HEALTH WEALTH CAREER

UNIVERSITY OF WINDSOR EMPLOYEES' RETIREMENT PLAN

REPORT ON THE ACTUARIAL VALUATION FOR FUNDING PURPOSES AS AT JULY 1, 2017

JUNE 2018

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To prepare the results in this report, actuarial assumptions are used to model a single scenario from a range of possibilities for each valuation basis. The results based on that single scenario are included in this report. However, the future is uncertain and the plan's actual experience will differ from those assumptions; these differences may be significant or material. Different assumptions or scenarios within the range of possibilities may also be reasonable, and results based on those assumptions would be different. Furthermore, actuarial assumptions may be changed from one valuation to the next because of changes in regulatory and professional requirements, developments in case law, plan experience, changes in expectations about the future, and other factors.

The valuation results shown in this report also illustrate the sensitivity to one of the key actuarial assumptions, the discount rate. We note that the results presented herein rely on many assumptions, all of which are subject to uncertainty, with a broad range of possible outcomes, and the results are sensitive to all the assumptions used in the valuation.

Should the plan be wound up, the going concern funded status and solvency financial position, if different from the wind-up financial position, become irrelevant. The hypothetical wind-up financial position estimates the financial position of the plan assuming it is wound up on the valuation date. Emerging experience will affect the wind-up financial position of the plan assuming it is wound up in the future. In fact, even if the plan were wound up on the valuation date, the financial position would continue to fluctuate until the benefits are fully settled.

Decisions about benefit changes, granting new benefits, investment policy, funding policy, benefit security, and/or benefit-related issues should not be made solely on the basis of this valuation, but only after careful consideration of alternative economic, financial, demographic, and societal factors, including financial scenarios that assume future sustained investment losses.

Funding calculations reflect our understanding of the requirements of *Pension Benefits Act (Ontario)*, the Income Tax Act, and related regulations that are effective as of the valuation date. Mercer is not a law firm, and the analysis presented in this report is not intended to be a legal opinion. You should consider securing the advice of legal counsel with respect to any legal matters related to this report.

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SUMMARY OF RESULTS

	01.07.2017	01.07.2014
Going Concern Financial Status		
Smoothed value of assets	$229,343,200	$179,832,300
Going concern funding target	$207,517,900	$174,039,100
Funding excess (shortfall)	$21,825,300	$5,793,200
Hypothetical Wind-up Financial Position		
Wind-up assets	$233,808,100	$197,393,000
Wind-up liability	$257,183,700	$198,177,700
Wind-up excess (shortfall)	($23,375,600)	($784,700)
Solvency Financial Position		
Solvency assets	$233,808,100	$197,393,000
Solvency liability	$256,477,600	$196,511,800
Solvency excess (deficiency)	($22,669,500)	$881,200
Transfer ratio	0.91	1.00
Ratio of solvency assets to solvency liabilities	0.91	1.00
Funding Requirements in the Year Following the Valuation[1]		
Total current service cost	$7,228,600	$6,753,400
Minimum special payments	$0	$0
Total current service cost plus minimum special payments	$7,228,600	$6,753,400

[1] Provided for reference purposes only. Contributions must be remitted to the Plan in accordance with the Minimum Funding Requirements and Maximum Eligible Contributions sections of this report.

	01.07.2017	01.07.2014
Estimated members' required contributions	$3,614,300	$3,376,700
Estimated employer's required contributions	$3,614,300	$3,376,700
Total	$7,228,600	$6,753,400
Minimum special payments[2]	$0	$0
Estimated minimum contribution[2]	$7,228,600	$6,753,400
Estimated maximum eligible contribution	$30,604,200	$7,538,100
Next required valuation date	July 1, 2020	July 1, 2017

[2] A new annual special payment requirement of $614,300 will commence to be paid effective July 1, 2018.

2 INTRODUCTION

TO THE UNIVERSITY OF WINDSOR

At the request of the University of Windsor (the "University"), we have conducted an actuarial valuation of the University of Windsor Employees' Retirement Plan (the "Plan"), sponsored by the University of Windsor, as at the valuation date, July 1, 2017. We are pleased to present the results of the valuation.

PURPOSE

The purpose of this valuation is to determine:

- The funded status of the Plan as at July 1, 2017 on going concern, hypothetical wind-up, and solvency bases;
- The minimum required funding contributions from July 1, 2017, in accordance with the *Pension Benefits Act, Ontario* (the "Act");
- The minimum required funding contributions from July 1, 2017, in accordance with the cost sharing provisions of the Plan; and
- The maximum permissible funding contributions from July 1, 2017, in accordance with the *Income Tax Act.*

The information contained in this report was prepared for the internal use of the University, and for filing with the Financial Services Commission of Ontario and with the Canada Revenue Agency, in connection with our actuarial valuation of the Plan. This report will be filed with the Financial Services Commission of Ontario and with the Canada Revenue Agency. This report is not intended or suitable for any other purpose.

In accordance with pension benefits legislation, the next actuarial valuation of the Plan will be required as at a date not later than July 1, 2020, or as at the date of an earlier amendment to the Plan.

TERMS OF ENGAGEMENT

In accordance with our terms of engagement with the University, our actuarial valuation of the Plan is based on the following material terms:

- It has been prepared in accordance with applicable pension legislation and actuarial standards of practice in Canada.

- As instructed by the University, the going concern discount rate reflects a margin for adverse deviations of 0.40% per year.

- We have reflected the University's decisions for determining the solvency funding requirements, summarized as follows:

  – The same plan wind-up scenario was hypothesized for both hypothetical wind-up and solvency valuations.

  – Certain excludable benefits were excluded from the solvency liabilities.

  – The solvency financial position was determined on a market value basis. .

  – Stage 2 relief was applied to determine the minimum special payments.

  See the Valuation Results - Solvency section of the report for more information.

EVENTS SINCE THE LAST VALUATION AT JULY 1, 2014

Pension Plan

There have been no special events since the last valuation date.

This valuation reflects the provisions of the Plan as at July 1, 2017. The Plan will be amended effective June 4, 2018 to reflect the new employee contribution rates. A new actuarial valuation of the Plan is being completed as at January 1, 2018. The amendment will reflect the employee contribution rates based on the Plan's cost sharing provisions and the results of the July 1, 2017 and January 1, 2018 valuations. We are not aware of any pending definitive or virtually definitive amendments coming into effect during the period covered by this report. The Plan provisions are summarized in Appendix F.

Assumptions

We have used the same going concern valuation assumptions and methods as were used for the previous valuation, except for the following:

	CURRENT VALUATION	PREVIOUS VALUATION
Discount rate:	5.05%	5.60%
Pensionable earnings increases:	3.00%	4.00%
Post-retirement pension increases:	• 0.66% at July 1, 2018, • 0.40% at July 1, 2019, • 0.74% at July 1, 2020, and • 0.00% per year thereafter	• 1.00% at July 1, 2015, • 1.00% at July 1, 2016, • 1.00% at July 1, 2017, and • 0.00% per year thereafter
Interest on employee contributions	2.50%	3.30%

	CURRENT VALUATION	PREVIOUS VALUATION
Commuted value election on pre-retirement termination:		
• Percentage of members electing commuted value on termination	• 40% of non-retirement eligible members; and • 10% of retirement eligible members	0% of all members
• Discount rate for calculation of commuted value assumed to be settled	4.00%	N/A
• Mortality rates and improvements for calculation of commuted value assumed to be settled	100% of the rates of the 2014 Canadian Pensioners Mortality Table (CPM2014) with fully generational mortality improvements using Scale B (CPM-B)	N/A

A summary of the going concern methods and assumptions is provided in Appendix C.

The hypothetical wind-up and solvency assumptions have been updated to reflect market conditions at the valuation date. A summary of the hypothetical wind-up and solvency methods and assumptions is provided in Appendix D.

Regulatory Environment and Actuarial Standards

There have been a number of changes to the Pension Benefits Act (Ontario) and regulations which impact the funding of the Plan.

At its meeting on June 9, 2015, the Actuarial Standards Board (ASB) decided to promulgate the use of the following mortality table with respect of the computation of pension commuted values ("CIA CV Standard"), effective October 1, 2015: *Mortality rates equal to the 2014 Canadian Pensioners Mortality Table (CPM2014) combined with mortality improvement scale CPM Improvement Scale B (CPM-B)*. The change affects the mortality assumption used to value the solvency and wind-up liabilities for benefits assumed to be settled through a lump sum transfer. The financial impact of the change in the CIA CV Standard has been reflected in this actuarial valuation on a solvency and hypothetical wind-up basis.

On May 19, 2017, the Government of Ontario announced proposed reforms to the funding requirements for single-employer pension plans registered in Ontario.

Regulations supporting transitional measures relating to these proposed funding reforms were filed on June 29, 2017 and took effect on July 1, 2017. Under these regulations, solvency funding relief measures were expanded to include an option to allow plan administrators whose first valuation prepared as of a date on or after December 31, 2016 and before December 31, 2017 to elect to defer the start of new solvency special payments by up to 24 months instead of the usual 12 months. As this funding relief measure does not apply to plans that have qualified for Stage 1 or Stage 2 relief for broader public sector plans, the 24 month deferral option does not apply to the Plan.

The Regulations to the Pension Benefits Act were amended in May 2011 to include temporary solvency funding relief measure for certain pension plans in the broader public sector, originally announced by the Ontario Minister of Finance in the 2010 budget. The University applied to enter Stage 2 of the temporary solvency funding relief measures for certain pension plans in the broader public sector as indicated in the amendment of the Act. Approval was granted by the Ontario Ministry of Finance in March 2018. Accordingly, the minimum monthly contribution requirements determined herein reflect the temporary solvency funding relief regulations for broader public sector pension plans.

During the three years of the Stage 2 relief period, the following provisions would apply:

- During the first three years of a period of 10 years, beginning on a day that is not later than12 months after the valuation date, special payments to liquidate the solvency deficiency must be made;
- The minimum amount of the solvency special payment to be made during that three-year period is the greater of zero and (a) minus (b) below:
  a. The amount of interest payable on the solvency deficiency (amount by which solvency liabilities exceed solvency assets) identified in the Stage 2 valuation report calculated using the same rates used to determine the solvency liabilities; and
  b. The amount of special payments, if any, required to liquidate any going concern unfunded liability as stated in the general regulation.

SUBSEQUENT EVENTS

On July 20, 2017, the Canadian Institute of Actuaries released an Exposure Draft with proposed changes to the standards for pension commuted values ("CIA CV Standard"). The impact of any changes to the CIA CV Standard will be considered in a future actuarial valuation, once the amendments are finalized.

On December 14, 2017, Bill 177, Stronger, Fairer Ontario Act, 2017 received Royal Assent. Bill 177 contained amendments to the Act to enable the new funding framework previously announced by the Government of Ontario in May, 2017. The new funding framework changed minimum funding requirements from both a going concern and solvency perspective. The regulations to the Act supporting the new funding rules were published on April 20, 2018 with effect from May 1, 2018. Valuation reports dated on or after December 31, 2017 that are filed on or after May 1, 2018 reflect the new rules. The amended regulations also allow for a transition from the funding rules that applied immediately before May 1, 2018 to the new funding rules over a three-year phase-in period starting in the first year following the valuation date of this report. The impact of the new funding framework will be reflected in the next filed valuation report.

The Canadian Institute of Actuaries (CIA) Task Force on Mortality Improvement released a report on September 20, 2017 which recommends that Canadian actuaries consider the selection of mortality improvement scale MI-2017 for the purpose of reflecting future mortality improvement in Canadian actuarial work, while acknowledging that it might be appropriate to use alternative mortality improvement assumptions to reflect the nature of the work. The CIA Committee on Pension Plan Financial Reporting published a revised version of the Educational Note on the Selection of Mortality Assumptions for Pension Plan Valuations on December 21, 2017. The Educational Note indicates that given the recent publication of the CPM-B (published in February 2014 as part of the Canadian Pensioners Mortality study) and MI-2017 improvement scales and the similar data sets used in their development, it may be appropriate to use either scale in the absence of credible information to the contrary, such as the publication of a successor scale by the CIA. For the current valuation, we have continued to use the CPM-B scale without adjustment, which is a reasonable outlook for future mortality improvement.

After checking with representatives of the University, to the best of our knowledge there have been no other events subsequent to the valuation date which, in our opinion, would have a material impact on the results of the valuation. Our valuation reflects the financial position of the Plan as of the valuation date and does not take into account any experience after the valuation date.

IMPACT OF CASE LAW

This report has been prepared on the assumption that all claims on the Plan after the valuation date will be in respect of benefits payable to members of the Plan determined in accordance with the Plan terms and that all Plan assets are available to provide for these benefits. It is possible that court and regulatory decisions and changes in legislation could give rise to additional entitlements to benefits under the Plan and cause the results in this report to change.

By way of example, we bring your attention to the following decisions:

- The Ontario Court of Appeal's 2003 decision in *Aegon Canada Inc. and Transamerica Life Canada versus ING Canada Inc.* restricted the use of original plan surplus where two or more pension plans were merged.
- The Supreme Court of Canada's 2004 decision in *Monsanto Canada Inc. versus Superintendent of Financial Services* upheld the requirement, with retroactive effect, to distribute surplus on partial plan wind-up under the *Pension Benefits Act (Ontario).*

We are not in a position to assess the impact that such decisions or changes could have on the assumption that all plan assets on the valuation date are available to provide for benefits determined in accordance with the Plan terms. If such a claim arises subsequent to the date of this report, the consequences will be dealt with in a subsequent report. We are making no representation as to likelihood of such a claim.

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VALUATION RESULTS – GOING CONCERN

FINANCIAL STATUS

A going concern valuation compares the relationship between the value of Plan assets and the present value of expected future benefit cash flows in respect of accrued service, assuming the Plan will be maintained indefinitely.

The results of the current valuation, compared with those from the previous valuation, are summarized as follows:

	01.07.2017	01.07.2014
Assets		
Market value of assets	$234,133,100	$197,693,000
Asset smoothing adjustment	($4,789,900)	($17,860,700)
Smoothed value of assets	$229,343,200	$179,832,300
Going concern funding target		
• Active members	$109,103,900	$103,090,500
• Disabled members	$5,753,500	$4,614,500
• Suspended members	$4,141,700	$3,087,200
• Pensioners and survivors	$83,727,900	$61,229,300
• Deferred pensioners	$4,790,900	$2,017,600
Total	$207,517,900	$174,039,100
Funding excess (shortfall)	$21,825,300	$5,793,200

The going concern funding target includes a provision for adverse deviations.

RECONCILIATION OF FINANCIAL STATUS

Funding excess (shortfall) as at previous valuation		$5,793,200
Interest on funding excess (shortfall) at 5.60% per year		$1,028,800
University's special payments, with interest		$0
Expected funding excess (shortfall)		$6,822,000
Net experience gains (losses)		
• Investment return	$22,196,700	
• Increases in pensionable earnings	$6,641,200	
• Increase in YMPE and in maximum pension	($634,300)	
• Indexation	$423,400	
• Retirement	($2,306,900)	
• Termination	($212,700)	
• Mortality	($818,400)	
• Total experience gains (losses)		$25,289,000
Impact of changes in assumptions		
• Discount Rate	($15,559,300)	
• Pensionable earnings decrease	$9,542,000	
• Elected form of benefit for pre-retirement termination	($3,097,700)	
• Post retirement pension increases	($1,444,800)	
• Interest on Employee contributions	$39,900	
Total assumption changes impact		($10,519,900)
Net impact of other elements of gains and losses		$234,200
Funding excess (shortfall) as at current valuation		$21,825,300

CURRENT SERVICE COST

The current service cost is an estimate of the present value of the additional expected future benefit cash flows in respect of pensionable service that will accrue in each year after the valuation date, assuming the Plan will be maintained indefinitely.

The current service cost during the year following the valuation date, compared with the corresponding value determined in the previous valuation, is as follows:

	2017	2014
Estimated Members' required contributions for current service cost	$3,614,300	$3,376,700
Estimated University matching contributions for current service cost	$3,614,300	$3,376,700
Total current service cost	$7,228,600	$6,753,400
Total current service cost expressed as a percentage of members' pensionable earnings	14.6%	14.0%

The key factors that have caused a change in the University's current service cost since the previous valuation are summarized in the following table:

Current service cost as at previous valuation	14.0%
Demographic changes	0.2%
Changes in assumptions	0.4%
Current service cost as at current valuation	14.6%

DISCOUNT RATE SENSITIVITY

The following table summarizes the effect on the going concern funding target and current service cost shown in this report of using a discount rate which is 1% lower than that used in the valuation. For the purposes of the illustration, we have not changed the interest rate used to determine commuted values upon termination of employment.

SCENARIO	VALUATION BASIS	REDUCE DISCOUNT RATE BY 1%
Going concern funding target	$207,517,900	$238,689,100
Current service cost	$7,228,600	$8,817,600

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VALUATION RESULTS – HYPOTHETICAL WIND-UP

FINANCIAL POSITION

When conducting a hypothetical wind-up valuation, we determine the relationship between the respective values of the Plan's assets and its liabilities assuming the Plan is wound up and settled on the valuation date, assuming benefits are settled in accordance with the Act and under circumstances consistent with the hypothesized scenario on the valuation date. More details on such scenario are provided in Appendix D.

The hypothetical wind-up financial position as of the valuation date, compared with that at the previous valuation, is as follows:

	01.07.2017	01.07.2014
Assets		
Market value of assets	$234,133,100	$197,693,000
Termination expense provision	($325,000)	($300,000)
Wind-up assets	$233,808,100	$197,393,000
Present value of accrued benefits		
• Active members	$135,044,700	$114,790,100
• Disabled Members	$7,395,100	$5,480,900
• Suspended Members	$5,097,100	$3,363,800
• Pensioners and survivors	$102,720,800	$71,772,200
• Deferred pensioners	$6,926,000	$2,770,700
Total	$257,183,700	$198,177,700
Windup excess (shortfall)	($23,375,600)	($784,700)

WIND-UP INCREMENTAL COST TO JULY 1, 2020

The wind-up incremental cost is an estimate of the present value of the projected change in the hypothetical wind-up liabilities from the valuation date until the next scheduled valuation date, adjusted for the benefit payments expected to be made in that period.

The hypothetical wind-up incremental cost determined in this valuation, compared with the corresponding value determined in the previous valuation, is as follows:

	01.07.2017	01.07.2014
Number of years covered by report	3 years	3 years
Total hypothetical wind-up liabilities at the valuation date (A)	$257,183,700	$198,177,700
Present value of projected hypothetical wind-up liability at the next required valuation (including expected new entrants) plus benefit payments until the next required valuation (B)	$295,665,600	$231,313,000
Hypothetical wind-up incremental cost (B – A)	$38,481,900	$33,135,300

The incremental cost is not an appropriate measure of the contributions that would be required to maintain the financial position of the Plan on a hypothetical wind-up basis unchanged from the valuation date to the next required valuation date, if actual experience is exactly in accordance with the going concern valuation assumptions. This is because it does not reflect the fact that the expected return on plan assets (based on the going concern assumptions) is greater than the discount rate used to determine the hypothetical wind-up liabilities.

DISCOUNT RATE SENSITIVITY

The following table summarizes the effect on the hypothetical wind-up liabilities shown in this report of using a discount rate which is 1% lower than that used in the valuation:

SCENARIO	VALUATION BASIS	REDUCE DISCOUNT RATE BY 1%
Total hypothetical wind-up liability	$257,183,700	$300,217,600

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VALUATION RESULTS – SOLVENCY

OVERVIEW

The Act also requires the financial position of the Plan to be determined on a solvency basis. The financial position on a solvency basis is determined in a similar manner to the Hypothetical Wind-up Basis, except for the following:

EXCEPTIONS	REFLECTED IN VALUATION BASED ON THE TERMS OF ENGAGEMENT
The circumstance under which the Plan is assumed to be wound up could differ for the solvency and hypothetical wind-up valuations.	The same circumstances were assumed for the solvency valuation as were assumed for the hypothetical wind-up valuation.
Certain benefits can be excluded from the solvency financial position. These include: (a) any escalated adjustment (e.g. indexing), (b) certain plant closure benefits, (c) certain permanent layoff benefits, (d) special allowances other than funded special allowances, (e) consent benefits other than funded consent benefits, (f) prospective benefit increases, (g) potential early retirement window benefit values, and (h) pension benefits and ancillary benefits payable under a qualifying annuity contract.	The following benefits were excluded from the solvency liabilities shown in this valuation: • Post–retirement pension increases
The financial position on the solvency basis needs to be adjusted for any Prior Year Credit Balance.	Not applicable.
The solvency financial position can be determined by smoothing assets and the solvency discount rate over a period of up to 5 years.	Smoothing was not used.
The benefit rate increases coming into effect after the valuation date can be reflected in the solvency valuation.	Not applicable.

FINANCIAL POSITION

The financial position on a solvency basis, compared with the corresponding figures from the previous valuation, is as follows:

	01.07.2017	01.07.2014
Assets		
Market value of assets	$234,133,100	$197,693,000
Termination expense provision	($325,000)	($300,000)
Net assets	$233,808,100	$197,393,000
Liabilities		
Total hypothetical wind-up liabilities	$257,183,700	$198,177,700
Difference in circumstances of assumed wind-up	$0	$0
Value of excluded benefits	($706,100)	($1,665,900)
Liabilities on a solvency basis	$256,477,600	$196,511,800
Surplus (shortfall) on a solvency basis	($22,669,500)	$881,200
Transfer ratio	0.91	1.00
Ratio of net assets to liabilities on a solvency basis	0.91	1.00

6
MINIMUM FUNDING REQUIREMENTS

The Act prescribes the minimum contributions that the University must make to the Plan. The minimum contributions in respect of a defined benefit component of a pension plan are comprised of going concern current service cost and special payments to fund any going concern or solvency shortfalls. In accordance with the cost sharing provisions of the Plan, the University and the members contribute equally to fund the minimum amounts required to fund the Plan.

The University has applied and qualified for Stage 2 relief under the temporary solvency funding relief measures for certain pension plans in the broader public sector. Accordingly, the minimum monthly contributions requirements determined herein reflect the University's Stage 2 relief under the temporary solvency funding relief regulations.

On the basis of the assumptions and methods described in this report, the rule for determining the minimum total required monthly contributions to be shared equally between the University and members, as well as an estimate of the contributions, from the valuation date until the next required valuation are as follows:

	CONTRIBUTION RULE		ESTIMATED CONTRIBUTIONS	
Period beginning	**Monthly current service cost[3]**	**Minimum monthly special payments**	**Monthly current service cost**	**Total minimum monthly contributions**
July 1, 2017	14.60%	$0	$602,383	$602,383
July 1, 2018	14.60%	$51,192	$620,454	$671,646
July 1, 2019	14.60%	$51,192	$639,068	$690,260

[3] Expressed as a percentage of members' pensionable earnings

The estimated contribution amounts above are based on projected members' pensionable earnings. Therefore, the University's and members' actual current service cost will be different from the above estimates and, as such, the contribution requirements should be monitored closely to ensure contributions are made in accordance with the Act. That said, under the cost sharing provisions of the Plan, and subject to any limits under the *Income Tax Act*, the University's contributions may not be less than the aggregate regular employee contributions for the year as specified by the Plan.

The development of the minimum special payments is summarized in Appendix A.

OTHER CONSIDERATIONS

Differences Between Valuation Bases

There is no provision in the minimum funding requirements to fund the difference between the hypothetical wind-up and solvency shortfalls, if any.

In addition, although minimum funding requirements do include a requirement to fund the going concern current service cost, there is no requirement to fund the expected growth in the hypothetical wind-up or solvency liability after the valuation date, which could be greater than the going concern current service cost.

Timing of Contributions

Funding contributions are due on a monthly basis. Contributions for current service cost must be made within 30 days following the month to which they apply. Special payment contributions must be made in the month to which they apply.

Retroactive Contributions

The University and members must contribute the excess, if any, of the minimum contribution recommended in this report over contributions actually made in respect of the period following the valuation date. This contribution, along with an allowance for interest, is due no later than 60 days following the date this report is filed.

Payment of Benefits

The Act imposes certain restrictions on the payment of lump sums from the Plan when the transfer ratio revealed in an actuarial valuation is less than one. If the transfer ratio shown in this report is less than one, the plan administrator should ensure that the monthly special payments are sufficient to meet the requirements of the Act to allow for the full payment of benefits, and otherwise should take the prescribed actions.

Additional restrictions are imposed when:

- The transfer ratio revealed in the most recently filed actuarial valuation is less than one and the administrator knows or 'ought to know' that the transfer ratio of the Plan has declined by 10% or more since the date the last valuation was filed.

- The transfer ratio revealed in the most recently filed actuarial valuation is greater than or equal to one and the administrator knows or 'ought to know' that the transfer ratio of the Plan has declined to less than 0.9 since the date the last valuation was filed.

As such, the administrator should monitor the transfer ratio of the Plan and, if necessary, take the prescribed actions.

Letters of Credit

Minimum funding requirements in respect of solvency deficiencies that otherwise require monthly contributions to the pension fund may be met, in the alternative, by establishing an irrevocable letter of credit subject to the conditions established by the Act. Required solvency special payments in excess of those met by a letter of credit must be met by monthly contributions to the pension fund.

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MAXIMUM ELIGIBLE CONTRIBUTIONS

The *Income Tax Act* (the "ITA") limits the amount of employer contributions that can be remitted to the defined benefit component of a registered pension plan.

In accordance with Section 147.2 of the ITA and *Income Tax Regulation* 8516, for a plan which is underfunded on either a going concern or on a hypothetical wind-up basis, the maximum permitted contributions are equal to the employer's current service cost, including the explicit expense allowance if applicable, plus the greater of the going concern funding shortfall and hypothetical wind-up shortfall.

For a plan which is fully funded on both going concern and hypothetical wind-up bases, the University can remit a contribution equal to the University's current service cost, including the explicit expense allowance if applicable, as long as the surplus in the plan does not exceed a prescribed threshold. Specifically, in accordance with Section 147.2 of the ITA, for a plan which is fully funded on both going concern and hypothetical wind-up bases, the plan may not retain its registered status if the University makes a contribution while the going concern funding excess exceeds 25% of the going concern funding target.

Notwithstanding the above, any contributions that are required to be made in accordance with pension benefits legislation are eligible contributions in accordance with Section 147.2 of the ITA and can be remitted.

SCHEDULE OF MAXIMUM CONTRIBUTIONS

In aggregate, the University and the members are permitted to fully fund the greater of the going concern and hypothetical wind-up shortfalls ($23,375,600) as well as make current service cost contributions. The portion of this contribution representing the payment of the hypothetical wind-up shortfall can be increased with interest at 2.71% per year from the valuation date to the date the payment is made, and must be reduced by the amount of any deficit funding made from the valuation date to the date the payment is made.

Assuming the University and the members contribute the greater of the going concern and hypothetical wind-up shortfall of $23,375,600 as of the valuation date, the rule for determining the estimated maximum eligible annual contributions, as well as an estimate of the maximum eligible contributions until the next valuation, are as follows:

	CONTRIBUTION RULE		ESTIMATED CONTRIBUTIONS
Year beginning	**Monthly current service cost[4]**	**Deficit Funding**	**Monthly current service cost including expense allowance**
July 1, 2017	14.60%	n/a	$602,383
July 1, 2018	14.60%	n/a	$620,454
July 1, 2019	14.60%	n/a	$639,068

The current service cost in the above table was estimated based on projected members' pensionable earnings. The University's and members' actual current service cost will be different from these estimates and, as such, the contribution requirements should be monitored closely to ensure compliance with the ITA. That said, under the cost sharing provisions of the Plan, and subject to any limits under the *Income Tax Act*, the University's contributions may not be less than the aggregate regular employee contributions for the year as specified by the Plan.

[4] Expressed as a percentage of members' earnings

8 ACTUARIAL OPINION

In our opinion, for the purposes of the valuations,

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

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 Pension Benefits Act, Ontario.

Bill Watson
Fellow of the Society of Actuaries
Fellow of the Canadian Institute of Actuaries

29 June 2018
Date

Lise Houle
Fellow of the Society of Actuaries
Fellow of the Canadian Institute of Actuaries

29 June 2018
Date

APPENDIX A

PRESCRIBED DISCLOSURE

DEFINITIONS

The Act defines a number of terms as follows:

DEFINED TERM	DESCRIPTION	RESULT
Transfer Ratio	The ratio of: (a) Solvency Assets minus the lesser of the Prior Year Credit Balance and the minimum required University contributions until the next required valuation; to (b) the sum of the Solvency Liabilities and liabilities for benefits, other than benefits payable under qualifying annuity contracts that were excluded in calculating the Solvency Liabilities.	0.91
Prior Year Credit Balance	Accumulated excess of contributions made to the pension plan in excess of the minimum required contributions (note: only applies if the University chooses to treat the excess contributions as a Prior Year Credit Balance).	$0
Solvency Assets	Market value of assets including accrued or receivable income and excluding the value of any qualifying annuity contracts.	$234,133,100
Solvency Asset Adjustment	The sum of:	
	(a) the difference between smoothed value of assets and the market value of assets	$0
	(b) the present value of going concern special payments (including those identified in this report) within 6 years following the valuation date	$0
	(c) the present value of any previously scheduled solvency special payments (excluding those identified in this report)	$0
		$0

DEFINED TERM	DESCRIPTION	RESULT
Solvency Liabilities	Liabilities determined as if the plan had been wound up on the valuation date, including liabilities for plant closure benefits or permanent layoff benefits that would be immediately payable if the University's business were discontinued on the valuation date of the report, but, if elected by the plan sponsor, excluding liabilities for, (a) any escalated adjustment, (b) excluded plant closure benefits, (c) excluded permanent layoff benefits, (d) special allowances other than funded special allowances, (e) consent benefits other than funded consent benefits, (f) prospective benefit increases, (g) potential early retirement window benefit values, and (h) pension benefits and ancillary benefits payable under a qualifying annuity contract.	$256,477,600
Solvency Liability Adjustment	The amount by which Solvency Liabilities are adjusted as a result of using a solvency valuation interest rate that is the average of market interest rates calculated over the period of time used in the determination of the smoothed value of assets.	$0
Solvency Deficiency	The amount, if any, by which the sum of:	
	(a) the Solvency Liabilities	$256,477,600
	(b) the Solvency Liability Adjustment	$0
	(c) the Prior Year Credit Balance	$0
		$256,477,600
	Exceeds the sum of	
	(d) the Solvency Assets net of estimated termination expenses[5]	$233,808,100
	(e) the Solvency Asset Adjustment	$0
		$233,808,100
	Solvency Deficiency	$22,669,500

[5] In accordance with accepted actuarial practice, for purposes of determining the financial position, the market value of plan assets was reduced by a provision for estimated termination expenses payable from the Plan's assets that may reasonably be expected to be incurred in terminating the Plan and to be charged to the Plan.

TIMING OF NEXT REQUIRED VALUATION

In accordance with the Act the next valuation of the Plan would be required at an effective date within one year of the current valuation date if:

- The ratio of solvency assets to solvency liabilities is less than 85%.
- The University elected to exclude plant closure or permanent lay-off benefits under Section 5(18) of the regulations, and has not rescinded that election.

Otherwise, the next valuation of the Plan would be required at an effective date no later than three years after the current valuation date.

Accordingly, the next valuation of the Plan will be required as of July 1, 2020.

SPECIAL PAYMENTS

Based on the results of this valuation, the Plan is not fully funded. In accordance with the Act, any going concern deficits must be amortized over a period not exceeding 15 years, beginning on a date not later than 12 months after July 1, 2017.

A new solvency deficiency of $22,669,500 was created as at July 1, 2017.

In accordance with the general regulations (excluding temporary funding relief measures), the solvency deficiency would have had to be amortized over a period not exceeding five years commencing not later than twelve months after the valuation date of July 1, 2017. As such, a new solvency special payment schedule would have had to be established in the amount of $415,083 per month, from July 1, 2018 until June 30, 2023 as set out below:

				PRESENT VALUE	
Type of Payment	Start Date	End Date	Monthly Special Payment	Going Concern Basis	Solvency Basis[6]
New solvency	July 1, 2018	July 1, 2023	$415,083	N/A	$22,669,500

Under the terms of the Plan, Special Payments are shared equally between the University and plan members.

[6] Calculation considers both solvency and going concern special payments (six years only) and is based on the average solvency discount rate.

TEMPORARY SOLVENCY FUNDING RELIEF

The University applied and qualified for Stage 2 relief. Accordingly, the minimum monthly special payment requirements determined herein reflect the temporary solvency funding relief regulations for broader public sector pension plans.

In accordance with the Stage 2 solvency funding relief measures, special payments to liquidate the solvency deficiency must be made during the first three years of period of 10 years beginning on a day that is not later than 12 months after the valuation date.

The minimum amount of the solvency special payment to be made during that three-year period is the greater of zero and (a) minus (b) below:

a. The amount of interest payable on the solvency deficiency (amount by which solvency liabilities exceed solvency assets) identified in the Stage 2 valuation report calculated using the same rates used to determine the solvency liabilities; and

b. The amount of special payments, if any, required to liquidate any going concern unfunded liability as stated in the general regulation.

Solvency deficiency[7] (A)	$22,669,500
Interest on solvency deficiency[8] (B)	2.71%
Annual interest payable on wind-up deficit (A x B)	$614,300
Minimum monthly special payments	$51,192

Accordingly, the special payments that must be made, based on temporary solvency funding relief regulations for broader public sector pension plans, are as follows:

Period beginning	Total monthly special payments (C)	Going concern monthly special payments (D)	Solvency monthly special payments [(C – D) not below $0]
July 1, 2017	$0	$0	$0
July 1, 2018	$51,192	$0	$51,192
July 1, 2019	$51,192	$0	$51,192

[7] Solvency deficiency excluding any solvency asset adjustment and solvency liability adjustment

[8] Liability weighted average solvency interest rate

PENSION BENEFIT GUARANTEE FUND (PBGF) ASSESSMENT

The PBGF assessment base and liabilities are derived as follows:

Solvency assets	$234,133,100	(a)
PBGF liabilities	$256,477,600	(b)
Solvency liabilities	$256,477,600	(c)
Ontario asset ratio	100%	(d) = (b) ÷ (c)
Ontario portion of the fund	$234,133,100	(e) = (a) x (d)
PBGF assessment base	$22,344,500	(f) = (b) – (e)
Amount of additional liability for plant closure and/or permanent layoff benefits which is not funded and subject to the 2% assessment pursuant to s.37(4)	$0	(g)

The PBGF assessment is calculated as follows:

$5 for each Ontario member	$6,330.00	(h)
0.5% of PBGF assessment base up to 10% of PBGF liabilities	$111,722.50	(i)
1.0% of PBGF assessment base between 10% and 20% of PBGF liabilities	$0.00	(j)
1.5% of PBGF assessment base over 20% of PBGF liabilities	$0.00	(k)
Sum of (h), (i), (j) and (k)	$118,052.50	(l)
$300 for each Ontario member	$379,800.00	(m)
Lesser of (l) and (m)	$118,052.50	(n)
2.0% of additional liabilities ((g) x 2%)	$0.00	(o)
Total Guarantee Fund Assessment ((n) + (o), no less than $250) (before applicable tax)	$118,052.50	(p)
Sales Tax (8%)	$9,444.20	(q)
Total Guarantee Fund Assessment ((p)+(q)) (after applicable tax)	$127,496.70	

APPENDIX B

PLAN ASSETS

The pension fund is held by Northern Trust Company. In preparing this report, we have relied upon fund statements prepared by Northern Trust Company without further audit. Customarily, this information would not be verified by a plan's actuary. We have reviewed the information for internal consistency and we have no reason to doubt its substantial accuracy.

RECONCILIATION OF MARKET VALUE OF PLAN ASSETS

The pension fund transactions since the last valuation are summarized in the following table:

	2014/2015	2015/2016	2016/2017
July 1	$197,692,976	$211,089,194	$213,275,093
PLUS			
University's contributions	$3,440,763	$3,557,790	$3,558,532
Members' contributions	$3,439,182	$3,557,639	$3,558,532
Other contributions	$18,563	$0	$0
Investment earnings and gains	$14,666,384	$5,625,717	$24,025,112
	$21,564,892	$12,741,146	$31,142,176
LESS			
Pensions paid	$5,843,800	$6,266,936	$6,914,725
Lump-sums paid	$1,259,329	$3,123,607	$2,068,548
Administration and investment fees	$1,065,545	$1,164,704	$1,300,912
	$8,168,674	$10,555,247	$10,284,185
July 30	$211,089,194	$213,275,093	$234,133,084
Rate of return net of expenses[9]	6.8833%	2.1248%	10.7017%

We have tested the pensions paid, the lump-sums paid, and the contributions for consistency with the membership data for the Plan members who have received benefits or made contributions. The results of these tests were satisfactory.

[9] Assuming mid-period cash flows.

INVESTMENT POLICY

The plan administrator has adopted a statement of investment policy and procedures. This policy is intended to provide guidelines for the manager(s) as to the level of risk that is consistent with the Plan's investment objectives. A significant component of this investment policy is the asset mix.

The plan administrator is solely responsible for selecting the plan's investment policies, asset allocations, and individual investments.

The constraints on the asset mix and the actual asset mix at the valuation date are provided for information purposes:

	INVESTMENT POLICY			ACTUAL ASSET MIX AS AT JULY 1, 2017
	Minimum	Target	Maximum	
Canadian Equities	15%	30%	40%	28.0%
Global Equities	15%	30%	40%	36.1%
Fixed Income	25%	40%	60%	33.9%
Alternatives	0%	0%	10%	0.0%
Cash and cash equivalents	0%	0%	20%	2.0%
		100%		100.0%

APPENDIX C

METHODS AND ASSUMPTIONS – GOING CONCERN

VALUATION OF ASSETS

For this valuation, we have continued to use a moving three-year average method to determine the smoothed value of assets. Under this method, fund investment return (net of expenses) above or below the expected return during a given year are spread on a straight-line basis over three years. As a result, the asset value produced at July 1, 2017 recognizes the following percentages of the fund investment return different from the expected return that arose during the past three years:

PERIOD	PERCENTAGE OF GAINS (LOSSES) RECOGNIZED
2016/2017	33.33%
2015/2016	66.67%
Before 2015/2016	100.0%

The asset values produced by this method are related to the market value of the assets, with the advantage that, over time, the market-related asset values will tend to be more stable than market values. To the extent that more capital gains than losses will arise over the long term, the smoothed value will tend to be lower than the market value.

The smoothed value of the assets at July 1, 2017 was derived as follows:

Market value of assets		$ 234,133,100
LESS		
Fund returns above or below expected 5.60%[10]	2015/2016: ($7,296,278) x 1/3% =	($2,432,100)
	2016/2017: 10,833,048 x 2/3% =	$7,222,000
		$4,789,900
Smoothed value of assets		$229,343,200

[10] 5.60% per year is the expected annual rate of return in effect in 2014 through 2017 based on July 1, 2014 actuarial valuation for funding purposes.

GOING CONCERN FUNDING TARGET

Over time, the real cost to the employer of a pension plan is the excess of benefits and expenses over member contributions and investment earnings. The actuarial cost method allocates this cost to annual time periods.

For purposes of the going concern valuation, we have continued to use the projected unit credit actuarial cost method. Under this method, we determine the present value of benefit cash flows expected to be paid in respect of service accrued prior to the valuation date, including ancillary benefits, based on projected final earnings. This is referred to as the funding target.

The funding excess or funding shortfall, as the case may be, is the difference between the market or smoothed value of assets and the funding target. A funding excess on a market value basis indicates that the current market value of assets and expected investment earnings are expected to be sufficient to meet the cash flows in respect of benefits accrued to the valuation date as well as expected expenses – assuming the plan is maintained indefinitely. A funding shortfall on a market value basis indicates the opposite – that the current market value of the assets is not expected to be sufficient to meet the plan's cash flow requirements in respect of accrued benefits, absent additional contributions.

As required under the Act, a funding shortfall must be amortized over no more than 15 years through special payments. A funding excess may, from an actuarial standpoint, be applied immediately to reduce required employer current service contributions unless precluded by the terms of the plan or by legislation.

The actuarial cost method used for the purposes of this valuation produces a reasonable matching of contributions with accruing benefits. Because benefits are recognized as they accrue, the actuarial cost method provides an effective funding target for a plan that is maintained indefinitely.

Current Service Cost

The current service cost is the present value of projected benefits to be paid under the plan with respect to service expected to accrue in each year during the period until the next valuation.

Under the projected unit credit actuarial cost method, the current service cost for an individual member will increase each year as the member approaches retirement. However, the current service cost of the entire group, expressed as a percentage of the members' required contributions, can be expected to remain stable as long as the average age distribution of the group remains constant.

Under the cost sharing provisions of the plan, subject to any limits under the Income Tax Act, the University and the members contribute equally to fund the minimum amounts required to fund the Plan.

ACTUARIAL ASSUMPTIONS – GOING CONCERN BASIS

The present value of future benefit payment cash flows is based on economic and demographic assumptions. At each valuation we determine whether, in our opinion, the actuarial assumptions are still appropriate for the purposes of the valuation, and we revise them, if necessary. Emerging experience will result in gains or losses that will be revealed and considered in future actuarial valuations.

ASSUMPTION	CURRENT VALUATION	PREVIOUS VALUATION
Discount rate:	5.05%	5.60%
Inflation:	2.00%	2.00%
ITA limit / YMPE increases:	3.00%	3.00%
Pensionable earnings increases:	3.00%	4.00%
Post retirement pension increases:	0.66% at July 1, 2018, 0.40% at July 1, 2019 and 0.74% at July 1, 2020; 0.00% per year thereafter	1.00% at each of July 1, 2015, July 1, 2016 and July 1, 2017; 0.00% per year thereafter
Interest on employee contributions	2.50%	3.30%
Retirement rates:	• Active - Age related table • Deferred - 100% at age 60	• Active - Age related table • Deferred - 100% at age 60
Termination rates:	Age related table	Age related table
Mortality rates:	100% of the rates of the 2014 Private Sector Canadian Pensioners Mortality Table (CPM2014Priv)	100% of the rates of the 2014 Private Sector Canadian Pensioners Mortality Table (CPM2014Priv)
Mortality improvements:	Fully generational using CPM Improvement Scale B (CPM-B)	Fully generational using CPM Improvement Scale B (CPM-B)
Disability rates:	None	None
Commuted value election on pre-retirement termination:		
• Percentage of members electing commuted value on termination	• 40% of non-retirement eligible members; and • 10% of retirement eligible members	0% of all members
• Discount rate for calculation of commuted value assumed to be settled	4.00%	N/A

ASSUMPTION	CURRENT VALUATION	PREVIOUS VALUATION
• Mortality rates and improvements for calculation of commuted value assumed to be settled	100% of the rates of the 2014 Canadian Pensioners Mortality Table (CPM2014) with fully generational mortality improvements using Scale B (CPM-B)	N/A

The assumptions are best-estimate with the exception that the discount rate includes a margin for adverse deviations, as shown below.

AGE RELATED TABLES

Sample rates from the age-related tables are summarized in the following table:

AGE	TERMINATION	RETIREMENT
20	4.0%	0.0%
25	6.0%	0.0%
30	4.0%	0.0%
35	4.0%	0.0%
40	1.0%	0.0%
45	1.0%	0.0%
50	1.0%	0.0%
55	0.0%	0.0%
56	0.0%	0.0%
57	0.0%	0.0%
58	0.0%	0.0%
59	0.0%	5.0%
60	0.0%	5.0%
61	0.0%	5.0%
62	0.0%	5.0%
63	0.0%	5.0%
64	0.0%	50.0%
65	0.0%	50.0%
66	0.0%	15.0%
67	0.0%	100.0%

Pensionable Earnings

The benefits ultimately paid will depend on each member's final average earnings. To calculate the pension benefits payable upon retirement, death, or termination of employment, we have taken the rate of pay on July 1, 2017 and assumed that such pensionable earnings will increase at the assumed rate.

RATIONALE FOR ASSUMPTIONS

A rationale for each of the assumptions used in the current valuation is provided below.

DISCOUNT RATE

We have discounted the expected benefit payment cash flows using the expected investment return on the market value of the fund net of fees and less a margin for adverse deviations. Other bases for discounting the expected benefit payment cash flows may be appropriate, particularly for purposes other than those specifically identified in this valuation report.

The discount rate is comprised of the following:

- Estimated returns for each major asset class consistent with market conditions on the valuation date, the expected time horizon over which benefits are expected to be paid, and the target asset mix specified in the Plan's investment policy.
- Implicit provision for passive investment expenses of 5bps, reflecting no advance recognition of potential future additional returns achieved through active management of equities.
- Implicit provision for non-investment expenses determined as the average rate of such expenses paid from the fund over the last 3 years and future expectations.
- A margin for adverse deviations of 0.40%

The discount rate was developed as follows:

Assumed investment return	5.69%
Implicit expense provision	(0.23%)
Margin for adverse deviation	(0.40%)
Rounding	(0.01%)
Net discount rate	5.05%

INFLATION

The inflation assumption is based on the mid-point of the Bank of Canada's inflation target range of between 1% and 3%.

INCOME TAX ACT PENSION LIMIT AND YEAR'S MAXIMUM PENSIONABLE EARNINGS

The assumption is based on historical real economic growth and the underlying inflation assumption.

PENSIONABLE EARNINGS

The assumption is based on general wage growth assumptions increased by our best estimate of future merit and promotional increases over general wage growth considering current economic and financial market conditions, applicable collective agreement provisions, and University expectations.

POST-RETIREMENT PENSION INCREASES

The assumption is based on the Plan formula and inflation assumption above.

RETIREMENT RATES

The assumption is based on experience over the years 2006/2007 to 2010/2011 and expectations of future experience based on Plan terms and employment standards law. Subsequent experience has been consistent with these rates.

TERMINATION RATES

The assumption is based on experience from 2006/2007 to 2010/2011. Subsequent experience has been consistent with these rates.

MORTALITY RATES

The assumption for the mortality rates is based on the Canadian Pensioners' Mortality (CPM) study published by the Canadian Institute of Actuaries in February 2014.

Due to the size of the Plan, specific data on plan mortality experience is insufficient to determine the mortality rates. The CPM mortality rates have been adjusted after considering plan-specific characteristics, such as the type of employment, the industry experience, the pension and employment income for the plan members, and data in the CPM study.

There is broad consensus among actuaries and other longevity experts that mortality improvement will continue in the future, but the degree of future mortality improvement is uncertain. Two mortality improvement scales were recently published by the Canadian Institute of Actuaries (CIA) and may apply to Canadian pension valuations:

- The Canadian Pensioners Mortality (CPM) study published in February 2014 included CPM Improvement Scale B (CPM-B) which is also used for commuted value calculations.
- A report released by the Task Force on Mortality Improvement on September 20, 2017 includes an analysis of the rate of mortality improvement for the Canadian population and provides for mortality improvement scale MI-2017 to be considered for the purpose of reflecting future mortality improvement in Canadian actuarial work, while acknowledging that it might be appropriate to use alternative mortality improvement assumptions to reflect the nature of the work.

The CIA Committee on Pension Plan Financial Reporting published a revised version of the Educational Note on the Selection of Mortality Assumptions for Pension Plan Valuations on December 21, 2017. The Educational Note indicates that given the recent publication of the CPM-B and MI-2017 improvement scales and the similar data sets used in their development, it may appropriate to use either scale in the absence of credible information to the contrary, such as the publication of a successor scale by the CIA.

For the present valuation, we have continued to use the CPM-B scale without adjustment, which is a reasonable outlook for future mortality improvement.

Based on the assumption used, the life expectancy of a member age 65 at the valuation date is 21.7 years for males and 24.1 years for females.

INTEREST ON EMPLOYEE CONTRIBUTIONS

The assumption is based on Plan terms and the underlying investment return assumption on government mid-term bonds.

DISABILITY RATES

Use of a different assumption would not have a material impact on the valuation.

APPENDIX D

METHODS AND ASSUMPTIONS – HYPOTHETICAL WIND-UP AND SOLVENCY

HYPOTHETICAL WIND-UP BASIS

The Canadian Institute of Actuaries requires actuaries to report the financial position of a pension plan on the assumption that the plan is wound up on the effective date of the valuation, with benefits determined on the assumption that the pension plan has neither a surplus nor a deficit.

To determine the actuarial liability on the hypothetical wind-up basis, we have valued those benefits that would have been paid had the Plan been wound up on the valuation date, with all members fully vested in their accrued benefits.

The circumstances in which the plan wind-up is assumed to have taken place are as follows:

- The University's is discontinued on the valuation date

No benefits payable on plan wind-up under the above postulated scenario were excluded from our calculations.

Upon plan wind-up, members are given options for the method of settling their benefit entitlements. The options vary by eligibility and by province of employment, but in general, involve either a lump sum transfer or an immediate or deferred pension.

The value of benefits assumed to be settled through a lump sum transfer is based on the assumptions described in Section 3500 – *Pension Commuted Values* of the Canadian Institute of Actuaries' Standards of Practice applicable for July 1, 2017.

Benefits provided as an immediate or deferred pension are assumed to be settled through the purchase of annuities based on an estimate of the cost of purchasing annuities.

However, there is limited data available to provide credible guidance on the cost of a purchase of indexed annuities in Canada. In accordance with the *Canadian Institute of Actuaries Educational Note: Assumptions for Hypothetical Wind-up and Solvency Valuations with Effective Dates Between December 31, 2016 and December 30, 2017 (the "Educational Note")*, we have used an annuity proxy to estimate the cost of purchasing annuities.

The Educational Note provides guidance on estimating the cost of annuity purchases assuming a typical group of annuitants. That is, no adjustments for sub- or super-standard mortality are considered. However, it is expected that insurers will consider plan experience and certain plan-specific characteristics when determining the mortality basis for a particular group. The Educational Note states that the actuary would be expected to make an adjustment to the regular annuity purchase assumptions where there is demonstrated substandard or super-standard mortality or where an insurer might be expected to assume so. In such cases, the actuary would be expected to make an adjustment to the mortality assumption in a manner consistent with the underlying annuity purchase basis. Given the uncertainty surrounding the actual mortality basis that would be typical of a group annuity purchase, it is reasonable to assume that there is a range of bases that can be expected not to be materially different from the actual mortality basis. Therefore, an adjustment to the regular annuity purchase assumptions would be warranted when the plan's assumed basis falls outside that range.

In this context, we have determined that no adjustment to the mortality rates used in the regular annuity purchase assumptions is required.

We have not included a margin for adverse deviation in the solvency and hypothetical wind-up valuations.

The assumptions are as follows:

FORM OF BENEFIT SETTLEMENT ELECTED BY MEMBER	
Lump sum:	70% of active members and deferred pensioners under age 55, and 50% of active members and deferred pensioners over age 55, elect to receive their benefit entitlement in a lump sum
Annuity purchase:	All remaining members are assumed to elect to receive their benefit entitlement in the form of a deferred or immediate pension. These benefits are assumed to be settled through the purchase of deferred or immediate annuities from a life insurance company.
BASIS FOR BENEFITS ASSUMED TO BE SETTLED THROUGH A LUMP SUM	
Mortality rates:	100% of the rates of the 2014 Canadian Pensioners Mortality Table (CPM2014) with fully generational improvements using CPM Scale B
Interest rate:	2.30% per year for 10 years, 3.30% per year thereafter
Maximum Pension limit:	$2,914.44 increasing at 2.02% per year for 10 years, 2.69% per year thereafter
Post retirement pension increases:	0.45% per year for 1 year; 0.00% per year for 1 year; 0.06% per year for 1 year; 0.00% per year thereafter

BASIS FOR BENEFITS ASSUMED TO BE SETTLED THROUGH THE PURCHASE OF AN ANNUITY	
Mortality rates:	100% of the rates of the 2014 Canadian Pensioners Mortality Table (CPM2014) with fully generational improvements using CPM Scale B
Interest rate:	2.93% per year based on a duration of 12.75 years determined for the liabilities assumed to be settled through the purchase of an annuity.
Maximum pension limit:	$2,914.44 increasing at 2.48% per year
Post retirement pension increases:	0.45% per year for 1 year; 0.00% per year for 1 year; 0.06% per year for 1 year; 0.00% per year thereafter
RETIREMENT AGE	
Maximum value:	Members are assumed to retire at the age which maximizes the value of their entitlement from the Plan, based on the eligibility requirements which have been met at the valuation date
Grow-in:	The benefit entitlement and assumed retirement age of Ontario members whose age plus service equals at least 55 at the valuation date reflect their entitlement to grow into early retirement subsidies
OTHER ASSUMPTIONS	
Special payments	Discounted at the average interest rate of 2.71% per year
Final average earnings:	Based on actual pensionable earnings over the averaging period
Family composition:	Same as for going concern valuation
Termination expenses:	$325,000

For solvency and wind-up valuation purposes, we have assumed that, for active members, the annuity conversion basis used at the time of their ultimate pension commencement will be the conversion basis used to value the supplementary benefits for funding purposes.

To determine the hypothetical wind-up position of the Plan, a provision has been made for estimated termination expenses payable from the Plan's assets in respect of actuarial and administration expenses that may reasonably be expected to be incurred in terminating the Plan and to be charged to the Plan.

Because the settlement of all benefits on wind-up is assumed to occur on the valuation date and is assumed to be uncontested, the provision for termination expenses does not include custodial, investment management, auditing, consulting, and legal expenses that would be incurred between the wind-up date and the settlement date or due to the terms of a wind-up being contested.

Expenses associated with the distribution of any surplus assets that might arise on an actual wind-up are also not included in the estimated termination expense provisions.

In determining the provision for termination expenses payable from the Plan's assets, we have assumed that the plan sponsor would be solvent on the wind-up date. We have also assumed, without analysis, that the Plan's terms as well as applicable legislation and court decisions would permit the relevant expenses to be paid from the Plan.

Although the termination expense assumption is a best estimate, actual fees incurred on an actual plan wind-up may differ materially from the estimates disclosed in this report.

INCREMENTAL COST

In order to determine the incremental cost, we estimate the hypothetical wind-up liabilities at the next valuation date. We have assumed that the cost of settling benefits by way of a lump sum or purchasing annuities remains consistent with the assumptions described above. Since the projected hypothetical wind-up liabilities will depend on the membership in the Plan at the next valuation date, we must make assumptions about how the Plan membership will evolve over the period until the next valuation.

We have assumed that the Plan membership will evolve in a manner consistent with the going concern assumptions as follows:

- Members terminate, retire and die consistent with the termination, retirement and mortality rates used for the going concern valuation.
- Pensionable earnings, money purchase accounts, the Income Tax Act pension limit, and the Year's Maximum Pensionable Earnings increase in accordance with the related going concern assumptions.
- Active members accrue pensionable service in accordance with the terms of the Plan.
- To accommodate for new entrants to the Plan, we have added to the projected liability an amount equal to the liability of new entrants that have joined the Plan since the previous valuation.

SOLVENCY BASIS

In determining the financial position of the Plan on the solvency basis, we have used the same assumptions and methodology as were used for determining the financial position of the Plan on the hypothetical wind-up basis with the exception that we have excluded post retirement indexing.

The solvency position is determined in accordance with the requirements of the Act.

APPENDIX E
MEMBERSHIP DATA

ANALYSIS OF MEMBERSHIP DATA

The actuarial valuation is based on membership data as at July 1, 2017, provided by the University.

We have applied tests for internal consistency, as well as for consistency with the data used for the previous valuation. These tests were applied to membership reconciliation, basic information (date of birth, date of hire, date of membership, gender, etc.), pensionable earnings, credited service, contributions accumulated with interest, and pensions to retirees and other members entitled to a deferred pension. Contributions, lump sum payments, and pensions to retirees were compared with corresponding amounts reported in financial statements. The results of these tests were satisfactory.

If the data supplied are not sufficient and reliable for its intended purpose, the results of our calculation may differ significantly from the results that would be obtained with such data. Although Mercer has reviewed the suitability of the data for its intended use in accordance with accepted actuarial practice in Canada, Mercer has not verified or audited any of the data or information provided.

Plan membership data are summarized below. For comparison, we have also summarized corresponding data from the previous valuation.

	01.07.2017	01.07.2014
Active Members		
Number	710	729
Total annualized pensionable earnings (2017/2018, 2014/2015)	$49,481,714	$48,173,471
Average annualized pensionable earnings for following year	$69,693	$66,082
Average years of pensionable service	13.9 years	14.3 years
Average age	49.3	49.3
Accumulated contributions with interest	$39,295,571	$37,185,529
Suspended members		
Number	25	21
Total pensionable earnings (2017/2018, 2014/2015)	$3,249,241	$2,537,821
Average pensionable earnings for following year	$129,970	$120,849
Average years of pensionable service	7.5 years	7.9 years
Average age	52.1	52.3
Accumulated contributions with interest	$905,840	$725,923
Disabled Members		
Number	27	22
Total pensionable earnings (2017/2018, 2014/2015)	$1,691,981	$1,364,807
Average pensionable earnings for following year	$62,666	$62,037
Average years of pensionable service	20.7 years	21.8 years
Average age	55.0	57.5
Accumulated contributions with interest	$1,855,642	$1,559,698
Deferred Pensioners		
Number	78	65
Total annual pension	$535,734	$260,204
Average annual pension	$6,868	$4,003
Average Age	49.7 years	49.0 years
Accumulated additional contributions with interest	$160,913	$175,195

	01.07.2017	01.07.2014
Pensioners and Survivors		
Number receiving lifetime pension	426	384
Total annual lifetime pension	$7,236,380	$5,554,670
Average annual lifetime pension	$16,987	$14,465
Average age	74.4 years	74.3 years
Number receiving temporary pension	-	7
Total annual temporary pension	$0	$62,570
Average annual lifetime pension	$0	$8,939

The membership movement for all categories of membership since the previous actuarial valuation is as follows:

	ACTIVES	SUSPENDED MEMBERS	DISABLED MEMBERS	DEFERRED PENSIONERS	PENSIONERS AND SURVIVORS	TOTAL
Total at 01.07.2014	729	21	22	65	384	1,221
New entrants	118	-	-	-	-	118
Suspended	(6)	6	-	-	-	-
LTD	(13)	-	13	-	-	-
Terminations:						
• Transfers/lump sums	(26)	(1)	(2)	(4)	-	(33)
• Deferred pensions	(23)	-	-	23	-	-
Deaths	(2)	-	(3)	-	(41)	(46)
Retirements	(67)	(1)	(3)	(6)	77	-
Beneficiary	-	-	-	-	9	9
Benefit Expiry	-	-	-	-	(3)	(3)
Total at 01.07.2017	**710**	**25**	**27**	**78**	**426**	**1,266**

The distribution of the active members by Age group and Pensionable service as at the valuation date is summarized as follows:

		YEARS OF PENSIONABLE SERVICE							
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35 +**	**Total**
< 25	5 $51,805								**5** **$51,805**
25 - 29	16 $64,793								**16** **$64,793**
30 - 34	27 $63,867	7 $76,055	2 *						**36** **$66,382**
35 - 39	25 $72,797	25 $66,898	39 $68,288	1 *					**90** **$69,420**
40 - 44	27 $69,159	15 $68,977	38 $72,048	7 $76,021					**87** **$70,942**
45 - 49	16 $66,140	18 $71,369	36 $75,255	23 $71,975	10 $70,081	7 $58,723			**110** **$71,085**
50 - 54	19 $68,564	19 $66,952	32 $72,283	23 $70,026	12 $73,852	16 $70,110	9 $82,212		**130** **$71,080**
55 - 59	11 $83,499	13 $70,170	25 $67,400	14 $73,458	14 $66,082	17 $75,529	37 $73,662		**131** **$72,357**
60 - 64	2 *	9 $65,095	18 $60,831	13 $65,850	13 $69,359	12 $63,643	14 $68,373	6 $68,250	**87** **$64,855**
65 +	1 *	3 $57,067	6 $59,722	4 $76,273	1 *	1 *	1 *	1 *	**18** **$66,423**
Total	**149** **$67,756**	**109** **$68,491**	**196** **$69,870**	**85** **$71,528**	**50** **$69,749**	**53** **$68,720**	**61** **$74,013**	**7** **$71,669**	**710** **$69,693**

*For individual cells with information on two members or less, the average earnings are not disclosed for confidentiality reasons.

The distribution of the inactive members by age as at the valuation date is summarized as follows:

	DEFERRED PENSIONERS		PENSIONERS AND SURVIVORS	
Age	**Number**	**Average Pension**	**Number**	**Average Pension**
<25				
25-29	2	*		
30-34	3	$1,442		
35-39	6	$5,696		
40-44	12	$2,938		
45-49	16	$5,153		
50-54	14	$6,095		
55-59	16	$14,468	7	$13,596
60-64	5	$11,450	30	$20,748
65-69	3	$140	119	$24,198
70-74	1	*	95	$17,625
75-79			60	$12,598
80-84			57	$11,954
85-89			37	$10,149
90-94			15	$8,062
95 +			6	$5,274
	78	**$6,868**	**426**	**$16,987**

*For individual cells with information on two members or less, the average pensions are not disclosed for confidentiality reasons.

APPENDIX F

SUMMARY OF PLAN PROVISIONS

Mercer has used and relied on the plan documents, including amendments and interpretations of plan provisions, supplied by the University. If any plan provisions supplied are not accurate and complete, the results of any calculation may differ significantly from the results that would be obtained with accurate and complete information. Moreover, plan documents may be susceptible to different interpretations, each of which could be reasonable, and the results of estimates under each of the different interpretations could vary.

This valuation is based on the plan provisions in effect on July 1, 2017. Since the previous valuation, the Plan has not been amended.

The following is a summary of the main provisions of the Plan in effect on July 1, 2017. This summary is not intended as a complete description of the Plan.

Background	The Plan became effective September 1, 1955. Benefits are based on a set formula and are paid for by the University and Member contributions.
Eligibility for membership	Any Non-Teaching Employee must become a Member upon completion of 30 days of employment. However, each Union member must become a Member on his/her seniority date. An Employee who is employed on a less than full-time basis is eligible to become a Member on the first day of the month coincident with or following the completion of 24 months of Continuous Service, provided that, in each of the two immediately preceding consecutive calendar years, the employee has: • earned at least 35% of the YMPE; or • worked at least 700 hours for the Employer.

Contributions	Subject to contribution limits under the *Income Tax Act*, Members contribute an amount equal to: i) 9.2% of earnings up to the Year's Basic Exemption; plus ii) 6.4% of earnings in excess of the Year's Basic Exemption, up to the Year's Maximum Pensionable Earnings; plus iii) 9.2% of earnings in excess of the Year's Maximum Pensionable Earnings Effective June 4, 2018, the Plan will be amended to change the Member contribution rates as follows: iv) 11.0% of earnings up to the Year's Basic Exemption; plus v) 7.7% of earnings in excess of the Year's Basic Exemption, up to the Year's Maximum Pensionable Earnings; plus vi) 11.0% of earnings in excess of the Year's Maximum Pensionable Earnings These contributions will continue to June 30, 2018, at which time the new contribution rates will depend on the results of the January 1, 2018 actuarial valuation. Subject to contribution limits under the *Income Tax Act*, the University shall contribute a minimum amount equal to the employee contributions in aggregate. A provision is also made for the Members to contribute additional voluntary contributions up to the limits allowed for deductibility under the appropriate sections of the *Income Tax Act*.
Cost Sharing Provisions	If at any time, the Actuary certifies that the assets of the Pension fund exceed its liabilities (such excess referred to as "funding excess"), such funding excess shall be applied in the following order: a) first, the funding excess shall be applied to reduce or eliminate any unfunded liabilities or experience deficiencies b) second, the funding excess shall be applied to reduce the University's contributions in respect of the normal cost benefits, provided that, where permitted under the *Income Tax Act*, the amount contributed by the University each Plan Year shall not be less than the aggregate regular employee contributions for the years If, after the application of funding excess, the University's contributions exceed the aggregate regular contributions, the employee contributions shall be increased such that the members and the University each contribution 50% of the total amount required to fund the Plan provided that the aggregate contributions made by a Member for any calendar year shall not exceed the maximum amount permitted under the *Income Tax Act* for that calendar year.

Retirement Dates	Normal Retirement Date • The normal retirement date is the first day of the month coincident with or next following the member's 65th birthday. Early Retirement Date • Early retirement is permitted during the 10-year period prior to the Normal Retirement Date. Disability Retirement Date • Retirement on total and permanent disability is allowed after age 50 and completion of 15 years of Continuous Service. Postponed Retirement Date • A Member may elect to postpone retirement beyond Normal Retirement Date.
Normal Retirement Pension	1.5% of the Member's Best Average Earnings not in excess of the Average Canada Pension Plan Base PLUS 2.0% of the Member's Best Average Earnings in excess of the Average Canada Pension Plan Base MULTIPLIED BY The Member's pensionable service.
Pensionable earnings	Gross salary or wage, as determined by the University.
Early Retirement Pension	If a member retires early, the member will be entitled to a pension that is calculated the same way as for a normal retirement. The basic pension payable, however, will be reduced by a given percentage for each month before the normal retirement date, as follows: • For the first 60 months: 0.33% per month • For the next 60 months: 0.50% per month
Postponed Retirement Pension	If a member elects to postpone retirement, the member will be entitled to a pension that is calculated the same way as for a normal retirement.
Disability Retirement Pension	If a member retires early, the member will be entitled to a pension that is calculated the same way as for a normal retirement. The pension payable will not be reduced to reflect the early payment in the event of total and permanent disability retirement.
Post-Retirement Indexing	Each June 30, pensions are adjusted by one-half of the excess of the Average Fund Rate of Return over the valuation interest rate, capped at 50% of the CPI for the year. The adjustment is not allowed to reduce pensions. Members retiring in the year the adjustment is made will receive a pro-rated portion of the adjustment.

Maximum Pension	The total annual pension payable from the Plan upon retirement, death or termination of employment cannot exceed the lesser of: • 2% of the average of the best three consecutive years of total compensation paid to the member by the University, multiplied by total credited service; and • $2,914.44 indexed from 2017 or such other maximum permitted under the *Income Tax Act*, multiplied by the member's total credited service. The maximum pension is determined at the date of pension commencement. For service prior to January 1, 1992, service is capped at 35 years when determining the maximum pension. Also, for service prior to January 1, 1992, the value of the pension benefit provided upon early retirement cannot exceed the above maximum pension payable at age 60 in the form of a single life annuity guaranteed for 10 years. For service on and after January 1, 1992, the above maximum must be reduced by ¼ of 1% for each month by which pension commencement preceded the earliest day on which: • The Member attains age 60; • The Member completes 30 years of Continuous Service; • The Members' age plus Continuous Service are equal to 80; • The Member suffers a total and permanent disability.
Death Benefits	Pre-retirement: • If a member dies before the normal retirement date and before any pension payments have begun, the member's spouse, or beneficiary if there is no spouse, will receive a lump sum settlement equal to the sum of the following: — 100% of the Member's required contributions made prior to January 1, 1987, with Credited Interest, increasing by 10% for each complete year of Continuous Service in excess of 10 years, reaching 200% after 20 or more years of Continuous Service; — The greater of: − 100% of the Member's required contributions made on or after January 1, 1987 and prior to January 1, 1992, with Credited Interest, increasing by 10% for each complete year of Continuous Service in excess of 10 years, reaching 200% after 20 or more years of Continuous Service; and − The Commuted Value of the pension accrued on and after January 1, 1987 and prior to January 1, 1992; — The Commuted Value of the pension accrued on and after January 1, 1992; — The Member's additional voluntary contributions with Credited Interest. Post retirement: • The normal form of payment is a lifetime pension guaranteed for five years. However, the member may elect to receive an optional form of pension on an actuarial equivalent basis provided such election is made at least 3 months prior to retirement. • If the member has a spouse on the date pension payments commence, the automatic form of payment is a 60% joint and survivor pension. The amount of this pension will be the actuarial equivalent of the normal form pension.

Termination Benefits	***Pension Benefit*** • A deferred lifetime pension based on the member's earnings, contributions and credited service accrued up to the date of termination. ***Additional Voluntary Contributions*** A Member who terminates employment is entitled to either: • Leave the balance of any additional voluntary contributions, under the Plan to provide an additional pension; or • Receive a lump sum refund of any additional voluntary contributions with Credited Interest. ***Payment of Benefits*** Deferred pensions are payable commencing at age 65. However, a member may elect to receive a reduced early retirement pension as early as age 55. A terminating Member may elect to transfer the Commuted Value of the deferred pension to another registered pension plan or registered retirement savings plan.
50% Cost Rule	If a member dies, retires or terminates employment and his/her own contributions made after January 1, 1987, with Credited Interest thereon, exceeds 50% of the value of the benefit earned in respect of that service, then the excess shall be paid to the Member, or his/her Spouse or Beneficiary in the case of a deceased Member, in a single lump sum payment.
Disability Accrual	During any period of Total Disability, the Member shall continue to accrue benefits under the Plan as though he/she were still actively employed, but the Member shall be deemed to have received Earnings and to have made contributions during the disability period based on his/her level of Earnings prior to disability including improvements in earnings as provided in subsequent contracts or University policies. The Member is not required to make Employee Contributions during any period of Total Disability.

APPENDIX G

UNIVERSITY CERTIFICATION

With respect to the Report on the Actuarial Valuation for Funding Purposes as at July 1, 2017, of the University of Windsor Employees' Retirement Plan, I hereby certify that, to the best of my knowledge and belief:

- The valuation reflects the terms of the University's engagement with the actuary described in section 2 of this report, particularly the requirement to include a margin of 0.40% in the discount rate used to perform the going concern valuation and the University's decisions in regards to determining the going-concern and solvency funding requirements.
- A copy of the official plan documents and of all amendments made up to July 1, 2017 was provided to the actuary and is reflected appropriately in the summary of plan provisions contained herein.
- The asset information summarized in Appendix B is reflective of the Plan's assets.
- The membership data provided to the actuary included a complete and accurate description of every person who is entitled to benefits under the terms of the Plan for service up to July 1, 2017.
- All events subsequent to July 1, 2017 that may have an impact on the Plan have been communicated to the actuary.

June 28, 2018

Date

Signed

SANDRA AVERSA

Name

VICE-PRESIDENT, PLANNING AND ADMINISTRATION

Title

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