Actuarial Valuation as at July 1, 2017 for University of Toronto Pension Plan

Regulatory Registration Number: 0312827

November 2017

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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, 2017 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, 2020.

Summary of Principal Results

Financial Position

July 1, 2017	Going Concern	Solvency	Hypothetical Wind Up
Assets	$ 4,698,216,000	$ 4,696,816,000[1]	$ 4,696,816,000[1]
Liabilities	5,060,643,000	5,880,388,000	7,823,395,000
Financial position	$ (362,427,000)	$(1,183,572,000)	$ (3,126,579,000)
Adjustments	-	319,022,000[2]	-
Surplus/(Unfunded Liability)	**$ (362,427,000)**	**$ (864,550,000)**	**$ (3,126,579,000)**

July 1, 2014	Going Concern	Solvency	Hypothetical Wind Up
Assets	$ 3,618,779,000	$ 3,617,379,000[1]	$ 3,617,379,000[1]
Liabilities	4,348,240,000	4,672,319,000	6,428,464,000
Financial position	$ (729,461,000)	$(1,054,940,000)	$ (2,811,085,000)
Adjustments	-	-	-
Surplus/(Unfunded Liability)	**$ (729,461,000)**	**$(1,054,940,000)**	**$ (2,811,085,000)**

Current Service Cost

	July 1, 2017	July 1, 2014
University current service cost	$ 116,082,000	$ 98,604,000
As a % of total capped pensionable earnings	12.29%	12.01%

[1] Net of estimated wind up expenses
[2] Solvency asset adjustment

Legislative Ratios

	July 1, 2017	July 1, 2014
Solvency ratio	0.80	0.77
Transfer ratio	0.60	0.56

Minimum University Contribution Requirements

Considering the funding and solvency status of the Plan, the minimum University contributions for the period from July 1, 2017 to July 1, 2020 in accordance with legislative requirements, are as follows:

	July 1, 2017 to June 30, 2018	July 1, 2018 to June 30, 2019	July 1, 2019 to June 30, 2020
University current service cost	$116,082,000	$120,704,000	$125,510,000
Special payments toward amortizing unfunded liability	44,496,000	44,496,000	44,496,000
Special payments toward amortizing solvency deficiency	-	21,253,000	21,253,000
Minimum Required University Contribution	**$160,578,000**	**$186,453,000**	**$191,259,000**

The University is currently contributing special payments of $78,660,000 and expects to continue special payments of that level until the next filed valuation.

Membership Data

	July 1, 2017	July 1, 2014
Active and disabled members	10,247	9,468
Retirees and beneficiaries	5,867	5,425
Deferred vested members	3,187	2,864
Pending/suspended/exempt members	154	191
Total	19,455	17,948

Key Assumptions

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

Going Concern Assumptions

	July 1, 2017	**July 1, 2014**
Discount rate	5.55% per year	5.75% per year
Cost-of-living adjustment	1.50% per year	Same
Pensionable earnings	4.00% per year[1]	4.00% per year
Mortality table	2014 Canadian Public Sector Pensioners' Mortality Table, with mortality improvements scale CPM-B	Same
Retirement rates	Age-related table	Same

Solvency Assumptions

	July 1, 2017	**July 1, 2014**
Discount rate	Annuity purchases: 2.90% per year Transfers: 2.30% per year for 10 years, 3.30% per year thereafter	Annuity purchases: 3.10% per year Transfers: 2.80% per year for 10 years, 4.20% per year thereafter
Mortality table	2014 Canadian Pensioners' Mortality Table (Combined), with mortality improvements scale CPM-B	1994 Uninsured Pensioner Mortality Table, with fully generational mortality improvements using scale AA
Retirement rates	Age that produces the highest lump-sum value	Same

[1] 2.75% per year for disabled members and members on leave of absence

Section 1: Introduction

Purpose and Terms of Engagement

We have been engaged by the 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, 2017 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, 2017;
- Determine the financial position of the Plan as at July 1, 2017 on a solvency and hypothetical wind up basis;
- Determine the funding requirements of the Plan as at July 1, 2017; and
- Provide the necessary actuarial certification required under the *Pension Benefits Act (Ontario)* (the "*Act*") and the *Income Tax Act.*

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, 2020 in accordance with Ontario Regulation 350/16.

Stage Two 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 has 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 amends Ontario Regulation 178/11 related to solvency funding relief for certain public sector pension plans. This amendment allows 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 Plan's minimum required contribution in the first subsequent report is determined based on funding towards 25% of the solvency deficiency over 7 years commencing one year after the subsequent report valuation date, with interest only funding required on the balance of the solvency deficiency. Any special payments determined in the Stage Two Valuation Report payable 12 months after the first subsequent report will be eliminated. This report as of July 1, 2017 is the first subsequent report filed under the Ontario Regulation 178/11 after the Stage Two Valuation Report of the Plan.

Transfer of Plan Assets

On June 2, 2015, the University submitted an application to the Ontario Superintendent of Financial Services to seek approval to transfer the assets and liabilities of the University of Toronto (OISE) Pension Plan to the University of Toronto Pension Plan with effect from July 1, 2014.

The asset transfer was approved by Ontario Superintendent of Financial Services on March 4, 2016, and the assets and liabilities of the University of Toronto (OISE) Pension Plan were transferred to the University of Toronto Pension Plan on June 30, 2016. An asset transfer cost certificate as of June 30, 2016 was filed in August 2016 to certify the completion of asset transfer.

The funded status and contribution information shown in this report reflect the impact of the asset transfer.

Summary of Changes Since the Last Valuation

The last such actuarial valuation in respect of the Plan was performed as at July 1, 2014. Since the time of the last valuation, we note that the following events have occurred:

- The funded status and contribution information shown in this report reflect the impact of the aforementioned asset transfer as of July 1, 2014.
- The University has elected and was accepted into the Stage Two of the solvency relief measures applicable to certain public sector pension plans.
- Effective January 2, 2015, the Plan was amended to gradually increase the maximum salary/wage for Academic Staff, Librarians, and Research Associates, and Administrative Staff. The increases in pension liabilities and total current service costs as a result of the increase in maximum salary/wage have been reflected in the July 1, 2017 actuarial valuation results. Please refer to Appendix E for the details of the increased maximum salary/wage.
- Effective June 30, 2017, the Plan was amended to gradually increase the employee contribution rates for all active members of the plan. The increases in pension liabilities and total current service costs as a result of the increase in employee contribution rates have been reflected in the July 1, 2017 actuarial valuation results. Please refer to Appendix E for the details of the increased employee contribution rates.
- The Canadian Institute of Actuaries (“CIA”) made revisions to the guidance for assumptions for hypothetical wind up and solvency valuations effective December 31, 2015. The key changes to the guidance are to use 2014 Canadian Pensioners’ Mortality Table (Combined), with mortality improvements scale CPM-B to determine the annuity purchase liabilities.

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, 2014;
- A copy of the Statement of Investment Policies and Procedures for the University;
- A copy of the asset transfer cost certificate as at June 30, 2016;
- Membership data compiled as at July 1, 2017 by the University;
- Asset data taken from the Plan's audited financial statements from July 1, 2014 to June 30, 2017; and
- A copy of the latest Plan text and amendments up to and including July 1, 2017.

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, 2017 will result in gains or losses which will be reflected in the next actuarial valuation report.
- 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, 2017 is shown in the following table. The results as at July 1, 2014 are also shown for comparison purposes.

Going Concern Financial Position

	July 1, 2017	July 1, 2014
Actuarial Value of Assets	**$ 4,698,216,000**	**$ 3,618,779,000**
Going Concern Liabilities		
Active and disabled members	$ 2,500,695,000	$ 2,114,963,000
Retirees and beneficiaries	2,342,255,000	2,072,888,000
Deferred vested members	213,698,000	155,301,000
Pending/suspended/exempt members	3,995,000	5,088,000
Total Liabilities	**$ 5,060,643,000**	**$ 4,348,240,000**
Going Concern Position	**$ (362,427,000)**	**$ (729,461,000)**
Prior year credit balance	-	-
Surplus/(Unfunded Liability)	**$ (362,427,000)**	**$ (729,461,000)**
Funded Ratio	**0.93**	**0.83**

On the basis of the Plan provisions, membership data, going concern assumptions and methods and asset information described in the Appendices, the going concern current service cost of the Plan as at July 1, 2017 is shown in the following table. The current service cost as at July 1, 2014 is also shown for comparison purposes.

Going Concern Current Service Cost

	July 1, 2017	July 1, 2014
Current Service Cost		
Total current service cost	$ 193,265,000	$ 156,577,000
Required member contributions[1]	(77,183,000)	(57,973,000)
University Current Service Cost	**$ 116,082,000**	**$ 98,604,000**
Total capped pensionable earnings	$ 944,661,000[2]	$ 820,945,000[3]
University Current Service Cost		
As a % of total capped pensionable earnings	12.29%	12.01%

[1] Includes member contributions made by the University on behalf of disabled members
[2] Capped at $161,000 for academic staff, librarians and research associates, and at $158,000 for administrative staff
[3] Capped at $150,000 for members

Change in Financial Position

The major components of the change in the Surplus/(Unfunded Liability) for the period from July 1, 2014 to July 1, 2017 are summarized in the following table.

	July 1, 2014 to June 30, 2015	July 1, 2015 to June 30, 2016	July 1, 2016 to June 30, 2017
Surplus/(Unfunded Liability) as at the Beginning of Period	$ (729,461,000)	$ (445,959,000)	$ (573,131,000)
Expected interest on Surplus/(Unfunded Liability)	(41,944,000)	(25,643,000)	(32,955,000)
University special payments with interest	68,500,000	80,890,000	80,890,000
Surplus/(Unfunded Liability) as at the End of Period	**$ (702,905,000)**	**$ (390,712,000)**	**$ (525,196,000)**
Change in liabilities due to experience gains/(losses)			
Gain/(loss) from investment earnings	220,064,000	(207,047,000)	302,736,000
Gain/(loss) due to salary increases	20,944,000	6,290,000	3,534,000
Gain/(loss) on *Income Tax Act* maximum pension	9,479,000	1,255,000	19,262,000
Gain/(loss) due to indexation of benefits	9,058,000	7,030,000	10,279,000
Gain/(loss) due to retirement experience	2,253,000	1,387,000	(5,123,000)
Gain/(loss) due to mortality experience	(1,639,000)	(4,549,000)	(5,875,000)
Gain/(loss) due to termination experience	886,000	(1,652,000)	(3,458,000)
Gain/(loss) on new entrants/transfer-in	(2,252,000)	(116,000)	530,000
Net gain/(loss) on all other sources	(1,847,000)	(22,000)	(725,000)
Surplus/(Unfunded Liability) After Experience Gains/(Losses) as at the End of Period	**$ (445,959,000)**	**$ (588,136,000)**	**$ (204,036,000)**
Changes due to changes in assumptions and methods	-	15,005,000	(158,391,000)
Surplus/(Unfunded Liability) as at the End of Period	**$ (445,959,000)**	**$ (573,131,000)**	**$ (362,427,000)**

Discussion of Changes in Assumptions and Methods

Effective July 1, 2016, the indexation adjustments which will be granted in the year of pension commencement are now assumed to be applied prior to testing the ITA maximum pension.

Effective July 1, 2017, the following assumptions were changed:

- The discount rate has been decreased from 5.75% per year to 5.55% per year.
- The salary increase scale for disabled members and members on leave of absence has been decreased from 4.00% per year to 2.75% per year.
- 40% of the members are now assumed to elect a commuted value transfer option upon termination with assumed lump-sum transfer value rate (net of cost-of-living adjustment) of 2.50% per year.

In combination, these changes in assumptions increased the going concern liabilities by $158,391,000 and increased the total current service cost by $10,420,000.

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 of using a discount rate 1% lower and 1% higher than that used for the going concern valuation.

		Effect	
July 1, 2017		**$**	**%**
Going concern liabilities	$ 5,060,643,000		
Going concern liabilities (discount rate – 1%)	$ 5,901,680,000	$ 841,037,000	16.6%
Going concern liabilities (discount rate + 1%)	$ 4,403,004,000	$ (657,639,000)	(13.0)%
Total current service cost	$ 193,265,000		
Total current service cost (discount rate – 1%)	$ 248,738,000	$ 55,473,000	28.7%
Total current service cost (discount rate + 1%)	$ 154,060,000	$ (39,205,000)	(20.3)%

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, 2017 is shown in the following table. The solvency financial position of the Plan as at July 1, 2014 is shown for comparison purposes.

Solvency Financial Position

	July 1, 2017	July 1, 2014
Assets		
Solvency assets	$ 4,698,216,000	$ 3,618,779,000
Estimated wind up expenses	(1,400,000)	(1,400,000)
Total Assets	**$ 4,696,816,000**	**$ 3,617,379,000**
Solvency Liabilities		
Active and disabled members	$ 3,028,736,000	$ 2,329,269,000
Retirees and beneficiaries	2,579,010,000	2,152,652,000
Deferred vested members	268,647,000	185,310,000
Pending/suspended/exempt members	3,995,000	5,088,000
Total Liabilities	**$ 5,880,388,000**	**$ 4,672,319,000**
Solvency Position	**$ (1,183,572,000)**	**$ (1,054,940,000)**
Prior year credit balance	-	-
Present value of special payments	319,022,000	-
Solvency Surplus/(Deficiency)	**$ (864,550,000)**	**$ (1,054,940,000)**
Solvency ratio	0.80	0.77

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.

Since the ratio of solvency assets to solvency liabilities ($4,698,216,000/ $5,880,388,000) is equal to 0.80, this report indicates solvency concerns. However, in accordance with Ontario Regulation 350/16, the next actuarial valuation of the Plan will be as at July 1, 2020.

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 eight years in accordance with Ontario Regulation 350/16, at the weighted solvency discount rate of 2.80% per year compounded monthly in arrears determined proportionately by the solvency discount rates used to determine the solvency liabilities.

Nature of Deficiency	Effective Date	End Date	Months Included in Solvency Asset Adjustment	Annual Special Payment	Present Value as of July 1, 2017
Going concern	July 1, 2012	June 30, 2027	96	$ 32,448,000	$ 232,642,000
Going concern	July 1, 2015	June 30, 2030	96	$ 12,048,000	86,380,000
Present Value of Special Payments					**$ 319,022,000**

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, 2017		**$**	**%**
Solvency liabilities	$5,880,388,000		
Solvency liabilities (discount rate – 1%)	$6,838,787,000	$ 958,399,000	16.3%
Solvency liabilities (discount rate + 1%)	$5,158,452,000	$(721,936,000)	(12.3)%

Incremental Cost on a Solvency Basis

The incremental cost on a solvency basis represents the present value at July 1, 2017 of the expected aggregate change in the solvency liabilities between July 1, 2017 and the next calculation date, that is, July 1, 2020. 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, 2017 to June 30, 2018	**July 1, 2018 to June 30, 2019**	**July 1, 2019 to June 30, 2020**
Incremental cost on a solvency basis	$ 325,499,000	$ 327,109,000	$ 334,935,000

Pension Benefits Guarantee Fund (“PBGF”)

The development of the PBGF Assessment Base is as follows:

PBGF Assessment Base	**July 1, 2017**
(1) Solvency assets	$ 4,698,216,000
(2) PBGF liabilities	$ 5,880,388,000
(3) Solvency liabilities	$ 5,880,388,000
(4) Ontario asset ratio: [(2) divided by (3)]	1.0000
(5) Ontario portion of fund: [(1) multiplied by the ratio in (4)]	$ 4,698,216,000
PBGF assessment base: [(2) subtract (5)]	$ 1,182,172,000

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, 2017 is shown in the following table. The hypothetical wind up financial position of the Plan as at July 1, 2014 is shown for comparison purposes.

Hypothetical Wind Up Financial Position

	July 1, 2017	**July 1, 2014**
Assets		
Hypothetical wind up assets	$ 4,698,216,000	$ 3,618,779,000
Estimated wind up expenses	(1,400,000)	(1,400,000)
Total Assets	**$ 4,696,816,000**	**$ 3,617,379,000**
Hypothetical Wind Up Liabilities		
Active and disabled members	$ 4,139,304,000	$ 3,331,221,000
Retirees and beneficiaries	3,225,845,000	2,752,703,000
Deferred vested members	454,251,000	339,452,000
Pending/suspended/exempt members	3,995,000	5,088,000
Total Liabilities	**$ 7,823,395,000**	**$ 6,428,464,000**
Hypothetical Wind Up Surplus/(Deficiency)	**$ (3,126,579,000)**	**$ (2,811,085,000)**

Transfer Ratio

The transfer ratio is determined as follows:

			July 1, 2017		July 1, 2014
(1) Hypothetical wind up assets		$	4,698,216,000	$	3,618,779,000
Prior year credit balance	(A)	$	-	$	0
Total University current service cost and required special payments until next mandated valuation	(B)	$	538,290,000	$	531,735,000
(2) Asset adjustment	Lesser of (A) and (B)	$	-	$	0
(3) Hypothetical wind up liabilities		$	7,823,395,000	$	6,428,464,000
Transfer Ratio [(1)-(2)] / (3)			**0.60**		**0.56**

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;
- An estimate of the current service cost for the 3 years following the valuation date; and
- The portion of the going concern current service cost that is to be paid by the members.

	July 1, 2017 to June 30, 2018	July 1, 2018 to June 30, 2019	July 1, 2019 to June 30, 2020
Current Service Cost			
Total current service cost	$ 193,265,000	$ 200,960,000	$ 208,961,000
Required member contributions[1]	(77,183,000)	(80,256,000)	(83,451,000)
University Current Service Cost	**$ 116,082,000**	**$ 120,704,000**	**$ 125,510,000**
Total capped pensionable earnings[2]	$ 944,661,000	$ 982,273,000	$ 1,021,383,000
University Current Service Cost			
As a % of total capped pensionable earnings	12.29%	12.29%	12.29%

In the event an updated funding range in accordance with legislative requirements is not certified before July 1, 2020, 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, 2020. 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 $161,000 for academic staff, librarians and research associates, and at $158,000 for administrative staff

Prior Year Credit Balance ("PYCB")

The PYCB is nil.

Excess Surplus

The *Income Tax Act* requires that any excess surplus first be applied to reduce or eliminate the University 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 $362,427,000, 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*.

Minimum Required Contribution

For a Plan Year, the minimum required University contribution is equal to:

The University Current Service Cost;

Plus: Special Payments toward amortizing any Going Concern Unfunded Accrued Liability over 15 years from the date on which the unfunded liability was established;

Plus: Special Payments toward amortizing any Solvency Deficiency over five years from the date on which the Solvency Deficiency was established;

Less: Application of Surplus as permitted by the Plan and any applicable Collective Agreement and subject to the provisions of the *Income Tax Act.*

Minimum Special Payments Under Solvency Relief Measures Applicable to Certain Public Sector Pension Plans

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

Amended Ontario Regulation 178/11 under the *Pension Benefits Act* (i.e., Regulation 350/16) requires the University to make special payments to the Plan to liquidate any solvency deficiency determined in this report (the "First Subsequent Report") according to the rules described below.

If the valuation date of the first subsequent report is on or before December 31, 2018 and if the administrator of the pension plan makes an election to do so, the special payments to liquidate any solvency deficiency determined in the First Subsequent Report as of its valuation date may be made in accordance with the following rules:

1. Notice of the election must be filed with the Superintendent no later than the day on which the first subsequent report is filed.
2. Any special payments required under paragraph 2 of subsection 9 (2) or paragraph 4 of subsection 9 (4) to liquidate a solvency deficiency determined in the Stage Two Valuation Report are no longer required on and after the day that is 12 months after the valuation date of the First Subsequent Report.
3. The minimum monthly amount of the special payments required with respect to the solvency deficiency determined in the First Subsequent Report is determined in accordance with the following rules:
    I. Determine the ratio of solvency assets to solvency liabilities (0.79896)
    II. Subtract the ratio of solvency assets to solvency liabilities from 1 (0.20104)
    III. Take the greater of zero and the amount calculated under subparagraph II and multiply it by 0.25 (0.05026)
    IV. Add the amounts calculated under subparagraphs I and III together (0.84922)

V. Determine the modified solvency liabilities of the pension plan as of the valuation date of the first subsequent report by multiplying the amount of the solvency liabilities by the amount calculated under subparagraph IV ($4,993,743,000)

VI. Determine the amount of the modified solvency deficiency of the pension plan which is the greater of zero and the amount by which the modified solvency liability exceeds the sum of the solvency assets and the solvency asset adjustment ($0)

VII. Determine the amount of the modified solvency special payments for the pension plan which is the amount of the special payments required to liquidate the modified solvency deficiency (together with interest at the same rates used in the first subsequent report to determine the solvency liabilities) by equal monthly instalments over a period of not more than seven years, beginning on a date no later than 12 months after the valuation date of the first subsequent report ($0)

VIII. Subtract the modified solvency liabilities from the solvency liabilities ($886,645,000)

IX. Determine the amount of initial interest payable over the period of one month on the amount determined under subparagraph VIII at the same rates used in the first subsequent report to determine the solvency liabilities ($24,826,000[1])

X. Determine the amount that is the greater of zero and the amount by which the sum of the solvency assets and the solvency asset adjustment exceeds the modified solvency liabilities ($22,095,000)

XI. Determine the monthly amount of interest offset for the period referred to in subparagraph VII, of which the present value, calculated using the interest rates used in the first subsequent report to determine the solvency liabilities, equals the amount calculated under subparagraph X ($3,573,000[1])

XII. Subtract the interest offset obtained under subparagraph XI from the initial interest obtained under subparagraph IX ($21,253,000[1])

XIII. Take the greater of zero and the amount determined under subparagraph XII ($21,253,000[1])

XIV. The minimum monthly amount of the special payments required in respect of the solvency deficiency is the sum of the amounts in subparagraphs VII and XIII ($21,253,000[1])

[1] Annual amounts

Development of Special Payments

The following table summarizes amortization schedules of special payments established in the July 1, 2014 actuarial valuation, before adjustment to reflect any gains or losses due to the going concern and solvency valuation results as of July 1, 2017.

Nature of Deficiency	Effective Date	End Date	Annual Special Payment
Going concern	July 1, 2012	June 30, 2027	$ 66,612,000
Going concern	July 1, 2015	June 30, 2030	12,048,000
Solvency	July 1, 2018	June 30, 2025	58,680,000
			$ 137,340,000

The following table summarizes the established amortization schedules of special payments after adjustment to reflect any gains or losses due to the going concern and solvency valuation results and before reflecting amendments to *Ontario Regulation 178/11.*

				Present Value as of July 1, 2017	
Nature of Deficiency	Effective Date	Revised End Date	Revised Annual Special Payment	For Going Concern Valuation	For Solvency Valuation
Going concern	July 1, 2012	June 30, 2027	$ 32,448,000	$ 250,151,000	$ 232,642,000
Going concern	July 1, 2015	June 30, 2030	12,048,000	112,276,000	86,380,000
Solvency	July 1, 2018	June 30, 2025	139,788,000	N/A	864,550,000
			$ 184,284,000	$ 362,427,000	$ 1,183,572,000

The following table summarizes the amortization schedules of special payments after application of the amended Stage Two solvency relief measures under the seven-year amortization option, which the University has elected. In accordance with the Regulation 350/16, the University will fund 25% of the solvency deficiency, if any, over 7 years, commencing July 1, 2018 and also make interest only contributions on 75% of the balance of the deficit with adjustment for the same period. The following table summarizes the amortization schedules of special payments after the aforementioned adjustments

				Present Value as of July 1, 2017	
Nature of Deficiency	Effective Date	Revised End Date	Revised Annual Special Payment	For Going Concern Valuation	For Solvency Valuation
Going concern	July 1, 2012	June 30, 2027	$ 32,448,000	$ 250,151,000	$ 232,642,000
Going concern	July 1, 2015	June 30, 2030	12,048,000	112,276,000	86,380,000
Solvency	July 1, 2018	June 30, 2025	21,253,000	N/A	131,439,000
			$ 65,749,000	$ 362,427,000	$ 450,461,000

Development of Minimum Required University Contribution

The table below presents the development of the minimum required University contribution for each of the plan years 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 as a percentage of pensionable earnings.

	July 1, 2017 to June 30, 2018	July 1, 2018 to June 30, 2019	July 1, 2019 to June 30, 2020
University current service cost	$ 116,082,000	$ 120,704,000	$ 125,510,000
Special payments toward amortizing unfunded liability	44,496,000	44,496,000	44,496,000
Special payments toward amortizing solvency deficiency	-	21,253,000	21,253,000
Required application of excess surplus	-	-	-
Permitted application of surplus	-	-	-
Minimum Required University Contribution, Prior to Application of PYCB	**$ 160,578,000**	**$ 186,453,000**	**$ 191,259,000**
Permitted application of PYCB	-	-	-
Minimum Required University Contribution	**$ 160,578,000**	**$ 186,453,000**	**$ 191,259,000**

Development of Maximum Eligible University Contribution

The table below presents the development of the maximum eligible University contribution for each of the plan years covered by this report.

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 as a percentage of pensionable earnings.

	July 1, 2017 to June 30, 2018	**July 1, 2018 to June 30, 2019**	**July 1, 2019 to June 30, 2020**
University current service cost	$ 116,082,000	$ 120,704,000	$ 125,510,000
Greater of the Unfunded liability and the hypothetical wind up deficiency/solvency deficiency	3,126,579,000	-	-
Required application of excess surplus	-	-	-
Maximum Eligible University Contribution	**$ 3,242,661,000**	**$ 120,704,000**	**$ 125,510,000**

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 eligible and that any regulatory requirements are considered.

Section 6: Actuarial Certificate

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

Canada Revenue Agency Registration Number: 0312827
Provincial Registration Number: 0312827

Opinion

This actuarial certification forms an integral part of the actuarial valuation report for the Plan as at July 1, 2017. We confirm that we have prepared an actuarial valuation of the Plan as at July 1, 2017 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, 2020.

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.

Allan Shapira, FCIA, FSA
Partner

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Partner

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November 2017

Appendix A: Assets

Asset Data

The Plan's assets are held by State Street Trust Company. 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 provided by the University as at July 1, 2017. For comparison purposes, the composition at the previous valuation date of July 1, 2014 is also shown.

	July 1, 2017	**July 1, 2014**
Fixed-income	30.7%	27.3%
Canadian equities	9.9%	14.5%
U.S. equities	19.9%	10.5%
International equities	14.8%	0.0%
Emerging market equity	10.0%	0.0%
Global equity	5.0%	0.0%
Non-North American equity	0.0%	21.4%
Other	9.7%[1]	26.3%[2]
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 May 25, 2017 and is as follows:

	Minimum	**Target**	**Maximum**
Fixed income	20.0%	40.0%	60.0%
Canadian equity	5.0%	10.0%	15.0%
U.S. equity	15.0%	20.0%	25.0%
International equity	10.0%	15.0%	20.0%
Emerging market equity	5.0%	10.0%	15.0%
Global equity	0.0%	5.0%	10.0%
Other[1]	0.0%	0.0%	15.0%
		100.0%	

[1] Includes cash, money market securities, real return bonds, absolute return bonds, and commodities
[2] Includes absolute return, private equity, real assets and cash

Reconciliation of Changes in Market Value of Assets

The table below reconciles changes in the market value of assets between July 1, 2014 and July 1, 2017.

	July 1, 2014 to June 30, 2015	July 1, 2015 to June 30, 2016	July 1, 2016 to June 30, 2017
Market Value of Assets, Beginning of Plan Year	**$3,618,779,000**	**$4,073,393,000**	**$4,131,365,000**
Contributions During Plan Year			
Member	$ 60,217,000	$ 63,894,000	$ 66,727,000
University current service cost	98,604,000	101,658,000	108,716,000
University special payments	66,612,000	78,660,000	78,660,000
Total	**$ 225,433,000**	**$ 244,212,000**	**$ 254,103,000**
Benefit Payments During Plan Year			
Non-retired members[1]	$ 21,720,000	$ 28,220,000	$ 33,763,000
Retired members	181,539,000	188,311,000	197,074,000
Total	**$ 203,259,000**	**$ 216,531,000**	**$ 230,837,000**
Transfers-In During Plan Year	**$ 3,566,000**	**$ 2,269,000**	**$ 2,563,000**
Fees/Expenses			
Investment fees/expenses	$ 34,302,000	$ 38,084,000	$ 38,034,000
Non-investment fees/expenses	2,849,000	3,519,000	3,280,000
Total	**$ 37,151,000**	**$ 41,603,000**	**$ 41,314,000**
Investment Income	**$ 466,025,000**	**$ 69,625,000**	**$ 582,336,000**
Market Value of Assets, End of Plan Year	**$4,073,393,000**	**$4,131,365,000**	**$4,698,216,000**
Rate of return, net of fees/expenses	11.8%	0.7%	13.1%

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, 2017. 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 years of credited service from July 1, 2014. This test also revealed any members who accrued less than 3 years of credited service;
- A reconciliation of pensionable earnings against the corresponding amounts provided for the last valuation to identify any unusual increases or decreases; and
- A reconciliation of inactive member benefit amounts against the corresponding amounts provided for the last valuation to ensure consistency of data.

For salary increases as of July 1, 2017 that were not reflected in the data provided due to timing of collective bargaining, an estimate was used for valuation purposes based on guidance provided by the University.

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, 2017 with the number of members as of July 1, 2014 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, 2014	**9,468**	**5,425**	**2,864**	**191**	**17,948**
Changes due to:					
New entrants	2,775	-	-	-	2,775
Retirement					
Immediate pension	(662)	786	(117)	(7)	-
Lump sum	(66)	-	(42)	(9)	(117)
Termination					
Pending	(3)	-	-	3	-
Deferred vested	(768)	-	784	(16)	-
Lump sum	(481)	-	(276)	(1)	(758)
Death					
No further benefits	-	(354)	-	-	(354)
Surviving beneficiary	(6)	(199)	(5)	-	(210)
Lump sum	(11)	(5)	(9)	(1)	(26)
New beneficiary					
Surviving beneficiary	-	210	-	-	210
Marriage breakdown spouse	-	1	-	-	1
Data correction	1	3	(12)	(6)	(14)
Net change	779	442	323	(37)	1,507
Members, July 1, 2017	**10,247**	**5,867**	**3,187**	**154**	**19,455**

Active and Disabled Members

	July 1, 2017	July 1, 2014
Number	10,247	9,468
Average age	47.3	47.6
Average Years of Credited Service	11.7	12.1
Average Age at Hire	35.6	35.4
Average Salary	$ 102,701	$ 96,862
Proportion female	56.5%	55.1%

Retirees and Beneficiaries

	July 1, 2017	July 1, 2014
Number – Lifetime benefit	5,867	5,425
Number – Bridge benefit	8	75
Average age- Lifetime benefit	76.3	75.7
Average age – Bridge benefit	64.5	63.4
Average Monthly Benefit – Lifetime benefit	$ 2,911	$ 2,772
Average Monthly Benefit – Bridge benefit	$ 308	$ 314
Proportion female	53.9%	53.1%

Deferred Vested Members

	July 1, 2017	July 1, 2014
Number	3,187	2,864
Average age	51.6	50.4
Average Monthly Benefit	$ 531	$ 470
Proportion female	54.0%	53.7%

Active and Disabled Membership Distribution

The following table provides a detailed summary of the active and disabled membership at the valuation date by years of credited service and by age group.

Age	< 5	5–10	10–15	15–20	20–25	25–30	>=30	Total
< 30	501	36						537
	$ 61,943	$ 71,165						$ 62,561
30–35	624	299	34					957
	$ 79,624	$ 79,366	$ 67,510					$ 79,113
35–40	693	466	281	46				1,486
	$ 85,439	$ 96,752	$ 88,239	$ 80,085				$ 89,351
40–45	489	423	326	197	6			1,441
	$ 90,033	$ 103,877	$ 114,662	$ 99,154	$ 81,239			$ 100,879
45–50	349	308	394	315	73	29		1,468
	$ 88,217	$ 102,906	$ 118,539	$ 126,051	$ 108,106	$ 81,917		$ 108,420
50–55	242	253	310	308	144	159	45	1,461
	$ 86,155	$ 97,960	$ 114,795	$ 124,208	$ 137,640	$ 98,334	$ 86,195	$ 108,700
55–60	179	198	247	252	153	238	189	1,456
	$ 90,023	$ 98,397	$ 103,420	$ 124,098	$ 139,342	$ 125,500	$ 90,270	$ 110,346
60–65	88	107	128	172	78	173	235	981
	$ 105,321	$ 103,085	$ 104,473	$ 122,208	$ 131,771	$ 141,941	$ 123,579	$ 120,862
>=65	27	34	54	64	34	80	167	460
	$ 100,570	$ 121,498	$ 125,174	$ 144,485	$ 141,266	$ 136,880	$ 166,569	$ 147,232
Total								
Count	3,192	2,124	1,774	1,354	488	644	671	10,247
Average Pensionable Earnings	$ 82,609	$ 97,194	$ 108,477	$ 120,177	$ 132,377	$ 121,848	$ 125,212	$ 102,701

Retired/Deferred Vested Membership Distribution

The following table provides a detailed summary of the retirees and beneficiaries and deferred vested members membership at the valuation date by age group.

Age	Retirees and Beneficiaries	Deferred Vested Members
< 50	10	1,403
	$ 1,694	$ 372
50–55	7	582
	$ 1,043	$ 621
55–60	57	526
	$ 1,290	$ 756
60–65	415	676[1]
	$ 2,684	$ 611
65–70	1,067	
	$ 2,654	
70–75	1,287	
	$ 3,451	
75–80	1,112	
	$ 3,329	
>=80	1,912	
	$ 2,560	
Total		
Count	5,867	3,187
Average Monthly Lifetime Pension	$ 2,911	$ 531

[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, 2017	July 1, 2014
Economic Assumptions		
Discount rate	5.55% per year	5.75% per year
Increase in consumer price index	2.00% per year	Same
Cost-of-living adjustment	1.50% per year	Same
Increase in merit and promotion	2.00% per year	Same
Increases in pensionable earnings		
Active members	4.00% per year	Same
Disabled and leave of absence members	2.75% per year	4.00% per year
Increases in year's maximum pensionable earnings ("YMPE")	2.75% per year	Same
Increases in maximum pension limit	\$2,914.44 in 2017; then 2.75% per year	\$2,770.00 in 2014; then 2.75% per year
Interest on member contributions	2.50% per year	Same
Passive investment expenses	0.05% per year[1]	Reflected in discount rate
Non-investment expenses	0.07% per year[1]	Reflected in discount rate
Margin for adverse deviation	0.12% per year[1]	Reflected in discount rate
Demographic Assumptions		
Mortality table	2014 Canadian Public Sector Pensioners' Mortality Table, with mortality improvements scale CPM-B (sex-distinct rates)	Same
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

[1] Taken into account in discount rate assumption

	July 1, 2017	July 1, 2014
Demographic Assumptions (Cont'd)		
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%	Not applicable
Lump sum transfer value rate	2.50% per year[1]	Not applicable
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

Sample rates used in this valuation are shown as rates per 1000 lives in the following table:

Present Age	Rates
20	100
21	100
22	100
23	100
24	100
25	100
26	90
27	80
28	71
29	63
30	56
31	50
32	45
33	40
34	36
35	32
36	30
37	28
38	26
39	24
40	22
41	21
42	20
43	19
44	18

Present Age	Rates
45	17
46	16
47	15
48	14
49	13
50	12
51	11
52	10
53	9
54	8

Justification of Actuarial Assumptions and Methods

Margins for Adverse Deviations

Margins for conservatism or provisions for adverse deviation have been built into the going concern assumptions where appropriate.

The margins have been chosen so as to balance the need for financial security for existing Plan members against overly conservative contribution requirements that potentially result in intergenerational inequity among members and unnecessary financial strain on the Plan sponsor.

The actuary has discussed the Plan's experience with the University and compared it to the expected experience. This review indicates that there is a need for use of margins for adverse deviations. The margins for adverse deviations incorporated in the assumptions reflect this review and the University's desire to maintain safety cushions.

The going concern assumptions (the discount rate) include margins for adverse deviations, as noted below. Additional margins from a going concern funding basis are also addressed through the additional special payments required for solvency funding and the additional special payments the University expects to make by continuing its current level of special payments (the combined impact of these two elements is special payments of $34,164,000 per year in excess of the minimum required going concern special payments of $44,496,000).

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	5.79%
Non-investment expenses	(0.07)%
Passive investment expenses	(0.05)%
Margin for adverse deviations	(0.12)%
Discount Rate	**5.55%**

Increase in Consumer Price Index ("CPI")

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

Real Wage Growth

The real wage growth assumption reflects our best estimate of future increases, which partially takes into account the historical real wage growth of approximately 0.50% over the last 30 years.

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 YMPE

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

The assumed increase in the YMPE reflects the assumed rate of inflation plus the real wage 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% 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 real wage increase assumption.

Interest on Member Contributions

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

Expenses

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

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. A generational projection scale, CPM-B, was also developed to allow for improvements in mortality after 2014. The continued use of this mortality table and projection scale are considered reasonable. We have not made any adjustments for pension size.

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 option.

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, 2017	July 1, 2014
Economic Assumptions		
Discount rate		
Transfer value basis —*Without indexation*	2.30% per year for 10 years; 3.30% per year thereafter	2.80% per year for 10 years; 4.20% per year thereafter
Annuity purchase basis —*Without indexation*	2.90% per year	3.10% per year
Duration used to determine annuity purchase basis without indexation	11.66 per year	Not applicable
Transfer value basis —*With indexation*	1.60% per year for 10 years; 2.00% per year thereafter	1.70% per year for 10 years; 2.40% per year thereafter
Annuity purchase basis —*With indexation*	0.65% per year	0.55% per year
Income Tax Act dollar limit	$2,914.44 per year	$2,770.00 per year
Blended rate used to determine solvency special payments	2.80% per year	3.00% per year
Demographic Assumptions		
Mortality table[1]	2014 Canadian Pensioners' Mortality Table (Combined), with mortality improvements scale CPM-B (sex-distinct rates)	UP94 Mortality Table, with fully generational mortality improvements using scale AA (sex-distinct rates)
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

[1] No preretirement mortality was applied

	July 1, 2017	July 1, 2014
Demographic Assumptions (Cont'd)		
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 and Disabled 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	The hypothetical wind up valuation results include the value of future escalated adjustments (future indexation) in the postretirement period and the preretirement period as provided for in the plan

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 = 1.44% + 0.90% **= 2.34% (rounded to 2.30%) per year**
Solvency lump-sum discount rate thereafter	= V122544[1] + 0.5 x (V122544[1] – V122542[1]) + 90 bps = 2.07% + 0.5 x (2.07% – 1.44%) + 0.90% **= 3.29% (rounded to 3.30%) per year**
Solvency annuity purchase discount rate	= V39062 + Duration Adjustment = 2.07% + 0.82% **= 2.89% (rounded to 2.90%) per year**

We have set the aforementioned assumptions based on guidance prepared by the CIA Committee on Pension Plan Financial Reporting ("PPFRC") in the Educational Note Assumptions for Hypothetical Wind Up and Solvency Valuations with Effective Dates Between June 30, 2017 and December 30, 2017 ("CIA Guidance") released on August 9, 2017.

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, 2017.

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 *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 unsmoothed 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

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 through 9

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.

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

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.

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 greater of: (i) two times the member's contributions with Credited Interest; and (ii) 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 and provided the member has not attained early retirement age).

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):

(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
7.70%[1] of the member's salary up to the CPP maximum salary plus 9.50%[2] of the member's salary in excess of the CPP maximum salary, up to the maximum salary recognized under the Plan.

Academic Staff, Librarians and Research Associates
7.15% of the member's salary up to the CPP maximum salary plus 9.50% of the member's salary in excess of the CPP maximum salary, up to the maximum salary recognized under the Plan.

1 7.15% for CUPE 2484; 6.80% for IBEW Local 353 and Unifor Local 2003
2 8.40% for IBEW Local 353 and Unifor Local 2003

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.
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 to a maximum salary of $161,000 for academic staff, librarians and research associates, a maximum salary of $158,000 for administrative staff.
University Year	The period of 12 consecutive months commencing on July 1.

A copy of a letter from the University 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 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 eligible 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 university'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 eligible 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 eligible 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 eligible 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 eligible in a given fiscal year, university 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 cost; plus
  - Special payments toward amortizing any unfunded liability over 15 years beginning no later than 12 months 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 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); 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.
- **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.
- 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 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 surplus/(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 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 15 years beginning no later than 12 months 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 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 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 solvency funding relief or the methodology may be somewhat different
- The **surplus/(unfunded liability)** is the difference between the actuarial value of assets and the sum of the going concern liabilities and the PYCB.
- 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 cost to determine the university current service cost. The total current service cost 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, 2017, 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, 2017;
- 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.

Name (print) of Authorized Signatory	Title
Signature	Date

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