - 39	38	4	1	1					44
	70,451	72,713	*	*					72,336
40 - 44	34	8	7	1					50
	70,093	86,262	90,785	*					76,002
45 - 49	19	7	7	11					44
	63,951	107,587	115,039	110,266					90,600
50 - 54	15	6	12	8	3	1	1		46
	60,317	97,445	114,868	118,068	*	*	*		95,848
55 - 59	19	4	11	10	8	5			57
	45,769	102,988	115,075	125,619	145,848	122,101			97,910
60 - 64	10	4	14	11	6	4	3	1	53
	57,018	128,601	83,959	118,794	127,352	172,137	*	*	104,315
65 - 69	2	1	4	4	3	1	1	3	19
	*	*	113,747	101,115	*	*	*	*	122,833
70 - 74	1	1					1	1	4
	*	*					*	*	90,200
Total	163	39	56	46	20	11	6	5	346
	63,079	97,079	103,984	115,724	139,020	140,510	124,777	137,215	89,524

*Earnings in cells with fewer than three members have been suppressed.



Non-Academic Union Members

Age Group	Credited Service								Total
	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35+	
0 - 25	1								1
	*								*
25 - 29	4	1							5
	48,011	*							50,306
30 - 34	14	3	1						18
	48,497	*	*						50,424
35 - 39	7	10	2	1					20
	50,289	58,928	*	*					54,871
40 - 44	6	5	5	4					20
	47,580	52,205	53,415	64,499					53,579
45 - 49	5	1	3	2		2			13
	44,279	*	*	*		*			52,283
50 - 54	2	1	3	2	2	1	1		12
	*	*	*	*	*	*	*		52,925
55 - 59	6	3	2	6	2	4	2		25
	45,295	*	*	46,783	*	57,784	*		48,484
60 - 64			2	2	4	3	5	2	18
			*	*	53,647	*	56,895	*	55,845
65 - 69		1	1		2	1		1	6
		*	*		*	*		*	43,473
70 - 74	2								2
	*								*
Total	47	25	19	17	10	11	8	3	140
	47,170	54,739	53,955	52,524	49,464	56,412	56,292	*	51,744

**Earnings in cells with fewer than three members have been suppressed.*



The following table summarizes the distribution of inactive members by age.

Pensioner and Survivor Lifetime Pensions			Deferred Pensioners		
Age	Count	Average Annual Lifetime Pension	Age	Count	Average Annual Deferred Pension Payable at 65
55 - 59	6	\$16,957	30 - 34	3	\$3,948
60 - 64	19	\$19,320	35 - 39	4	\$4,390
65 - 69	73	\$24,077	40 - 44	6	\$5,090
70 - 74	69	\$34,163	45 - 49	8	\$6,543
75 - 79	76	\$28,579	50 - 54	10	\$7,366
80 - 84	45	\$25,201	55 - 59	19	\$5,291
85 - 89	24	\$23,331	60 - 64	15	\$5,290
90 - 94	17	\$15,107	65 - 69	5	\$6,597
95+	2	\$7,219	70+	3	\$6,952
Total	331	\$26,347	Total	73	\$5,749



The following table summarizes the changes in membership since the previous valuation.

Reconciliation of Membership

	Active ⁷		Pensioner ⁸	Deferred	Sessional ⁹	Total
	Academic and non-union members	Non-Academic union members				
At December 31, 2017	318	137	329	78	43	905
New entrants	44	11		1	3	59
Sessional to active						-
Active to sessional	(5)				5	-
Terminations						
- Deferred	(3)			4	(1)	-
- Paid out	(4)	(4)		(5)	(2)	(15)
Retirements						
- Pension	(3)	(4)	12	(5)		-
Death	(1)		(11)	(1)		(13)
Survivors			3			3
At December 31, 2018	346	140	333	72	48	939

⁷ Includes sessional employees with earnings in the year prior to the valuation date.

⁸ Includes one member who has returned to work and has suspended pension payments

⁹ Sessional employees with no earnings in the year prior to valuation date.



Appendix D. PLAN ASSETS

Assets of the Plan are held in trust with CIBC Mellon. The funds are invested in a number of pooled funds operated by Connor, Clark, & Lunn. We have relied on the draft financial statements for the fund prepared by Brandon University for the December 31, 2018 year-end, as well as information provided by CIBC Mellon to determine the assets of the Plan.

Asset Mix Policy

	Minimum	Maximum	Benchmark
Canadian Equities	25%	55%	35%
U.S. Equities	0%	30%	12.5%
International Equities	0%	30%	12.5%
Bonds	30%	70%	35%
Real Estate	0%	5%	0%
Cash and Equivalents	0%	40%	5%
Total			100.0%

Total exposure to equities is to be no less than 35% of the pension fund and no more than 70% of the pension fund.

FINANCIAL STATEMENTS

A summary of the change in assets since January 1, 2016, provided by the University, is summarized below:

	2016	2017	2018
Balance at January 1	159,207,717	169,952,516	185,433,809
Member Contributions	2,313,213	2,322,506	2,314,296
University Contributions	4,292,569	3,701,727	3,289,314
Transfers	34,244	30,681	53,355
Investment Income	4,285,567	5,421,198	4,793,796
Realized Gains + Losses	12,000,480	11,148,570	5,172,202
Change in Market Values	(3,004,792)	2,756,720	(14,227,750)
Other income	0	229	7
Pensions Paid	(7,518,346)	(8,039,812)	(8,683,502)
Termination Payments	(916,346)	(238,395)	(837,841)
Death Payments	0	(880,835)	(155,733)
Expenses	(741,790)	(741,296)	(878,321)
Balance at December 31	169,952,516	185,433,809	176,273,632

The market value of assets as at December 31, 2018 shown above is equal to the invested assets of \$175,525,784 plus contributions receivable equal to \$873,963 minus payables equal to \$126,115.

ACTUARIAL VALUE OF ASSETS

To place a value on the assets for actuarial valuation purposes, we have used an approach which smooths out the volatility of the market valuation by amortizing excess investment earnings net of expenses over the assumed investment earnings for the same period based on the actuarial valuation in effect at the time. Specifically, net investment earnings in excess of the following assumed rates are amortized over a four-year period. We further restrict the actuarial value of assets to be within 5% of the market value, if required.

Year	Assumed Investment Return		Actual Net Investment Return	Excess Net Investment Return
2015	5.65%	8,725,488	6,069,006	(2,656,482)
2016	5.55%	8,786,226	12,539,465	3,753,239
2017	5.55%	9,346,225	18,585,192	9,238,967
2018	5.55%	10,180,018	(5,140,073)	(15,320,091)



In practical terms, the actuarial asset value includes 100% of the excess investment earnings from 2015, 75% from 2016, 50% from 2017 and 25% from 2018.

The actuarial asset value is derived as follows:

Market value at Dec. 31, 2018				176,273,632
-75% of 2018 excess investment earnings	0.75 x	(15,320,091)	=	11,490,068
-50% of 2017 excess investment earnings	0.50 x	9,238,967	=	(4,619,483)
-25% of 2016 excess investment earnings	0.25 x	3,753,239	=	(938,310)
-0% of 2015 excess investment earnings	0.00 x	(2,656,482)	=	0
Actuarial value at Dec. 31, 2018, before limit				182,205,907
Actuarial value as a percent of market value				103.4%

The actuarial value of assets must be within 5% of the market value of assets. As shown above, the actuarial value is within 5% of the market value and therefore no restriction applies.

INVESTMENT RETURN

Assuming that all cash flows occurred in the middle of the year, the pension fund earned a rate net of return of expenses of -2.80% based on the market value of assets and 5.10% based on the actuarial value of assets in 2018.

Appendix E. CERTIFICATE OF TRUSTEES

With regards to the December 31, 2018 actuarial report for the Brandon University Retirement Plan, we hereby certify that, to the best of our knowledge and belief:

- A copy of the official Plan document and all amendments made to December 31, 2018, were provided to the actuary;
- The membership data provided to the actuary includes a complete and accurate description of every person who is entitled to benefits under the terms of the Plan for service up to December 31, 2018; and
- All events subsequent to December 31, 2018 that may have an impact on the valuation have been communicated to the actuary.
- The valuation reflects the terms of the engagement with the actuary, in particular the use of a 5.55% valuation interest rate.

Signature

Signature

Title

Title

Date

Date