Actuarial Valuation as at July 1, 2020 for University of Toronto Pension Plan

Regulatory Registration Number: 0312827

November 2020

Empower Results®

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Executive Summary

An actuarial valuation has been prepared for the University of Toronto Pension Plan (the "Plan") as at July 1, 2020 for the primary purpose of establishing a funding range in accordance with legislative requirements for the Plan until the next actuarial valuation is performed. This section provides an overview of the important results and the key valuation assumptions which have had a bearing on these results. The next actuarial valuation for the purposes of developing funding requirements should be performed no later than as at July 1, 2021.

Summary of Principal Results

Financial Position

	July 1, 2020	July 1, 2017
Going Concern		
Assets	$ 5,473,636,000	$ 4,698,216,000
Liabilities	5,867,924,000	5,060,643,000
Financial Position	$ (394,288,000)	$ (362,427,000)
Adjustments[2]	(537,330,000)	-
Surplus/(Unfunded Liability)	**$ (931,618,000)**	**$ (362,427,000)**
Solvency		
Assets[1]	$ 5,472,236,000	$ 4,696,816,000
Liabilities	7,415,778,000	5,880,388,000
Financial Position	$ (1,943,542,000)	$ (1,183,572,000)
Adjustments[2]	701,952,000	319,022,000
Surplus/(Unfunded Liability)	**$ (1,241,590,000)**	**$ (864,550,000)**
Hypothetical Wind Up		
Assets[1]	$ 5,472,236,000	$ 4,696,816,000
Liabilities	9,759,569,000	7,823,395,000
Surplus/(Unfunded Liability)	**$ (4,287,333,000)**	**$ (3,126,579,000)**

Current Service Cost

	July 1, 2020	July 1, 2017
University current service cost	$ 138,948,000	$ 116,082,000
As a % of total capped pensionable earnings[3,4]	13.09%	12.29%

[1] Net of estimated wind up expenses
[2] Include Provision for Adverse Deviation (PfAD), prior year credit balance, and all solvency liability and solvency asset adjustments where applicable
[3] Capped at $173,200 for all members as at July 1, 2020
[4] Capped at $ 161,000 for Academic Staff, Librarians and Research Associates, and at $158,000 for Administrative Staff as at July 1, 2017

Legislative Ratios

	July 1, 2020	July 1, 2017
Going concern funded ratio (without PfAD)	0.93	0.93
Going concern funded ratio (with PfAD)	0.85	n/a
Solvency ratio	0.74	0.80
Transfer ratio	0.56	0.60

Minimum Contribution Requirements

Considering the funding and solvency status of the Plan, the minimum University contributions for the period from July 1, 2020 to July 1, 2021 in accordance with legislative requirements, are as follows:

	July 1, 2020 to June 30, 2021
University current service cost	$ 138,948,000
Special payments toward amortizing unfunded liability	44,496,000
Special payments toward amortizing solvency deficiency	21,253,000
Adjustments	-
Minimum Required University Contribution	**$ 204,697,000**

Membership Data

	July 1, 2020	July 1, 2017
Active and LTD Members	11,010	10,247
Retirees and Beneficiaries	6,410	5,867
Deferred Members	3,449	3,187
Pending/suspended/exempt Members	83	154
Total	**20,952**	**19,455**

Key Assumptions

The principal assumptions to which the valuation results are most sensitive are outlined in the following table.

Going Concern	**July 1, 2020**	**July 1, 2017**
Discount rate	5.35% per year	5.55% per year
Inflation rate	1.75% per year	2.00% per year
Cost-of-living adjustment	1.3125% per year	1.50% per year
Provision for adverse deviation	10.49% of non-indexed liabilities and service cost	N/A
Pensionable earnings	3.75% per year	4.00% per year
Mortality table	95% of 2014 Canadian Public Sector Pensioners' Mortality Table, with mortality improvement scale MI-2017	2014 Canadian Public Sector Pensioners' Mortality Table, with mortality improvement scale CPM-B
Retirement rates	Age-related table	Same

Solvency/ Hypothetical Wind Up	**July 1, 2020**	**July 1, 2017**
Discount rate	Annuity purchases: 2.50% per year Transfers: 1.30% per year for 10 years, 2.20% per year thereafter	Annuity purchases: 2.90% per year Transfers: 2.30% per year for 10 years, 3.30% per year thereafter
Mortality table	2014 Canadian Pensioners' Mortality Table (Combined), with mortality improvements scale CPM-B	Same
Retirement rates	Age that produces the highest lump-sum value	Same

Section 1: Introduction

Purpose and Terms of Engagement

We have been engaged by University of Toronto, and hereafter referred to as the University, to conduct an actuarial valuation of the Plan, registered in Ontario, as at July 1, 2020 for the general purpose of determining the minimum and maximum funding contributions required by pension standards, based on the actuarial assumptions and methods summarized herein. Specifically, the purposes of the valuation are to:

- Determine the financial position of the Plan on a going concern basis as at July 1, 2020;
- Determine the financial posit ion of the Plan as at July 1, 2020 on a solvency and hypothetical wind up basis;
- Determine the funding requirements of the Plan as at July 1, 2020 with consideration of the 2016 multi-jurisdictional agreement and Ontario Regulation 250/18 in effect on May 1, 2018; and
- Provide the necessary actuarial certification required under the *Pension Benefits Act (Ontario)* (the "*Act*") and the *Income Tax Act.*

In accordance with Regulation, the employer has elected to defer all new going concern special payments established as at July 1, 2020 by 12 months.

The intended users of this report are the University, the committees involved in the governance of the Plan and the associations and unions representing Plan members.

The results of this report may not be appropriate for accounting purposes or any other purposes not listed above.

The next required valuation will be as at July 1, 2021.

Solvency Funding Relief for Certain Public Sector Pension Plans

On December 15, 2014, the University submitted an application for the Plan to participate in Stage Two of the solvency relief measures applicable to certain public sector pension plans. In 2015, the Plan was accepted into Stage Two through Amended Ontario Regulation 178/11.

In accordance with Section 9(4) of the Ontario Regulation 178/11, the University made an election to liquidate the solvency deficiency determined in the July 1, 2014 report (the "Stage Two Valuation Report") using the three-year deferral/seven-year amortization option.

On October 31, 2016, Ontario Regulation 350/16 was filed and became effective. This regulation amended Ontario Regulation 178/11 related to solvency funding relief for certain public sector pension plans. This amendment allowed sponsors of certain public sector pension plans to reduce the minimum required level of solvency funding in the first subsequent report filed under Ontario Regulation 178/11 after the Stage Two Valuation Report. In accordance with Ontario Regulation 350/16, the University made an election, effective for the valuation dated July 1, 2017, to determine the Plan's minimum required contribution based on funding towards 25% of the solvency deficiency over 7 years commencing one year after the valuation date, with interest only funding required on the balance of the solvency deficiency. Special payments determined in the Stage Two Valuation Report payable 12 months after the first subsequent report were eliminated.

In accordance with Ontario Regulation 257/18, which amends Ontario Regulation 178/11, the funding requirements for the July 1, 2020 report have been determined in accordance with the general regulations to the Act.

Ontario Funding Reform

This report reflects new Ontario Regulation 250/18 that modifies the funding rules for Ontario registered defined benefit pension plans for actuarial valuations effective from December 31, 2017 and filed on or after May 1, 2018. The report also reflects new Ontario Regulation 105/19, which amends the funding rules to clarify certain elements that took effect on May 1, 2018 under Ontario Regulation 250/18.
In particular, this report allows for:

- The funding of a reserve in the Plan, referred to as a Provision for Adverse Deviation (PfAD);
- The amortization of a going concern deficit over 10 years, instead of 15 years, and a "fresh start" at each valuation;
- The funding of a solvency deficiency up to the level that the Plan would be 85% funded on a solvency basis.

Summary of Changes Since the Last Valuation

The last such actuarial valuation in respect of the Plan was performed as at July 1, 2017. Since the time of the last valuation, we note that the following events have occurred:

- Effective January 1, 2019, the cap on pensionable salary increased from $161,000 to $164,700 for Academic Staff/Librarians/Research Associates and from $158,000 to $161,400 for Administrative Staff.
- Effective July 1, 2019, the cap on pensionable salary increased to $169,500 for all members.
- Effective July 1, 2020, the cap on pensionable salary increased to $173,200 for all members.
- For retirements or terminations after July 1, 2019, indexation to pension benefits on each July 1st will be prorated for the period from date of pension commencement to that July 1st. Prior to the change, there was no proration in the first year after pension commencement.
- For terminations after July 1, 2019, the lump-sum termination option will be the greater of the commuted value of the deferred pension or two times member contributions made prior to July 1, 2019 with interest.
- For Academic Staff/Librarians/Research Associates, member contribution rates increased from 7.15%/9.50% (below/above CPP Maximum Salary) to 8.20%/10.50% effective July 1, 2019 and 9.20%/11.50% effective July 1, 2020. For all other members, member contribution rates increased from 7.70%/9.50% to 9.20%/11.50% effective July 1, 2019.
- For CUPE Local 2484, the benefit rate below the average CPP Maximum Salary was increased from 1.50% to 1.60% effective July 1, 2019 for past and future service.

University Information and Inputs

In order to prepare our valuation, we have relied upon the following information:

- A copy of the previous valuation report as at July 1, 2017;
- A copy of the Statement of Investment Policies and Procedures for the Plan;
- Membership data compiled as at July 1, 2020 by the University;
- Asset data taken from the Plan's audited financial statements from July 1, 2017 to June 30, 2020; and
- A copy of the latest Plan text and amendments up to and including July 1, 2020.

Furthermore, our actuarial assumptions and methods have been chosen to reflect our understanding of the University's desired funding objectives with due respect to accepted actuarial practice and regulatory constraints.

Subsequent Events

As of the date of this report, we have not been made aware of any subsequent events which would have an effect on the results of this valuation. However, the following points should be noted in this regard:

- Actual experience deviating from expected after July 1, 2020 will result in gains or losses which will be reflected in the next actuarial valuation report.
- Due to the COVID-19 pandemic, the financial markets experienced significant volatility after the valuation date. As with other experience emerging after the valuation date, the financial impact of this event on the Plan will be reflected in the next actuarial valuation report.
- The Canadian Institute of Actuaries has amended the Standards of Practice related to pension plans effective December 1, 2020. In particular, the amended Standards of Practice revise the way that commuted values are determined. The changes impact the interest rates and the retirement age assumption used in the determination of commuted values. As this change is not retroactive, it does not impact the Plan as at July 1, 2020 and the change will be reflected in future valuations.
- On November 12, 2020, the Chief Executive Officer of the Financial Services Regulatory Authority of Ontario ("FSRA") consented to the conversion of the Plan from a single employer pension plan to a jointly sponsored pension plan, effective July 1, 2021, through the transfer of assets and liabilities of the Plan to the University Pension Plan Ontario ("UPP"), pursuant s. 80.4 of the *Pension Benefits Act* (Ontario). The UPP is registered with FSRA and the Canada Revenue Agency under registration number 1357243 and is a listed plan under s.1.3.1(3) of Ontario Regulation 909 to the Pension Benefits Act (Ontario). Effective July 1, 2021, members of the Plan will become members of the UPP and begin accruing pension benefits under the provisions of the UPP in the case of active members and begin receiving their pensions from the UPP in the case of retired members and beneficiaries. The next valuation of the Plan as of July 1, 2021 will represent the asset transfer report required under s.10 of Ontario Regulation 311/15.
- To the best of our knowledge, the results contained in this report are based on the regulatory and legal environment in effect at the date of this report and do not take into consideration any potential changes that may be currently under review. To the extent that actual changes in the regulatory and legal environment transpire, any financial impact on the Plan as a result of such changes will be reflected in future valuations.

Section 2: Going Concern Valuation Results

Going Concern Financial Position of the Plan

The going concern valuation provides an assessment of the Plan's financial position at the valuation date on the premise that the Plan continues on into the future indefinitely.

The selection of the applicable actuarial assumptions and methods reflect the Plan's funding objectives, as communicated by the University, actuarial standards of practice, and pension standards.

On the basis of the Plan provisions, membership data, going concern assumptions and methods, and asset information described in the Appendices, the going concern financial position of the Plan as at July 1, 2020 is shown in the following table. The results as at July 1, 2017 are also shown for comparison purposes.

Going Concern Financial Position

	July 1, 2020	July 1, 2017
Actuarial Value of Assets	**$ 5,473,636,000**	**$ 4,698,216,000**
Going Concern Liabilities		
Active and Disabled Members	$ 2,885,041,000	$ 2,500,695,000
Retirees and Beneficiaries	2,724,010,000	2,342,255,000
Deferred Vested Members	257,350,000	213,698,000
Pending/suspended/exempt Members	1,523,000	3,995,000
Total Liabilities	**$ 5,867,924,000**	**$ 5,060,643,000**
Going Concern Position	**$ (394,288,000)**	**$ (362,427,000)**
Additional liabilities due to PfAD	537,330,000	-
Prior year credit balance	-	-
Surplus/(Unfunded Liability)	**$ (931,618,000)**	**$ (362,427,000)**
Going Concern Funded Ratio (without PfAD)	**0.93**	**0.93**
Going Concern Funded Ratio (with PfAD)	**0.85**	**n/a**

The PfAD is not required to be applied to the liabilities in respect of post-employment indexation of $745,619,000 as at July 1, 2020.

Going Concern Current Service Cost

On the basis of the Plan provisions, membership data, going concern assumptions and methods, asset information and legislative requirement described in the Appendices, the going concern current service cost of the Plan as at July 1, 2020 is shown in the following table. The current service cost as at July 1, 2017 is also shown for comparison purposes.

		July 1, 2020		July 1, 2017
Current Service Cost				
Total current service cost	$	226,363,000	$	193,265,000
Additional current service cost due to PfAD		20,771,000		-
Required member contributions[1]		(108,186,000)		(77,183,000)
Provision for non-investment expenses[2]		-		-
University Current Service Cost	**$**	**138,948,000**	**$**	**116,082,000**
Total capped pensionable earnings[3][4]	$	1,061,878,000	$	944,661,000
As a % of total capped pensionable earnings		13.09%		12.29%

The PfAD is not required to be applied to the total current service cost in respect of post retirement indexation of $28,353,000 as at July 1, 2020.

[1] Includes member contributions made by the University on behalf of disabled members and reflects new member contribution rates described in page 7
[2] A provision for non-investment expenses has been included on the development of the discount rate
[3] Capped at $173,200 for all members as at July 1, 2020
[4] Capped at $ 161,000 for Academic Staff, Librarians and Research Associates, and at $158,000 for Administrative Staff as at July 1, 2017

Change in Financial Position

The major components of the change in the Surplus/(Unfunded Liability) for the period from July 1, 2017 to July 1, 2020 are summarized in the following table.

	July 1, 2017 to June 30, 2018	July 1, 2018 to June 30, 2019	July 1, 2019 to June 30, 2020
Surplus/(Unfunded Liability) as at the Beginning of the Period	**$ (362,427,000)**	**$ (211,755,000)**	**$ (239,844,000)**
University Special Payments	78,660,000	72,360,000	72,360,000
Expected interest	(17,962,000)	(9,771,000)	(13,311,000)
Expected Surplus/(Unfunded Liability) as at the End of the Period	**$ (301,729,000)**	**$ (149,166,000)**	**$ (180,795,000)**
Change in liabilities due to experience gains/(losses):			
Gain/(loss) from investment earnings	126,459,000	(88,655,000)	(175,848,000)
Gain/(loss) due to salary increases	6,777,000	(14,780,000)	41,026,000
Gain/(loss) due to indexation experience	2,627,000	199,000	(5,157,000)
Gain/(loss) due to retirement experience	(5,669,000)	(5,173,000)	(4,583,000)
Gain/(loss) due to mortality experience	(1,600,000)	(2,366,000)	(5,986,000)
Gain/(loss) due to termination experience	455,000	2,465,000	(1,517,000)
Gain/(loss) on YMPE increase	1,809,000	(2,699,000)	6,584,000
Gain/(loss) on ITA maximum pension increase	(3,166,000)	(61,000)	(117,000)
Gain/(loss) on contributions/new entrants	1,176,000	(4,047,000)	11,706,000
Gain/(loss) due to status changes	-	-	4,841,000
Gain/(loss) on service/transfer-in	-	(837,000)	1,916,000
Net gain/(loss) due to other experience and miscellaneous items	2,898,000	28,000	983,000
Surplus/(Unfunded Liability) After Experience Gains/(Losses) as at the End of the Period	**$ (169,963,000)**	**$ (265,092,000)**	**$ (306,947,000)**
Increase due to changing mortality scale and mortality table	$ (41,792,000)	-	$ (64,052,000)
Decrease due to first-year proration of indexation	-	21,458,000	-
Decrease due to change in minimum termination benefit	-	3,924,000	-
Increase due to accrual rate change to 1.60% for CUPE Local 2484	-	(134,000)	-
Increase due to new funding rules	-	-	(232,289,000)
Increase due to change in inflation rate and related assumptions	-	-	(44,687,000)
Increase due to change in discount rate	-	-	(277,075,000)
Increase due to change in lump-sum transfer value rate and change in interest on member contributions	-	-	(6,568,000)
Surplus/(Unfunded Liability) as at the End of the Period	**$ (211,755,000)**	**$ (239,844,000)**	**$ (931,618,000)**

Discussion of Changes in Assumptions

Effective July 1, 2018, the following assumption was changed:

- The mortality improvement scale was changed from CPM-B to MI-2017. This change in assumption increased the going concern liabilities by $41,792,000 and increased the total current service cost by $2,024,000 (0.21% of the total capped pensionable earnings).

Effective July 1, 2020, the following assumptions were changed:

- Replacement of an implicit margin in the discount rate (38 bps) with an explicit margin in the liabilities called the PfAD (10.49% of the non-indexed liabilities) due to adoption of the new funding rules. The removal of the margin in the discount rate decreased liabilities by $305,041,000 while the new PfAD increased liabilities by $537,330,000. The net impact was to increase the going concern liabilities by $232,289,000 and the total current service cost by $ 2,007,000 (0.19% of the total capped pensionable earnings).
- The increase in the consumer price index was changed from 2.00% to 1.75%. All related assumptions were also decreased by 25 bps accordingly (discount rate, increases in pensionable earnings, increases in CPP maximum salary, increases in ITA maximum pension limit, lump-sum value interest rate). These changes in assumptions increased the going concern liabilities by $44,687,000 and increased the total current service cost by $2,293,000 (0.22% of the total capped pensionable earnings).
- The discount rate was changed from 5.68% to 5.35%. This change in assumption increased the going concern liabilities by $ 277,075,000 and increased the total current service cost by $17,590,000 (1.65% of the total capped pensionable earnings).
- The lump-sum transfer value interest rate was changed from 2.46% to 1.67%[1] and the interest rate on member contributions was changed from 2.50% to 1.75%.. This change in assumption increased the going concern liabilities by $6,568,000 and increased the total current service cost by $792,000 (0.08% of the total capped pensionable earnings).
- The mortality table was changed from 100% of the rates in the 2014 Canadian Public Sector Pensioners' Mortality Table to 95% of the rates in the 2014 Canadian Public Sector Pensioners' Mortality Table. This change in assumption increased the going concern liabilities by $64,052,000 and increased the total current service cost by $1,637,000 (0.15% of the total capped pensionable earnings).

[1] A portion of the impact was reflected both under the change in the inflation rate and the change in the discount rate.

Discussion of Plan Changes

Effective July 1, 2019, the following changes have been made to the Plan:

- Effective January 1, 2019, the cap on pensionable salary increased from $161,000 to $164,700 for Academic Staff/Librarians/Research Associates and from $158,000 to $161,400 for Administrative Staff;
- For retirements or terminations after July 1, 2019, indexation to pension benefits on each July 1st will be prorated for the period from date of pension commencement to that July 1st. Prior to the change, there was no proration in the first year after pension commencement;
- For terminations after July 1, 2019, the lump-sum termination option will be the greater of the commuted value of the deferred pension or two times member contributions made prior to July 1, 2019 with interest;
- For Academic Staff/Librarians/Research Associates, member contribution rates increased from 7.15%/9.50% (below/above CPP Maximum Salary) to 8.20%/10.50% effective July 1, 2019 and 9.20%/11.50% effective July 1, 2020. For all other members, member contribution rates increased from 7.70%/9.50% to 9.20%/11.50% effective July 1, 2019. In conjunction with this change, the cap on pensionable salary for member contributions increased to $169,500 effective July 1, 2019; and
- For CUPE Local 2484, the benefit rate below the average CPP Maximum Salary was increased from 1.50% to 1.60% effective July 1, 2019 for past and future service.

The change to the Plan to prorate the first cost-of-living adjustment decreased the going concern liabilities by $21,458,000 and the total current service cost by $1,922,000 (0.19% of the total capped pensionable earnings).

The change to the Plan to the minimum termination benefit decreased the going concern liabilities by $3,924,000 and the total current service cost by $1,836,000 (0.18% of the total capped pensionable earnings).

The changes to the Plan to increase member contribution rates and the salary cap for contribution purposes to $169,500 effective July 1, 2019 increased the member contributions by $15,203,000 (1.48% of the total capped pensionable earnings) and decreased the university current service cost by $15,088,000 net of the increase in total current service cost.

The change to the Plan to increase the benefit rate below the average CPP Maximum Salary for CUPE Local 2484 members increased the going concern liabilities by $134,000 and the total current service cost by $15,000.

Going Concern Valuation Sensitivity Results

In accordance with the CIA Standards of Practice specific to pension plans, the table below presents the sensitivity of the going concern liabilities and the total current service cost (prior to the application of the Provision for Adverse Deviation) of using a discount rate 1% lower and 1% higher than that used for the going concern valuation.

			Effect	
July 1, 2020			**$**	**%**
Going concern liabilities	$	5,867,924,000		
Going concern liabilities (discount rate – 1%)	$	6,837,477,000	$ 969,553,000	16.5%
Going concern liabilities (discount rate + 1%)	$	5,106,514,000	$ (761,410,000)	(13.0)%
Total current service cost	$	226,363,000		
Total current service cost (discount rate – 1%)	$	290,080,000	$ 63,717,000	28.1%
Total current service cost (discount rate + 1%)	$	180,004,000	$ (46,359,000)	(20.5)%

Plausible Adverse Scenarios

In accordance with the Canadian Institute of Actuaries Standards of Practice specific to pension plans, below is summarized scenarios of adverse but plausible assumptions, relative to the best estimate assumptions otherwise selected for the valuation.

Interest Rate Sensitivity

The table below presents the sensitivity of the going concern position of using interest rates 1% lower than the current level. In order to calculate the impact on the Actuarial Value of Assets, the decrease in interest rates only impacts fixed income assets (38.6% of total assets) and a duration of 8.08 was considered.

	Base Scenario	Adverse Scenario	Impact ($)
Actuarial value of assets	$ 5,473,636,000	$ 5,644,352,000	$ 170,716,000
Going concern liabilities	5,867,924,000	6,837,477,000	969,553,000
Going concern position	$ (394,288,000)	$ (1,193,125,000)	$ (798,837,000)
Additional liabilities due to PfAD	537,330,000	609,222,000	71,892,000
Surplus/(Unfunded Liability)	**$ (931,618,000)**	**$ (1,802,347,000)**	**$ (870,729,000)**
Total Current Service Cost			
Total current service cost	$ 247,134,000	$ 316,578,000	$ 69,444,000

Deterioration in Asset Value

In assessing the risk related to the deterioration in asset value we have chosen an adverse scenario equal to a 15% reduction in the non-fixed income asset values and assume no change in future return expectations.

The table below presents the sensitivity of the going concern position of using the assets with a 15% reduction in non-fixed income asset values.

	Base Scenario	Adverse Scenario	Impact ($)
Actuarial value of assets	$ 5,473,636,000	$ 5,156,713,000	$ (316,923,000)
Going concern liabilities	5,867,924,000	5,867,924,000	-
Going concern position	$ (394,288,000)	$ (711,211,000)	$ (316,923,000)
Additional liabilities due to PfAD	537,330,000	537,330,000	-
Surplus/(Unfunded Liability)	**$ (931,618,000)**	**$ (1,248,541,000)**	**$ (316,923,000)**
Total Current Service Cost			
Total current service cost	$ 247,134,000	$ 247,134,000	$ -

Mortality Sensitivity

The table below presents the sensitivity of the going concern position of the Plan to using a mortality assumption with a 10% improvement to the base mortality rates. For the purposes of this analysis, we have used 90% of the rates of the base table used in the going concern valuation.

	Base Scenario	Adverse Scenario	Impact ($)
Actuarial value of assets	$ 5,473,636,000	$ 5,473,636,000	$ -
Going concern liabilities	5,867,924,000	5,996,526,526	128,602,000
Going concern position	$ (394,288,000)	$ (522,890,000)	$ (128,602,000)
Additional liabilities due to PfAD	537,330,000	547,804,000	10,474,000
Surplus/(Unfunded Liability)	**$ (931,618,000)**	**$ (1,070,694,000)**	**$ (139,076,000)**
Total Current Service Cost			
Total current service cost	$ 247,134,000	$ 250,755,000	$ 3,621,000

Section 3: Solvency Valuation Results

Solvency Financial Position of the Plan

The solvency valuation is a financial assessment of the Plan that is required by the *Act* and is performed in accordance with requirements prescribed by that legislation. It is intended to provide an assessment of the Plan's financial position at the valuation date on the premise that certain obligations as prescribed by the *Act* are settled on the valuation date for all members. The liabilities must be calculated based on a postulated scenario that maximizes liabilities on wind up of the Plan. Contingent benefits are included in the liabilities that would be payable under the postulated scenario, unless permitted to be omitted under the definition of solvency liabilities under the Regulations to the *Act.* All assumptions for the solvency valuation are listed in Appendix D.

On the basis of the Plan provisions, membership data, solvency assumptions and methods and asset information described in the Appendices, as well as the requirements of the *Act*, the solvency financial position of the Plan as at July 1, 2020 is shown in the following table. The solvency financial position of the Plan as at July 1, 2017 is shown for comparison purposes.

Solvency Financial Position

	July 1, 2020	July 1, 2017
Assets		
Solvency assets	$ 5,473,636,000	$ 4,698,216,000
Estimated wind up expenses	(1,400,000)	(1,400,000)
Total Assets	**$ 5,472,236,000**	**$ 4,696,816,000**
Solvency Liabilities		
Active and Disabled Members	$ 4,035,069,000	$ 3,028,736,000
Retirees and Beneficiaries	3,034,906,000	2,579,010,000
Deferred Vested Members	344,280,000	268,647,000
Pending/suspended/exempt Members	1,523,000	3,995,000
Total Liabilities	**$ 7,415,778,000**	**$ 5,880,388,000**
Solvency Position	**$ (1,943,542,000)**	**$ (1,183,572,000)**
Prior year credit balance	-	-
Present value of special payments	701,952,000	319,022,000
Solvency Surplus/(Deficiency)	**$ (1,241,590,000)**	**$ (864,550,000)**
Solvency Ratio[1]	**0.74**	**0.80**

[1] Solvency Assets divided by Solvency Liabilities

Solvency Asset Adjustment

The present value of scheduled special payments for solvency valuation purposes has been calculated by discounting the annual special payments to be remitted up to the end of their amortization period to a maximum of six years, at the weighted solvency discount rate of 2.20% per year compounded monthly in arrears, which was determined proportionately by the solvency discount rates used to determine the solvency liabilities.

Nature of Deficiency	Effective Date	End Date	Months Included	Annual Special Payment	Present Value as of July 1, 2020
Going concern	July 1, 2012	June 30, 2021	12	$ 32,448,000	$ 32,068,000
Going concern	July 1, 2015	June 30, 2021	12	$ 12,048,000	11,907,000
Going concern	July 1, 2021	June 30, 2031	60	$ 120,348,000	557,380,000
Solvency	July 1, 2018	June 30, 2025	60	$ 21,253,000	100,597,000
Present Value of Special Payments					**$ 701,952,000**

Statutory Solvency Financial Position

The minimum funding requirements under the Regulation are based on the reduced solvency deficiency as at the valuation date which is calculated as follows:

	July 1, 2020	July 1, 2017
The amount by which the sum of:		
85% of solvency liabilities	$ 6,303,411,000	$ 4,998,330,000[1]
85% of solvency liability adjustment	0	0[2]
Prior year credit balance	0	0
	$ 6,303,411,000	$ 4,998,330,000
Exceeds the sum of:		
Solvency assets net of wind-up expenses	$ 5,472,236,000	$ 4,696,816,000
Solvency asset adjustment	701,952,000	319,022,000
	$ 6,174,188,000	$ 5,015,838,000
Reduced Solvency Deficiency	**$ (129,223,000)**	**$ 17,508,000**

[1] 100% of total liabilities under regulations in effect prior to May 1, 2018
[2] 100% of solvency liability adjustment under regulations in effect prior to May 1, 2018

Solvency Concerns

A report indicates solvency concerns under the *Act* if the ratio of the solvency assets to solvency liabilities is less than 0.85.

Where a report indicates solvency concerns, the effective date of the next valuation that needs to be filed under the *Act* is one year from the valuation date of the valuation that gave rise to the solvency concerns.

Since the ratio of solvency assets to solvency liabilities is equal to 0.74, this report indicates solvency concerns.

Solvency Valuation Sensitivity Results

In accordance with the CIA Standards of Practice specific to pension plans, the table below presents the sensitivity of the solvency liabilities to using a discount rate of 1% lower and 1% higher than that used for the solvency valuation.

		Effect	
July 1, 2020		**$**	**%**
Solvency liabilities	$ 7,415,778,000		
Solvency liabilities (discount rate – 1%)	$ 8,770,115,000	$ 1,354,337,000	18.3%
Solvency liabilities (discount rate + 1%)	$ 6,381,349,000	$ (1,034,429,000)	(13.9)%

Incremental Cost on a Solvency Basis

The incremental cost on a solvency basis represents the present value at July 1, 2020 of the expected aggregate change in the solvency liabilities between July 1, 2020 and the next calculation date, that is July 1, 2021. Appendix D gives more details on the calculation methodology and on assumptions.

Based on this methodology and on these assumptions, the incremental cost on a solvency basis can be found in the following table.

	July 1, 2020 to June 30, 2021
Incremental cost on a solvency basis	$ 412,786,000

Pension Benefits Guarantee Fund ("PBGF")

The development of the PBGF Assessment Base is as follows:

PBGF Assessment Base	**July 1, 2020**
(1) Solvency assets	$ 5,473,636,000
(2) PBGF liabilities	$ 7,415,778,000
(3) Solvency liabilities	$ 7,415,778,000
(4) Ontario asset ratio: [(2) divided by (3)]	1.0000
(5) Ontario portion of fund: [(1) multiplied by the ratio in (4)]	$ 5,473,636,000
PBGF Assessment Base: [(2) subtract (5); if negative, enter zero]	**$ 1,942,142,000**

Section 4: Hypothetical Wind Up Valuation Results

Hypothetical Wind Up Financial Position of the Plan

A hypothetical wind up valuation is performed to determine the financial position of the Plan as at the valuation date on a wind up basis, reflecting market settlement rates as of the valuation date. Unlike the solvency valuation, all benefits are included that would be payable under the postulated scenario that would maximize benefits. The hypothetical wind up valuation is determined using benefit entitlements on the assumption that the Plan has neither a surplus nor a deficit. Contingent benefits are included in the liabilities that would be payable under the postulated scenario. Assets are set equal to market value net of estimated wind up expenses. All assumptions for the hypothetical wind up valuation are listed in Appendix D.

On the basis of Plan provisions, membership data, hypothetical wind up assumptions and methods, and asset information described in the Appendices, as well as the requirements of the *Act*, the hypothetical wind up financial position of the Plan as at July 1, 2020 is shown in the following table. The hypothetical wind up financial position of the Plan as at July 1, 2017 is shown for comparison purposes.

Hypothetical Wind Up Financial Position

	July 1, 2020	July 1, 2017
Assets		
Hypothetical wind up assets	$ 5,473,636,000	$ 4,698,216,000
Estimated wind up expenses	(1,400,000)	(1,400,000)
Total Assets	**$ 5,472,236,000**	**$ 4,696,816,000**
Hypothetical Wind Up Liabilities		
Active and Disabled Members	$ 5,364,623,000	$ 4,139,304,000
Retirees and Beneficiaries	3,806,667,000	3,225,845,000
Deferred Vested Members	586,756,000	454,251,000
Pending/suspended/exempt Members	1,523,000	3,995,000
Total Liabilities	**$ 9,759,569,000**	**$ 7,823,395,000**
Hypothetical Wind Up Surplus/(Deficiency)	**$ (4,287,333,000)**	**$ (3,126,579,000)**

Transfer Ratio

The transfer ratio is determined as follows:

			July 1, 2020		July 1, 2017
(1)	Hypothetical wind up assets		$ 5,473,636,000	$	4,698,216,000
	Prior year credit balance	(A)	$ -	$	-
	Total university current service cost and required special payments until next mandated valuation	(B)	$ 204,697,000	$	538,290,000
(2)	Asset adjustment	Lesser of (A) and (B)	$ -	$	-
(3)	Hypothetical wind up liabilities		$ 9,759,569,000	$	7,823,395,000
Transfer Ratio [(1)-(2)] / (3)			**0.56**		**0.60**

Section 5: Contribution Requirements

Contribution Requirements in Respect of the Current Service Cost

The annual going concern cost of benefits in respect of service accruing after the valuation date is known as the current service cost. The following table sets out:

- The development of the rule to determine the current service cost until the next actuarial funding range in accordance with legislative requirements is certified;
- An estimate of the current service cost for one year following the valuation date; and
- The portion of the going concern current service cost that is to be paid by the members.

		July 1, 2020 to June 30, 2021
Current Service Cost		
Total current service cost	$	226,363,000
Additional service cost due to PfAD		20,771,000
Required member contributions[1]		(108,186,000)
Provision for non-investment expenses		-
University Current Service Cost	**$**	**138,948,000**
Total capped pensionable earnings[2]	$	1,061,878,000
As a % of pensionable earnings		13.09%

In the event an updated funding range in accordance with legislative requirements is not certified before July 1, 2021, the rule for determining the University current service cost contributions outlined in the above table will continue to be appropriate for the plan year commencing on the next valuation date of July 1, 2021. Adjustment to the University contributions may be required once the next actuarial funding range in accordance with legislative requirements is certified.

[1] Includes member contributions made by the University on behalf of disabled members
[2] Capped at $173,200 for all members as at July 1, 2020.

Development of Special Payments

The following table summarizes previously established amortization schedules of special payments before adjustment to reflect any gains or losses due to the going concern and solvency valuation results.

Nature of Deficiency	Effective Date	End Date	Annual Special Payment
Going concern	July 1, 2012	June 30, 2027	$ 32,448,000
Going concern	July 1, 2015	June 30, 2030	12,048,000
Solvency	July 1, 2018	June 30, 2025	21,253,000
			$ 65,749,000

The following table summarizes the amortization schedules of special payments after adjustment to reflect any gains or losses due to the going concern and solvency valuation results. In accordance with Regulation, the University has decided to defer all new going concern and solvency special payments established as at July 1, 2020 by 12 months. The following table summarizes the amortization schedules of special payments after the aforementioned adjustments.

				Present Value as of July 1, 2020	
Nature of Deficiency	Effective Date	Revised End Date	Revised Annual Special Payment	For Going Concern Valuation[1]	For Solvency Valuation[2]
Going concern	July 1, 2012	June 30, 2021	$ 32,448,000	$ 31,548,000	$ 32,068,000
Going concern	July 1, 2015	June 30, 2021	12,048,000	11,714,000	11,907,000
Solvency	July 1, 2018	June 30, 2021	21,253,000	n/a	21,004,000
Going concern	July 1, 2021	June 30, 2031	120,348,000	888,356,000	557,380,000
Solvency	July 1, 2021	June 30, 2026	45,085,000	n/a	208,816,000
				$ 931,618,000	**$ 831,175,000**

As a result of the conversion of the Plan to the UPP effective July 1, 2021, member contributions and university current service cost contributions to the Plan will cease on June 30, 2021, and on the basis that the circumstances described in s.17 of Ontario Regulation 311/15 have been met, the requirement to make special payments to the Plan as outlined in the table above on or after July 1, 2021 would be cancelled.

Prior Year Credit Balance ("PYCB")

The PYCB is nil as at July 1, 2020.

[1] The values in the table were developed using the going concern discount rate compounded monthly in arrears.
[2] The values in the table were developed using the weighted average solvency discount rate compounded monthly in arrears.

Available Actuarial Surplus

As at July 1, 2020 the Available Actuarial Surplus is calculated as follows:

Going Concern Basis		
(A)	Total assets	$ 5,473,636,000
(B)	Total liabilities	5,867,924,000
(C)	Additional liabilities due to PfAD	537,330,000
(D)	Prior year credit balance	-
(E)	**Available surplus: maximum (A – B – C – D); 0)**	**$ -**
Solvency Basis		
(F)	**Assets in Excess of a Solvency Ratio of 105%**	**$ -**
(G)	**Available Actuarial Surplus: minimum (E; F)**	**$ -**

Under Regulations 7.0.3(1), 7.0.3(3) and 7.0.3(4) of the *Pension Benefits Act (Ontario)*, a contribution holiday may be permissible if an actuarial cost certificate is filed within the first 90 days of the fiscal year and the amount of the contribution holiday is less than the amount of the Available Actuarial Surplus.

Excess Surplus

The *Income Tax Act* requires that any excess surplus first be applied to reduce or eliminate the company contribution requirements. Excess surplus is defined in Section 147.2(2)(d) of the *Income Tax Act*, as the portion of surplus (if any) that exceeds 25% of the going concern liabilities.

Since the Plan has an unfunded liability of $931,618,000, there is no excess surplus and therefore it does not impact the development of the University contribution requirements in accordance with Subsection 8516(2) of the Regulations to the *Income Tax Act*.

Development of Minimum Required University Contribution

The table below presents the development of the minimum required University contribution for plan year from July 1, 2020 to June 30,2021.

While we have shown a fixed University current service cost in the table below, the University may actually fund the current service cost per member accruing service.

		July 1, 2020 to June 30, 2021
University current service cost[1]	$	138,948,000
Special payments toward amortizing unfunded liability		44,496,000
Special payments toward amortizing solvency deficiency		21,253,000
Minimum Required University Contribution Prior to Application of Prior Year Credit Balance	**$**	**204,697,000**
Permitted application of prior year credit balance		-
Minimum Required University Contribution	**$**	**204,697,000**

[1] Based on University current service cost rate of 13.09% with total pensionable earnings as of July 1, 2020 capped at $173,200

Development of Maximum Eligible University Contribution

The table below presents the development of the maximum eligible University contribution for plan year from July 1, 2020 to June 30,2021.

The maximum eligible University contribution presented in the table below for a given plan year is calculated assuming that the University makes the maximum eligible University contribution in the first plan year covered by this report.

While we have shown a fixed University current service cost in the table below, the University may actually fund the current service cost per member accruing service.

	July 1, 2020 to June 30, 2021
University current service cost[1]	$ 138,948,000
Greater of the unfunded liability and the hypothetical wind up deficiency	4,287,333,000
Required application of excess surplus	-
Maximum Eligible University Contribution	**$ 4,426,281,000**

If the University wishes to make the maximum eligible University contribution, it is advisable to contact the Plan's actuary before making such contribution to ensure that the contribution will be permissible and deductible and that any regulatory requirements are considered.

[1] Based on University current service cost rate of 13.09% updated with total capped pensionable earnings as of July 1, 2020 before increase to $173,200

Section 6: Actuarial Certificate

Actuarial Opinion, Advice and Certification for the University of Toronto Pension Plan

Canada Revenue Agency Registration Number: 0312827

Opinion

This actuarial certification forms an integral part of the actuarial valuation report for the Plan as at July 1, 2020. We confirm that I have prepared an actuarial valuation of the Plan as at July 1, 2020 for the purposes outlined in the Introduction section to this report and consequently:

Our advice on funding is the following:

- The University should contribute the amounts within the range of minimum and maximum contribution amounts as outlined in Section 5 of this report, in accordance with legislative requirements.
- The next actuarial valuation for the purpose of developing funding requirements should be performed no later than as at July 1, 2021.

We hereby certify that, in our opinion:

- The contribution range as outlined in this report is expected to be sufficient to satisfy the Plan's funding requirements.
- The University contribution range outlined in this report qualifies as eligible contributions under Section 147.2(2) of the *Income Tax Act.*
- The pre-1990 maximum pension restrictions in Subsection 8504(6) of the Regulations to the *Income Tax Act* do not apply to any members of the Plan.
- For the purposes of the valuation:
  - The data on which this valuation is based are sufficient and reliable;
  - The assumptions used are appropriate; and
  - The actuarial cost methods and the asset valuation methods used are appropriate.
- This report and its associated work have been prepared, and our opinion given, in accordance with accepted actuarial practice in Canada and in compliance with the requirements outlined in subparagraphs 147.2(2)(a)(iii) and (iv) of the *Income Tax Act*.

- Notwithstanding the above certifications, emerging experience differing from the assumptions will result in gains or losses that will be revealed in subsequent valuations.

Andrew Hamilton, FCIA, FSA
Partner

Allan Shapira, FCIA, FSA
Senior Partner

Aon
20 Bay Street, Suite 2300
Toronto, ON M5J 2N9

November 2020

Appendix A: Assets

Asset Data

The Plan's assets are held by State Street Trust Company and invested by University of Toronto Asset Management. The asset information presented in this report is based on the financial statements of the pension fund prepared by Ernst & Young.

Tests of the sufficiency and reliability of the asset data were performed and the results were satisfactory.

Market Value of Assets

The following is a summary of the composition of the Plan's assets by asset type as reported by State Street Trust Company as at July 1, 2020. For comparison purposes, the composition at the previous valuation date of July 1, 2017 is also shown.

	July 1, 2020	July 1, 2017
	%	%
Cash and short term	0.0%	0.0%
Fixed-income	38.6%	30.7%
Canadian equities	1.6%	9.9%
U.S. equities	21.8%	19.9%
International Equities	10.6%	14.8%
Global Equities	21.8%	5.0%
Emerging Market Equities	4.7%	10.0%
Other	0.9%	9.7%
Total Invested Assets	**100.0%**	**100.0%**

Target Asset Mix

The target asset mix of the Plan is contained in the Plan's Statement of Investment Policies and Procedures approved on March 25, 2020 and is as follows:

Reference Portfolio	Minimum	Target	Maximum
Global equities	50.0%	60.0%	70.0%
Canadian equities	0.0%	0.0%	0.0%
U.S. equities	0.0%	0.0%	0.0%
International equities	0.0%	0.0%	0.0%
Fixed-income	25.0%	40.0%	50.0%
Other[1]	0.0%	0.0%	0.0%
		100.0%	

Investment Program	Target
Public Equity	45.0%
Private Equity	10.0%
Absolute Return Strategies	12.5%
Alternative Credit	10.0%
Canadian Investment Grade Corporate Bonds	10.0%
Canadian Investment Grade Government Bonds	20.0%
Private Real Estate	5.0%
Cash and Cash Equivalents	(12.5)%
	100.0%

[1] Includes cash, money market securities and absolute return funds

Reconciliation of Changes in Market Value of Assets

The table below reconciles changes in the market value of assets between July 1, 2019 and July 1, 2020.

	July 1, 2017 to June 30, 2018	July 1, 2018 to June 30, 2019	July 1, 2019 to June 30, 2020
Market Value of Assets, Beginning of Plan Year	**$4,698,216,000**	**$5,114,036,000**	**$5,322,886,000**
Contributions During Plan Year			
Member	$ 78,540,000	$ 82,675,000	$ 102,555,000
University Current Service Cost	116,082,000	119,734,000	125,357,000
University Special Payments	78,660,000	72,360,000	72,360,000
Total	**$ 273,282,000**	**$ 274,769,000**	**$ 300,272,000**
Benefit Payments During Plan Year			
Non-retired members[1]	$ 41,664,000	$ 45,412,000	$ 46,674,000
Retired members	207,182,000	218,859,000	229,275,000
Total	**$ 248,846,000**	**$ 264,271,000**	**$ 275,949,000**
Transfers During Plan Year			
Into plan	$ 3,412,000	$ 2,814,000	$ 6,024,000
Out of plan	-	-	-
Total	**$ 3,412,000**	**$ 2,814,000**	**$ 6,024,000**
Fees/Expenses			
Investment fees/expenses	$ 43,616,000	$ 48,443,000	$ 47,795,000
Non-investment fees/expenses	2,872,000	3,075,000	2,965,000
Total	**$ 46,488,000**	**$ 51,518,000**	**$ 50,760,000**
Investment Income	**$ 434,460,000**	**$ 247,056,000**	**$ 171,163,000**
Market Value of Assets, End of Plan Year	**$5,114,036,000**	**$5,322,886,000**	**$5,473,636,000**
Rate of Return, Net of Fees/Expenses	**8.2%**	**3.8%**	**2.3%**

Development of Actuarial Value of Assets

The actuarial value of assets is equal to the market value of assets, which reflected contribution, benefit payments, transfers and fees/expenses in-transit, as of the valuation date.

[1] Includes members who have terminated employment or died

Appendix B: Membership Data

Source of Data

This valuation was based on member data provided by the University as of July 1, 2020. Tests of the sufficiency and reliability of the member data were performed and the results were satisfactory. The tests included:

- A reconciliation of membership status against the membership status at the last valuation. This test was performed to ensure that all members were accounted for. A summary of this reconciliation follows on the next page;
- A reconciliation of birth, hire, and participation dates against the corresponding dates provided for the last valuation to ensure consistency of data;
- A reconciliation of credited service against the corresponding amount provided for the last valuation to ensure that no member accrued more than 3 year of credited service from July 1, 2017. This test also revealed any members who accrued less than 3 year of credited service;
- A reconciliation of pensionable earnings against the corresponding amounts provided for the last valuation to identify any unusual increases or decreases;
- A reconciliation of accrued benefits against the corresponding amounts provided for the last valuation to identify any unusual benefit accruals;
- A reconciliation of any stated benefit payments since July 1, 2017 (for retired, terminated, or deceased members) against the financial statements of the pension fund for confirmation of the payments; and
- A reconciliation of inactive member benefit amounts against the corresponding amounts provided for the last valuation to ensure consistency of data.

A copy of the administrator certification certifying the accuracy and completeness of the member data (and the Plan provisions summarized in this report) is included in Appendix G of this report.

Membership Summary

The table below reconciles the number of members as of July 1, 2020 with the number of members as of July 1, 2017 and the changes due to experience in the period.

	Active and Disabled Members	Retirees and Beneficiaries	Deferred Vested Members	Pending, Suspended, Exempt Members	Total
Members, July 1, 2017	**10,247**	**5,867**	**3,187**	**154**	**19,455**
Changes due to:					
New entrants	3,072	-	-	-	3,072
Returned from Pending	21	-	7	(28)	-
Retirement					
Immediate pension	(718)	939	(208)	(13)	-
Lump sum	(97)	-	(68)	(8)	(173)
Termination					
Pending	(3)	-	3	-	-
Deferred vested	(921)	-	929	(8)	-
Lump sum	(551)	-	(330)	(3)	(884)
Death					
No further benefits	(5)	(405)	(3)	-	(413)
Surviving beneficiary	(4)	(187)	(1)	-	(192)
Lump sum	(28)	(5)	(16)	(1)	(50)
New beneficiary					
Surviving beneficiary	-	191	-	-	191
Marriage breakdown spouse	-	-	-	-	-
Data correction	(3)	10	(51)	(10)	(54)
Net change	763	543	262	(71)	1,497
Members, July 1, 2020	**11,010**	**6,410**	**3,449**	**83**	**20,952**

Active and Disabled Members

	July 1, 2020	July 1, 2017
Number	11,010	10,247
Average age	47.1	47.3
Average Years of Pensionable Service	11.5	11.7
Average Age at Hire	35.5	35.6
Average Salary	$ 108,488	$ 102,701
Proportion female	57.2%	56.5%

Retirees and Beneficiaries

	July 1, 2020	July 1, 2017
Number - Lifetime benefit	6,410	5,867
Number - Bridge benefit	-	8
Average age - Lifetime benefit	76.7	76.3
Average Age - Bridge benefit	N/A	64.5
Average Monthly Benefit - Lifetime benefit	$ 3,084	$ 2,911
Average Monthly Benefit - Bridge benefit	$ -	$ 308
Proportion female	55.1%	53.9%

Deferred Vested Members

	July 1, 2020	July 1, 2017
Number	3,449	3,187
Average age	52.4	51.6
Average Monthly Benefit	$ 569	$ 531
Proportion female	53.7%	54.0%

Active/Disabled Membership Distribution

The following table provides a detailed summary of the active/disabled membership at the valuation date by years of credited service and by age group. For privacy reasons, average pensionable earnings is not shown for groups with two or less members.

Age	< 5	5–10	10–15	15–20	20–25	25–30	>=30	Total
< 30	556	44						600
	$ 65,083	$ 75,164	$	$	$	$	$	$ 65,822
30–35	714	282	42					1,038
	$ 82,811	$ 85,178	$ 83,954	$	$	$	$	$ 83,500
35–40	800	498	265	54				1,617
	$ 90,066	$ 102,149	$ 94,146	$ 85,458	$	$	$	$ 94,302
40–45	586	460	388	229	35			1,698
	$ 92,179	$ 109,350	$ 120,216	$ 104,070	$ 80,224	$	$	$ 104,595
45–50	380	326	368	318	135	5		1,532
	$ 91,854	$ 111,116	$ 127,875	$ 133,159	$ 117,111	$ 85,014	$	$ 115,382
50–55	245	241	289	376	225	78	50	1,504
	$ 89,140	$ 101,756	$ 123,490	$ 140,671	$ 141,285	$ 111,215	$ 86,274	$ 119,495
55–60	180	184	209	300	229	150	205	1,457
	$ 89,799	$ 98,753	$ 107,939	$ 123,291	$ 148,276	$ 148,922	$ 101,734	$ 117,385
60–65	105	112	136	206	151	129	233	1,072
	$ 85,382	$ 105,126	$ 113,516	$ 119,614	$ 134,871	$ 165,625	$ 137,018	$ 125,442
>=65	26	45	55	69	57	51	189	492
	$ 101,075	$ 140,975	$ 118,669	$ 142,818	$ 159,045	$ 164,996	$ 173,062	$ 154,887
Total Count	**3,592**	**2,192**	**1,752**	**1,552**	**832**	**393**	**697**	**11,010**
Average Pensionable Earnings	**$ 85,157**	**$ 102,889**	**$ 115,519**	**$ 125,751**	**$ 136,771**	**$ 145,753**	**$ 135,442**	**$ 108,488**

Retired/Deferred Vested Membership Distribution

The following table provides a detailed summary of the retired/deferred vested membership at the valuation date by age group. For privacy reasons, average pensions are not shown for groups with two or less members.

Age		Retirees and Beneficiaries	Deferred Vested Members
< 50	Count	7	1,422
	Average Monthly Lifetime Pension	$ 2,091	$ 413
50-55	Count	6	579
	Average Monthly Lifetime Pension	$ 2,103	$ 700
55-60	Count	54	631
	Average Monthly Lifetime Pension	$ 1,567	$ 787
60-65	Count	421	451
	Average Monthly Lifetime Pension	$ 2,842	$ 674
65[1]–70	Count	1,060	366
	Average Monthly Lifetime Pension	$ 2,657	$ 474
70-75	Count	1,449	
	Average Monthly Lifetime Pension	$ 3,255	
75-80	Count	1,227	
	Average Monthly Lifetime Pension	$ 3,832	
>=80	Count	2,186	
	Average Monthly Lifetime Pension	$ 2,848	
Total			
Count		6,410	3,449
Average Monthly Lifetime Pension		$ 3,084	$ 569

[1] Includes all deferred vested members over age 65

Appendix C: Going Concern Assumptions and Methods

Assumptions and Methods

A member's entitlements under a pension plan are generally funded during the period over which service is accrued by the member. The cost of each member's benefits is allocated in some fashion over the member's service. An actuarial valuation provides an assessment of the extent to which allocations relating to periods prior to a valuation date (often referred to as the actuarial liabilities) are covered by the plan's assets.

The going concern valuation provides an assessment of a pension plan on the premise that the plan continues on into the future indefinitely based on assumptions in respect of future events upon which a plan's benefits are contingent and methods that effectively determine the way in which a plan's costs will be allocated over the members' service. The true cost of a plan, however, will emerge only as experience develops, investment earnings are received, and benefit payments are made.

This appendix summarizes the going concern assumptions and methods that have been used for the going concern valuation of the Plan at the valuation date. The going concern assumptions and methods have been chosen to reflect our understanding of the Plan's funding objectives with due respect to accepted actuarial practice and regulatory constraints. For purposes of this valuation, the going concern methods and assumptions were reviewed and changes as indicated were made.

The actuarial assumptions and methods used in the current and previous valuations are summarized below and described on the following pages.

	July 1, 2020	**July 1, 2017**
Economic Assumptions		
Discount rate	5.35% per year	5.55% per year
Increase in consumer price index	1.75% per year	2.00% per year
Cost-of-living adjustment	1.3125% per year	1.50% per year
Increase in merit and promotion	2.00% per year	2.00% per year
Increases in pensionable earnings		
Active members	3.75% per year	4.00% per year
Disabled and leave of absence members	2.50% per year	2.75% per year
Increases in CPP maximum salary	2.50% per year	2.75% per year
Increases in ITA maximum pension limit	$3,092.22 in 2020; then 2.50% per year	$2,914.44 in 2017; then 2.75% per year
Interest on member contributions	1.75% per year	2.50% per year
Passive investment expenses	0.05% per year[1]	Same
Non-investment expenses	0.07% per year[1]	Same
Margin for adverse deviation	N/A	0.12% per year[1]
Provision for adverse deviation	10.49% of non-indexed liabilities and current service cost	N/A

[1] Taken into account in discount rate assumption

	July 1, 2020	July 1, 2017
Demographic Assumptions		
Mortality table	95% of 2014 Canadian Public Sector Pensioners' Mortality Table, with mortality improvements scale MI-2017 (sex-distinct rates)	2014 Canadian Public Sector Pensioners' Mortality Table, with mortality improvements scale CPM-B (sex-distinct rates)
Retirement rates		
Academic staff and librarians	Variable by age (Table A following), but no earlier than one year after valuation data, subject to early retirement provisions	Same
Administrative staff, unionized administrative staff, unionized staff and research associates	Age 63, subject to early retirement provisions	Same
Termination rates	Variable by age (Table B following)	Same
Disability rates	None	Same
Proportion married		
Non-retired proportion with spouse	85% for male members and 70% for female members	Same
Non-retired spousal age differential	Males members with spouse four year younger and female members with spouse two years older	Same
Retired members	Actual marital status and ages are used	Same
Termination-option election		
Lump-sum transfer	40%	40%
Lump-sum transfer value rate	1.67% per year[1]	2.46% per year[1]
Methods		
Actuarial cost method	Projected unit credit	Same
Asset valuation method	Market value of assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in transit as of the valuation date	Same

[1] Net of cost-of-living adjustment

Table A—Retirement Rates

Retirement rates for academic staff and librarians are in accordance with the following table:

Age	10 or More Years of Pensionable Service	Less Than 10 Years of Pensionable Service
60	5%[1]	-
61	5%	-
62	5%	-
63	5%	-
64	5%	-
65	30%	30%
66	30%	30%
67	30%	30%
68	30%	30%
69	50%	50%
70	50%	50%
71	100%	100%

[1] Applies at age 60 or, if later, first age at which member is eligible for an unreduced pension

Table B—Termination Rates

Rates used in this valuation are shown as rates per 100 lives in the following table:

Present Age	Rates	Present Age	Rates
20	100	45	17
21	100	46	16
22	100	47	15
23	100	48	14
24	100	49	13
25	100	50	12
26	90	51	11
27	80	52	10
28	71	53	9
29	63	54	8
30	56	55	7
31	50	56	6
32	45	57	5
33	40	58	4
34	36	59	3
35	32	60	2
36	30	61	1
37	28	62+	0
38	26		
39	24		
40	22		
41	21		
42	20		
43	19		
44	18		

Justification of Actuarial Assumptions and Methods

Economic Assumptions

Discount Rate

The overall expected return ("best-estimate") was developed using best-estimate returns for each major asset class in which the pension fund is invested. A Monte Carlo simulation is performed over 30 years where the portfolio returns are projected assuming annual rebalancing. The average of the 30-year geometric return is used to develop an overall best-estimate rate of return for the entire pension fund. Gains from rebalancing and diversification are implicit to this return. There are no additional returns assumed to be derived from active management, net of investment fees from active management.

The above determined rate of return has been established based on the University's investment policy and its funding policy (whether formal or informal) and objectives. There may be some barriers to achieving this return such as inflation higher than expected, asset returns lower than expected, and assets and liabilities that are mismatched. We have derived a going concern discount rate which reflects the University's investment policy combined with a margin for adverse deviation so as to account for the variables mentioned above. The following table lays out the adjustments that have been made to the overall expected rate of return in order to arrive at our going concern discount rate assumption:

Development of Discount Rate

Overall expected return (based on inflation rate of 1.75%)				5.47%
Non-investment expenses				(0.05)%
Investment expenses				
Passive	(1)	(0.07)%		
Actively managed	(2)	(0.00)%		
			(1)+(2)	(0.07)%
Additional returns due to active management				0.00%
Discount Rate				**5.35%**

Increase in Consumer Price Index

The CPI rate assumption reflects our best estimate of future inflation considering current economic and financial market conditions.

Merit and Promotion Increases

The assumption for merit and promotion increases includes the effect of progression through the ranks/grid steps/merit and promotion, reflecting Plan experience and University input.

Increases in Pensionable Earnings

The assumption for increases in pensionable earnings for active members reflects the assumed rate of inflation, plus allowances for the effect of merit and promotion increases.

The assumption for increases in pensionable earnings for disabled members and members on leave of absence reflects the assumed rate of inflation plus the real wage increase assumption.

Increases in CPP Maximum Salary

As the benefits paid to a member from the Plan are dependent on the future CPP Maximum Salary, it is necessary to make an assumption regarding the future increases in the CPP Maximum Salary.

The assumed increase in the CPP Maximum Salary reflects the assumed rate of inflation plus the productivity increase assumption.

Increases in the Maximum Pension Limit

Pensions are limited to the maximum limits under the *Income Tax Act*. The *Income Tax Act* specifies both a dollar limit, and in addition pensions cannot exceed 2.00% of indexed highest average compensation per year of credited service. The assumed increase in the dollar limit reflects the assumed rate of inflation plus the productivity increase assumption.

Interest on Member Contributions

Interest is credited on member contributions with the rate credited by chartered banks on five-year personal fixed term deposits. The assumption for interest on member contributions reflects our long term expectation for these rates.

Expenses

Since the discount rate has been established net of all/investment expenses, no explicit assumption is required for all/investment expenses.

Provision for Adverse Deviation

For the purpose of this valuation, the PfAD is established based on the target asset allocation for each category of investments set out in the Plan's Statement of Investment Policies and Procedures (SIPP) in effect at the date of this report

Asset Mix Component	Investment Categorization under Regulation 76 (12)	Categorization under Regulation 11.2 (8)[1]	Target Asset Allocation (%)
Cash and short term	4	Fixed Income ("L")	(12.5)%
Fixed-income	15	Fixed Income ("L")	30.0%
Canadian equities	13	Non-Fixed Income	10.0%
U.S. equities	14	Non-Fixed Income	0.0%
International equities	14	Non-Fixed Income	45.0%
Other[2]	7	Alternative Investment ("M")	27.5%
			100.0%

Fixed income ("L")	17.50%
Alternative Investment ("M")	27.50%
(a) Percentage of fixed income for PfAD ["L" + 50%* "M"]	31.25%
(b) Percentage of non-fixed income for PfAD [100%-(a)]	68.75%
(c) Asset mix component (see table below) [3]	5.75%

Percent of Non-Fixed Income Assets	PfAD for Closed Plans	PfAD for Open Plans
0%	0%	0%
20%	2%	1%
40%	4%	2%
50%	5%	3%
60%	7%	4%
70%	11%	6%
80%	15%	8%
100%	23%	12%

[1] The fixed income investments satisfy the minimum credit rating requirements prescribed by the Regulation
[2] Includes Absolute Return Strategies, Alternative Credit and Real Estate
[3] Based on linear interpolation

Benchmark Discount Rate (BDR)

(d) V39056 rate at the valuation date	1.01%
(e) BDR [(d)+1.5%*(a)+5.0%*(b)+0.5%]	5.42%
(f) Best estimate discount rate[1]	5.47%
(g) Plan duration	14.80

PfAD is Determined as Follows:

Fixed component (open 4% or closed 5%)	4.00%
Asset mix component	5.75%
BDR component [Max [0, (g)*((f)-(e))]]	0.74%
Total	**10.49%**

[1] Gross of non-investment expenses and passive investment management fees

Demographic Assumptions

Mortality

During 2014, the CIA completed a study of Canadian pensioner mortality levels and trends. The 2014 study published mortality rates split by sector and included Public, Private and Combined tables, as well as possible pension size adjustment factors. In 2017, a new mortality improvement scale (MI-2017) was developed and published by CIA to account for broader mortality improvements for the Canadian population. The continued use of this mortality table and projection scale are considered reasonable.

To address the specifics of the Plan demographics and experience, we have modified the mortality assumptions used on the going concern basis and are now using the following table: 2014 Canadian Public Sector Pensioners' Mortality with adjustment factor of 95%. The use of this base table is supported by recent experience of the Plan's pensioner and mortality data.

Retirement

For Academic staff/Librarians, retirement rates from age 60 (earliest unreduced retirement age) to age 71 (to reflect the elimination of mandatory retirement) are used. For all other staff groups, a single point retirement age of age 63 is used to reflect the various unreduced early retirement provisions available at age 60 or later (with minimum requirements for pensionable service or age-plus-continuous service points). We monitor actual experience against this assumption at each valuation and consider this retirement age to be appropriate.

Termination of Employment

The rates of termination of employment before retirement represent a best estimate of termination rates for a Plan of the size and workforce characteristics of this Plan. The termination assumption does not have as significant an impact on the valuation as in some other plans because of indexing in the deferral period. The experience gains and losses attributable to this assumption have been relatively small. Therefore, we continue to find this Table appropriate.

Option Elections on Termination

We have assumed that a portion of members will elect a deferred annuity, while others will elect a commuted value transfer or cash on termination. In recognition of the lower prevailing discount rates and to determine commuted values, we have employed a different discount rate basis used to calculate termination benefits for those that elect a lump-sum transfer value.

Disability

If an active Plan member becomes disabled, contributory service continues to accrue until unreduced pension commencement age, but employee contributions are waived. Since this benefit is substantially the same as the benefit that accrues to an active member, no disability assumption was used. Use of an actual disability assumption in this case would reduce liabilities slightly, so a nil disability incidence assumption represents a small element of conservatism. The disability assumption has very little impact on the valuation results.

Proportion of Members with Spouses and Spousal Age Differential

These assumptions are relevant to the valuation of benefits since there is a subsidized joint and survivor benefit available for members with a spouse. The proportion of members who will have a spouse is based on broad population statistics. The spousal age difference was based on observance of actual age differences in the group for members where the spouse age is known.

Other

Actuarial Cost Method

An actuarial cost method is a technique used to allocate in a systematic and consistent manner the expected cost of a pension plan over the years of service during which Plan members earn benefits under the Plan. By funding the cost of a pension plan in an orderly and rational manner, the security of benefits provided under the terms of the Plan in respect of service that has already been rendered is significantly enhanced.

The projected unit credit actuarial cost method has been used for this valuation. Under this method, the actuarial present value of benefits in respect of service prior to the valuation date, but based on pensionable earnings projected to retirement, is compared with the actuarial asset value, revealing either a surplus or an unfunded actuarial liability.

With respect to service after the valuation date, the expected value of benefits for service in the year following the valuation date (i.e., the current service cost) net of any required employee contributions is expressed as a percentage of the expected value of participating payroll for that year. The employer current service cost contributions are determined each year by applying this percentage to the actual participating payroll for the year.

When calculating the actuarial present value of benefits at the valuation date, the present value of all retirement, withdrawal and preretirement death benefits are included. For each member, the retirement, withdrawal and preretirement death benefits for a particular period of service are first projected each year into the future taking into account future vesting, early retirement entitlements and minimum pension/value entitlements. These projected benefits for each future year are then capitalized, multiplied by the probability of the member leaving the Plan in that year and discounted with interest and survivorship to the valuation date. The actuarial present value of benefits for the particular period of service is then determined by summing the present values of these projected benefits.

The pattern of future contributions necessary to pre fund future benefit accruals for any one particular individual will increase gradually as a percentage of their pensionable earnings as the individual approaches retirement. For a stable population (i.e., one where the demographics of the group remain constant from year to year), the current service cost will remain relatively level as a percentage of payroll. The projected unit credit actuarial cost method therefore allocates contributions among different periods in an orderly and rational manner for a stable population group.

In the event of future adverse experience, contributions in addition to the current service cost calculated under the projected unit credit actuarial cost method may be required to ensure that the Plan's assets are adequate to provide the benefits. Conversely, favourable experience may generate surplus which may serve to reduce future contribution requirements.

Asset Valuation Method

Market value, adjusted by in-transit cash flows was used as the actuarial value of assets for this valuation. Asset-smoothing techniques are often used to reduce volatility in the University's contribution requirements. However, since this Plan's contributions are primarily being driven by the solvency valuation, we deemed it unnecessary to use an asset-smoothing technique for the going concern valuation.

Appendix D: Solvency and Hypothetical Wind Up Assumptions and Methods

Valuation Assumptions

	July 1, 2020	July 1, 2017
Economic Assumptions		
Discount rate		
Transfer value basis —*Without indexation*	1.30% per year for 10 years; 2.20% per year thereafter	2.30% per year for 10 years; 3.30% per year thereafter
Annuity purchase basis —*Without indexation*	2.50% per year	2.90% per year
Duration used to determine annuity purchase basis without indexation	11.99 per year	11.66 per year
Transfer value basis —*With indexation*	1.00% per year for 10 years; 1.20% per year thereafter	1.60% per year for 10 years; 2.00% per year thereafter
Annuity purchase basis —*With indexation*	0.25% per year	0.65% per year
Income Tax Act dollar limit	$3,092.22 per year	$2,914.44 per year
Blended rate used to determine solvency special payments	2.20% per year	2.80% per year

	July 1, 2020	July 1, 2017
Demographic Assumptions		
Mortality table	2014 Canadian Pensioners' Mortality Table (Combined), with mortality improvements scale CPM-B (sex-distinct rates)	Same
Termination rates	Not applicable	Same
Retirement age		
Active and disabled members		
Ontario members with 55 or more age-plus-service points as of valuation date	June 30 between early retirement date and normal retirement date that produces highest present value with grow-in	Same
Other active members	June 30 between early retirement date and normal retirement date that produces highest present value without grow-in	Same
Deferred vested members	Normal retirement date	Same
Retired members and beneficiaries	Not applicable	Same
Termination of employment	Terminate with full vesting	Same
Marital status		
Non-retired spousal proportion	85% for male members and 70% for female members	Same
Non-retired spousal age differential	Males members with spouse four year younger and female members with spouse two years older	Same
Retired members	Actual marital status and ages are used	Same
Other		
Wind up expenses	$1,400,000	Same
Actuarial cost method	Unit credit	Same
Asset valuation method	Market value of assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in transit as of the valuation date	Same
Incremental Cost		
The assumptions for the expected benefit payments and decrement probabilities, service accruals, and projected changes in benefits and/or pensionable earnings	Same as going concern	Same

Based on the CIA's Guidance and information such as pension legislation, Plan provisions and Plan experience, we have made the following assumptions regarding how the Plan's benefits would be settled on Plan wind up:

	Percent of Liability Assumed to be Settled By Purchase of Annuities	Percent of Liability Assumed to be Settled By Lump-Sum Transfer
Active Members		
Not retirement eligible	0%	100%
Retirement eligible	100%	0%
Deferred Vested Members		
Not retirement eligible	100%	0%
Retirement eligible	100%	0%
Retired Members and Beneficiaries	100%	0%

Postulated Scenario

The postulated scenario is the assumption of immediate termination of employment for the active group at the valuation date. Therefore, no allowance for future salary increases or demographic experience are reflected.

Benefits Valued

	Solvency Valuation	Hypothetical Wind Up Valuation
Vesting	We have treated all accrued benefits as vested on Plan wind up.	We have treated all accrued benefits as vested on Plan wind up.
Grow-in Benefits	Active members with 55 age-plus-continuous service points as of the valuation date are assumed to grow into the enhanced early retirement reduction	Active members with 55 age-plus-continuous service points as of the valuation date are assumed to grow into the enhanced early retirement reduction
Indexing	In accordance with the *Pension Benefits Act* (Ontario), solvency liability excludes the value of future escalated adjustments (future indexation) for both the preretirement and postretirement period	In accordance with the *Pension Benefits Act* (Ontario), solvency liability excludes the value of future escalated adjustments (future indexation) for both the preretirement and postretirement period

Justification for Valuation Assumptions

Development of Non-Indexed Discount Rates

The development of the non-indexed discount rates is shown below.

Solvency lump-sum discount rate for 10 years	= V122542[1] + 90 bps = 0.43% + 0.90% **= 1.33% (rounded to 1.30%) per year**
Solvency lump-sum discount rate thereafter	= V122544[30]+ 0.5 x (V122544[1] – V122542[1]) + 90 bps = 1.02% + 0.5 x (1.02% – 0.43%) + 0.90% **= 2.22% (rounded to 2.20%) per year**
Solvency annuity purchase discount rate	= V39062 + Duration Adjustment = 0.91% +1.61% **= 2.52%(rounded to 2.50%) per year**

We have set the aforementioned assumptions based on guidance prepared by the CIA Committee on Pension Plan Financial Reporting ("PPFRC") in Educational Note – Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates between June 30, 2020 and December 30, 2020 ("CIA Guidance") released on August 12, 2020.

For benefit entitlements that are expected to be settled by lump-sum transfer, we based the assumptions on Section 3500 (Pension Commuted Values) of the CIA Standards of Practice, using rates corresponding to a valuation date of July 1, 2020.

For benefit entitlements that are expected to be settled by purchase of annuities, we based the assumptions on information compiled by the PPFRC from insurance companies active in the group annuity market as described in the educational note.

Mortality Table

The derivation of the discount rate above is in conjunction with 2014 Canadian Pensioners' Mortality Table (Combined) in accordance with the CIA Guidance.

Preretirement Mortality

We have made no allowance for preretirement mortality. The impact of including such an assumption would not have a material impact on the valuation, since the value of the death benefit is approximately equal to the value of the accrued pension.

Pensionable Earnings

To estimate active and disabled members' best average earnings, we have used actual historical member earnings.

[1] CANSIM Series (annualized)

Assumptions Not Needed

The following are not relevant to the solvency or hypothetical wind up valuation:

- Increases in pensionable earnings;
- Termination of employment rates;
- Increases in CPP and OAS benefits;
- Increases in *Income Tax Act* maximum pension limit; and
- Disability rates.

Estimated Wind Up Expenses

Plan wind up expenses would normally include such items as fees related to preparation of the actuarial wind up report, fees imposed by a pension supervisory authority, legal fees, administration, custodial and investment management expenses. We calculated this as a flat $1,400,000. We have assumed that the University will still be solvent on the wind up of the Plan.

Calculation of Special Solvency Payments

To calculate the special payments necessary to liquidate the Solvency deficiency we used a weighted average of the solvency discount rates based on the relative proportions of benefit entitlements that are expected to be settled by purchase of annuities and lump-sum transfer.

Unisex Assumption

The liabilities are valued on a sex-distinct basis. The determination of the unisex percentage used in the payment of commuted values to members eligible for portability is based on the proportion of active and deferred vested liabilities for males and females. As such, the determination of commuted value liabilities on a sex-distinct basis in the solvency/hypothetical wind-up valuation is appropriate.

Actuarial Cost Methods

Unit credit (accrued benefit) cost method as prescribed.

Asset Valuation Method Considerations

Assets for solvency purposes have been determined using market value.

Incremental Cost

The incremental cost represents the present value, at the calculation date (time 0), of the expected aggregate change in the liabilities between time 0 and the next calculation date (time t), adjusted upwards for expected benefit payments between time 0 and time t.

An educational note was published in December 2010 by the CIA Committee on PPFRC to provide guidance for actuaries on the calculation of this new information.

The calculation methodology can be summarized as follows:

- The present value at time 0 of expected benefit payments between time 0 and time t, discounted to time 0,

  plus

- Projected liabilities at time t, discounted to time 0, allowing for, if applicable to the pension plan being valued:
  - expected decrements and related changes in membership status between time 0 and time t,
  - accrual of service to time t,
  - expected changes in benefits to time t,
  - a projection of pensionable earnings to time t,

  minus

- The liabilities at time 0.

The projection calculations take into account the following assumptions and additional considerations:

- The assumptions for the expected benefit payments and decrement probabilities, service accruals, and projected changes in benefits and/or pensionable earnings would be consistent with the assumptions used in the pension plan's going concern valuation.
- The assumptions used to calculate the projected liability at time t are consistent with the assumptions for the liabilities at time 0, assuming that interest rates remain at the levels applicable at time 0, that the select period is reset at time t for interest rate assumptions that are select and ultimate and that the Standards of Practice for the calculation of commuted values and the guidance for estimated annuity purchase costs in effect at time 0 remain in effect at time t.
  - Active and inactive Plan members as of time 0 are considered in calculating the incremental cost.

Appendix E: Summary of Plan Provisions

This funding valuation was based on Plan design information provided by the University as of July 1, 2020. The following is a summary of the main provisions of the Plan.

Effective Date	January 1, 1966
Eligibility	All members of the University staff in receipt of a rate of annual salary of at least 35% of the CPP Maximum Salary or who are scheduled to work at least 700 hours in the University year, are eligible to become members of the Plan on the July 1, October 1, January 1 or April 1 coincident with or next following attainment of such annual salary, and provided that they have not reached the maximum age prescribed by the *Income Tax Act* and are not an active participant of the Teachers' Pension Plan or any other concurrent pension plan which the University has established or to which it contributes (other than the Canada Pension Plan).
Participation	Participation is required of all eligible members of the staff with the following exceptions: (a) Members of the staff whose percentage of appointment is less than 25% of full-time. (b) Members of the staff whose percentage of appointment is at least 25% of full-time and who have not attained age 35 and completed at least one year of continuous service. (c) Members who can demonstrate to the satisfaction of the University that they have a more advantageous arrangement elsewhere.
Normal Retirement	
Eligibility	June 30 coincident with or next following attainment of age 65.
Benefit	**For Full-Time Service, and Part-Time Service on or after July 1, 1987:** Annual benefit equal to (a) + (b) below for each year of Pensionable Service. ***Academic Staff, Librarians and Research Associates*** (a) 1.5% of Highest Average Salary up to the Average CPP Maximum Salary. (b) 2.0% of Highest Average Salary in excess of the Average CPP Maximum Salary.

Benefit (continued)	***Administrative Staff, Unionized Administrative Staff and Unionized Staff*** (a) 1.6% of Highest Average Salary up to the Average CPP Maximum Salary. (b) 2.0% of Highest Average Salary in excess of the Average CPP Maximum Salary. **For Part-Time Service before July 1, 1987** Annual benefit equal to 2% of indexed salary for each year of participation, where indexed salary is the salary paid in the University year in which the benefit is earned, indexed by the increases in the Average Industrial Wage from the end of the University year to the beginning of the University year in which the member retires, terminates, or dies in active service of the University, whichever occurs first. **Maximum Pension** The annual benefit for a member cannot exceed the lesser of: ▪ Defined benefit limit on such date times years of Pensionable Service; and ▪ 2.0% of the average of the best three consecutive years of salary times Pensionable Service. Regulation 8504(6) imposes a lower maximum benefit limit in respect of any pre-1990 service that is granted after June 8, 1990 (e.g., buy-back or granting of years of pre-1990 service that was not previously counted as Pensionable Service).
Unreduced Early Retirement	
Eligibility	**Academic Staff and Librarians[1]** December 31 or June 30 following attainment of age 60 and 10 or more years of Pensionable Service **Administrative Staff—P/Ms 6 and Above** Age 60 and 15 or more years of Pensionable Service **Administrative Staff (Other Than Above), Unionized Administrative Staff, Unionized Staff and Research Associates** Age 60 and age plus continuous service totaling 80 or more.
Benefit	The benefit calculated under the normal retirement formula based on Highest Average Salary and Pensionable Service as of early retirement date, without reduction for early commencement.

[1] Only if retiring on December 31, on June 30

Reduced Early Retirement

Eligibility	Within 10 years of normal retirement date and not eligible for unreduced early retirement.
Benefit	The benefit calculated under the normal retirement formula based on Highest Average Salary and Pensionable Service as of early retirement date, reduced 5% for each year that actual retirement precedes the normal retirement date.

Postponed Retirement

Eligibility	Any age after normal retirement date, but for Plan purposes pension benefits must commence no later than December 1 of the year in which the member's 71st birthday occurs.
Benefit	The benefit calculated under the normal retirement formula based on Highest Average Salary and Pensionable Service as of postponed retirement date.

Disability

Eligibility	Any age up to earlier of termination, normal retirement date or death.
Benefit	If eligible (or deemed eligible) to receive disability income from Long-Term Disability Plan: The benefit calculated under the normal retirement formula, payable at normal retirement date, based on Pensionable Service which continues to accrue during periods of disability and on salary which is increased during each year of disability by the lesser of: (a) 7%; and (b) The "across-the-board" economic increase granted to active employees during the preceding 12 months.

Termination of Service

Eligibility	Any age
Benefit	A terminating member may choose one of the following options: (a) A benefit calculated under the normal retirement formula above based on Highest Average Salary and Pensionable Service at termination date, payable at normal retirement date (or actuarially reduced for early commencement). (b) A transfer of the commuted value of the accrued benefit to a new employer's pension plan, another prescribed retirement savings vehicle, or a life insurance company to purchase an annuity (provided the funds are transferred on a "locked-in" basis). For terminations after July 1, 2019 but prior to early retirement age, the minimum termination benefit will be two times the member's required contributions made prior to July 1, 2019 with interest.

Death in Service

Eligibility	Any age
Benefit	Lump-sum death benefit equal to the commuted value of the accrued benefit calculated under the normal retirement formula above based on Highest Average Salary and Pensionable Service at date of death. If the beneficiary is the spouse, the spouse shall receive an immediate pension unless he or she chooses a lump sum cash payment, a transfer to an RRSP or RRIF, or a deferred pension. A beneficiary who is not a spouse, or an estate, shall receive the benefit as a single lump sum cash payment.

Minimum Employer Cost	On retirement, death, or termination, the required member contributions with interest, cannot provide more than 50% of the commuted value of the benefit. In the event that required member contributions provide for more than 50%, the excess will be refunded to the member or beneficiary, if applicable.

Normal Form of Annuity

The normal form for members with a spouse at pension commencement date is a life annuity with 60% continuing thereafter to the surviving spouse for his or her lifetime. If the spouse is more than 15 years younger than the member, the pension will be actuarially reduced to reflect the number of years in excess of 15 that the spouse is younger than the member. For members without a spouse at pension commencement, the normal form is a life annuity with a five-year guarantee period.

For members who terminated prior to July 1, 1996 and are entitled to a future pension under the Plan, the normal form will be determined based on the Plan provisions in effect at the time of termination.

Cost-of-Living Adjustments

Pensions payable under this Plan and the Prior Plans (including pensions for members who have terminated service on or after July 1, 1982, and pensions for members who have postponed retirement—whether deferred or not, but excluding pensions arising from voluntary additional contributions and from non-reciprocal transfers and excluding those paid from the Teachers Insurance and Annuity Association and the Government Annuities Branch under Prior Plans) will be increased as from July 1 each year by the greater of (a) and (b) prorated to reflect the number of months from pension commencement date to the July 1:

(a) The increase in the CPI for Canada for the previous calendar year minus 4.0%; or
(b) 75% of the increase in the CPI for the previous calendar year to a maximum CPI increase of 8%, plus 60% of the increase in CPI in excess of 8%.

Member Contributions

Each member contributes each year an amount equal to:

Administrative Staff, Unionized Administrative Staff and Unionized Staff
9.20% of the member's salary up to the CPP Maximum Salary plus 11.50% of the member's salary in excess of the CPP Maximum Salary, up to the pensionable salary cap for contribution purposes ($173,200 as of July 1, 2020).

Academic Staff, Librarians and Research Associates
9.20% of the member's salary up to the CPP Maximum Salary plus 11.50% of the member's salary in excess of the CPP Maximum Salary, up to the pensionable salary cap for contribution purposes ($173,200 as of July 1, 2020).

Definitions

Average CPP Maximum Salary	The average of the CPP Maximum Salary during the last 36 months of full-time participation.
CPP Maximum Salary	The maximum salary taken into account for purposes of the Canada Pension Plan (i.e., the year's maximum pensionable earnings) as at the beginning of a University year.
Credited Interest	4% per annum up to June 30, 1981; after June 30, 1981, an annual rate equal to the increase in the CPI plus 2% subject to the minimum rate prescribed by the *Pension Benefits Act* (Ontario) and its Regulations; from July 1, 2012 onward, the increase in CPI plus 2% is removed in conjunction with the increase in required member contribution rates for members noted on the previous page.
Highest Average Salary	The highest average of the Salary received by a member during any 36 completed months of participation. Highest Average Salary is capped at the level at which the ITA maximum pension is reached in the month of retirement or earlier termination.
Pensionable Service	Member's years and completed months of continuous service with the University while a member in the Plan. For service of a member employed on a full-time basis or the service on or after July 1, 1987 of a member employed on a part-time basis, the period of service is multiplied by the percentage appointment.
Prior Plans	The 1955 Pension Plan for members of the academic and administrative staff, the 1946 Plan for academic staff, the 1919 Plan for academic staff, the 1951 Plan for administrative staff, the 1929 Plan for administrative staff, the 1954 Plan for staff of the Connaught Medical Research Laboratory, and the 1946 Pension Plan of the Ontario College of Pharmacy.
Salary	Gross regular salary/wages including academic administrative stipends, but excluding all other payments.
University Year	The period of 12 consecutive months commencing on July 1.

A copy of the administrator certification certifying the accuracy and completeness of the Plan provisions summarized in this report is included in Appendix G of this report.

Appendix F: Glossary of Terms

- The **actuarial value of assets** is the asset value used for going concern valuation purposes. Smoothing methods are sometimes used to smooth investment gains and losses over a certain period.
- The **estimated wind up expenses** is an estimate of the administrative and other expenses expected to be charged against the pension fund if the Plan were to terminate on the valuation date.
- The **going concern excess/(unfunded liability)** is the difference between the actuarial value of assets and sum of the going concern liabilities, the amount equal to the provision for adverse deviations in respect of the going concern liabilities of the pension plan, and the prior year credit balance of the pension plan.
- The **going concern funded ratio** compares the value of the assets of the pension plan determined on the basis of a going concern valuation, including accrued and receivable income but excluding the amount of any letter of credit held in trust for the pension plan, exceeds the prior year credit balance to the total amount of the going concern liabilities of the pension plan.
- The **going concern liabilities** are the actuarial present value of benefits earned in respect of service prior to the valuation date. The going concern liabilities are calculated using the going concern assumptions and methods summarized in Appendix C of this report.
- The **going concern position** is the difference between the actuarial value of assets and the going concern liabilities.
- The **maximum deductible University contribution** refers to an eligible contribution pursuant to Section 147.2(2) of the *Income Tax Act*. Under Subsection 8502(b) of the Regulations to the *Income Tax Act*, each University contribution made after January 1, 1991 in respect of a defined benefit provision of a registered pension plan must be such eligible contribution.

  In a company's fiscal year, the following contributions are eligible under Section 147.2(2) of the *Income Tax Act*:

  – The University current service cost, eligible under Section 147.2(2) subject to certification by the actuary and approval by the Canada Revenue Agency; plus

  – Special payments eligible under Section 147.2(2) up to the amount of the unfunded liability, the solvency deficiency, or the hypothetical wind up deficiency, whichever is greater, subject to certification by the actuary and approval by the Canada Revenue Agency; less

  – Required application of excess surplus.

  The University current service cost and special payments for this Plan will be deductible under Section 147.2(2) of the *Income Tax Act*, subject to the approval of the Canada Revenue Agency.

  Note that contributions to a plan are still permissible and deductible if there is an excess surplus, providing there is simultaneously a solvency or hypothetical wind up deficiency in the Plan or the contributions are required as minimum contributions under provincial or federal *Act* legislation, pursuant to Subsections 8516(2) and (3) of the Regulations to the *Income Tax Act*.

One restriction under the *Income Tax Act* is that if there is an excess surplus, and a solvency or hypothetical wind up deficiency, the maximum deductible contribution is restricted to the full amount of the deficiency without allowance for interest or any other contributions such as University current service cost and/or transfer deficiency payments.

In order to be deductible in a given fiscal year, company contributions must be made not later than 120 days after the end of the fiscal year.

- The **minimum required University contribution** for each plan year is equal to:
  - The University current service plus
  - Special payments toward amortizing any unfunded liability over ten (10) years beginning one year from the date on which the unfunded liability was established; plus
  - Special payments toward amortizing any solvency deficiency over five years beginning no later than 12 months (24 months if the company elected temporary funding relief option 8) from the date on which the solvency deficiency was established (this period of years may be longer if the University has elected temporary funding relief options 3, 5, and/or 7); less
  - Required application of excess surplus; less
  - Permitted application of surplus; less
  - Permitted application of PYCB.

  In order to satisfy the requirements of the *Act* and its Regulations, contributions to the fund must be made in accordance with the following rules:
  - Required member contributions (if any) must be remitted to the pension fund within 30 days following the month in which the contributions were received from the member or deducted from his or her remuneration.
  - University current service cost contributions must be remitted to the pension fund within 30 days after the end of the month for which the contributions are payable.
  - Special payments must be remitted to the pension fund in the month for which they are payable.
- The **prior year credit balance** is:
  - The PYCB stated in the last report in respect of the Plan under the Regulation; plus
  - The total amount of contributions made to the Plan by the University after the valuation date of the last report in respect of the Plan and before the valuation date for the report being prepared; less
  - The total minimum amount of contributions required to have been made after the valuation date of the last report in respect of the Plan and before the valuation date for the report being prepared, if the contributions had been calculated without reference to any PYCB.

  The University may choose to set the PYCB between nil and the amount as calculated above, but may not recapture the amount forfeited at any time.
- **Reduced solvency deficiency** the difference between the sum of 85% of the solvency liability, 85% of solvency liability adjustment and the PYCB to the sum of the solvency asset and solvency asset adjustment.
- **Solvency/Hypothetical wind up assets** are the market value of pension fund assets adjusted to reflect contributions, benefit payments, transfers and fees/expenses in-transit at the valuation date.

- The **solvency asset adjustment** is an adjustment that may be made to the solvency assets to reflect:
  - The impact of using an averaging method that stabilizes short-term fluctuations in the market value of the Plan's assets calculated over a period of not more than five years; plus
  - The present value of any remaining special payments required to liquidate any unfunded liability (for service not previously recognized for benefit determination purposes) established after December 31, 1987; plus
  - The present value of any remaining special payments other than those above that are scheduled for payment within six years after the valuation date. This period of years may be longer if the University has elected temporary funding relief options 3, 5, 7, and/or 8.
- The **solvency liabilities** are the actuarial present value of benefits earned in respect of service prior to the valuation date determined as if the Plan were wound up on the valuation date and taking into account Section 74 of the *Act* (i.e., grow-in). In calculating the solvency liabilities, which includes plant closure benefits or permanent layoff benefits that would be immediately payable if the Plan sponsor's business was discontinued on the valuation date, the *Act* and its Regulations permit the exclusion of the following benefits:
  - Any escalated adjustments;
  - "Excluded plant closure benefits" that the University elected on November 26, 1992 to exclude;
  - "Excluded permanent layoff benefits" that the University elected on November 26, 1992 to exclude;
  - Special allowances other than those where the member has met all age and service eligibility requirements;
  - Consent benefits other than those where the member has met all eligibility requirements except the consent of the employer, or in the case of a jointly sponsored pension plan, the consent of the employer or the administrator;
  - Prospective benefit increases;
  - Potential early retirement window benefit values; and
  - Pension and ancillary benefits payable under a qualifying annuity contract.

  The solvency liabilities are determined using benefit entitlements on the assumption that the Plan has neither a surplus nor a deficit. The solvency liabilities are calculated using the solvency valuation assumptions summarized in Appendix D of this report.
- The **solvency liability adjustment** is an adjustment that may be made to the solvency liabilities to reflect the impact of using a solvency valuation discount rate for discounting the liability that is the average of market discount rates calculated over the same period of time as that used in the calculation of the solvency asset adjustment.
- The **solvency position** is the difference between the solvency assets (net of estimated wind up expenses) and the solvency liabilities.
- The **solvency ratio** compares the solvency assets (plus any letters of credit held in trust exceeding the prior year credit balance) to the solvency liabilities for purposes of Subsections 14(2) and (3) of the Regulations of the *Act* to determine the latest effective date of the next required valuation.

- The **solvency excess/(deficiency)** is the solvency position, increased by the solvency asset adjustment and the solvency liability adjustment, then decreased by the PYCB.
- The **special payments** are payments required to liquidate the unfunded liability and/or reduced solvency deficiency:
  - The going concern special payments are payments required to liquidate the unfunded liability, with interest at the going concern valuation discount rate, by equal monthly instalments over a period of ten (10) years beginning one year from the valuation date of the report in which the going concern unfunded liability was determined.
  - The solvency special payments are payments required to liquidate the reduced solvency deficiency, with interest at the solvency valuation discount rate, by equal monthly instalments over a period of five years beginning no later than 12 months (24 months if company elected temporary funding relief option 8) from the valuation date of the report in which the solvency deficiency was determined. This period of years may be longer if the University has elected temporary funding relief options 3, 5, and/or 7.
- The **total current service cost** is the actuarial present value of benefits expected to be earned in respect of service for each year starting on the valuation date. Required member contributions (if any) are deducted from the total current service to determine the University current service cost. The total current service is calculated using the going concern valuation assumptions and methods summarized in Appendix C of this report.
- The **transfer ratio** compares the solvency assets, minus the lesser of the PYCB and the required University contributions until the next required valuation (before application of the PYCB), to the solvency liabilities plus the liability of any excluded benefits (except for pension benefits and ancillary benefits payable under a qualifying annuity contract). If the transfer ratio is less than 1.00, lump-sum transfers from the pension fund under Section 42 of the *Act* are limited to the commuted value of the member's pension multiplied by the transfer ratio. The administrator may transfer the entire commuted value if:
  - The administrator is satisfied that an amount equal to the transfer deficiency has been remitted to the pension fund; or
  - The aggregate of transfer deficiencies for all transfers made since the last valuation date does not exceed 5% of the Plan's assets at that time.

  In June 2009, Subsection 19 of the Regulations of the *Act* was amended and Policy T800-402 was released. The Policy imposes additional restrictions for payment of commuted values under certain circumstances.

Appendix G: Administrator Certification

With respect to the University of Toronto Pension Plan, forming part of the actuarial report as at July 1, 2020, I hereby certify that, to the best of my knowledge and belief:

- The asset data provided or made available to the actuaries is complete and accurate;
- The membership data and subsequent query answers provided or made available to the actuaries are complete and accurate for all persons who are entitled to benefits under the terms of the Plan in respect of service up to the date of the valuation;
- The Plan provisions provided or made available to the actuaries are complete and accurate up to and including amendment effective July 1, 2020;
- The actuaries have been notified of all relevant events subsequent to the valuation measurement date; and
- The terms of engagement contained in Section 1 of this report are accurate and reflect the plan administrator's direction.

Ian MacEachern	Director, Pension, Benefits & Payroll
Name (print) of Authorized Signatory	Title
Signature	Date

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