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THE COLLEGES OF APPLIED ARTS AND TECHNOLOGY PENSION PLAN

REPORT ON THE ACTUARIAL VALUATION FOR FUNDING PURPOSES AS AT JANUARY 1, 2016

MARCH 2016

Financial Services Commission of Ontario and
Canada Revenue Agency Registration Number: 0589895

MARSH & McLENNAN COMPANIES

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

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

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

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

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

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Introduction

To The Board of Trustees of the CAAT Pension Plan

At the request of the Board of Trustees of The Colleges of Applied Arts and Technology Pension Plan (the "Board"), we have conducted an actuarial valuation of The Colleges of Applied Arts and Technology Pension Plan (the "Plan") as at the valuation date, January 1, 2016. We are pleased to present the results of the valuation.

Purpose

The purpose of this valuation is to determine:

- The funded status of the Plan as at January 1, 2016 on going concern, hypothetical wind-up, and solvency bases; and
- The required contributions from 2016, in accordance with the *Pension Benefits Act (Ontario)* ("the Act").

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

In accordance with Section 14 of the regulations to the *Pension Benefits Act (Ontario)*, the next actuarial valuation of the Plan will be required as at a date not later than January 1, 2019, or as at the date of an earlier amendment to the Plan that would have a material impact on the valuation results.

Terms of Engagement

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

- We have not reflected a margin for adverse deviations in the going concern valuation.

- We have reflected the Board's decisions for determining the solvency financial position, summarized as follows:
  - The same Plan wind-up scenario was hypothesized for both hypothetical wind-up and solvency valuations.
  - Certain excludable benefits were excluded from the solvency liabilities.
  - The solvency financial position was determined on a market value basis.
  - The solvency deficiency, as defined in the Regulations to the *Pension Benefits Act (Ontario),* has been specified to be zero in accordance with Section 1.3.1(3) of the Regulations.

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

Events since the Last Valuation at January 1, 2015

Pension Plan

This valuation reflects the provisions of the Plan as at January 1, 2016. The Plan's benefit provisions have not been amended since the date of the previous valuation, and we are not aware of any pending definitive or virtually definitive amendments that would have a material impact on the valuation results. The Plan provisions are summarized in Appendix F.

The Plan is fully funded on a going-concern basis as of January 1, 2016. Since the Plan provides for indexation adjustments in respect of post-2007 service that are contingent upon the funded status of the Plan, we have made an allowance in the Plan's actuarial liability for those adjustments that may occur prior to the filing of the next expected actuarial valuation (January 1, 2019), i.e. at January 1, 2017, 2018 and 2019.

Assumptions

We have made changes to the going concern valuation assumptions since the previous valuation, as summarized below. All other assumptions and methods are unchanged from the previous valuation.

	Current valuation	**Previous valuation**
Discount rate:	5.70%	5.80%
Interest on member contributions	2.20%	2.30%
Retirement rates (active members):	4.9% per year prior to unreduced age, 14.8% per year on or after unreduced age, revised age-related table at ages 65 to 71	3.1% per year prior to unreduced age, 16% per year on or after unreduced age, age-related table at ages 65 to 70
Termination rates:	Service-based table	Age-related table

	Current valuation	Previous valuation
Mortality rates:	Pre-Retirement 55% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ) Post-Retirement 105% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ)	Pre and Post-Retirement 95% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ)
Basis used to determine lump sums	Non-indexed interest rates 1.9% per year for 10 years, 3.6% per year thereafter Partially indexed interest rates 1.4% per year for 10 years, 2.2% per year thereafter	Non-indexed interest rates 2.4% per year for 10 years, 3.7% per year thereafter Partially indexed interest rates 1.6% per year for 10 years, 2.1% per year thereafter
Rate of part-time service accrual:	Assume same rate of service accrual as previous year	0.5 years

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

The hypothetical wind-up and solvency assumptions have been updated to reflect market conditions at the valuation date, and to exclude grow-in benefits pursuant to the Board's election to opt out of providing grow-in benefits pursuant to Section 74.1 of the Act. A summary of the hypothetical wind-up and solvency methods and assumptions is provided in Appendix D.

Regulatory Environment and Actuarial Standards

At its meeting on June 9, 2015, the Actuarial Standards Board (ASB) decided to promulgate the use of the following mortality table with respect of the computation of pension commuted values ("CIA CV Standard"), effective October 1, 2015: *Mortality rates equal to the 2014 Canadian Pensioners Mortality Table (CPM2014) combined with mortality improvement scale CPM Improvement Scale B (CPM-B)*. The Regulations to the *Pension Benefits Act (Ontario)* were amended effective December 10, 2015 for the CIA CV Standard. The change affects the mortality assumption used to value the solvency and wind-up liabilities for benefits assumed to be settled through a lump sum transfer. It also affects the mortality assumption used to determine the commuted values payable upon termination for members assumed to elect a lump-sum transfer under the going-concern basis. The financial impact of the change in the CIA CV Standard was already reflected in the previous actuarial valuation on a going-concern basis and is reflected on a solvency and hypothetical wind-up basis for this valuation.

Subsequent Events

In November 2015, the Plan entered into an agreement with the Royal Ontario Museum (ROM) for the ROM to become a participating employer of the Plan. In December 2015, ROM plan members voted in favour of joining the Plan, and active ROM members began earning benefits in the Plan as of January 1, 2016. Upon regulatory approval from the Financial Services Commission of Ontario, assets and past service liabilities under the ROM pension plan will be

merged into the Plan. Our valuation does not take in to account the impact of this plan merger, the benefits earned by ROM employees in the Plan on and after January 1, 2016, nor the contributions to be made by ROM and its employees in the Plan on and after January 1, 2016. The merger is not expected to materially impact the financial position of the Plan.

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

Impact of Case Law

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

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Valuation Results – Going Concern

Financial Status – Current Valuation

A going concern valuation compares the value of Plan assets, including expected future contributions, and the present value of expected future benefits in respect of accrued and future service for the current membership, assuming the Plan will be maintained indefinitely.

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

(000's)	01.01.2016	01.01.2015
Assets		
Market value of assets	$8,592,300	$7,964,800
Asset smoothing adjustment	($558,900)	($579,000)
Smoothed value of assets	$8,033,400	$7,385,800
Present value of future contributions		
▪ basic contributions	$3,263,500	$2,949,300
▪ supplemental contributions	$1,229,300	$1,156,400
Actuarial value of assets	$12,526,200	$11,491,500
Going concern funding target		
Present value of accrued benefits for:		
▪ active members	$3,953,800	$3,882,700
▪ pensioners	$4,074,700	$3,857,200
▪ survivors	$213,400	$206,400
▪ deferred pensioners	$94,200	$84,400
▪ terminations in progress	$8,000	$3,000
Total liabilities for accrued benefits	$8,344,100	$8,033,700
Present value of future benefits for active members	$2,978,100	$2,665,700
Provision for indexation adjustments relating to post-2007 service to the year of the next required valuation	$24,900	$19,100
Total actuarial liability	$11,347,100	$10,718,500
Funding excess (shortfall)	$1,179,100	$773,000

The going concern funding target is based on best-estimate assumptions and does not include a provision for adverse deviations.

Reconciliation of Financial Status (000's)

Funding excess (shortfall) as at previous valuation		$773,000
Interest on funding excess (shortfall) at 5.80% per year		$44,800
Recognition of additional year of supplemental contributions		$65,400
Expected funding excess (shortfall)		$883,200
Net experience gains (losses)		
• Investment return	$139,000	
• Increases in pensionable earnings/YMPE	$45,400	
• Termination experience	$15,600	
• Inflation experience	$13,500	
• Mortality experience	$5,700	
• Retirement experience	($18,100)	
• Present value of future contribution in excess of future benefits for new entrants	$36,200	
Total experience gains (losses)		$237,300
Impact of changes in assumptions		
• Withdrawal assumption	$700	
• Retirement assumption	($32,100)	
• Mortality assumptions	$198,300	
• Discount rate	($144,300)	
Total assumption changes impact		$22,600
Impact of extension of indexing in respect of post-2007 service to Jan. 1, 2019		($9,500)
Data corrections and valuation refinements		($4,500)
Impact of asset smoothing		$53,800
Net impact of other elements of gains and losses		($3,800)
Funding excess (shortfall) as at current valuation		$1,179,100

Reference Valuation

Pursuant to Section 4(2.2) of the Regulations to the *Act,* a going-concern valuation of the Plan using an actuarial cost method that is not a benefit allocation method, must test the present value of minimum required contributions under the Current Valuation against a valuation prepared ("the Reference Valuation") using a benefit allocation method (projected unit credit in the case of this valuation).

However, pursuant to Section 47.7.1 of the Regulations to the *Act*, the minimum required contribution test under Section 4(2.2)(b) does not apply to the Plan for a report with a valuation date between January 1, 2012 and January 1, 2018. Consequently, the results below are for information purposes only.

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

(000's)	01.01.2016	01.01.2015
Assets		
Market value of assets	$8,592,300	$7,964,800
Asset smoothing adjustment	($558,900)	($579,000)
Smoothed value of assets	$8,033,400	$7,385,800
Going concern funding target		
Present value of accrued benefits for:		
▪ active members	$3,953,800	$3,882,700
▪ pensioners	$4,074,700	$3,857,200
▪ survivors	$213,400	$206,400
▪ deferred pensioners	$94,200	$84,400
▪ terminations in progress	$8,000	$3,000
▪ provision for indexation adjustments relating to post-2007 service to the year of the next required valuation	$24,200	$18,500
Total liabilities for accrued benefits	$8,368,300	$8,052,200
Funding excess (shortfall)	($334,900)	($666,400)

The actuarial assumptions used for the Reference Valuation are identical to those used under the going-concern valuation. The going concern funding target in the Reference Valuation is based on best estimate assumptions and does not include a provision for adverse deviations.

Current Service Cost

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

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

(000's)	2016	2015
Total current service cost	$253,300	$238,500
Current service cost expressed as a percentage of members' pensionable earnings	15.14%	15.06%

Discount Rate Sensitivity

The following table summarizes the effect of using a discount rate which is 1% lower than that used in the valuation on the total liability for future benefits, total liability for accrued benefits (including the provision for conditional indexation until the next valuation report is filed), the current service cost and the present value of future contributions:

Scenario (000's)	Valuation Basis	Reduce Discount Rate by 1%
Total liability for future benefits	$11,347,100	$13,417,600
Total liability for accrued benefits	$8,368,300	$9,539,400
Current Service Cost	$253,300	$311,000
Present value of future contributions		
▪ basic contributions	$3,263,500	$3,542,900
▪ supplemental contributions	$1,229,300	$1,315,200

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Valuation Results – Hypothetical Wind-up

Financial Position

When conducting a hypothetical wind-up valuation, we determine the relationship between the respective values of the Plan's assets and its liabilities assuming the Plan is wound up and settled on the valuation date, assuming benefits are settled in accordance with the Act and under circumstances producing the maximum wind-up liabilities on the valuation date.

There are significant difficulties in establishing appropriate assumptions for purposes of conducting a wind-up valuation for this Plan due to the size of the liabilities expected to be settled through the purchase of annuities relative to the size of the Canadian group annuity market, and the contractual cost of living adjustments provided to these members on their benefits.

The estimated cost of purchasing annuities has been determined in accordance with the Canadian Institute of Actuaries Educational Note Supplement: *Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates from December 31, 2015, to December 30, 2016*. The estimated cost is based on the cost of purchasing annuities of significantly smaller size that would not be affected by the capacity constraints of the Canadian group annuity market. The actual cost of setting the Plan benefits could differ, perhaps significantly, from the costs estimated on this basis.

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

(000's)	01.01.2016	01.01.2015
Assets		
Market value of assets	$8,592,300	$7,964,800
Termination expense provision	($20,000)	($20,000)
Wind-up assets	$8,572,300	$7,944,800
Present value of accrued benefits for:		
▪ active members	$6,098,300	$5,823,400
▪ pensioners	$5,638,500	$5,153,700
▪ survivors	$295,300	$275,800
▪ deferred pensioners	$142,700	$124,100
▪ terminations in progress	$12,100	$4,100
Total wind-up liability	$12,186,900	$11,381,100
Wind-up excess (shortfall)	($3,614,600)	($3,436,300)

The wind-up liabilities for active members as of January 1, 2016 reflect the Board's election to opt out of providing grow-in benefits pursuant to Section 74.1 of the Act.

Wind-up Incremental Cost

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

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

(000's)	01.01.2016	01.01.2015
Number of years covered by report	3 years	3 years
Total hypothetical wind-up liabilities at the valuation date (A)	$12,186,900	$11,381,100
Present value of projected hypothetical wind-up liability at the next required valuation (including expected new entrants) plus benefit payments until the next required valuation (B)	$13,700,100	$12,895,000
Hypothetical wind-up incremental cost (B – A)	$1,513,200	$1,513,900

The incremental cost is not an appropriate measure of the contributions that would be required to maintain the financial position of the Plan on a hypothetical wind-up basis unchanged from the valuation date to the next required valuation date, if actual experience is exactly in accordance with the going concern valuation assumptions. This is because it does not reflect the

fact that the expected return on plan assets (based on the going concern assumptions) is greater than the discount rate used to determine the hypothetical wind-up liabilities.

Also note that the above incremental cost at January 1, 2015 does not take into account the impact of the change in the mortality table to be used for the computation of pension commuted values as described in the introduction of this report.

Discount Rate Sensitivity

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

Scenario (000's)	Valuation Basis	Reduce Discount Rate by 1%
Total hypothetical wind-up liability	$12,186,900	$14,024,200

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Valuation Results – Solvency

Overview

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

Exceptions	Reflected in valuation based on the terms of engagement
The circumstance under which the Plan is assumed to be wound up could differ for the solvency and hypothetical wind-up valuations.	The same circumstances were assumed for the solvency valuation as were assumed for the hypothetical wind-up valuation.
Certain benefits can be excluded from the solvency financial position. These include: (a) any escalated adjustment (e.g. indexing), (b) certain plant closure benefits, (c) certain permanent layoff benefits, (d) special allowances other than funded special allowances, (e) consent benefits other than funded consent benefits, (f) prospective benefit increases, (g) potential early retirement window benefit values, and (h) pension benefits and ancillary benefits payable under a qualifying annuity contract.	Indexing was excluded from the solvency liabilities shown in this valuation.
The financial position on the solvency basis needs to be adjusted for any Prior Year Credit Balance.	Not applicable.
The solvency financial position can be determined by smoothing assets and the solvency discount rate over a period of up to 5 years.	Smoothing was not used.
The benefit rate increases coming into effect after the valuation date can be reflected in the solvency valuation.	Not applicable.
Section 1.3.1(3) of the Regulations to the Act state that a valuation report prepared on certain pension plans, including the Plan with an effective date on or after December 31, 2010 may specify the solvency deficiency to be a stated amount (not to be less than zero)	The solvency deficiency has been specified to be zero.

Financial Position

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

(000's)	01.01.2016	01.01.2015
Assets		
Market value of assets	$8,592,300	$7,964,800
Termination expense provision	($20,000)	($20,000)
Net assets	$8,572,300	$7,944,800
Total hypothetical wind-up liabilities	$12,186,900	$11,381,100
Value of excluded benefits	($1,455,900)	($1,457,300)
Liabilities on a solvency basis	$10,731,000	$9,923,800
Surplus (shortfall) on a market value basis	($2,158,700)	($1,979,000)
Solvency ratio	0.80	0.80
Transfer ratio	0.70	0.70

As permitted under Section 1.3.1(3) of the regulations to the *Pension Benefits Act (Ontario)*, the solvency deficiency may be specified to be a stated amount, not to be less than zero. Consequently, the solvency deficiency as at January 1, 2016 has been specified to be zero.

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Funding Requirements

Scheduled Contributions

Members must contribute an amount equal to the sum of the following in 2016:

- 11.20% of pensionable earnings up to the YMPE, plus
- 14.80% of pensionable earnings in excess of the YMPE.

Consistent with the Plan's Funding Policy, the total scheduled member contribution rate consists of a 8.20%/11.80% basic contribution rate and a supplemental contribution rate of 3% of pensionable earnings. Employers are required to match member scheduled contributions.

The table below summarizes the estimated total contributions (by members and employers) for the year, in comparison to the estimated total contributions as of the last valuation:

(000's)	2016	2015
Members' contributions	$209,350	$198,000
Employers' contributions	$209,350	$198,000
Total contributions	$418,700	$396,000
Payroll for year (excludes LTD's)[1]	$1,672,600	$1,583,900
Total contributions as a % of payroll	25.03%	25.00%

[1] Annual member pensionable earnings capped at maximum allowable for accruing benefits in the Plan under the Income Tax Act.

As illustrated in Section 2, the Plan is fully funded on a going-concern basis under the Current Valuation. In addition, the solvency deficiency has been specified to be zero. Consequently, no additional special payments are required to be made in addition to the scheduled contributions.

The *Act* prescribes the minimum contributions that members and employers must make to the Plan. The minimum contributions in respect of a defined benefit component of a pension plan are comprised of going concern current service cost and special payments to fund any going concern or solvency shortfalls. However, pursuant to Section 47.7.1 of the Regulations to the *Act*, the minimum required contribution test under Section 4(2.2)(b) does not apply to the Plan for a report with a valuation date between January 1, 2012 and January 1, 2018.

In our opinion, the contributions being made to the Plan are sufficient to meet the requirements of the *Act*.

Other Considerations

Differences Between Valuation Bases

There is no provision in the Plan's scheduled contributions to fund the hypothetical wind-up deficit. Consequently, the Plan is likely to remain under-funded on a wind-up basis unless there are strong investment returns and/or significant increases in long-term nominal and real interest rates.

Payment of Benefits

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

Additional restrictions are imposed when:

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

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

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

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Actuarial Opinion

In our opinion, for the purposes of the valuations,

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

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

Paul Christiani
Fellow of the Society of Actuaries
Fellow of the Canadian Institute of Actuaries

March 12, 2016
Date

Manuel Monteiro
Fellow of the Society of Actuaries
Fellow of the Canadian Institute of Actuaries

March 12, 2016
Date

APPENDIX A

Prescribed Disclosure

Definitions

The Act defines a number of terms as follows:

Defined Term	Description	Result
Transfer Ratio	The ratio of: (a) Solvency Assets minus the lesser of the Prior Year Credit Balance and the minimum required employer contributions until the next required valuation; to (b) the sum of the Solvency Liabilities and liabilities for benefits, other than benefits payable under qualifying annuity contracts that were excluded in calculating the Solvency Liabilities.	0.70
Prior Year Credit Balance	Accumulated excess of contributions made to the pension plan in excess of the minimum required contributions (note: only applies if the Company chooses to treat the excess contributions as a Prior Year Credit Balance).	$0
Solvency Assets (000's)	Market value of assets including accrued or receivable income and excluding the value of any qualifying annuity contracts.	$8,592,300
Solvency Asset Adjustment	The sum of:	
	(a) the difference between smoothed value of assets and the market value of assets	$0
	(b) the present value of going concern special payments (including those identified in this report) within 6 years following the valuation date	$0
	(c) the present value of any previously scheduled solvency special payments (excluding those identified in this report)	$0
	(d) the face value of the letter of credit	$0
		$0

Defined Term	Description	Result
Solvency Liabilities (000's)	Liabilities determined as if the plan had been wound up on the valuation date, including liabilities for plant closure benefits or permanent layoff benefits that would be immediately payable if the employer's business were discontinued on the valuation date of the report, but, if elected by the plan sponsor, excluding liabilities for, (a) any escalated adjustment, (b) excluded plant closure benefits, (c) excluded permanent layoff benefits, (d) special allowances other than funded special allowances, (e) consent benefits other than funded consent benefits, (f) prospective benefit increases, (g) potential early retirement window benefit values, and (h) pension benefits and ancillary benefits payable under a qualifying annuity contract.	$10,731,000
Solvency Liability Adjustment	The amount by which solvency liabilities are adjusted as a result of using a solvency valuation interest rate that is the average of market interest rates calculated over the period of time used in the determination of the smoothed value of assets.	$0
Solvency Deficiency (000's)	The amount, if any, by which the sum of:	
	(a) the Solvency Liabilities	$10,731,000
	(b) the Solvency Liability Adjustment	$0
	(c) the Prior Year Credit Balance	$0
		$10,731,000
	Exceeds the sum of	
	(d) the Solvency Assets net of estimated termination expenses[2]	$8,572,300
	(e) the Solvency Asset Adjustment	$0
		$8,572,300
	(f)	$2,158,700
	In accordance with Section 1.3.1(3) of the Regulations, the Solvency Deficiency can be specified to be an amount less than (f) above, not to be less than zero	The solvency deficiency has been specified to be $0

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

Timing of Next Required Valuation

In accordance with Section 14 of the regulations to the *Pension Benefits Act (Ontario)*, the next valuation of the Plan would be required as of no later than January 1, 2019, or as at the date of an earlier amendment to the Plan.

Special Payments – Current Valuation

Since there is no going-concern funding shortfall under the Current Valuation, no going-concern special payments are required. Also, since the solvency deficiency has been specified to be zero, no solvency special payments are required.

Pension Benefit Guarantee Fund (PBGF) Assessment

In accordance with Section 37(1.1) of the regulations to the *Pension Benefits Act (Ontario),* the Plan is not subject to assessment by the Pension Benefits Guarantee Fund.

APPENDIX B

Plan Assets

The pension fund is held in trust by the Plan. In preparing this report, we have relied upon the draft auditors' report for 2015 without further audit. Customarily, this information would not be verified by a plan's actuary. We have reviewed the information for internal consistency and we have no reason to doubt its substantial accuracy.

Reconciliation of Market Value of Plan Assets

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

(000's)	2015
January 1	$7,964,803
PLUS	
Members' contributions	$201,319
Company's contributions	$201,319
Service purchases	$9,472
Transfer from other pension plans	$19,961
Investment income	$621,481
	$1,053,552
LESS	
Pensions paid	$372,351
Lump-sums paid	$33,963
Transfer to other pension plans	$0
Administration and investment fees	$19,740
	$426,054
December 31	$8,592,301
Gross rate of return[3]	7.8%
Rate of return net of expenses[4]	7.5%

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

[3] Assuming mid-period cash flows.

[4] Assuming mid-period cash flows.

Investment Policy

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

The plan administrator is solely responsible for selecting the plan's investment policies, asset allocations, and individual investments. The constraints on the asset mix and the actual asset mix at the valuation date are provided for information purposes:

	Investment Policy			Actual Asset Mix as at December 31, 2015
	Minimum	Target	Maximum	
Canadian Equities	6.0%	8.0%	10.0%	7.8%
Global Equities	30.0%	34.0%	40.0%	33.2%
Emerging Market Equities	8.0%	10.0%	12.0%	10.0%
Private Equities	2.0%	5.0%	10.0%	5.5%
Commodities	3.0%	5.0%	7.0%	4.3%
Infrastructure	5.0%	10.0%	15.0%	7.0%
Real Estate	2.0%	5.0%	10.0%	4.9%
Nominal Long Bonds	10.0%	12.0%	30.0%	15.7%
Nominal Universe Bonds	3.0%	5.0%	7.0%	4.8%
Real Return Bonds	4.0%	6.0%	8.0%	6.4%
Cash and Cash Equivalents	0.0%	0.0%	0.0%	0.4%
		100.0%		100.0%

APPENDIX C

Methods and Assumptions – Going Concern

Determining the January 1, 2016 Liabilities

The effective date of the data at this valuation is December 31, 2014 (one year prior to the valuation date). In determining the actuarial liabilities as at January 1, 2016, we first calculated the actuarial liabilities as at January 1, 2015, and then projected the liabilities to January 1, 2016. The one year projection reflected any known as well as anticipated experience during 2015 with respect to benefit payments, contributions, and YMPE growth and inflation. We assumed that salary growth would be consistent with the last valuation assumption. For active members on LTD we reflected the deemed salary increases. We also compared the actual termination and retirement experience with what was expected based on our decrement rates. However, the difference was not significant enough to require special adjustments in the projection. For purposes of this valuation, we believe that this projection process produces results that are within acceptable tolerances from the results that would have been determined using actual membership data (at December 31, 2015).

Valuation of Assets

For this valuation, we have continued to use an adjusted market value method for purposes of determining the actuarial value of the plan assets.

For periods commencing January 1, 2013, investment gains and losses relative to the discount rate are recognized on a linear basis over five years. This method is applied prospectively from January 1, 2013.

Gains and losses incurred prior to January 1, 2013 continue to be recognized using the following approach:

- Fixed income assets were valued at market value; and
- Equity assets were smoothed over 5 years. The equity gain or loss was measured as the difference between actual market index returns (S&P/TSX Composite index for Canadian equities and MSCI World Index for non-Canadian equities) and expected market index returns (Change in CPI + 6%) in each of the 4 years preceding the valuation date

The table below shows the calculation of the gain/(loss) on assets under the smoothing approach for periods commencing January 1, 2013:

($000)	**2013**	**2014**	**2015**
Market value of assets at beginning of year	$6,259,906	$7,127,136	$7,964,803
Net cashflows in the year	$24,815	$48,522	$25,757
Expected return on assets	$363,794	$414,781	$462,706
Expected value of assets at end of year	$6,648,515	$7,590,439	$8,453,266
Actual value of assets at end of year	$7,127,136	$7,964,803	$8,592,301
Gain/(loss)	$478,621	$374,364	139,035
Liability discount rate at the beginning of the year	5.80%	5.80%	$5.80%

The following table shows the calculation of the equity gain/(loss) from 2012 under the prior smoothing approach:

(000's)	**2012**
Canadian Equities	
% at December 31*	14.7%
Actual index return (S&P/TSX Composite)	7.19%
Expected return	6.83%
Actual minus expected return	0.36%
Average market value	$844,710
Gain/(loss)	$3,041
Non-Canadian Equities	
% at December 31	39.1%
Actual index return (MSCI World)	13.96%
Expected return	6.83%
Actual minus expected return	7.13%
Average market value	$2,171,008
Gain/(loss)	$154,793
Total equity gain/(loss)	$157,834

*includes private equity investments

The smoothed value of the assets at January 1, 2016, was derived as follows:

(000's)		
Market value of assets		$8,592,301
LESS		
Total Equity Gain/(Loss)	2012: $157,834 x 20% =	$31,568
	2013: $478,621 x 40% =	$191,448
	2014: $374,364 x 60% =	$224,618
	2015: $139,035 x 80% =	$111,228
		$558,862
Smoothed value of assets		$8,033,439

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

Going Concern Funding Target

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

Current Valuation

For purposes of the Current Valuation, we have continued to use the modified aggregate actuarial cost method. Under this method, the funding target is determined as the present value of benefit cash flows expected to be paid in respect of service accrued prior to the valuation date, plus service expected to accrue to currently active members in the future, based on projected earnings.

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

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

This method does not produce a normal cost in the usual sense. Rather, it determines whether or not the contributions expected to be made in the future by the members and the employers together with the assets of the Plan and investment income thereon are expected to be sufficient to meet the obligations of the Plan.

The present value of future basic contributions has been determined on a closed group basis. The present value of future supplemental contributions has been determined on an open group basis over a 15 year period.

The *funding excess* or *unfunded liability*, as the case may be, is the difference between the actuarial value of assets and the actuarial liability.

Reference Valuation

For purposes of the Reference Valuation, we have continued to use the projected unit credit actuarial cost method. Under this method, the funding target is determined as the present value of benefit cash flows expected to be paid in respect of service accrued prior to the valuation date, based on projected earnings. For each individual Plan member, accumulated contributions with interest are established as a minimum actuarial liability.

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

Under the Reference Valuation, the current service cost is the present value of projected benefits to be paid under the Plan with respect to service expected to accrue during the period until the next valuation.

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

Actuarial Assumptions – Going Concern Basis

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

The table below shows the various assumptions used in the Current Valuation and the Reference Valuation in comparison with those used in the previous valuation.

Assumption	Current valuation	Previous valuation
Discount rate:	5.70%	5.80%
Inflation:	2.00%	2.00%
ITA limit / YMPE increases:	3.00%	3.00%
Pensionable earnings increases:	3.75%	3.75%
Indexing:	1.50%	1.50%
Interest on member contributions:	2.20%	2.30%
Retirement rates (active members):	4.9% per year prior to unreduced age, 14.8% per year on or after unreduced age, revised age-related table at ages 65 to 71 (see below)	3.1% per year prior to unreduced age, 16% per year on or after unreduced age, age-related table at ages 65 to 70 (see below)
Retirement rates (deferred members)	Age 55	Age 55
Retirement rates (LTD members)	Age 65	Age 65
Termination rates:	Service-based table (see below)	Age-related table (see below)
Proportion of terminating members electing a lump sum	80%	80%
Basis used to determine lump sums	Mortality rates CPM2014 mortality table with projection scale CPM-B Non-indexed interest rates 1.9% per year for 10 years, 3.6% per year thereafter Partially indexed interest rates 1.4% per year for 10 years, 2.2% per year thereafter	Mortality rates CPM2014 mortality table with projection scale CPM-B Non-indexed interest rates 2.4% per year for 10 years, 3.7% per year thereafter Partially indexed interest rates 1.6% per year for 10 years, 2.1% per year thereafter

Mortality rates at valuation date:	Pre-Retirement 55% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ) Post-Retirement 105% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ)	Pre and Post-Retirement 95% of the rates of the CPM2014 Public Sector mortality table
Future mortality improvements:	Fully generational using Scale CPM-B	Fully generational using Scale CPM-B
Disability rates:	None	None
Eligible spouse at retirement:	85% of male members and 65% of female members	85% of male members and 65% of female members
Spousal age difference:	Male 3 years older	Male 3 years older
Rate of part-time service accrual	Assume same rate of service accrual as previous year	0.5

The assumptions are best-estimates and do not include a margin for adverse deviations.

Retirement Rates

Retirement rates on or after age 65 are summarized in the following table:

Age	**Retirement Rates - Current Valuation**	**Retirement Rates – Previous Valuation**
65	35%	35%
66	17%	17%
67	17%	17%
68	17%	17%
69	30%	30%
70	50%	100%
71	100%	100%

Termination Rates

Sample rates from the termination assumption are summarized in the following tables:

Termination Rates - Current Valuation

Service	Rate
< 1	5.90%
1	5.15%
2	4.30%
3	3.70%
4	3.20%
5	2.70%
6	2.30%
7	2.00%
8	1.80%
9	1.65%
10	1.55%
11	1.50%
12	1.40%
13	1.30%
14	1.20%
15	1.10%
16	1.05%
17-29	1.00%
30+	0.00%

Termination Rates - Previous Valuation

Age	Rate
20	14.9%
25	9.9%
30	6.9%
35	4.9%
40	2.9%
45	1.8%
50	0.7%
55	0.0%

Pensionable Earnings

The benefits ultimately paid will depend on each member's final average earnings. To calculate the pension benefits payable upon retirement, death or termination of employment, we have taken 2014 earnings and assumed that such pensionable earnings will increase at the assumed rate.

Rationale for Assumptions

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

Discount Rate

We have discounted the expected benefit payment cash flows using the expected investment return on Plan assets. Other bases for discounting the expected benefit payment cash flows may be appropriate, particularly for purposes other than those specifically identified in this valuation report.

The discount rate is comprised of the following:

- A long-term expected return on Plan assets reduced by:
- An implicit provision for expenses determined as the average rate of investment and administrative expenses paid from the fund over the last three years.

The discount rate was developed as follows:

Gross expected return on Plan assets	6.10%
Implicit provision for expenses	(0.40%)
Margin for adverse deviation	0.00%
Net discount rate	5.70%

The long-term expected return on Plan assets was derived based on expected returns for each of the major asset classes based on market conditions at the valuation date and the target asset mix specified in the Plan's investment policy.

The Board has established a detailed funding policy that describes how contributions and benefits (including post-retirement indexation) should be adjusted, depending on the financial position of the Plan. The funding policy also describes the size of the margin to be used in the going-concern valuations of the Plan, again depending on the financial position of the Plan.

Under the funding policy, the margin is used as (1) a mechanism to reduce the frequency and magnitude of adjustments to contribution and benefit levels and (2) to further the goal of equity between different generations of plan members and equity between the employers whose employment size and patterns will evolve differently over time. Although benefit security is a goal of the Sponsors of the Plan, it is less critical than the above factors in determining the size of the margin given the nature of the employers and the very low probability that the Plan would be wound up in the foreseeable future.

Based on the current financial position of the Plan, the funding policy indicates that no margins should be used in the valuation. The rationale for no margins in the current situation is as follows. Current members and employers are already making significant contributions to the Plan. If the going-concern basis is too conservative, it will likely result in the current generation of plan members and employers paying too much for their generation's benefits, with the excess funds generated being at least partly used to subsidize the benefits of subsequent generations. Conversely, if the going-concern basis is too aggressive, it will likely result in the current generation being subsidized by the subsequent generation. This suggests that the most appropriate way to fund the Plan in the current circumstance is to use best estimate assumptions (i.e. no margins for adverse deviations).

In accordance with the funding policy, should the financial position of the Plan improve in the future beyond certain thresholds, a part of the experience gains would be used to reduce contribution levels and to grant any past indexation increases that had been missed. The remaining portion of the gains would be used to create margins for adverse deviations and explicit reserves in the going-concern valuation. In the event of subsequent experience losses, the margins for adverse deviations and explicit reserves would be drawn down and therefore reduce the magnitude of required contribution increases and/or benefit reductions. While the use of margins and reserves in this fashion will likely result in some transfer of wealth between generations when the Plan is well funded, this is considered less important than the goal of reducing the magnitude of contribution and benefit adjustments. The inter-generational equity goal is considered less important in circumstances when the Plan is well funded because such transfers are being borne by members and employers who are benefiting through lower future contributions and/or higher benefits.

Inflation

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

Income Tax Act Pension Limit and Year's Maximum Pensionable Earnings

The assumption is based on the historical average productivity over the last 40 years of 1% per year and the underlying inflation assumption.

Pensionable Earnings

The assumption is based on general wage growth assumptions increased by our best estimate of future merit and promotional increases over general wage growth considering industry averages

Indexing

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

Retirement Rates

The assumption has been updated based on experience over the years 2008 to 2013. LTD members are assumed to retire at age 65.

Termination Rates

The assumption has been updated based on experience over the years 2008 to 2013.

Mortality Rates

The assumption is based on experience over the years 2008 to 2013.

Based on the assumption used, the life expectancy of a retired member age 65 at the valuation date is 22.4 years for males and 24.3 years for females.

Future Mortality Improvements

This assumption is based on rates published by the Canadian Institute of Actuaries in their 2014 research report on Canadian pensioner mortality. There is insufficient experience to develop plan specific mortality improvement rates.

Interest on Member Contributions

The assumption is based on Plan terms and the Government of Canada long bond yields.

Disability Rates

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

Eligible Spouse

The assumption is based on an industry standard for non-retired members. For retired members, the actual marital status is used..

Spousal Age Difference

The assumption is based on an industry standard showing males are typically 3 years older than their spouse.

Proportion of Terminating Members Electing a Lump Sum and Basis Used to Determine Lump Sums

The percentage of terminating active members assumed to elect a lump sum is based on experience over the years 2007 to 2012.

The cost of future lump sums will depend on the level of market interest rates at the time the lump sum is paid and any changes in the applicable actuarial standards for the determination of pension plan commuted values. The assumed cost of future lump sums is based on the average expected level of market interest rates over the period during which lump sums are expected to be paid, taking into account market conditions on the valuation date. We have also assumed that future lump sums elected by eligible plan participants will be calculated using the new mortality basis applicable under the actuarial standards since October 2015.

APPENDIX D

Methods and Assumptions – Hypothetical Wind-up and Solvency

The hypothetical wind-up and solvency liabilities at January 1, 2016 were determined based on a projection of a valuation performed using membership data as of December 31, 2014. Please refer to Appendix C for a description of the methodology.

Hypothetical Wind-up Basis

The Canadian Institute of Actuaries requires actuaries to report the financial position of a pension plan on the assumption that the plan is wound-up on the effective date of the valuation, with benefits determined on the assumption that the pension plan has neither a surplus nor a deficit. For the purposes of the hypothetical wind-up valuation, the plan wind-up is assumed to occur in circumstances that maximize the actuarial liability.

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

No benefits payable on plan wind-up were excluded from our calculations.

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

The value of benefits assumed to be settled through a lump sum transfer is based on the assumptions described in Section 3500 – Pension Commuted Values of the Canadian Institute of Actuaries' Standards of Practice applicable for January 1, 2016.

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

However, there is virtually no data available to provide credible guidance on the cost of a purchase of indexed annuities or annuities for a plan of this size in Canada. The estimated cost of purchasing annuities has been determined in accordance with the Canadian Institute of Actuaries Educational Note Supplement: *Guidance for Assumptions for Hypothetical Wind-Up and Solvency Valuations Update – Effective December 31, 2015, and applicable to Valuations with Effective Dates between December 31, 2015 and December 30, 2016*. The estimated cost is based on the cost of purchasing annuities of significantly smaller size that would not be affected by the capacity constraints of the Canadian group annuity market. The actual cost of setting the Plan benefits could differ, perhaps significantly, from the costs estimated on this basis.

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

The assumptions are as follows:

Form of Benefit Settlement Elected by Member	
Lump sum	70% of active members under age 55 and 50% of active members over age 55 elect to receive their benefit entitlement in a lump sum
Annuity purchase	All remaining members are assumed to elect to receive their benefit entitlement in the form of a deferred or immediate pension. These benefits are assumed to be settled through the purchase of deferred or immediate annuities from a life insurance company
Basis for Benefits Assumed to be Settled through a Lump Sum	
Mortality rates:	100% of the rates of the 2014 Canadian Pensioners Mortality Table (CPM2014) with fully generational improvements using CPM Scale B
Interest rate:	1.9% per year for 10 years, 3.6% per year thereafter
Partially indexed interest rates:	1.4% per year for 10 years, 2.2% per year thereafter
Basis for Benefits Assumed to be Settled through the Purchase of an Annuity	
Mortality rates:	100% of the rates of the 2014 Canadian Pensioners Mortality Table (CPM2014) with fully generational improvements using CPM Scale B
Interest rate:	3.03% per year based on a duration of 11.1 years determined for the liabilities assumed to be settled through the purchase of an annuity.
Partially indexed interest rate:	0.72% per year based on a duration of 11.1 years determined for the liabilities assumed to be settled through the purchase of an annuity
Retirement Age	
Maximum value:	Members are assumed to retire at the age which maximizes the value of their entitlement from the Plan based on the eligibility requirements which have been met at the valuation date
Grow-in:	Grow-in benefits have not been valued, as an election has been made to exclude grow-in benefits for members of the Plan, as permitted for jointly sponsored pension plans per Section 74.1 of the Act
Other Assumptions	
Final average earnings:	Based on actual pensionable earnings over the averaging period
Family composition:	Same as for going concern valuation
Maximum pension limit:	$2,890.00 per year
Termination expenses:	$20,000,000

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

Because the settlement of all benefits on wind-up is assumed to occur on the valuation date and is assumed to be uncontested, the provision for termination expenses does not include custodial, investment management, auditing, consulting and legal expenses that would be

incurred between the wind-up date and the settlement date or due to the terms of a wind-up being contested. Expenses associated with the distribution of any surplus assets that might arise on an actual wind-up are also not included in the estimated termination expense provisions.

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

Actual fees incurred on an actual Plan wind-up may differ materially from the estimates disclosed in this report.

Incremental Cost

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

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

- Members terminate, retire and die consistent with the termination, retirement and mortality rates used for the going concern valuation.
- Pensionable earnings, the Income Tax Act pension limit and the Year's Maximum Pensionable Earnings increase in accordance with the related going concern assumptions.
- Active members accrue pensionable service in accordance with the terms of the Plan.
- To accommodate for new entrants to the Plan, we have added to the projected liability, an amount equal to the liability of new entrants that have joined the Plan since the previous valuation. For each active member whose membership is assumed to terminate, we have assumed a new active member joins the Plan. The demographics and earnings of the new entrants are consistent with the new entrants hired over the past year.
- Cost of living adjustments are consistent with the inflation assumption used for the going concern valuation.

Solvency Basis

In determining the financial position of the Plan on the solvency basis, we have excluded the value of escalated adjustments from the solvency liabilities.

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

APPENDIX E

Membership Data

Analysis of Membership Data

The actuarial valuation is based on membership data as at December 31, 2014 (one year prior to the valuation date), provided by The Colleges of Applied Arts and Technology Pension Plan.

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

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

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

	31.12.2014	31.12.2013
Active Members (including LTD)		
Number	24,604	22,021
Number of members on LTD	502	495
Percentage male	41%	40%
Average age	48.0	48.5
Average pensionable service (with buyback service)	9.0 years	10.0 years
Total pensionable service (with buyback service)	221,422 years	220,685 years
Number with buyback service	4,352	4,314
Total buyback service	11,247 years	10,940 years
Total buyback contributions	$67,902,000	$63,390,200
Average annual salary	$76,124	$74,652
Total regular contributions with interest	$1,530,224,200	$1,449,954,800
Deferred Pensioners		
Number	2,119	1,692
Percentage male	38%	39%
Average age	48.8	49.7
Average annual pension	$4,700	$4,900
Average bridge pension	$1,500	$1,500
Terminations in progress[1]		
Number	282	151
Percentage male	43%	40%
Average age	53.2	52.8
Average annual lifetime pension	$4,400	$5,900
Average bridge pension	$1,200	$1,500
Total contributions with interest	$3,190,500	$3,336,600

(1) ”Termination in progress” refers to members who have ceased employment, received a statement of benefit, but have not yet made an election.

Membership Data (continued)

	31.12.2014	31.12.2013
Retired Members		
Number	12,074	11,504
Percentage male	47%	47%
Average age	71.7	71.5
Average annual lifetime pension payable	$26,800	$26,200
Average bridge pension	$7,800	$7,600
Number with bridge pension	2,320	2,246
Total pensions paid	$342,239,059	$318,857,051
Survivors		
Number	1,715	1,647
Percentage male	18%	17%
Average age	78.6	78.3
Average annual lifetime pension payable	$12,600	$12,200
Total pensions paid	$21,684,452	$20,142,885
Non-vested Refunds		
Number	165	169
Percentage male	52%	51%
Average age	54.2	53.2
Total contributions with interest	$962,655	$971,507

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

	Actives	**Deferred Vested**	**Retired Members**	**Survivors**	**Terminations in Progress**	**Refunds**	**Total**
Total at 31.12.2013	22,021	1,692	11,504	1,647	151	169	37,184
New entrants	4,166						4,166
Return to active	31	(23)	(7)		(1)		-
Terminations:							
▪ deferred pensions	(620)	636			(14)	(2)	-
▪ in progress	(158)	(52)			212	(2)	-
▪ refunds							-
▪ paid out	(35)	(91)			(62)		(188)
Benefit Expired			(1)				(1)
Retirements	(778)	(36)	818		(4)		-
Deaths, no survivor	(19)	(1)	(110)	(74)			(204)
Deaths with survivor	(4)		(130)	134			-
Data Corrections		(6)		8			2
Total at 31.12.2014	24,604	2,119	12,074	1,715	282	165	40,959

The distribution of the active members by age and pensionable service as at the valuation date is summarized as follows:

	Years of Pensionable Service								
Age	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35+**	**Total**
< 25	210								210
	39,557								39,557
25-29	1,047	93							1,140
	52,513	58,014							52,962
30-34	1,556	517	72						2,145
	58,899	65,098	64,285						60,574
35-39	1,502	711	399	43					2,655
	65,420	72,436	72,451	78,352					68,565
40-44	1,611	716	557	217	20				3,121
	67,452	77,867	81,531	80,589	68,133				73,272
45-49	1,656	744	638	310	232	104	3		3,687
	68,952	84,686	87,416	86,840	80,180	75,800	70,980		77,727
50-54	1,606	791	738	387	389	506	100	2	4,519
	72,186	83,146	89,007	91,713	85,082	83,297	76,478	67,622	80,971
55-59	1,159	606	616	392	342	507	232	67	3,921
	73,013	87,456	89,898	92,758	89,923	94,469	86,781	77,932	85,020
60-64	639	374	360	221	227	331	166	112	2,430
	74,813	86,299	90,512	89,493	91,114	93,106	90,070	83,535	85,700
65-69	217	88	129	57	56	83	52	55	737
	73,978	94,461	93,145	89,692	94,252	96,367	100,273	108,068	89,455
70 +	10	4	9	1	1	4	5	5	39
	84,854	118,399	94,936	*	*	96,166	82,192	84,735	92,240
Total	11,213	4,644	3,518	1,628	1,267	1,535	558	241	24,604
	66,111	79,488	85,628	88,836	86,720	89,335	87,044	87,469	76,124

* Pensionable earnings amounts are not displayed to preserve confidentiality

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

	Deferred Pensioners		Retired Members		Survivors	
Age	**Number**	**Average Pension**	**Number**	**Average Pension**	**Number**	**Average Pension**
< 30	98	1,003			1	*
30 – 34	164	2,048				
35 – 39	205	3,098			3	13,042
40 – 44	271	3,669			1	*
45 – 49	296	5,453			2	12,557
50 – 54	453	5,676	68	29,877	13	15,771
55 – 59	333	5,385	616	32,492	38	16,459
60 – 64	223	5,870	1,869	31,873	94	18,445
65 – 69	62	6,029	3,009	30,276	154	18,716
70 – 74	12	20,458	2,676	27,668	274	14,336
75 – 79	1	*	1,799	22,909	319	12,842
80 – 84			1,142	19,703	359	11,607
85 – 89	1	*	611	16,059	282	9,585
90 – 94			243	13,647	138	7,320
95 – 100			38	13,936	33	7,266
100+			3	5,810	4	2,193
Total	2,119	4,740	12,074	26,847	1,715	12,644

* Pension amounts are not displayed to preserve confidentiality

APPENDIX F

Summary of Plan Provisions

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

This valuation is based on the plan provisions in effect on January 1, 2016. Since the previous valuation, the Plan's benefit provisions have not been amended.

The following is a summary of the main provisions of the Plan in effect on January 1, 2016. This summary is not intended as a complete description of the Plan.

Background	The Plan became effective July 1, 1967. Benefits are based on a set formula and are paid for by the members and participating employers.
Eligibility for Membership	A full-time employee must join the Plan upon employment. A part-time employee may join the Plan immediately on hire.
Member Contributions	Members who contribute to the Canada Pension Plan are required to contribute an amount equal to the sum of the following: ▪ 11.2% of pensionable earnings up to the YMPE; plus ▪ 14.8% of pensionable earnings in excess of the YMPE. Contributions in respect of earnings above the earnings limit ($163,715 in 2016) are directed to the RCA. The earnings limit is the earnings level at which the pension accrued in the year (calculated based on current year earnings and YMPE only) is equal to the maximum pension limit ($2,890.00 in 2016). Members who are receiving benefits under a long term disability plan or are disabled under the Worker's Compensation Act are not required to contribute to the Plan.
Employer Contributions	The employers are required to match the member contributions.

Retirement Dates	Normal Retirement Date ▪ The normal retirement date is the last day of the month coincident with or next following the member's 65th birthday. Early Retirement Date ▪ A member may choose to retire early on the last day of the month coincident with or next following the earliest of – Age 55 with 2 years of Plan membership; – Age 50 with 20 years of credited service; or – Age plus years of credited service totalling 85 years.
Normal Retirement Pension	<u>Basic Benefit</u> 1.3% of the annualized average pensionable earnings for the 60 consecutive months for which they are the highest, up to the average of the YMPE during the last 5 calendar years PLUS 2.0% of the excess, if any, of the member's annualized average pensionable earnings for the 60 consecutive months for which they are the highest, in excess of the average of the YMPE during the last 5 calendar years MULTIPLIED BY The member's total years of credited service. <u>Supplemental Benefit (payable to age 65)</u> 0.7% of the annualized average pensionable earnings for the 60 consecutive months for which they are the highest, up to the average of the YMPE during the last 5 calendar years MULTIPLIED BY The member's total years of credited service.
Early Retirement Pension	If a member retires early, the member will be entitled to a pension that is calculated the same way as for a normal retirement. The basic pension and supplemental benefit payable, however, will be reduced by ¼% per month for each month that the member's early retirement precedes the earliest date on which the member would have attained the following if the member had continued employment to such date: ▪ Age 65; ▪ Age 60 with 20 years of credited service; or ▪ Age plus years of credited service totalling 85 years.
Maximum Pension	The total annual pension payable from the Plan upon retirement, death or termination of employment cannot exceed the lesser of: ▪ 2% of the average of the best three consecutive years of total compensation paid to the member by the employer, multiplied by years of credited service; and ▪ The defined benefit limit under the *Income Tax Act*, multiplied by the member's years of credited service. The limit in respect of pre-1990 service credited after June 7, 1990 is 2/3rds of the defined benefit limit. The maximum pension is subject to minimum early retirement reductions as required under the *Income Tax Act.* The maximum pension is determined at the date of pension commencement.

Death Benefits	Pre-retirement: ▪ If a member dies before the normal retirement date and before any pension payments have begun, the member's spouse, or beneficiary if there is no spouse, will receive a lump sum settlement equal to the value of the benefits to which the member would have been entitled had employment terminated on the date of death. If the deceased member has children under the age of 18 and does not have a spouse, 50% of the member's accrued pension shall be divided equally among the children under 18. The beneficiary or estate will then receive a lump sum settlement equal to the value of the benefits to which the member would have been entitled had employment terminated on the date of death, less the value of the children's benefits. Post retirement: ▪ The normal form of payment is a lifetime pension. For a member with a qualifying spouse at death, the normal form is a joint and survivor 60% pension.
Termination Benefits	A deferred lifetime pension, based on the member's earnings and years of credited service up to the date of termination. Deferred pensions are payable commencing at age 65, subject to a 5% per annum reduction for commencement prior to age 65.
Pre-retirement and post-retirement indexation	Pensions in payment and deferred pensions in respect of service on or after January 1, 1992 but before January 1, 2008 are increased every January 1 at 75% of the increase in the Consumer Price Index, up to a maximum annual increase of 8%. Increases in excess of 8%, as well as decreases, are carried forward to future years. Pensions in payment and deferred pensions in respect of service prior to January 1, 1992 are increased in the same manner, with the last approved increase occurring on January 1, 2014. Pensions in payment and deferred pensions in respect of service on or after January 1, 2008 are contingent on the funded status of the Plan at the last filed valuation.

APPENDIX G

Plan Administrator Certification

With respect to the Report on the Actuarial Valuation for Funding Purposes as at January 1, 2016 of The Colleges of Applied Arts and Technology Pension Plan, I hereby certify that, to the best of my knowledge and belief:

- The valuation reflects the terms of the Board's engagement with the actuary described in Section 1 of this report, particularly the requirement to not reflect a margin for adverse deviations in the going concern valuation.
- A copy of the official plan documents and of all amendments made up to January 1, 2016 was provided to the actuary and is reflected appropriately in the summary of plan provisions contained herein.
- The asset information summarized in Appendix B is reflective of the Plan's assets.
- The membership data provided to the actuary included a complete and accurate description of every person who is entitled to benefits under the terms of the Plan for service up to December 31, 2014.
- All events subsequent to January 1, 2016 that may have an impact on the Plan have been communicated to the actuary.

March 12, 2016
Date

Signed

DEREK DOBSON
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