DALHOUSIE UNIVERSITY
STAFF PENSION PLAN

REPORT ON THE ACTUARIAL VALUATION AS AT JANUARY 31, 2020

(REGISTRATION NO. C242297)

OCTOBER 2020

PREPARED BY:

ECKLER

1969 UPPER WATER STREET, SUITE 503
HALIFAX, NOVA SCOTIA
B3J 3R7

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SUMMARY OF RESULTS

Going Concern Financial Position	All Figures in ($000's) January 31, 2020
Going concern value of assets	$1,486,423
Going concern actuarial liabilities	(1,425,755)
Provision for adverse deviations ("PfAD")	(109,758)
Going concern excess / (unfunded actuarial liabilities)	($49,090)
Required PfAD	7.70%

Solvency Financial Position	January 31, 2020
Solvency assets	$1,484,330
Solvency liabilities x % for measuring solvency deficiency*	(1,580,475)
Solvency excess / (deficiency) excluding present value of special payments	($96,145)
Solvency concerns ratio	79.9%

* *85% at January 31, 2020, 100% at previous valuations*

Wind-up Financial Position	January 31, 2020
Wind-up assets	$1,484,330
Total wind-up liabilities	(1,859,382)
Wind-up surplus / (deficiency)	($375,052)
Transfer ratio	79.9%

Funding Requirements (annualized)	January 31, 2020 % of Payroll	 $
Estimated pensionable earnings		268,922
Total annual current service cost	16.71%	44,926
Employee regular contributions	6.06%	16,308
Employee supplementary contributions	2.00%	5,378
Employer matching regular contributions	6.06%	16,308
Balance of cost = employer "overmatching contribution"	2.59%	6,932
Employer contributions as a percentage of employee contributions	107.32%	
Minimum special payments in 2020/21 towards amortization of unfunded actuarial liabilities		$918
Total minimum employer contributions in year following valuation		$24,597
Maximum contribution		$398,292

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SECTION I INTRODUCTION AND PURPOSE OF VALUATION

At the request of Dalhousie University, we have completed an actuarial valuation of the *Dalhousie University Staff Pension Plan* (the "Plan") as of January 31, 2020. The last actuarial valuation was performed as at March 31, 2019.

The regulations under the Nova Scotia *Pension Benefits Act* have changed for actuarial valuations effective on and after December 31, 2019. This report is based on those new regulations. Further discussion of the new rules follows in the relevant sections of this report.

The purposes of this actuarial valuation are as follows:

- to determine the financial position of the Plan on going concern, solvency, and hypothetical wind-up bases;
- to establish the minimum and maximum contributions to the Plan until the next valuation; and
- to meet the statutory filing requirements under the Nova Scotia *Pension Benefits Act* and the *Income Tax Act* (Canada).

In this report, we have first provided the valuation results, along with an actuarial opinion with recommended funding levels for use until the next valuation. The data, actuarial assumptions and methodology used in valuing both the assets and the actuarial liabilities are provided by way of appendices for ease of reference.

The intended users of this report are Dalhousie University, the Nova Scotia Superintendent of Pensions and the Canada Revenue Agency. This report is not intended or necessarily suitable for purposes other than those listed above. Any party reviewing this report for other purposes should have their own actuary or other qualified professional assist in their review to ensure that the party understands the assumptions, results and uncertainties inherent in our estimates.

The next valuation of the Plan must be completed as at a date no later than January 31, 2023.

Reliance

We have relied on the asset information in the financial statements provided by Dalhousie University. We have also relied on the Plan sponsor to provide all relevant data and to confirm the pertinent Plan terms.

SECTION II PLAN CHANGES AND SUBSEQUENT EVENTS

This pension plan is a "best average salary" defined benefit plan. This means that each Member's retirement pension is calculated as a specified percentage (2% in this case) of his or her average salary during the best three years of membership in the Plan.

The previous valuation was prepared as at March 31, 2019. There have been no amendments or changes to the Plan between the last actuarial valuation and this valuation effective January 31, 2020.

A detailed description of the current provisions of the Plan is contained in Appendix E, at the end of this report.

Actuarial Assumptions

There have been changes to the going concern assumptions since the last valuation. We have increased the pre-retirement discount rate assumption to 6.30% from 6.00% used at the previous valuation to reflect the current expectation of the long-term rate of return, and to remove the margin for adverse deviations that was previously included. In respect of the post-retirement period, we have maintained the assumption used in the previous valuation for PTF liabilities and as specified in the Plan Rules, i.e., 4.55% per annum. This post-retirement interest rate incorporates some conservatism in that it includes (in accordance with plan rule 9(b)) a "holdback as a provision against life expectancy variations and other contingencies". For RTF liabilities, we have removed the holdback in the post-retirement interest rate resulting in a rate of 5.05% per annum for the January 31, 2020 valuation.

With the removal of the holdback in the interest rate for RTF liabilities, size adjustments factors of 0.876 for males and 0.970 for females have been applied to the mortality table.

There have been no other changes to the going concern assumptions since the last valuation.

The solvency assumptions have been changed to reflect market conditions at the valuation date.

The actuarial assumptions used in the valuation are provided in Appendix B.

Since January 31, 2020, and as of the date of this report, there has been significant volatility in global equity markets (a significant deterioration following by a period of correction) as well as declining bond yields in connection with COVID-19. At the time this report was prepared, it was too soon to know the impact on the market value of assets, underlying assumptions and any other effects related to COVID-19. These effects therefore are not reflected in the valuation results and as such, the plan's financial position shown in this report may be materially different if those factors were incorporated in our valuation. These effects, once better understood, will be revealed in future valuations.

The Actuarial Standards Board (ASB) published amendments to the CIA Standards of Practice (Section 3500: practice-specific standards for pension commuted values) on January 24, 2020 with an effective date of August 1, 2020. On April 6, 2020, the ASB announced it has decided to delay the effective date of the new Standard of Practice to be a date no earlier than December 1, 2020. The effect, if any, of this new Standard of Practice has not been incorporated into this valuation.

We are not aware of any other events that occurred between the valuation date and the date this report was completed that would have a material impact on the results of this valuation.

SECTION III GOING CONCERN VALUATION UNDER PRIOR FUNDING RULES

This section provides results of the valuation under the funding rules that existed prior to April 1, 2020 (the "prior rules") applicable for valuations with effective dates before December 31, 2019. Actuarial assumptions used in these results are the same as the actuarial assumptions used in the March 31, 2019 valuation. The purpose of providing results on this basis is to be able to compare with the results of the previous valuation as well as to provide information required for phasing in funding requirements under the new rules.

The tables below set out the going concern valuation balance sheet as of January 31, 2020 for the Pension Trust Fund (PTF), the Retirees Trust Fund (RTF), and the Plan as a whole, respectively. The results as at March 31, 2019 are also shown for comparative purposes.

PENSION TRUST FUND - GOING CONCERN ACTUARIAL BALANCE SHEET
(ALL FIGURES IN $000'S)

	March 31, 2019	January 31, 2020
Going concern assets		
Market value of assets	$737,213	$769,240
Financial statement (payables) / receivables	(9,599)	(16,585)
Total going concern assets	$727,614	$752,655
Going concern actuarial liabilities		
Active members	$709,977	$709,733
Additional voluntary contributions	395	332
Deferred pensioners and pending transfers	53,807	60,056
Termination solvency holdbacks	429	377
Total going concern actuarial liabilities	$764,608	$770,498
Going concern excess / (unfunded actuarial liability)	**($36,994)**	**($17,843)**

RETIREES TRUST FUND - GOING CONCERN ACTUARIAL BALANCE SHEET
(ALL FIGURES IN $000'S)

	March 31, 2019	January 31, 2020
Going concern assets		
Market value of assets	$658,106	$718,785
Financial statement (payables) / receivables	3,547	14,090
Total going concern assets	$661,653	$732,875
Going concern actuarial liabilities		
Pensioners and beneficiaries	$613,153	$671,069
Deferred members	17,948	17,601
Total going concern actuarial liabilities	$631,101	$688,670
Going concern excess / (unfunded actuarial liability)	**$30,552**	**$44,205**

TOTAL PLAN - GOING CONCERN ACTUARIAL BALANCE SHEET
(ALL FIGURES IN $000'S)

	March 31, 2019	January 31, 2020
Going concern assets		
Market value of PTF assets*	$727,614	$752,655
Market value of RTF assets*	661,653	732,875
Total going concern assets	$1,389,267	$1,485,530
Going concern actuarial liabilities		
PTF actuarial liabilities	$764,608	$770,498
RTF actuarial liabilities	631,101	688,670
Total going concern actuarial liabilities	$1,395,709	$1,459,168
Going concern excess / (unfunded actuarial liability)	**($6,442)**	**$26,362**

* *Net of (Payables)/Receivables*

As shown above, the January 31, 2020 actuarial valuation has revealed a going concern excess under the prior funding rules in the amount of $26,362,000. This compares to a going concern unfunded actuarial liability at the previous valuation of $6,442,000.

Reconciliation of Going Concern Financial Position

The reconciliation provides an independent cross-check of the calculations performed, and also determines the chief reasons leading to the changes in the going concern financial position that have occurred since the previous valuation date.

Although a complete analysis down to the final dollar can be made, such an analysis requires the processing of a considerable amount of detailed data relating to the Plan, the expense of which would not normally be justified unless there were special circumstances. However, it is possible to make an approximate analysis along broader lines and under normal circumstances, this type of analysis will produce meaningful results.

The table below summarizes the results of our reconciliation of change in financial position over the period under consideration.

ANALYSIS OF SOURCES OF GAIN AND LOSS BETWEEN MARCH 31, 2019 AND JANUARY 31, 2020 (GOING CONCERN VALUATION)

	PTF	RTF	Total
Going concern excess / (unfunded liability) at March 31, 2019	(36,994)	30,552	(6,442)
Interest on market value surplus / (deficit)	(1,850)	1,161	(689)
Investment income greater / (less) than expected	21,713	25,815	47,528
Special payments plus interest	942	0	942
Salary increases (greater) / less than expected	2,386	0	2,386
Change in maximum pension less than expected	923	0	923
Retirement, termination, active death experience	(1,665)	0	(1,665)
Change in prescribed interest rates for pending terminations	(3,607)	0	(3,607)
Cost of indexing	0	(11,197)	(11,197)
Pensioner mortality experience	0	(2,874)	(2,874)
Miscellaneous experience gains / (losses)[1]	309	748	1,057
Going concern excess / (unfunded liability) at January 31, 2020	**(17,843)**	**44,205**	**26,362**

[1] *Miscellaneous experience includes all items not specifically traced, and imprecision imposed by valuation and measurement methodologies in some of the items that are traced. Included are experience gains and losses associated with the basis implicit in PTF to RTF transfers (e.g., assumed versus actual proportion of married members among new retirees), data refinements, and the interplay among assumptions in dealing with actual versus expected results.*

Current Service Cost

The Plan's current service cost (also referred to as the "normal cost") is the value of the benefits accruing to members in the year following the valuation, determined on a going concern basis.

The table below summarizes the results of the Plan's current service cost for the 12-month period following January 31, 2020.

CURRENT SERVICE COST

	% of Payroll	($000's)
Estimated pensionable earnings		268,922
Total annual current service cost	17.21%	46,283
Employee regular contributions	6.06%	16,308
Employee supplementary contributions	2.00%	5,378
Employer matching regular contributions	6.06%	16,308
Balance of cost = employer "overmatching contribution"	3.09%	8,289
Employer contributions as a percentage of employee contributions	113.52%	

The cost of benefits accruing in respect of the year following the valuation date is $46,283,000. This amounts to 17.21% of active contributory payroll. The table below summarizes the estimated employee and employer current service contributions for the four years commencing January 31, 2020, assuming pensionable earnings of $268,922,000 for 2020-2021 and increasing by 3.50% per annum in the years following.

	Feb. 1, 2020 – Jan. 31, 2021	Feb. 1, 2021 – Jan. 31, 2022	Feb. 1, 2022 – Jan. 31, 2023	Feb. 1, 2023 – Jan. 31, 2024
Estimated contributory payroll	268,922,000	278,334,000	288,076,000	298,159,000
Estimated total value of benefits for service	46,283,000	47,901,000	49,578,000	51,313,000
Estimated total employee contributions	21,686,000	22,434,000	23,219,000	24,031,000
Estimated total employer contributions	24,597,000	25,467,000	26,359,000	27,282,000

The total current service cost has decreased from 17.32% of payroll to 17.21% of payroll, as a result of the net impact of demographic changes. The following sets out an approximate reconciliation of the change in the total current service cost as a percentage of payroll:

CURRENT SERVICE COST RECONCILIATION

	% of Payroll
Total current service cost as at the previous valuation	17.32%
Demographic changes	(0.11%)
Total current service cost as at the current valuation	17.21%

Special Payments

In addition to current service contributions, special payments may be required in order to amortize any Plan deficiencies. The valuation as at January 31, 2020 revealed a going concern excess under the prior funding rules. Therefore, under the prior funding rules, there would be no new special payments required, and previously established special payments could cease immediately.

SECTION IV GOING CONCERN VALUATION UNDER CURRENT FUNDING RULES

This section provides results under the funding rules for valuations with effective dates on or after December 31, 2019 (the "current rules"). In accordance with the Regulations, the going concern valuation must reflect an explicit provision for adverse deviations ("PfAD"), which is to be applied to the going concern liabilities. A PfAD of 7.7% was determined – more information on the determination of the PfAD is provided in Appendix B of this report.

The tables below set out the going concern valuation balance sheet as of January 31, 2020 for the Pension Trust Fund (PTF), the Retirees Trust Fund (RTF), and the Plan as a whole, respectively.

PENSION TRUST FUND - GOING CONCERN ACTUARIAL BALANCE SHEET
(ALL FIGURES IN $000'S)

	January 31, 2020
Going concern assets	
Market value of assets	$769,240
Financial statement (payables) / receivables	(16,585)
Present value of special payments*	893
Total going concern assets	$753,548
Going concern actuarial liabilities	
Active members	$694,084
Additional voluntary contributions (AVCs)	332
Deferred pensioners and pending transfers	60,056
Termination solvency holdbacks	377
Total going concern actuarial liabilities	$754,849
PfAD = 7.7% of actuarial liabilities (excluding AVCs)	58,098
Total going concern liabilities including PfAD	$812,947
Going concern excess / (unfunded liability)	**($59,399)**

* *Equal to the present value of one year of special payments from the March 31, 2019 actuarial valuation (i.e., the present value of an annual payment of $918,000 to be made in the year ending January 31, 2021).*

RETIREES TRUST FUND - GOING CONCERN ACTUARIAL BALANCE SHEET
(ALL FIGURES IN $000'S)

	January 31, 2020
Going concern assets	
Market value of assets	$718,785
Financial statement (payables) / receivables	14,090
Total going concern assets	$732,875
Going concern actuarial liabilities	
Pensioners and beneficiaries	$653,489
Deferred members	17,417
Total going concern actuarial liabilities	$670,906
PfAD = 7.7% of actuarial liabilities	51,660
Total going concern liabilities including PfAD	$722,566
Going concern excess / (unfunded liability)	**$10,309**

TOTAL PLAN - GOING CONCERN ACTUARIAL BALANCE SHEET
(ALL FIGURES IN $000'S)

	January 31, 2020
Going concern assets	
Market value of PTF assets*	$752,655
Market value of RTF assets*	732,875
Present value of special payments	893
Total going concern assets	$1,486,423
Going concern actuarial liabilities	
PTF actuarial liabilities	$754,849
RTF actuarial liabilities	670,906
Total going concern actuarial liabilities	$1,425,755
PfAD = 7.7% of actuarial liabilities (excluding AVCs)	109,758
Total going concern liabilities including PfAD	$1,535,513
Going concern excess / (unfunded liability)	**($49,090)**

* *Net of (Payables)/Receivables*

As shown above, the January 31, 2020 actuarial valuation has revealed a going concern unfunded liability in the amount of $49,090,000.

Reconciliation of Going Concern Financial Position from Results under Prior Funding Rules

The table below summarizes the reconciliation of change in financial position between the results shown under the prior funding rules, and the results shown under the current funding rules.

	PTF	RTF	Total
Going concern excess / (unfunded liability) under prior funding rules	($17,843)	$44,205	$26,362
PV of one year of special payment from the March 31, 2019 valuation	893	-	893
Change in economic assumptions	15,649	28,316	43,965
Change in demographic assumptions	-	(10,551)	(10,551)
Provision for adverse deviations (PfAD)	(58,098)	(51,660)	(109,758)
Going concern excess / (unfunded liability) at January 31, 2020	**($59,399)**	**$10,309**	**($49,090)**

Current Service Cost

The Plan's current service cost (also referred to as the "normal cost") is the value of the benefits accruing to members in the year following the valuation, determined on a going concern basis.

The table below summarizes the results of the Plan's current service cost for the 12-month period following January 31, 2020.

CURRENT SERVICE COST

	% of Payroll	($000's)
Estimated pensionable earnings		268,922
Total annual current service cost	16.71%	44,926
Employee regular contributions	6.06%	16,308
Employee supplementary contributions	2.00%	5,378
Employer matching regular contributions	6.06%	16,308
Balance of cost = employer "overmatching contribution"	2.59%	6,932
Employer contributions as a percentage of employee contributions	107.32%	

The cost of benefits accruing in respect of the year following the valuation date is $44,926,000. This amounts to 16.71% of active contributory payroll. The table below summarizes the estimated employee and employer current service contributions for the four years commencing January 31, 2020, assuming pensionable earnings of $268,922,000 for 2020-2021 and increasing by 3.50% per annum in the years following.

	Feb. 1, 2020 – Jan. 31, 2021	Feb. 1, 2021 – Jan. 31, 2022	Feb. 1, 2022 – Jan. 31, 2023	Feb. 1, 2023 – Jan. 31, 2024
Estimated contributory payroll	268,922,000	278,334,000	288,076,000	298,159,000
Estimated total value of benefits for service	44,926,000	46,510,000	48,137,000	49,822,000
Estimated total employee contributions	21,686,000	22,434,000	23,219,000	24,031,000
Estimated total employer contributions	23,240,000	24,076,000	24,918,000	25,791,000

The table below summarizes the reconciliation of current service cost between the results shown under the prior funding rules, and the results shown under the current funding rules.

	% of Payroll
Total current service cost under prior funding rules	17.21%
Change in economic assumptions	(0.50%)
Total current service cost at January 31, 2020	16.71%

Sensitivity Analysis

Below we show the impact on the going concern actuarial liability and the 2020/21 current service cost as at January 31, 2020 of a one percentage point drop in the discount rate assumption. All other assumptions were kept unchanged.

	Impact of 1% Drop
Total Going Concern Actuarial Liability (excluding PfAD)	$1,623,989,000
Total Current Service Cost	$55,183,000

The change would have the impact of increasing the going concern liabilities by $198,234,000, or 13.9%. The change in the discount rate would have the impact of increasing the current service cost by $10,257,000 or 22.8% as at January 31, 2020. With employee regular and supplementary contributions remaining at a total 8.06% of pay, the employer contribution requirement (i.e., matching and overmatching) would rise to 12.46% of pay (i.e., a total cost of 20.52% of pay).

Special Payments

In addition to current service contributions, special payments are required in order to amortize the Plan's going concern unfunded liability.

Under the new Regulations, the special payment in the year following the valuation is $918,000 (equal to one special payment from the March 31, 2019 actuarial valuation), followed by special payments equal to that required to amortize the going concern unfunded liability over a 10-year period (starting effective one year following the valuation date) detailed as follows:

ANNUAL SPECIAL PAYMENTS DETERMINED AS AT JANUARY 31, 2020[2]

Payment Type	Date Established	Term Remaining as at January 31, 2020	Annual Payment ($000's)	Present Value of Remaining Payments[2] ($000's)
Going Concern	January 31, 2020	10 years[1]	6,956	49,090
Total			**$6,956**	**$49,090**

[1] *As per Regulations 99(3) of the Nova Scotia Pension Benefits Act, the special payments to liquidate the going concern unfunded liability must be made over a period no longer than 10 years beginning 1 year after the valuation date. Consequently, the special payment established as at January 31, 2020 should commence on February 1, 2021.*

[2] *Present value of payments calculated at 6.30% interest rate.*

In summary, under the current rules (i.e., new Regulations), the minimum required annual special payments are $918,000 for the year ending January 31, 2021, followed by special payments of $6,956,000 per annum starting February 1, 2021 until the next valuation.

The Plan has a solvency funding exemption as per subsection 19(6) of the Regulations under the Nova Scotia *Pension Benefits Act*; therefore, no special payments are required to amortize the Plan's solvency deficiency.

SECTION V SOLVENCY VALUATION

The tables below set out the solvency valuation balance sheet as of January 31, 2020 for the Pension Trust Fund (PTF), the Retirees Trust Fund (RTF), and the Plan as a whole, respectively. The results as at March 31, 2019 are also shown for comparative purposes.

PENSION TRUST FUND – SOLVENCY BALANCE SHEET
(ALL FIGURES IN $000'S)

	March 31, 2019	January 31, 2020
Solvency assets		
Market value of assets	$737,213	$737,213
Financial statement (payables) / receivables	(9,599)	(16,585)
Estimated wind-up expenses	(1,200)	(1,200)
Total solvency assets	$726,414	$751,455
Solvency liabilities		
Active members	$921,556	$978,138
Additional voluntary contributions	395	332
Deferred Pensioners and Pending transfers	53,807	60,056
Termination solvency holdbacks	429	377
Total solvency liabilities	$976,187	$1,038,903
Applicable percentage of solvency liabilities for purposes of measuring solvency deficiency[1]	$976,187	$883,068
Solvency excess / (deficiency) excluding present value of special payments	**($249,773)**	**($131,613)**
Present value of 5 years' worth of unfunded liability special payments (i.e., the solvency asset adjustment)	4,282	26,730
Solvency excess / (deficiency)	**($245,491)**	**($104,883)**

[1] *Under Section 9 of the Regulations under the Nova Scotia Pension Benefits Act, the applicable percentage of solvency liabilities to be included for purposes of measuring a solvency deficiency is 85% at January 31, 2020, and 100% at March 31, 2019.*

RETIREES TRUST FUND – SOLVENCY BALANCE SHEET
(ALL FIGURES IN $000'S)

	March 31, 2019	January 31, 2020
Solvency assets		
Market value of assets	$658,106	$718,785
Financial statement (payables) / receivables	3,547	14,090
Total solvency assets	$661,653	$732,875
Solvency liabilities		
Pensioners and beneficiaries	$709,588	$801,719
Deferred members	19,020	18,760
Total solvency liabilities	$728,608	$820,479
Applicable percentage of solvency liabilities for purposes of measuring solvency deficiency[1]	$728,608	$697,407
Solvency excess / (deficiency)	**($66,955)**	**$35,468**

TOTAL PLAN – SOLVENCY BALANCE SHEET
(ALL FIGURES IN $000'S)

	March 31, 2019	January 31, 2020
Solvency assets		
Market value of PTF assets[2]	$727,614	$752,655
Estimated wind-up expenses	(1,200)	(1,200)
Market value of RTF assets[2]	661,653	732,875
Total solvency assets	$1,388,067	$1,484,330
Solvency liabilities		
PTF solvency liabilities	$976,187	$1,038,903
RTF solvency liabilities	728,608	820,479
Total solvency liabilities	$1,704,795	$1,859,382
Applicable percentage of solvency liabilities for purposes of measuring solvency deficiency[1]	$1,704,795	$1,580,475
Solvency excess / (deficiency) excluding present value of special payments	**($316,728)**	**($96,145)**
Present value of 5 years' worth of unfunded liability special payments (i.e., the solvency asset adjustment)	4,282	26,730
Solvency excess / (deficiency)	**($312,446)**	**($69,415)**

[1] *Under Section 9 of the Regulations under the Nova Scotia Pension Benefits Act, the applicable percentage of solvency liabilities to be included for purposes of measuring a solvency deficiency is 85% at January 31, 2020, and 100% at March 31, 2019.*

[2] *Net of (payables) / receivables*

As shown above, the solvency valuation has revealed a solvency deficiency of $96,145,000 prior to the inclusion of the present value of any special payments as at January 31, 2020. With the inclusion of five years' worth of special payments, there is a solvency deficiency of $69,415,000.

As per the Nova Scotia *Pension Benefits Regulations*, the plan is exempt from funding the solvency deficiency.

Sensitivity Analysis

Below we show the impact on the solvency liability as at January 31, 2020 of a one percentage point drop in the discount rate assumption. All other assumptions were kept unchanged.

SOLVENCY SENSITIVITY (FIGURES IN $000'S)

	Impact of 1% Drop
Total Solvency Actuarial Liability	$2,163,306,000

A 1% decline in the solvency discount rate would increase the solvency liability by $303,924,000 or 16.3%.

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 next calculation date.

In our report, we have determined the incremental cost on a 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, change in membership status and service accrual between the current valuation date and the next valuation date. No adjustment was made for new entrants between the two valuation dates. The resulting projected solvency liability was then discounted 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 to the current valuation date; and

(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 valuation date, were determined using the going concern demographic assumptions. The projected solvency liability at the next valuation date was determined using the same methods and assumptions as disclosed in Appendix B of this report. In particular, we have assumed that the discount rates will remain the same throughout the projection period and the Standards of Practice for determining Pension Commuted Values in effect at the valuation date will remain unchanged, as will the current educational guidance on the estimation of annuity purchase costs.

The estimated incremental cost from January 31, 2020 to January 31, 2023 is $239,851,000. The estimated incremental cost does not impact the funding requirements of the Plan under the Nova Scotia *Pension Benefits Act* and is for information purposes only.

Transfer Ratio as at January 31, 2020

The Regulations under the Nova Scotia *Pension Benefits Act* require the determination of a "transfer ratio". This transfer ratio is used to determine whether transfers of commuted values to terminating members can be made in full, immediately. The transfer ratio is the ratio of:

(i) the solvency assets (at market value), minus the lesser of the previous year credit balance and the sum of the minimum employer contributions required under the Regulations until the next valuation date ($1,485,530,000 – $0), to

(ii) the sum of the solvency liabilities and the liabilities for benefits that were excluded in calculating the solvency liabilities (note that there were no such benefits excluded for the solvency valuation).

As at January 31, 2020 the transfer ratio was 79.9% (i.e., $1,485,530,000 divided by $1,859,382,000).

If the transfer ratio is less than 100% then, unless certain conditions are met, a portion of a terminated member's commuted value cannot be paid in a lump sum, but instead must be held back and paid with interest within 5 years. For this plan, the portion is 20.1%. The conditions that allow full payment of the commuted value are:

- if an additional contribution is remitted to the fund equal to the portion of the commuted value that should be held back; or
- if the aggregate of transfer deficiencies for all transfers made since the last review date does not exceed 5% of the assets of the plan at that time.

Next Valuation Date

The ratio of solvency assets to solvency liabilities is 79.9% at January 31, 2020. Because this ratio is less than 85%, the Plan is deemed to have "solvency concerns" under the Regulations and therefore a cost certificate must be completed effective January 31, 2021 (i.e., 1 year following the valuation) providing the regulator with certain prescribed information. The next full actuarial valuation of the Plan must be at a date no later than January 31, 2023 (i.e., within 3 years following the valuation).

SECTION VI WIND-UP VALUATION

The financial position of the Plan on a wind-up basis as of January 31, 2020 is as follows:

TOTAL PLAN – WIND-UP BALANCE SHEET
(ALL FIGURES IN $000'S)

	March 31, 2019	January 31, 2020
Wind-up assets		
Market value of PTF assets*	$727,614	$752,655
Estimated wind-up expenses	(1,200)	(1,200)
Market value of RTF assets*	661,653	732,875
Total wind-up assets	$1,388,067	$1,484,330
Wind-up liabilities		
PTF wind-up liabilities	$976,187	$1,038,903
RTF wind-up liabilities	728,608	820,479
Total wind-up liabilities	$1,704,795	$1,859,382
Wind-up excess / (deficiency)	**($316,728)**	**($375,052)**

* *Net of (payables) / receivables*

As shown above, on a wind-up basis there is a deficiency of $375,052,000 in the Plan after providing for settlement of all accrued benefit entitlements as at January 31, 2020.

SECTION VII FUNDING REQUIREMENTS

A. Minimum Contributions

Under the new funding rules, the University is required to make special payments to fund the going concern unfunded liability at January 31, 2020.

The minimum required University annual contribution for the four years following the valuation under the new rules would be as follows (as outlined in Section IV):

	Annual Required University Contributions (new rules)			
	2020/21	2021/22	2022/23	2023/24
Current service cost	$23,240,000	$24,076,000	$24,918,000	$25,791,000
Special payments for going concern unfunded liability	918,000	6,956,000	6,956,000	6,956,000
Total estimated required contributions	$24,158,000	$31,032,000	$31,874,000	$32,747,000

Under the funding rules in effect prior to April 1, 2020, the University would have been required to make current service contributions, but no special payments in respect of a going concern unfunded liability.

The minimum required University annual contributions for the four years following the valuation under the prior rules would have been as follows:

	Annual Required University Contributions (prior rules)			
	2020/21	2021/22	2022/23	2023/24
Current service cost	$24,597,000	$25,467,000	$26,359,000	$27,282,000
Special payments for going concern unfunded liability	-	-	-	-
Total required contributions	$24,597,000	$25,467,000	$26,359,000	$27,282,000

In accordance with Section 86A of the Regulations, if payments under the new rules are greater than payments under the prior rules, the minimum payments required are determined in accordance with the following formula: A – [(A-B) x C], where

A = payments under the new rules
B = payments under the prior rules; and
C = 1 in year 1, 0.8 in year 2, 0.6 in year 3, 0.4 in year 4 and 0.2 in year 5.

Applying the "transition" rules, the estimated minimum required University contribution for the four years following the valuation would be as follows:

	Annual Required University Contributions (transition rules)			
	2020/21	2021/22	2022/23	2023/24
Funding requirements under new rules	$24,158,000	$31,032,000	$31,875,000	$32,747,000
Funding requirements under prior rules	$24,597,000	$25,467,000	$26,359,000	$27,282,000
Increase in contribution requirement due to new rules (if >0)	-	$5,565,000	$5,516,000	$5,465,000
Portion of Increase to be phased-in	Nil	20%	40%	60%
Old funding rule requirement	$24,597,000	$25,467,000	$26,359,000	$27,282,000
Portion phased-in	-	1,113,000	2,206,000	3,279,000
Total required contributions	$24,597,000	$26,580,000	$28,565,000	$30,561,000

B. Maximum Contribution

At the University's option, the University may choose to fund at a higher level than the minimum requirement stated above. The maximum tax-deductible employer contribution prior to the next valuation is equal to the wind-up deficiency plus employer portion of the current service cost ($375,052,000 + $16,308,000 + $6,932,000 = $398,292,000).

C. Timing of Contributions

Employer contributions for current service must be paid in monthly installments, no later than 30 days after the month for which contributions are payable. Special payments must be paid by equal monthly installments, within 30 days following the end of each month.

SECTION VIII SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

The following represents our primary conclusions as a result of our actuarial valuation of the Dalhousie University Staff Pension Plan as at January 31, 2020:

1. As at the valuation date, there exists a going concern unfunded actuarial liability of $49,090,000.

2. The Plan has a solvency deficiency of $69,415,000 as at January 31, 2020 (after including the present value of 5 years' worth of scheduled special payments).

3. The going concern unfunded actuarial liability must be amortized according to the special payment schedule detailed in Section IV. In summary, special payments are $918,000 for the next year and $6,956,000 per annum for the following ten years. Under Nova Scotia pension legislation these new funding requirements may be phased in over a 5-year period – detail on the funding requirements under the transition rules are provided in section VII.

4. The cost of benefits accruing in respect of the year following the valuation date is $44,926,000, which amounts to 16.71% of active contributory payroll. Employee regular contributions (6.06% of payroll) and supplementary contributions (2.00% of payroll) are expected to generate contributions of 8.06% of payroll. In addition to the University's matching regular contribution (6.06% of payroll), employer overmatching contributions of 2.59% of payroll are required.

5. The adequacy and appropriateness of this funding level should be reviewed at the next actuarial valuation of this Plan, which should take place as of January 31, 2023 at the latest.

6. For purposes of paragraph 147.2(2)(d) of the *Income Tax Act* (Canada), the excess surplus based on the going concern valuation was nil as of January 31, 2020.

7. If the Plan were to be wound up on the valuation date, the value of Plan assets would be less than the Plan's wind-up liabilities by an amount of $375,052,000.

8. The transfer ratio of the Plan is 79.9%.

9. The previous year credit balance as at January 31, 2020 is $0.

10. We are not aware of any events, other than those outlined in Section II, that occurred between the valuation date and the date this report was completed that would have a material impact on the results of this valuation.

We shall be pleased to provide any additional details or explanations you may require regarding any of the matters dealt with in this report.

SECTION IX ACTUARIAL OPINION

We hereby certify that in our opinion,

(i) the data on which the valuation is based are sufficient and reliable for the purposes of the valuation as described in Section I;

(ii) the assumptions described herein are appropriate for the purposes of the valuation; and

(iii) the methods employed in the valuation are appropriate for the purposes of the valuation.

This report has been prepared, and our opinions given, in accordance with accepted actuarial practice in Canada. It has also been prepared in accordance with the funding and solvency standards set by the Nova Scotia *Pension Benefits Act*.

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

Respectfully submitted,

Jeff Turnbull, FSA, FCIA

Colleen Glenn, FSA, FCIA, CERA

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APPENDIX A PLAN ASSETS

The Plan's assets are currently managed in such a way as to allow for a mix of equity and fixed income investments. Several independent fund managers, who deal at arm's length with the University, manage the assets, which are segregated into two trusts: the Pension Trust Fund (PTF) invests the accumulated contributions in respect of active Members and supports benefits payable during the period of active membership, and the Retirees' Trust Fund (RTF) supports pension payments after retirement. The two trusts, together and in aggregate, form the portfolio of assets supporting the Plan.

Reconciliation of Plan Assets

Financial statements of the Plan's holdings, in aggregate by asset class, were provided to us by the University for this valuation. The tables below contain summaries of the revenue accounts for the PTF and the RTF, respectively, based on the information supplied in respect of the period covered by this valuation (i.e., April 1, 2019 through January 31, 2020).

RECONCILIATION OF ASSETS IN THE PENSION TRUST FUND
(ALL FIGURES IN $000'S)

For the 10 months ending	January 31, 2020
Market value at beginning of period	$737,213
Employee regular contributions	12,981
Employee supplementary contributions	4,189
Employee other contributions*	768
Employer contributions	20,607
Net investment income	57,428
Net change in payables	(2,448)
Transfer to RTF	(54,613)
Benefit withdrawals	(6,885)
Market value at end of period	**$769,240**

* *Employee other contributions include additional voluntary contributions, past service purchases, and transfers from other plans.*

RECONCILIATION OF ASSETS IN THE RETIREES' TRUST FUND
(ALL FIGURES IN $000'S)

For the 10 months ending	January 31, 2020
Market value at beginning of period	$658,106
Transfers in from PTF	54,613
Net investment income	51,008
Net change in payables	(1,109)
Pension payments	(43,833)
Market value at end of period	**$718,785**

Performance of Plan Assets

The following table summarizes the net rate of return on the Plan's assets over the past 10 months.

PENSION FUND RATES OF RETURN
(NET OF EXPENSES)

10 Months Ending Jan. 31	Pension Trust Fund	Retirees Trust Fund	Total Plan (i.e., Combined PTF and RTF)
2020	7.8%	7.6%	7.7%

APPENDIX B ACTUARIAL METHODS AND ASSUMPTIONS

A. Valuation of Assets

For the valuation as at January 31, 2020, the market value of assets, plus any net payables / receivables was used as the actuarial value of assets. This is the same asset valuation method as was used in the previous valuation.

The table below summarizes the calculation of the going concern asset value as at January 31, 2020, rounded to the nearest $1,000.

ACTUARIAL VALUE OF ASSETS
(ALL FIGURES IN $000'S)

	January 31, 2020
Market value of assets	$1,488,025
Benefits Payable	(2,328)
Expenses Payable	(167)
Actuarial value of assets	$1,485,530

B. Going Concern Valuation

For the purposes of a going concern valuation, we select actuarial assumptions with a long-term focus. That is, we anticipate that the pension plan will continue indefinitely into the future. Actuarial assumptions are selected giving consideration to historical trends, future expectations and pension plan specific experience, where possible. The assumptions chosen are expected to produce a stable pattern of funding and meet the Plan sponsor's desire to minimize potential for significant shortfalls or deficits in the future.

The purpose of this part of our analysis is to determine an appropriate method and series of assumptions to make proper allowance for the Plan's future liabilities by way of payment of pensions and other benefits. In making these calculations, assumptions must be made as to:

- the probability that a particular payment will be made at a certain time (for example, depending upon whether or not the individual concerned survives to that date); and
- the expected amount of each such payment.

In order to do this, we make a series of assumptions in connection with the many factors which will have a bearing upon the future financial operation of the Plan. These include the following:

- future rates of mortality (and the corresponding life expectancies of the Plan members and their spouses);
- future rates of salary increase for members of the Plan;
- the rate of increase in the maximum pension (as mandated by the *Income Tax Act*) that the Plan is allowed to pay;
- future rates of employee turnover (withdrawal from the Plan);
- the age at which retirement occurs; and
- the propensity for members who are eligible for an immediate pension, but who may choose between the receipt of such pension and a lump-sum termination benefit, to choose the latter.

Finally, we consider the rate of interest that will be earned on the assets of the pension funds in future years.

As part of our process of analysis, all of these factors have received consideration. Where applicable, we have taken into account the actual experience of this pension plan. However, it should be noted that, from a statistical point of view, actual experience data developed from a single pension plan has limited validity unless the number of plan members is very large. Therefore, it becomes necessary to take into account statistics developed from many other larger pension plans.

The assumptions we have adopted, as well as a brief commentary where appropriate, are described below. The results under the prior funding rules use the same assumptions as were used in the March 31, 2019 valuation.

Going Concern Discount Rate Assumption

We have increased the pre-retirement discount rate assumption from 6.00% (used in the March 31, 2019 actuarial valuation) to 6.30% per annum for the January 31, 2020 actuarial valuation. This increase reflects the removal of the margin for adverse deviations in the determination of the discount rate.

The economic assumptions (i.e., those related to interest rates and inflation) for this valuation are based on reasonable expectations with respect to the relationships among key economic variables over the long term, as well as the expected impact of those economic variables on the investment performance of the pension fund given the fund's investment policy.

We have taken a "best estimate" approach to the determination of the discount rate, based on the expected future investment return on the assets of the pension plan. In particular, our approach consists of:

- determining the best estimate of long-term, expected future investment returns for the various asset classes in which the Plan invests;
- combining these best estimate, long-term expected future investment returns to reflect the Plan's investment policy, thereby creating an "expected" fund return that is a weighted average of the asset class returns;
- including an allowance for additional return due to active versus passive management, and the impact of rebalancing and diversification, which we have considered appropriate in the circumstance as a result of stochastic modelling specific to the Plan's target asset mix; and
- making appropriate provision for expenses.

The result of our analysis is depicted in the following table:

DISCOUNT RATE

	Discount Rate
Unadjusted "best estimate" return	6.00%
Less fees	(0.60%)
Plus value added return from active management	0.40%
Plus "rebalancing and diversification effect"	0.50%
Best estimate discount rate	6.30%

The unadjusted best estimate asset return assumption was determined using the Plan's target investment mix and the expected return for each asset class. Expected returns are developed each year through a rigorous stochastic modelling process. This model is designed to simulate all key economic and market variables over thousands of different paths that are path-wise consistent. Key variables include bond yields (nominal and real), inflation, equity market returns, and alternative asset class returns. Adjustments for specific approaches to investment implementation are applied to asset class expected returns where appropriate. The details are depicted in the following table:

Asset Class	Target Weight	Expected Return
Universe bonds	6.5%	2.60%
Corporate bonds	5.5%	3.30%
Core Plus bonds	12.5%	3.30%
Private debt	5.5%	4.90%
Canadian equity	12.0%	6.80%
US equity	14.0%	7.00%
International equity	11.0%	7.00%
Emerging market equity	3.0%	8.70%
Real estate	10.5%	5.50%
Infrastructure	7.0%	6.20%
Private equity	12.5%	9.00%
Total portfolio	**100.0%**	**6.00%**

In respect of the post-retirement period, we have maintained the assumption used in the last valuation for PTF liabilities and as specified in the Plan Rules, i.e., 4.55% per annum. This post-retirement interest rate incorporates some conservatism in that it includes (in accordance with plan rule 9(b)) a "holdback as a provision against life expectancy variations and other contingencies". For RTF liabilities, we have removed the holdback used in the post-retirement interest rate resulting in a rate of 5.05% per annum used for the January 31, 2020 valuation.

Salary Scale

Pensions from the Plan are based on the average of an employee's best 3 years of earnings. Since wage levels typically increase over time, an employee's best 3 years of earnings usually occur towards the end of their career. In conducting our valuation, it is prudent to project each employee's accrued pension to the time of their retirement by projecting their earnings level, and this is accomplished through the use of a salary scale assumption.

In respect of the salary scale assumption, the assumption used in the March 31, 2019 actuarial valuation was a flat 2.75% per annum assumption combined with the following merit/promotion table:

- 1.75% for ages below 45;
- 1.00% for ages between 45 and 55; and
- 0.00% for ages after 55.

This assumption has not changed with the January 31, 2020 actuarial valuation. This assumption reflects the low inflation environment that exists at the present time (and that is expected to persist), as well as the future expected pressure on University budgets and funding levels.

Maximum Pension

Pensions are capped by regulation at $3,092.22 per year of service for retirements occurring in 2020. It is expected that this maximum will be increased in accordance with an average wage index from 2020 onward. For purposes of the valuation, we have assumed that the maximum pension will increase after 2020 by 2.75% per annum (i.e., equal to the base salary scale rate). This is the same assumed rate of increase as in the March 31, 2019 valuation.

Going Concern Mortality Assumption

For the measurement of PTF liabilities, we have retained the mortality assumption used in the previous valuation, i.e., the 2014 Canadian Pensioners' Mortality (Public Sector) Table (CPM 2014 Public) projected generationally with improvement scale CPM-B. The CPM 2014 Public table represents the best available information to date on the mortality patterns of Canadians participating in, or retired from, defined benefit pension plans in the public sector, and as such was considered to offer the most appropriate estimate of mortality patterns for participants in this plan.

For the RTF liabilities, we have used the 2014 Canadian Pensioners' Mortality (Public Sector) Table (CPM 2014 Public) with 87.6% adjustment for males, and 97.0% adjustment for females projected generationally with improvement scale CPM-B. These size adjustments result in an increase in predicted life expectancy for RTF pensioners. This change was made in conjunction with the change to remove the holdback in the RTF post-retirement interest rate.

We expect to review the mortality assumption from time to time, both to reflect continued societal improvements in mortality, as well as the development of new actuarial tables and standards.

Retirement Age

There has been no change to the retirement age assumption. Rates of retirement for ages prior to 65 were developed based on experience. In 2009, mandatory retirement was removed in the province of Nova Scotia. Given experience for retirement at ages over 65 is very minimal for Dalhousie, we relied on a research paper prepared by Statistics Canada titled "Mandatory Retirement Rules and the Retirement Decisions of University Professors in Canada" for purposes of determining expected retirement rates for ages between 65 and 71.

Age of Member	Probability of Retirement
55	2%
56	2%
57	3%
58	3%
59	4%
60	6%
61	7%
62	12%
63	12%
64	12%
65	60%
66	25%
67	25%
68	25%
69	25%
70	25%
71	*100%

* *Note the 100% reflects the fact that, under the Income Tax Act, all Members, whether or not they retire from active employment, must commence their pension by no later than the end of the year in which they turn age 71*

With regard to retirement rates between age 65 and age 71, we will continue to monitor actual Dalhousie experience over time, to determine whether the assumed rates of retirement need to be adjusted to be more "Dalhousie-specific".

SOCC Take-up Rate

Upon termination of employment, a Member is offered the choice between a lump sum transfer from the Plan and a deferred pension. The value of the lump sum transfer is the greater of (i) the Member's "Sum of Contributions Compounded", or "SOCC", which generally represents the Member's required contributions, times two, plus interest, and (ii) the commuted value of the deferred pension.

For each Member of the Plan, we have projected the Member's SOCC to the assumed points of early and normal retirement, and, at each point, compared the SOCC to the amount that would be transferred from the Pension Trust Fund to the Retirees Trust Fund were the Member to retire at that point.

There has been no change to the SOCC Take-up Rate since the previous valuation. We assume that 40% of members (where their projected SOCC is greater than the projected PTF-to-RTF-transfer) at all ages up to and including age 65 would take their SOCC rather than receive an immediate pension.

Withdrawal Rates

The scale of "termination of membership" rates remains unchanged from rates used in the previous valuation. The following table details the rates used in the current valuation.

Service of Member	Termination Rates
1 year	12.0%
2 years	10.2%
3 years	8.7%
4 years	8.4%
5 years	8.4%
6-10 years	6.5%
11-15 years	2.7%
16-20 years	2.7%
21-25 years	0.8%
More than 25 years	0.0%

Termination benefits are projected to each service date, and the liability determined. Projected liabilities take into consideration the minimum withdrawal benefit of twice contributions, plus interest.

Proportion Married and Spouse's Age

We have continued to assume that seventy percent of active members have a spouse at the time of their retirement or death.

We have continued to assume that male spouses are 2 years older than their female counterparts.

Going Concern Actuarial Methods

The actuarial cost method used in conducting this valuation is the projected unit credit method. This is the same method as was used in the previous valuation.

In using this method, as a first step, a calculation is made of the liability in respect of all benefits that have accrued to members on account of service up to and including the valuation date. This represents the "accrued liability". It should be noted that this calculation takes into account projected future pay increases for each member up to and including expected retirement date.

As a completely separate process, the current year cost has been calculated (using the same actuarial assumptions). This represents the cost of providing the benefits that will accrue in respect of the 12-month period following the valuation date. This is compared with the amount of required employee contributions, supplementary contributions, and regular matching employer contributions over that period. The difference represents the additional minimum required employer contribution (referred to as the “overmatching contribution”) necessary in order for these benefits to be properly funded.

For an individual member, the funding pattern produced by the projected unit credit cost method is one that increases (both in dollar terms and as a percentage of salary) over time. However, for the group as a whole, if the average age remains constant (which can occur through the retirement of older members and the addition of new, younger members) and salary levels increase in accordance with the salary scale, the contribution rate recommended under this method will remain relatively constant. If the Plan's average age increases, on the other hand, the current year cost will also increase. Such increases would be revealed in future valuations.

Provision for Adverse Deviations (PfAD)

For actuarial valuations with an effective date on or after December 31, 2019, the Regulations under the Nova Scotia *Pension Benefits Act* were amended to include a PfAD when determining the going concern financial position of the plan. The PfAD is derived from the target investment portfolio of the Plan and Section 12B of the Regulations under the Nova Scotia *Pension Benefits Act*. There are two components when determining the PfAD:

A) A flat 5%; plus

B) A value determined under Section 12D of the Regulations, based on the Plan’s combined target asset allocation for non-fixed income assets as determined under Section 12C of the Regulations.

As per Section 12B(2) of the Regulations, the value of "A" in the formula above is zero for a pension plan that is exempt from solvency funding. The following table details the calculation of the PfAD as at January 31, 2020:

DETERMINATION OF PFAD AS PER THE REGULATIONS UNDER THE NOVA SCOTIA *PENSION BENEFITS ACT*

Asset Class	Target Asset Allocation Per Plan's Statement of Investment Policies and Procedures	Per Regulation 12C, Percentage of Asset Class Deemed Fixed Income Assets	Adjustment for Portion of Asset Class Deemed Non-Fixed Income	"Product" Used to Determine Value of "C" under Regulation 12C
Formula	**M**	**N**	**O**	**P= M x N x (100% - O)**
Universe bonds	6.5%	100%		6.5%
Corporate bonds	5.5%	100%		5.5%
Core plus bonds	12.5%	100%	15%[1]	10.6%
Private debt	5.5%	50%		2.8%
CND equity	12.0%	0%		0.0%
US equity	14.0%	0%		0.0%
International equity	11.0%	0%		0.0%
EM equity	3.0%	0%		0.0%
Real estate	10.5%	50%	40%[2]	3.2%
Infrastructure	7.0%	50%	40%[2]	2.1%
Private Equity	12.5%	0%		0.0%
Total	100.0%			

Value of "C" under Regulation 12C	31%
100% - C = "Non-fixed Income Assets" under Regulation 12C(1)	69%
Determine Provision for Adverse Deviations (Regulation 12B)	
Per Regulation 12D(1), table amount for 60% non-fixed income assets	5.00%
Per Regulation 12D(1), table amount for 70% non-fixed income assets	8.00%
Per Regulation 12D(2), linear Interpolation = 0.1 X 5.00% + 0.9 X 8.00%	7.70%

[1] *Adjustment to reflect the fact that within Core Plus strategies a portion of the investments can be allocated to fixed income instruments that would be deemed to be "non-fixed income" under the Regulations.*

[2] *Long term expectations for the Real Estate and Infrastructure asset classes are that approximately 40% of the indicated allocations will be achieved through the purchase of public equities listed on public stock exchanges. Because these allocations are subject to the potential increased volatility of public stock markets, this 40% is deemed to be fully non-fixed income (i.e., similar to other equities in the Plan's portfolio).*

Therefore, the total PfAD for the Plan is equal to "A" + "B" = 0% + 7.70% = 7.70%.

The following table details the actuarial assumptions that have been used in the going concern valuation:

GOING CONCERN VALUATION ACTUARIAL ASSUMPTIONS

January 31, 2020	
Interest	
▪ Pre-retirement:	6.30% p.a.
▪ Post-retirement:	PTF: 4.55% p.a. RTF: 5.05% p.a.
Salary scale:	2.75% p.a. plus merit/promotion scale of 1.75% p.a. for ages below 45, 1.00% p.a. for ages between 45 and 55, and 0.00% for ages after 55
Maximum pension:	$3,092.22 in 2020, increasing at 2.75% p.a. thereafter
Mortality:	PTF: 2014 Canadian Pensioner Mortality tables (Public Sector) projected generationally with mortality improvement at Scale CPM-B RTF: 2014 Canadian Pensioner Mortality tables (Public Sector) projected generationally with mortality improvement at Scale CPM-B (with adjustment factors of 87.6% for males, 97.0% for females)
Retirement age:	In accordance with the retirement rates described previously in this section
Withdrawals:	In accordance with the termination rates described previously in this section
Percentage married:	70% of active members
Spouse's age:	Actives: Males spouses are assumed to be 2 years older than their female counterparts Pensioners: Actual spouse's age
Interest credited on employee contributions:	2.50% p.a.
SOCC take-up assumption:	40% at all ages up to and including age 65
Funding method:	Projected Unit Credit

C. Solvency Valuation

The Nova Scotia *Pension Benefits Act* prescribes a solvency valuation. A solvency valuation permits the regulator to assess the solvency of the Plan should it terminate or wind-up effective on the valuation date. That is, an assessment is made as to whether the assets of the pension fund would be sufficient if no further benefits were provided and all members were paid their entitlements.

For active members not eligible for immediate retirement (i.e., those under age 55), the interest rate used for calculating solvency liabilities was 2.50% p.a. for 10 years and 2.60% p.a. thereafter. These rates were determined in accordance with Section 3500 of the Canadian Institute of Actuaries ("CIA") Standards of Practice – Pension Commuted Values with rates in effect for January 2020. The mortality assumption used was the CPM-2014 (Combined) mortality table projected with Scale CPM-B.

For retired lives and active members 55 or older, the solvency liabilities were calculated using an interest rate of 2.59% per annum and the Canadian Pensioner Mortality (CPM2014 Combined) tables projected generationally with mortality improvement at Scale CPM-B. These assumptions represent the estimated basis for settlement of the Plan's obligations for retired lives by the purchase of insured annuities on the valuation date, and were determined in accordance with the Canadian Institute of Actuaries Educational Note Supplement entitled "Assumptions for Hypothetical Wind-up and Solvency Valuations with Effective Dates Between December 31, 2019 and December 30, 2020".

Note that the solvency valuation does not make any assumptions about future pay increases or future termination of employment, since all members are assumed to terminate on the valuation date. The actuarial assumptions for the solvency valuation are described in the following table:

SOLVENCY VALUATION ACTUARIAL ASSUMPTIONS

January 31, 2020	
Interest:	For actives < 55, 2.50% p.a. for 10 years, 2.60% p.a. thereafter For pensioners and actives > 55, 2.59% p.a.
Mortality:	2014 Canadian Pensioner Mortality tables (Combined) projected generationally with mortality improvement at Scale CPM-B
Salary scale:	None
ITA maximum pension:	$3,092.22 per year of service
Retirement age:	Age that maximizes the value of the benefits
SOCC take-up assumption:	100% for Active Members less than Age 55; 0% for Active Members greater than Age 55
Withdrawals:	None
Percentage married:	70% of active members
Spouse's age:	Actives: Males spouses are assumed to be 2 years older than their female counterparts Pensioners: Actual spouse's age
Cost method:	Termination method

D. Hypothetical Wind-up Valuation

The only difference between solvency and wind-up assumptions for the Dalhousie Plan is that the wind-up valuation assumptions must account for indexation. However, at the time of this valuation there is no difference in wind-up and solvency assumptions because interest rates are at levels low enough that there is no expectation of excess interest indexing. Therefore, the wind-up valuation liability assumptions are the same as those used in the solvency valuation.

APPENDIX C PLAUSIBLE ADVERSE SCENARIOS

A plausible adverse scenario is considered to be one that will occur in the short term (immediately to one year) with a likelihood of occurring between 1 in 10 and 1 in 20 based on the opinion of the actuary. The purpose of the following scenarios is to illustrate the impact on the Plan's financial position of the following adverse but plausible assumptions relative to the best estimate assumptions selected for the Plan's going concern valuation. The purpose of disclosing these results is to demonstrate the sensitivity of the funded status and annual current service cost between January 31, 2020 and January 31, 2023 to certain key risk factors affecting the Plan. The results of the scenarios selected are shown in the table below, with a description of each scenario following.

	Going Concern Results at January 31, 2020 ($000's)	Plausible Adverse Scenario Results at January 31, 2020		
		Interest rate risk* ($000's)	Deterioration of Asset Values* ($000's)	Longevity Risk ($000's)
Going concern assets	1,486,423	1,498,848	1,271,021	1,486,423
Going concern liabilities	1,425,755	1,438,755	1,425,755	1,454,559
PfAD on going concern liabilities	109,758	110,759	109,758	111,975
Total going concern liabilities plus PfAD	1,535,513	1,549,514	1,535,513	1,566,534
Going concern excess / (unfunded liability)	**(49,090)**	**(50,666)**	**(264,492)**	**(80,111)**
Current service cost	44,926	46,052	44,926	45,699
Deficit funding requirement (starting Feb. 1, 2021)	6,956	7,087	37,478	11,351
Change in going concern liabilities plus PfAD		14,001	-	31,021
% change in going concern liabilities plus PfAD		0.91%	-	2.02%
Change in current service cost		1,126	-	773
% change in current service cost		2.51%	-	1.72%
Change in deficit funding requirement		131	30,522	4,395
Discount rate	6.30%	6.05%	6.30%	6.30%
PfAD	7.70%	7.70%	7.70%	7.70%
Life expectancy (in years) for a retiree age 65	25	25	25	26

* *Scenario shown represents the median of the worst 10% of stochastic simulations.*

Interest Rate Risk

This scenario illustrates the sensitivity of the funded status of the Plan and current service cost to an immediate change in the market interest rates underlying fixed income investments.

In order to asses the impact of a decrease in interest rates of a magnitude consistent with a 1 in 10 likelihood of occurring, we have used the same stochastic model that is used to determine the going concern discount rate (see Appendix B). The stochastic model is based on 5,000 simulations of projected financial variables, including long-term yields on fixed income investments and asset class returns. Our long-term best estimates for these variables, and the going concern discount rate are based on the median values of these 5,000 simulations.

To determine the sensitivity to interest rate risk, and the resulting impact on Plan assets and liabilities, we have:

- considered the hypothetical going concern discount rate over the 500 trials where fixed income yields are lowest at the one-year horizon, and
- determined the decrease in median long-term fixed income yields over the 500 trials where fixed income yields are the lowest at the one-year horizon.

Based on the above analysis, we have determined that the going concern discount rate would decrease by 25 basis points as of January 31, 2020, and long-term yields on fixed income investments would decrease by 35 basis points.

Based on the estimated duration of the Plan assets, liabilities and current service cost, we have then determined the estimated change to the Plan's funded status under the interest rate risk scenario.

Deterioration of Asset Values

This scenario illustrates the sensitivity of the funded status of the Plan to short-term shock which causes a reduction in the market value of assets, with no change to the liabilities of the Plan. This scenario is assumed not to impact the current expectation of the long-term rate of return, and consequently, the going concern discount rate.

In order to assess the impact of a decrease in asset values of a magnitude consistent with a 1 in 10 likelihood of occurring, we have used the same stochastic model that is used to determine the going concern discount rate (see Appendix B). The stochastic model is based on 5,000 simulations of projected financial returns, including long-term yields on fixed income investments and asset class returns.

To determine the sensitivity to a deterioration in asset values based on the Plan's target asset mix, we have reviewed the 500 trials where investment returns are lowest at the one-year horizon and determined that at the median scenario, the market value of assets would decrease by 14.5% as of January 31, 2020.

Longevity Risk

This scenario illustrates the sensitivity of the funded status of the Plan to pension plan members living longer than expected. The impact of this scenario was determined using a one-year age setback to the mortality table used for the going concern valuation as of January 31, 2020. This is a more conservative mortality assumption than currently employed.

APPENDIX D MEMBERSHIP DATA

The data in respect of active membership (including members on disability or leave of absence), and in respect of all pensioners and deferred pensioners are maintained on a computerized pension administration system called Ariel. The system is updated by Retirement Services, a unit of Dalhousie University's Human Resources Department. The information was extracted by Morneau Shepell (the Ariel vendor) and submitted to us in electronic format. A summary of the data is shown in this Appendix.

We subjected this 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:
- salaries increased at a reasonable rate;
- credited service increased by a reasonable amount;
- pensions in pay changed by a reasonable amount (e.g., by the amount of indexing applied for retired members, etc.);
- a member's gender did not change;
- the form of pension payment did not change (other than resulting from the death of a retired member);
- the pension amounts on the pensioner file was compared with the payments reported in the financial statements for the Plan; 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.

For some employee groups, the raw data did not reflect outstanding salary increases that were effective prior to the valuation date. In these cases, Dalhousie provided us with the retroactive salary increase amounts.

Where there was data missing, we made the following assumptions for pensioners:

- Forms of pension were assumed to be the same as in the previous valuation
- Male spouses are assumed to be 2 years older than their female counterparts

All of our tests had satisfactory results, or the data was corrected. However, the tests may not have captured all deficiencies in the data. We have also relied on the Plan administrator's certification on the quality of the data.

Reconciliation of Membership

	Active	Terminated non-vested members	Deferred (via PTF)	Deferred (via RTF)	Pensioners and survivors	Total
Number as at March 31, 2019	**3,121**	**319**	**512**	**117**	**1,331**	**5,400**
New entrants	247	-	-	-	-	247
Returned to active	2	-	(2)	-	-	-
Retirements	(99)	-	(9)	(10)	118	-
Terminations						
▪ Deferred or pending (via PTF)	(74)	-	74	-	-	-
▪ Deferred (via RTF)	(6)	-	-	6	-	-
▪ Fully settled	(39)	(4)	(29)	-	-	(72)
Deaths paid out	(2)	-	-	-	(16)	(18)
New survivors	-	-	-	-	5	5
New limited member pensions	-	-	-	-	2	2
Consolidation of records	-	-	(1)	-	-	(1)
Number as at January 31, 2020	**3,150**	**315**	**545**	**113**	**1,440**	**5,563**

Statistical Profile of Active Members

	Number*	Average Age	Average Credited Service	Expected Salary, Year Following January 31, 2020	Average Accumulated Contributions**
Males	1,250	49.0	12.0	$97,255	$90,310
Females	1,835	47.8	11.0	$80,645	$64,644
Total	3,085	48.3	11.4	$87,375	$75,044

* *These figures do not include 65 individuals who have reached 35 years pensionable service and are therefore no longer accruing benefits for future service.*

** *Includes past service contributions and transfers into the Plan*

March 31, 2019 Tables For Comparison

Total	3,051	48.6	11.6	$86,136	$78,398

Statistical Profile of Deferred Pensioners (under deferral via the PTF*)

	Number	Average Age	Average Annual Lifetime Pension
Males	223	48.5	$8,263
Females	322	47.1	$6,942
Total	545	47.7	$7,482

* *Under "deferral via the PTF", the individual is entitled to a deferred pension, or the commuted value of the pension (determined in accordance with CIA standards).*

March 31, 2019 Tables For Comparison

Total	512	48.0	$7,510

Statistical Profile of Deferred Pensioners (under deferral via the RTF*)

	Number	Average Age	Average Deferred Account Balance
Males	9	63.5	$700,593
Females	15	60.9	$502,110
Total	24	61.9	$576,541

* *Under "deferral via the RTF", the individual is entitled to a pension that can be provided by their deferred account balance (determined on an actuarial equivalent basis).*

March 31, 2019 Tables For Comparison

Total	22	62.3	$618,262

Statistical Profile of Pensioners (Including Survivors)

	Number	Average Age	Average Annual Lifetime Pension
Males	653	74.0	$48,953
Females	787	71.6	$30,073
Total	1,440	72.7	$38,634

March 31, 2019 Tables For Comparison

Total	1,331	72.7	$38,109

SALARY/ AGE/ SERVICE DISTRIBUTION FOR ALL ACTIVE MEMBERS

	Service (years)							
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30+**	**Total**
	25							25
20-24	1,090,137							1,090,137
	43,605							43,605
	91	11						102
25-29	4,953,125	588,011						5,541,136
	54,430	53,456						54,325
	165	58	9					232
30-34	11,596,478	3,752,050	501,473					15,850,001
	70,282	64,691	55,719					68,319
	206	110	53	1				370
35-39	16,141,888	9,072,165	3,843,496	61,925				29,119,474
	78,359	82,474	72,519	61,925				78,701
	151	135	103	33	6			428
40-44	12,087,872	12,073,821	9,428,163	2,663,052	434,606			36,687,514
	80,052	89,436	91,536	80,699	72,434			85,718
	126	95	131	100	38	1		491
45-49	10,412,404	8,377,113	13,369,821	10,657,570	2,591,899	67,671		45,476,478
	82,638	88,180	102,060	106,576	68,208	67,671		92,620
	92	80	99	123	65	46	8	513
50-54	7,650,547	7,081,902	9,361,731	14,008,309	6,427,376	3,359,136	532,231	48,421,232
	83,158	88,524	94,563	113,889	98,883	73,025	66,529	94,388
	68	61	82	85	74	59	60	489
55-59	5,825,024	5,010,557	6,517,311	7,587,289	7,757,810	5,540,705	3,813,872	42,052,568
	85,662	82,140	79,479	89,262	104,835	93,910	63,565	85,997
	25	48	58	45	62	61	40	339
60-65	1,889,467	3,921,028	4,824,862	4,491,946	7,328,696	6,884,289	4,157,179	33,497,467
	75,579	81,688	83,187	99,821	118,205	112,857	103,929	98,813
	8	11	15	17	10	12	23	96
Over 65	783,207	1,050,644	1,775,325	2,097,179	1,324,452	1,493,320	3,291,602	11,815,729
	97,901	95,513	118,355	123,363	132,445	124,443	143,113	123,081
	957	**609**	**550**	**404**	**255**	**179**	**131**	**3,085**
Grand Total	**72,430,148**	**50,927,292**	**49,622,182**	**41,567,269**	**25,864,840**	**17,345,121**	**11,794,884**	**269,551,736**
	75,685	**83,624**	**90,222**	**102,889**	**101,431**	**96,900**	**90,037**	**87,375**

*Key: Each cell contains the following information (in order): a "count" of the number of members who fit within the cell's parameters (for instance, the cell in the upper left corner indicates that 25 members are between the ages of 20 and 24, **and** have between 0 and 4 years of service); the total salaries paid to the members in the cell; and the average salary of members in the cell (the upper left cell, for instance, shows that the 25 members earned a total of $1,090,137, or an average of $43,605).*

Note: These figures do not include individuals who have reached 35 years pensionable service and are therefore no longer accruing benefits for future service. There are 65 such members.

SALARY/ AGE/ SERVICE DISTRIBUTION FOR ACTIVE MEMBERS – MALES ONLY

	Service (years)							
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30+**	**Total**
	7							7
20-24	287,534							287,534
	41,076							41,076
	26	2						28
25-29	1,614,972	81,637						1,696,610
	62,114	40,819						60,593
	59	20	3					82
30-34	4,584,786	1,357,277	162,284					6,104,346
	77,708	67,864	54,095					74,443
	75	43	20					138
35-39	6,253,489	3,835,492	1,512,006					11,600,987
	83,380	89,197	75,600					84,065
	64	55	46	10	5			180
40-44	5,614,514	5,433,039	4,576,404	811,628	338,967			16,774,552
	87,727	98,783	99,487	81,163	67,793			93,192
	50	47	62	42	22			223
45-49	4,444,081	4,616,589	6,846,916	5,148,937	1,547,792			22,604,314
	88,882	98,225	110,434	122,594	70,354			101,365
	26	37	42	53	26	20	1	205
50-54	2,194,340	3,395,188	4,198,660	6,482,634	3,027,631	1,573,547	60,634	20,932,633
	84,398	91,762	99,968	122,314	116,447	78,677	60,634	102,110
	27	24	34	34	35	24	13	191
55-59	2,419,085	2,051,689	3,003,544	3,569,982	4,121,346	2,655,061	1,072,954	18,893,662
	89,596	85,487	88,340	104,999	117,753	110,628	82,535	98,920
	10	17	22	12	32	29	23	145
60-65	748,459	1,364,637	1,932,950	1,657,479	4,065,410	3,267,888	2,610,932	15,647,754
	74,846	80,273	87,861	138,123	127,044	112,686	113,519	107,916
	3	3	8	5	8	8	16	51
Over 65	405,814	402,996	1,062,229	724,670	1,099,652	985,167	2,345,948	7,026,475
	135,271	134,332	132,779	144,934	137,456	123,146	146,622	137,774
	347	**248**	**237**	**156**	**128**	**81**	**53**	**1,250**
Grand Total	**28,567,074**	**22,538,544**	**23,294,992**	**18,395,328**	**14,200,797**	**8,481,663**	**6,090,468**	**121,568,866**
	82,326	**90,881**	**98,291**	**117,919**	**110,944**	**104,712**	**114,914**	**97,255**

Key: Each cell contains the following information (in order): a "count" of the number of members who fit within the cell's parameters; the total salaries paid to the members in the cell; and the average salary of members in the cell.

Note: These figures do not include individuals who have reached 35 years pensionable service and are therefore no longer accruing benefits for future service.

SALARY/ AGE/ SERVICE DISTRIBUTION FOR ACTIVE MEMBERS – FEMALES ONLY

	Service (years)							
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30+**	**Total**
	18							18
20-24	802,603							802,603
	44,589							44,589
	65	9						74
25-29	3,338,152	506,374						3,844,527
	51,356	56,264						51,953
	106	38	6					150
30-34	7,011,692	2,394,773	339,190					9,745,655
	66,148	63,020	56,532					64,971
	131	67	33	1				232
35-39	9,888,400	5,236,673	2,331,490	61,925				17,518,487
	75,484	78,159	70,651	61,925				75,511
	87	80	57	23	1			248
40-44	6,473,357	6,640,782	4,851,759	1,851,424	95,639			19,912,962
	74,406	83,010	85,119	80,497	95,639			80,294
	76	48	69	58	16	1		268
45-49	5,968,323	3,760,524	6,522,905	5,508,633	1,044,108	67,671		22,872,164
	78,531	78,344	94,535	94,976	65,257	67,671		85,344
	66	43	57	70	39	26	7	308
50-54	5,456,207	3,686,714	5,163,071	7,525,675	3,399,746	1,785,589	471,597	27,488,599
	82,670	85,738	90,580	107,510	87,173	68,676	67,371	89,249
	41	37	48	51	39	35	47	298
55-59	3,405,939	2,958,869	3,513,767	4,017,307	3,636,463	2,885,643	2,740,918	23,158,906
	83,072	79,969	73,203	78,771	93,243	82,447	58,317	77,714
	15	31	36	33	30	32	17	194
60-65	1,141,008	2,556,391	2,891,911	2,834,467	3,263,287	3,616,402	1,546,246	17,849,713
	76,067	82,464	80,331	85,893	108,776	113,013	90,956	92,009
	5	8	7	12	2	4	7	45
Over 65	377,393	647,648	713,096	1,372,509	224,800	508,153	945,654	4,789,254
	75,479	80,956	101,871	114,376	112,400	127,038	135,093	106,428
	610	**361**	**313**	**248**	**127**	**98**	**78**	**1,835**
Grand Total	**43,863,075**	**28,388,748**	**26,327,190**	**23,171,941**	**11,664,043**	**8,863,458**	**5,704,416**	**147,982,870**
	71,907	**78,639**	**84,112**	**93,435**	**91,843**	**90,443**	**73,134**	**80,645**

Key: Each cell contains the following information (in order): a "count" of the number of members who fit within the cell's parameters; the total salaries paid to the members in the cell; and the average salary of members in the cell.

Note: These figures do not include individuals who have reached 35 years pensionable service and are therefore no longer accruing benefits for future service.

PENSIONERS

Age at Valuation	Female	Male	Total
40 to 44	1		1
	4,493		4,493
	4,493		4,493
45 to 49		1	1
		1,300	1,300
		1,300	1,300
50 to 54	3		3
	86,658		86,658
	28,886		28,886
55 to 59	29	7	36
	608,512	91,605	700,117
	20,983	13,086	19,448
60 to 64	123	45	168
	3,497,218	1,517,559	5,014,777
	28,433	33,724	29,850
65 to 69	226	159	385
	7,651,057	6,823,367	14,474,424
	33,854	42,914	37,596
70 to 74	171	173	344
	5,078,428	9,103,582	14,182,010
	29,698	52,622	41,227
75 to 79	105	146	251
	3,213,374	8,474,726	11,688,100
	30,604	58,046	46,566
80 to 84	61	56	117
	1,961,230	2,777,786	4,739,016
	32,151	49,603	40,504
85 to 89	39	38	77
	880,783	1,752,518	2,633,301
	22,584	46,119	34,199
90 to 94	24	20	44
	594,365	1,031,786	1,626,151
	24,765	51,589	36,958
95 and over	5	8	13
	91,314	391,884	483,198
	18,263	48,986	37,169
Total count by gender	**787**	**653**	**1,440**
Total lifetime benefit	**23,667,432**	**31,966,113**	**55,633,545**
Total average lifetime benefit	**30,073**	**48,953**	**38,634**

Key: Each cell contains the following information (in order): count, sum of lifetime retirement benefit, and average lifetime retirement benefit.

APPENDIX E SUMMARY OF PLAN PROVISIONS

The following is a summary of the Plan's main provisions in effect on January 31, 2020. This summary is not intended as a complete description of the Plan. For specific details of the Plan provisions, reference should be made to the Plan text.

Effective Date of the Plan

Contributions to this Plan (and eligibility for pension benefits) commenced effective September 1, 1959.

Eligibility and Membership

Up to June 30, 1996 all full-time employees and regular part-time employees of Dalhousie University are eligible to join the Plan upon completion of at least 75 days of employment with the University. After June 30, 1996 eligibility for membership occurs at the date of employment.

Statutory part-time employees may elect to join the Plan following completion of two consecutive calendar years of employment during which, in each of the calendar years, their earnings were at least 35% of the Canada Pension Plan YMPE, or their hours worked were at least 700.

Required Contributions

A. By Members: 4.65% of the first $5,000 of annual salary plus 6.15% of annual salary in excess of $5,000 (where the salary is ultimately limited to that which would produce a pension entitlement in the year equal to the maximum pension for that year according to the provisions of the *Income Tax Act*), plus Supplementary Contributions in the amount of 2.00% of the same annual salary.

B. By the University: the amount required to meet the cost of all benefits not met by the Members' required contributions.

Interest

Any refund of contributions, payable either to a member or his or her estate, includes interest credited each year from the 1st of October at a rate based on the average of the yields of 5-year personal fixed term chartered bank deposit rates (CANSIM series V122515) over the 12-month period ending on the most recent June 30th.

Normal Retirement Date

The normal retirement date for all employees is the July 1st immediately following attainment of age 65 except for those members who were on full-time staff prior to July 1, 1964. In the latter case, normal retirement date is the 1st day of September immediately following the attainment of age 65.

Early Retirement

A member who has attained age 55 may retire at any time prior to attainment of his or her normal retirement age. In these circumstances, the member would receive a reduced pension in accordance with the following table:

Full Years Prior to Age 65	Early Retirement Adjustment Factor	
	For benefits earned after June 30, 2004	For benefits earned up to June 30, 2004
10	.63	.76
9	.66	.80
8	.69	.84
7	.72	.88
6	.75	.92
5	.78	.95
4	.81	.98
3	.85	1.00
2	.90	1.00
1	.95	1.00

These adjustment factors are interpolated where retirement occurs between anniversary dates. Under Phase Three of the Surplus Use Agreement (1996), these reduction factors are applicable prior to exact age 65 instead of the normal retirement date.

Partial Early Retirement and Reduced Workload Arrangements

Any regular full-time staff member may apply for partial early retirement through an approved reduced workload arrangement provided that he or she has completed at least three years of Continuous full-time or regular part-time employment since last date of hire. A Reduced Workload Period shall be for a fixed term. Participation in and approval of such RWA is by mutual consent, and is not extended as a matter of right.

In respect of any Member working under an RWA, the following shall apply:

(1) the calculation of the Member's pension benefit shall be based on the Member's Nominal Salary (pre-RWA Salary with adjustments for salary increases) rather than the actual Salary received by the Member under RWA;

(2) the Member will make pension contributions through payroll deduction based on the actual Salary received during the period rather than the Member's Nominal Salary on which the benefits are based; and

(3) the University will pay contributions on behalf of the Member in respect of the difference between the Member's actual Salary and Nominal Salary as well as its contributions on the Nominal Salary.

This provision does not mean that a member can retire and commence receipt of pension benefits and continue to accrue benefits simultaneously. Such action is not permitted.

Deferment of Pension Benefits

Any member eligible to receive a pension (either at normal or early retirement age) may elect to defer commencement of pension payments until some later date (but not beyond the end of the calendar year the member attains age 71 in any event). In these circumstances, the actuarial equivalent value of the member's pension as of the selected retirement date is transferred into the Retirees' Trust Fund, and is credited with investment income until the member's pension payments start. The actual pension payable from deferred retirement date is calculated on a consistent actuarial equivalent basis. The ultimate pension at date of commencement must not exceed the maximum pension payable from a Defined Benefit Plan, as prescribed in the *Income Tax Act*.

Pension at Normal Retirement

The pension provided under this Plan is expressed as a certain percentage of the average of the best three years of remuneration received by the member.

For the total period of membership in the Plan, the percentage applicable is 2% multiplied by the number of years of participation during that period.

The annual amount of lifetime pension payable to members, excluding any benefits derived from the member's AVCs, for the calendar year in which these benefits commence to be paid shall not exceed the product of:

A. the number of years of Pensionable Service of the Member which, when combined with the Member's Pensionable Service prior to January 1, 1992, if any, will not exceed 35 years, and

B. the lesser of:

   (1) 1/9 of the Money Purchase Limit in the calendar year in which benefits commence, and

   (2) 2% of the average of Member's best three consecutive years of Compensation in respect of the Employer.

Type of Pension

Pensions are payable throughout the lifetime of a Pensioner. For service up to June 30, 2004, the minimum guaranteed number of payments for single members or for married members electing a single life form of pension is 120 months. For married members electing a joint form of pension, the normal form of pension is a lifetime pension payable to the member and spouse jointly. The benefit is payable at a rate reduced by one third to the spouse should the spouse survive the member, provided that the spouse is not younger than the member by more than 60 months. If the spouse is younger by more than 60 months, the benefit is reduced in consideration of the actual age of the spouse to be actuarially equivalent to the benefit payable to a member whose spouse is 60 months younger. No fewer than 60 monthly payments shall be paid in any event.

For service from July 1, 2004, the normal form of pension for all members is a lifetime pension payable to the member, with a guarantee that no fewer than 84 payments shall be paid in any event.

A member with a spouse is required to receive a pension which includes a 60% survivor's pension; such pension being the actuarial equivalent of the pension otherwise payable in the normal form. Other optional forms of pension are available on an actuarial equivalent basis subject to signature of a waiver form by member and spouse.

Adjustment to Pensions in Course of Payment

Effective July 1, 1982, the decision was made to discontinue the previous policy of purchasing immediate annuities from life insurance companies in respect of retiring employees. Accordingly, a separate Retirees' Trust Fund was established and, in respect of employees retiring on or after July 1, 1982, pension payments are being made directly from this Retirees' Trust Fund.

At the time of retirement, a capital sum is transferred from the Pension Trust Fund into the Retirees' Trust Fund in respect of each retiring employee; the amount of this transfer being based on the mortality and interest assumptions used in the most recent actuarial valuation of this Pension Plan.

The three-year average investment yield on the Retirees' Trust Fund in excess of the post-retirement interest assumption (PRIA) will be used to fund indexing of pensions in the manner described below, subject to a "hold back" as a provision against life expectancy variations and other contingencies of 0.1% for Members who retired prior to June 30, 1994, 0.4% for Members who retired on or after June 30, 1994 but before June 30, 1996 and 0.5% for Members who retired on or after June 30, 1996.

In addition, accumulated pension increases shall not exceed corresponding accumulated increases in the Consumer Price Index.

Notwithstanding the above, in the event that the applicable three-year average investment yield on the Retirees' Trust Fund does not exceed the PRIA by the "hold back" percentages, then there shall be no adjustment to pensions in course of payment for that year except as may be provided with surplus funds. Furthermore, in these circumstances, there will be a corresponding reduction in the rate of increase of pensions in the following year or years of such amount, or amounts that would be required to bring pensions in course of payment to the same level that would apply if negative adjustments had been made in those years when the three-year average investment yield on the Retirees' Trust Fund did not exceed the PRIA by the "hold back" percentages.

The first such increase took effect as of January 1, 1984, and further increases after that date – to the extent an adjustment can be made – take place on each subsequent 1st of January.

Death Benefits Before Retirement

Upon death prior to retirement, the benefit payable to the member's spouse or beneficiary is an amount equal to the sum of:

(i) The greater of

   a. The Member's required contributions plus interest in respect of service prior to January 1, 1988, plus 100% of the Commuted Value of the Member's pension accrued to the date of death, in respect of service after December 31, 1987; and

   b. An amount equal to the Sum of Contributions Compounded of the Member up to the date of death; and

(ii) The Member's additional voluntary contributions plus interest.

In lieu of the lump sum described above, the Member's spouse can elect to receive a lifetime pension equal to the actuarial equivalent of the lump sum.

Disability Benefit

In the event that a member becomes totally and permanently disabled prior to normal retirement date, and becomes eligible to receive benefits under the University's Long Term Disability Plan, provision is made for the continuation of joint contributions to the Pension Plan while the member is receiving LTD Benefits until normal retirement age. At that time, the disability benefit ceases, and a pension will become payable under this Plan with full credit being given both for years of active participation and for years when the member continued to contribute to the Plan while disabled.

Termination of Employment

A Member who terminates employment is entitled to a deferred pension payable at the normal retirement date. A Member can elect to receive an early retirement pension which is the pension payable at the normal retirement date, with the appropriate actuarial reduction factors applied, as outlined above.

In lieu of a pension benefit as described above, a Member may elect to have the greater of (i) their Locked-in Contributions, and (ii) the Commuted Value of the Member's pension accrued to the date of termination, including any 50% rule excess employee contributions, transferred to a Registered Plan permitted under the *Pension Benefits Act* and the *Income Tax Act*, provided that such arrangement is administered as locked-in as required by the *Pension Benefits Act*.

APPENDIX F EMPLOYER CERTIFICATION

On behalf of Dalhousie University, I hereby certify that the employee data provided to Eckler Ltd. for the purposes of the actuarial valuation of the Dalhousie University Staff Pension Plan as at January 31, 2020 are accurate and complete.

LAURIE CREELMAN
Name


Signature

Senior Pension Advisor + Manager, Retirement Services
Title

November 2, 2020
Date