

The Colleges of Applied Arts and Technology Pension Plan

Report on the Actuarial
Valuation for Funding Purposes
as at January 1, 2022

March 2022

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

Note to reader regarding actuarial valuations:

This valuation report may not be relied upon for any purpose other than those explicitly noted in the Introduction, nor may it be relied upon by any party other than the parties noted in the Introduction. Mercer is not responsible for the consequences of any other use. A valuation report is a snapshot of a plan's estimated financial condition at a particular point in time; it does not predict a pension plan's future financial condition or its ability to pay benefits in the future. If maintained indefinitely, a plan's total cost will depend on a number of factors, including the amount of benefits the plan pays, the number of people paid benefits, the amount of plan expenses, and the amount earned on any assets invested to pay the benefits. These amounts and other variables are uncertain and unknowable at the valuation date. The content of the report may not be modified, incorporated into or used in other material, sold or otherwise provided, in whole or in part, to any other person or entity, without Mercer's permission. All parts of this report, including any documents incorporated by reference, are integral to understanding and explaining its contents; no part may be taken out of context, used, or relied upon without reference to the report as a whole.

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

Contents

1. Introduction.....	1
2. Valuation results – Going concern	4
3. Valuation results – Hypothetical wind-up	9
4. Valuation results – Solvency.....	12
5. Minimum funding requirements.....	14
6. Actuarial opinion	16
Appendix A: Prescribed disclosure.....	17
Appendix B: Plan assets	20
Appendix C: Methods and assumptions – Going concern	22
Appendix D: Methods and assumptions – Hypothetical wind-up and solvency	31
Appendix E: Membership data	35
Appendix F: Summary of plan provisions.....	43
Appendix G: Plausible adverse scenarios	50
Appendix H: Plan administrator certification	55

Section 1

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, 2022. 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, 2022 on going concern, hypothetical wind-up, and solvency bases; and
- The required funding contributions from 2022, 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 of Trustees, the Sponsors’ Committee, and Plan staff, and for filing with the Financial Services Regulatory Authority 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 Regulatory Authority 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, 2025, 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 reflected a margin for adverse deviations of 0.90% per year in the going concern discount rate.
- We have reflected the Board’s decisions for determining the solvency funding requirements, summarized as follows:
 - The same Plan wind-up scenario was hypothesized for both hypothetical wind-up and solvency valuations.
 - Certain excludable benefits were excluded from the solvency liabilities.
 - The solvency financial position was determined on a market value basis.

- 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, 2021

Pension Plan

The Plan is fully funded on a going-concern basis as of January 1, 2022. Since the Plan provides for certain benefits 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, 2025), i.e., at January 1, 2023, 2024 and 2025.

On February 28 and March 2, 2022 respectively, the Board and Sponsors' Committee approved amendments to the Plan to grant an additional year of pre-retirement Average Industrial Wage (AIW) indexing for DBplus benefits to January 1, 2025 (previously January 1, 2024) and to extend the conditional 3% early retirement reduction factor for DBplus members to January 1, 2025 (previously January 1, 2024), consistent with the Funding Policy. The impact of these amendments have been reflected in this valuation.

Other amendments to the Plan since the date of the previous valuation do not have a material impact on the funded status of the Plan and we are not aware of any other pending definitive or virtually definitive amendments coming into effect during the period covered by this report that would have a material impact on the funded status of the Plan. The Plan provisions are summarized in Appendix F.

Assumptions

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

	Current valuation	Previous valuation
Interest on member contributions	2.00%	1.20%
Basis used to determine lump sums	<u>Non-indexed interest rates</u>	<u>Non-indexed interest rates</u>
	2.1% per year for 10 years, 3.1% per year thereafter	1.2% per year for 10 years, 2.8% per year thereafter
	<u>Partially indexed interest rates</u>	<u>Partially indexed interest rates</u>
	1.0% per year for 10 years, 1.5% per year thereafter	0.8% per year for 10 years, 1.3% per year thereafter

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

There have been no changes to the Act or the relevant regulations which impact the funding of the Plan.

Subsequent Events

On September 14, 2021, the Canadian Institute of Actuaries released revised standards for pension commuted values which will be effective February 1, 2022. From the effective date, they will affect the assumptions used to value the solvency and wind-up liabilities for benefits with post-employment indexation assumed to be settled through a lump sum transfer. They will also affect the assumptions 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 those changes will be reflected in future valuations.

In accordance with the merger agreements between the Plan and the plan sponsors of the single employer pension plans (the SEPPs) that have merged into the Plan prior to the valuation date, for a specified period following the asset transfer date, the SEPPs may be liable or stand to credit in the event that assets and liabilities transferred to the Plan had been materially different had true, complete and accurate documentation, data, calculations and records been used at the date of transfer. Any amounts transferred from/to the SEPPs as a result are expected to have an immaterial impact to the funded position of the Plan and will be reflected, if applicable, at the next valuation of the Plan.

The Plan has entered into agreements with several employee groups to join the Plan and, in some cases, transfer past service assets and liabilities into the Plan with an effective date in 2022. The impact of these new members and, where applicable, the transferred assets and liabilities will be reflected at the next valuation date following their effective dates and consent from the relevant regulators as required.

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.

Section 2

Valuation results – Going concern

Financial Status

A going concern valuation compares the value of Plan assets, including expected future contributions, and the present value of expected future benefit cash flows in respect of accrued service 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)	01.01.2022	01.01.2021
Assets		
Market value of assets	\$17,978,000	\$15,583,900
Merger related buy-In assets ¹	\$2,200	\$2,300
Merger related amortization payments ¹	\$40,000	\$42,100
Asset smoothing adjustment	(\$2,011,400)	(\$1,084,400)
Smoothed value of assets	\$16,008,800	\$14,543,900
Present value of future contributions		
• Basic contributions – DBprime	\$3,604,400	\$3,485,500
• Supplemental contributions – DBprime	\$1,488,900	\$1,451,800
• Contributions – DBplus	\$1,312,000	\$1,201,900
Actuarial value of assets	\$22,414,100	\$20,683,100
Going concern funding target		
Present value of accrued benefits for:		
• Active members	\$5,553,200	\$5,394,700
• Pensioners and survivors	\$7,214,600	\$6,970,900
• Deferred pensioners	\$269,200	\$243,600
Total liabilities for accrued benefits	\$13,037,000	\$12,609,200
Present value of future benefits - DBprime	\$3,968,500	\$3,724,700
Present value of future benefits – DBplus	\$902,300	\$955,200
Provision for conditional benefits to the year of the next required valuation	\$136,900	\$123,800
Total actuarial liability	\$18,044,700	\$17,412,900
Funding excess (shortfall)	\$4,369,400	\$3,270,200
Going-concern funded ratio	124%	119%

The going concern funding target is based on best-estimate assumptions except that it reflects a margin for adverse deviations in the discount rate.

¹ Valued on a going-concern basis
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Reconciliation of Financial Status (000's)

Funding excess (shortfall) as at previous valuation	\$3,270,200
Less: Smoothing adjustment	\$1,084,400
Funding excess (shortfall) as at previous valuation (market basis)	\$4,354,600
Interest on funding excess (shortfall) at 4.95% per year	\$215,600
Recognition of additional year of supplemental contributions	\$86,800
Expected funding excess (shortfall)	\$4,657,000
Net experience gains (losses)	
• Investment return	\$1,654,500
• Increases in pensionable earnings/YMPE	\$53,800
• Inflation experience	(\$8,500)
• Mortality experience	\$36,300
• Retirement experience	(\$16,800)
• Termination experience	(\$13,500)
• Present value of future contributions in excess of future benefits for new entrants	\$81,000
Total experience gains (losses)	\$1,786,800
Impact of changes in assumptions	
• Basis to determine lump sum value	\$12,000
• Interest on member contributions	(\$37,800)
Total assumption changes impact	(\$25,800)
Extension of conditional benefits to Jan. 1, 2025	(\$42,600)
Impact of asset smoothing	(\$2,011,400)
Net impact of other elements of gains and losses	\$5,400
Funding excess (shortfall) as at current valuation	\$4,369,400

Reference Valuation

Prior to January 1, 2018, 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).

As at January 1, 2018, an amendment to the Regulations to the *Pension Benefits Act (Ontario)* made permanent the temporary exemption for plans named in Section 47.7.1 of the Regulations from requiring scheduled contributions to meet minimum contribution requirements determined by the Reference Valuation. However, the regulator has requested that a Reference Valuation continue to be prepared and disclosed.

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

(000's)	01.01.2022	01.01.2021
Assets		
Market value of assets	\$17,978,000	\$15,583,900
Merger related buy-in policy ²	\$2,200	\$2,300
Merger related amortization payments ²	\$40,000	\$42,100
Asset smoothing adjustment	(\$2,011,400)	(\$1,084,400)
Smoothed value of assets	16,008,800	\$14,543,900
Going concern funding target		
Present value of accrued benefits for:		
• Active members	\$5,553,200	\$5,394,700
• Pensioners and survivors	\$7,214,600	\$6,970,900
• Deferred pensioners	\$269,200	\$243,600
• Provision for conditional benefits to the year of the next required valuation	\$129,000	\$114,700
Total liabilities for accrued benefits	\$13,166,000	\$12,723,900
Funding excess (shortfall)	\$2,842,800	\$1,820,000

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 except that it reflects a margin for adverse deviations in the discount rate.

² Valued on a going-concern basis

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)	2022	2021
Current service cost – DBprime	\$347,400	\$334,200
Current service cost – DBplus	\$68,400	\$70,300
Total current service cost	\$415,800	\$404,500
Current service cost expressed as a percentage of member's pensionable earnings – DBprime	18.03%	17.79%
Current service cost expressed as a percentage of member's pensionable earnings – DBplus	8.91%	10.53%
Total current service cost expressed as a percentage of total members' pensionable earnings	15.43%	15.89%

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 benefits until the next valuation report is filed), the current service cost and the present value of future contributions. For the purposes of the illustration, we have not changed the interest rate used to determine commuted values upon termination of employment.

Scenario (000's)	Valuation Basis	Reduce Discount Rate by 1%
Total liability for future benefits	\$18,044,700	\$21,378,700
Total liability for accrued benefits	\$13,128,700	\$15,000,600
Current service cost	\$415,800	\$513,400
Present value of future contributions		
• basic contributions	\$4,916,400	\$5,356,500
• supplemental contributions	\$1,488,900	\$1,595,800

Plausible Adverse Scenarios

The financial impact on the going concern results of plausible adverse scenarios that would pose threats to the Plan's future financial condition is presented in Appendix G.

Section 3

Valuation results – Hypothetical wind-up

Financial Position

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

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: *Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates on or after December 31, 2021 and no later than December 31, 2022*. 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)	01.01.2022	01.01.2021
Assets		
Market value of assets	\$17,978,000	\$15,583,900
Merger related buy-in policy ³	\$2,700	\$2,900
Merger related amortization payments ⁴	\$19,100	\$19,600
Termination expense provision	(\$30,000)	(\$20,000)
Wind-up assets	\$17,969,800	\$15,586,400
Present value of accrued benefits for:		
• Active members	\$7,633,700	\$7,932,600
• Pensioners and survivors	\$9,510,500	\$9,521,800
• Deferred pensioners	\$386,000	\$374,100
Total wind-up liability	\$17,530,200	\$17,828,500
Wind-up excess (shortfall)	\$439,600	(\$2,242,100)

The wind-up liabilities for active members as of January 1, 2022 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.

³ Valued on a wind-up basis

⁴ Market value of amortization payments from draft financial statements

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)	01.01.2022	01.01.2021
Number of years covered by report	3 years	3 years
Total hypothetical wind-up liabilities at the valuation date (A)	\$17,530,200	\$17,828,500
Present value at the valuation date of projected hypothetical wind-up liability at the next required valuation (including expected new entrants) plus expected benefit payments until the next required valuation (B)	\$19,513,800	\$20,055,700
Hypothetical wind-up incremental cost (B – A)	\$1,983,600	\$2,227,200

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

Discount Rate Sensitivity

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

Scenario (000's)	Valuation Basis	Reduce Discount Rate by 1%
Total hypothetical wind-up liability	\$17,530,200	\$20,196,500

Plausible Adverse Scenarios

The financial impact on the hypothetical wind-up financial position of plausible adverse scenarios that would pose threats to the Plan's future financial condition is presented in Appendix G.

Section 4

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.
<p>Certain benefits can be excluded from the solvency financial position. These include:</p> <ul style="list-style-type: none"> (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)	01.01.2022	01.01.2021
Assets		
Market value of assets	\$17,978,000	\$15,583,900
Merger related buy-in policy ⁵	\$2,700	\$2,900
Merger related amortization payments ⁶	\$19,100	\$19,600
Termination expense provision	(\$30,000)	(\$20,000)
Net assets	\$17,969,800	\$15,586,400
Total hypothetical wind-up liabilities		
Value of excluded benefits	(\$1,955,000)	(\$1,900,700)
Liabilities on a solvency basis	\$15,575,200	\$15,927,800
Surplus (shortfall) on a market value basis	\$2,394,600	(\$341,400)
Solvency ratio	1.16	0.98
Transfer ratio	1.03	0.87

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, 2022 has been specified to be zero.

Plausible Adverse Scenarios

The financial impact on the solvency financial position of plausible adverse scenarios that would pose threats to the Plan's future financial condition is presented in Appendix G.

⁵ Valued on a wind-up basis

⁶ Market value of amortization payments from draft financial statements

Section 5

Minimum funding requirements

Scheduled Contributions

Under DBprime, members and employers must contribute an amount equal to the sum of the following in 2022:

- 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 DBprime member contribution rate consists of a 8.20%/11.80% basic contribution rate and a supplemental contribution rate of 3% of pensionable earnings.

Under DBplus, the level of fixed contribution rates can vary by employer and member group as stipulated in the Plan provisions, with total member and employer contributions not to exceed 18% of pensionable earnings. There are no supplemental contributions required under DBplus.

Note that contributions are being phased-in for certain participating employers who have joined either DBprime or DBplus. This results in members having lower contribution rates than employers for a fixed period of time.

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)	2022	2021
Members' contributions – DBprime	\$240,000	\$234,400
Members' contributions – DBplus	\$62,000	\$55,000
Employers' contributions – DBprime	\$240,000	\$234,500
Employers' contributions – DBplus	\$62,400	\$55,300
Total contributions	\$604,400	\$579,200
DBprime payroll for year (excludes LTD's) ⁷	\$1,926,300	\$1,878,300
DBplus payroll for year (excludes LTD's) ⁸	\$768,000	\$667,800
Total payroll for year (excludes LTD's)	\$2,694,300	\$2,546,100
Contributions as a % of payroll – DBprime	24.92%	24.96%
Contributions as a % of payroll – DBplus	16.18%	16.52%
Total contributions as a % of total payroll	22.43%	22.75%

⁷ Annual member pensionable earnings capped at maximum allowable for accruing benefits in the Plan under the Income Tax Act.

⁸ Total contributions to DBplus in respect of each member are capped at the Money Purchase Limit (\$30,780 in 2022)

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, as at January 1, 2018, an amendment to the Regulations to the *Pension Benefits Act (Ontario)* made permanent the temporary exemption for plans named in Section 47.7.1 of the Regulations from requiring scheduled contributions to meet minimum contribution requirements determined by the Reference Valuation.

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 minimum funding requirements to fund the difference between the hypothetical wind-up and reduced solvency shortfalls, if any. 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. If the transfer ratio shown in this report is less than one, the plan administrator should ensure that the monthly special payments are sufficient to meet the requirements of the *Act* to allow for the full payment of benefits, and otherwise should take the prescribed actions.

Additional restrictions are imposed when:

- The transfer ratio revealed in the most recently filed actuarial valuation is less than one and the administrator knows or 'ought to know' that the transfer ratio of the Plan has declined by 10% or more since the date the last valuation was filed.
- The transfer ratio revealed in the most recently filed actuarial valuation is greater than or equal to one and the administrator knows or 'ought to know' that the transfer ratio of the Plan has declined to less than 0.9 since the date the last valuation was filed.

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

Section 6

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.

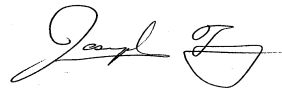
This report has been prepared, and our opinions given, in accordance with accepted actuarial practice in Canada. It has also been prepared in accordance with the funding and solvency standards set by the *Pension Benefits Act (Ontario)* and Regulations.



Luc Girard
Fellow of the Society of Actuaries
Fellow of the Canadian Institute of Actuaries

March 24, 2022

Date



Joseph Fung
Fellow of the Society of Actuaries
Fellow of the Canadian Institute of Actuaries

March 24, 2022

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.	1.03
Solvency Ratio	The ratio of: (a) Solvency Assets related to defined benefits and ancillary benefits plus the total amount of any letters of credit minus the Prior Year Credit Balance (b) the sum of the Solvency Liabilities related to defined benefits and ancillary benefits	1.16
Prior Year Credit Balance	Accumulated sum of contributions made to the pension plan in excess of the minimum required contributions (note: only applies if the Plan administrator chooses to treat the excess contributions as a Prior Year Credit Balance and the actuarial cost method used is a benefit allocation method).	\$0
Solvency Assets (000's)	Market value of assets including accrued or receivable income and excluding the value of any qualifying annuity contracts.	\$17,999,800

Defined Term	Description	Result
Solvency Asset Adjustment	<p>The sum of:</p> <ul style="list-style-type: none"> (a) the difference between smoothed value of assets and the market value of assets (b) the present value of going concern special payments required to liquidate any past service unfunded liability (c) the present value of any previously scheduled solvency special payments (excluding those identified in this report) (d) the total value of all letters of credit in respect of the special payments due before the valuation date, subject to the limit of 15% of solvency liabilities 	<p>\$0</p> <p>\$0</p> <p>\$0</p> <p>\$0</p> <hr/> <p>\$0</p>
Solvency Liabilities (000's)	<p>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,</p> <ul style="list-style-type: none"> (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. 	<p>\$15,575,200</p>
Solvency Liability Adjustment	<p>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.</p>	<p>\$0</p>

Defined Term	Description	Result
Solvency Deficiency (000's)	The amount, if any, by which the sum of:	
	(a) the Solvency Liabilities	\$15,575,200
	(b) the Solvency Liability Adjustment	\$0
	(c) the Prior Year Credit Balance	\$0
		\$15,575,200
	Exceeds the sum of	
	(d) the Solvency Assets net of estimated termination expenses ⁹	\$17,969,800
	(e) the Solvency Asset Adjustment	\$0
		\$17,969,800
	(f)	\$0
	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

Timing of Next Required Valuation

In accordance with Section 14 of the regulations of the *Pension Benefits Act (Ontario)*, the next valuation of the Plan would be required as of no later than January 1, 2025, or as at the date of an earlier amendment to the Plan.

Special Payments – Current Valuation

As the Plan does not have a 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 Benefits 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.

⁹ 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.

Appendix B

Plan assets

The pension fund is held by the Plan. In preparing this report, we have relied upon the draft financial statements for 2021 and supplemental information provided by Plan staff regarding the value of the merger related buy-in policy and merger related amortization payments 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)	2021
January 1	\$15,584,000
PLUS	
Members' contributions	\$294,000
Employer's contributions	\$301,000
Service purchases	\$23,000
Residual asset transfers from prior mergers	\$3,000
Transfers from other pension plans	\$16,000
Net investment income	\$2,489,000
	\$3,126,000
LESS	
Pensions paid	\$605,000
Lump-sums paid	\$63,000
Investment and administration expenses	\$64,000
	\$732,000
December 31	\$17,978,000
Gross rate of return ¹⁰	16.0%
Rate of return net of expenses ¹⁰	15.6%

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.

¹⁰ Assuming mid period cashflows
Mercer

Investment Policy

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

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

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

	Investment Policy			Actual asset mix as at December 31, 2021
	Minimum	Target	Maximum	
Global Developed Equity	20.0%	27.0%	35.0%	25.5%
Emerging Market Equities	8.0%	10.0%	12.0%	9.6%
Private Equities	5.0%	15.0%	20.0%	18.2%
Commodities	3.0%	5.0%	7.0%	5.2%
Infrastructure and Real Estate	10.0%	20.0%	25.0%	16.0%
Nominal Long Bonds	10.0%	13.0%	25.0%	14.7%
Nominal Universe Bonds	3.0%	5.0%	7.0%	5.0%
Real Return Bonds	3.0%	5.0%	7.0%	5.4%
Cash and Cash Equivalents	n/a	n/a	n/a	0.4%
		100.0%		100.0%

Appendix C

Methods and assumptions – Going concern

Determining the January 1, 2022 Liabilities

The effective date of the data at this valuation is December 31, 2020 (one year prior to the valuation date). In determining the actuarial liabilities as at January 1, 2022, we first calculated the actuarial liabilities as at January 1, 2021, and then projected the liabilities to January 1, 2022. The one year projection reflected any known as well as anticipated experience during 2021 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 DBprime and DBplus 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, 2021). We have also made an allowance for future DBplus contributions and benefits for employers joining the Plan in 2021.

Valuation of Assets

For this valuation, we have continued to use an adjusted market-value method to determine the actuarial value of assets. Under this method, investment gains and losses relative to the discount rate are recognized on a linear basis over 5 years.

The table below shows the gain/(loss) on assets under the smoothing approach:

(000's)	2018	2019	2020	2021
Market value of assets at beginning of year	\$10,786,226	\$10,817,567	\$13,470,130	\$15,583,895
Net cash flows in the year	\$16,225	\$1,018,325	\$761,746	(\$31,000)
Expected return on assets	\$604,483	\$599,725 ¹¹	\$698,924 ¹¹	\$770,636
Expected value of assets at end of year	\$11,406,934	\$12,435,617	\$14,930,800	\$16,323,531
Actual value of assets at end of year	\$10,817,567	\$13,470,130	\$15,583,895	\$17,978,000
Gain/(loss)	(\$589,367)	\$1,034,513	\$653,095	\$1,654,469
Liability discount rate at the beginning of the year	5.6%	5.5%	5.15%	4.95%

The smoothed value of the assets at January 1, 2022 was derived as follows:

Market value of assets (000's)		\$17,978,000
LESS		
Total investment gain/(loss) (000's)	2018: (\$589,367) × 20% =	(\$117,873)
	2019: \$1,034,513 × 40% =	\$413,805
	2020: \$653,095 × 60% =	\$391,857
	2021: \$1,654,469 × 80% =	\$1,323,576
		\$2,011,365
Smoothed value of assets (000's)		\$15,966,635

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.

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.

¹¹ Reflects actual timing of asset transfers

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 under DBprime and the present value of contributions under DBplus has been determined on a closed group basis over the period in which active members are expected to accrue service, based on the demographic actuarial assumptions used in the valuation. The present value of future supplemental contributions under DBprime has been determined on an open group basis over a 15 year period whereby the aggregate pensionable earnings of DBprime members at the valuation date are projected in each future year using the average wage increase assumption used in the valuation. The supplemental contributions in each year over the 15 year period following the valuation date are determined by multiplying the supplemental contribution rate by the projected aggregate pensionable earnings, and are then discounted back to the valuation date.

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 in comparison with those used in the previous valuation.

Assumption	Current valuation	Previous valuation
Discount rate:	4.95%	4.95%
Inflation:	2.00%	2.00%
ITA limit / YMPE / AIW increases:	3.00%	3.00%
Pensionable earnings increases:	3.75%	3.75%
Indexation (75% of CPI):	1.50%	1.50%
Interest on member contributions:	2.00%	1.20%
Retirement rates (active members):	5.6% per year prior to unreduced age, 19.0% per year on or after unreduced age, age-related table at ages 65 to 71 (see below)	5.6% per year prior to unreduced age, 19.0% per year on or after unreduced age, age-related table at ages 65 to 71 (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)	Service-based table (see below)
Proportion of terminating members electing a lump sum	55%	55%
Basis used to determine lump sums	<u>Mortality rates</u> CPM2014 mortality table with projection scale CPM-B	<u>Mortality rates</u> CPM2014 mortality table with projection scale CPM-B

Assumption	Current valuation	Previous valuation
	<u>Non-indexed interest rates</u> 2.1% per year for 10 years, 3.1% per year thereafter	<u>Non-indexed interest rates</u> 1.2% per year for 10 years, 2.8% per year thereafter
	<u>Partially indexed interest rates</u> 1.0% per year for 10 years, 1.5% per year thereafter	<u>Partially indexed interest rates</u> 0.8% per year for 10 years, 1.3% per year thereafter
Mortality rates:	<u>Pre-Retirement</u> 55% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ)	<u>Pre-Retirement</u> 55% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ)
	<u>Post-Retirement</u> 105% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ)	<u>Post-Retirement</u> 105% of the rates of the 2014 Public Sector Canadian Pensioners Mortality Table (CPM2014Publ)
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	Assume same rate of service accrual as previous year

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

Retirement Rates

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

Age	Rate
65	30%
66	22%
67	22%
68	22%
69	22%
70	22%
71	100%

Termination Rates

Sample rates from the termination assumption are as follows:

Service	Rate	Service	Rate
< 1	11.00%	16	1.10%
1	6.50%	17	1.00%
2	4.90%	18	1.00%
3	3.70%	19	0.90%
4	3.20%	20	0.80%
5	2.70%	21	0.70%
6	2.30%	22	0.60%
7	2.00%	23	0.50%
8	1.80%	24	0.40%
9	1.70%	25	0.30%
10	1.60%	26	0.20%
11	1.50%	27	0.10%
12	1.40%	28	0.10%
13	1.30%	29	0.10%
14	1.20%	30+	0.00%
15	1.10%		

Pensionable Earnings

The benefits ultimately paid will depend on final average earnings for DBprime members and total contributions to the Plan for DBplus members. To calculate the pension benefits payable upon retirement, death or termination of employment, we have taken 2020 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 cash flows using the expected investment return on Plan assets. Other bases for discounting the expected 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:

- The actuary's best estimate of the 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.
- A margin for adverse deviations of 0.90% per year.

The discount rate was developed as follows:

Gross expected return on Plan assets	6.25%
Implicit provision for expenses	(0.40%)
Margin for adverse deviations	(0.90%)
Net discount rate	4.95%

The long-term expected return on Plan assets was derived based on our best estimate of 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 conditional benefits) should be adjusted, depending on the financial position of the Plan. The funding policy also describes the amount of funding reserves to be held, again depending on the financial position of the Plan.

The Plan is currently in a surplus position on a going-concern basis. Consistent with the funding policy, the Board has chosen to notionally allocate the entire surplus under the Plan as a funding reserve to fully protect against a reduction in the discount rate up to 1% from its current level and to pre-fund a portion of conditional 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, Year's Maximum Pensionable Earnings and Average Industrial Wage Increases

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 is based on experience over the years 2013 to 2018. LTD members are assumed to retire at age 65.

Termination Rates

The assumption is based on experience over the years 2013 to 2018.

Mortality Rates

The assumption for the mortality rates is based on the Canadian Pensioners' Mortality (CPM) study published by the Canadian Institute of Actuaries in February 2014. Mortality rates selected reflect plan-specific experience over the years 2007 to 2019. There is broad consensus among actuaries and other longevity experts that mortality improvement will continue in the future, but the degree of future mortality improvement is uncertain. For the present valuation, we have continued to use the CPM-B scale, which is a reasonable outlook for future mortality improvement. Based on the assumption used, the life expectancy of a member age 65 at the valuation date is 22.7 years for males and 24.5 years for females.

Interest on Employee 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.

Form of benefit elected and cost of future lump sums

The assumption for the percentage of eligible plan participants that will elect to receive their benefit as a lump sum transfer from the plan is based on experience from 2013 to 2016.

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.

Eligible Spouse

The assumption is based on an industry standard for non-retired members (actual status used for retirees).

Spousal Age Difference

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

Appendix D

Methods and assumptions – Hypothetical wind-up and solvency

The hypothetical wind-up and solvency liabilities at January 1, 2022 were determined based on a projection of a valuation performed using membership data as of December 31, 2020. 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, 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, 2022.

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: *Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates on or after December 31, 2021 but not later than December 31, 2022*. 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 40% 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:	2.1% per year for 10 years, 3.1% per year thereafter
Partially indexed interest rates:	1.0% per year for 10 years, 1.5% per year thereafter
Retirement age:	50% probability that pension will commence at the age which maximizes the value of their entitlement from the Plan and 50% probability that pension will commence at the earliest age that an unreduced pension is available, both based on the eligibility requirements which have been met at the valuation date

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
Adjustment to mortality rates:	No adjustment
Interest rate:	2.86% per year based on a duration of 11.3 years determined for the liabilities assumed to be settled through the purchase of an annuity.
Partially indexed interest rate:	0.29% per year
Retirement age:	Members are assumed to retire at the age that maximizes the value of their entitlement from the Plan, based on the eligibility requirements that have been met at the valuation date

Other Assumptions

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
Final average earnings:	Based on actual pensionable earnings over the averaging period
Family composition:	Same as for going concern valuation
Maximum pension limit:	\$3,420.00 per year
Termination expenses:	\$30,000,000

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.

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.

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

Incremental Cost

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

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

- Members terminate, retire, and die consistent with the termination, retirement, and mortality rates used for the going concern valuation.

- Pensionable earnings, 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, 2020 (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.

	31.12.2020	31.12.2019
Active Members (including LTD) accruing benefits in DBprime as at the valuation date		
Number	20,992	21,740
Number of members on LTD	538	519
Percentage female/male	59%/41%	59%/41%
Average age	47.6	47.4
Average pensionable service (with buyback service)	10.6 years	10.1 years
Total pensionable service (with buyback service)	221,602 years	220,072 years
Number with buyback service	4,452	4,572
Total buyback service	11,206 years	11,148 years
Total buyback contributions with interest	\$101,743,600	\$82,902,700
Average annual salary	\$88,909	\$85,686
Total regular contributions with interest	\$1,996,374,100	\$1,886,742,800
Total annual accrued lifetime DBplus pension	\$464,200	\$239,600
Total annual prior plan/frozen DBprime benefits	\$2,974,800	\$2,990,100
Active OTRFT Members (including LTD) accruing benefits in DBplus as at the valuation date		
Number	10,511	9,481
Percentage female/male	59%/41%	61%/39%
Average age	46.6	46.9
Average salary	\$28,011	\$30,226
Total regular contributions with interest	\$139,281,000	\$122,446,300
Total annual accrued lifetime DBplus pension	\$8,008,200	\$3,989,700
Total annual prior plan/frozen DBprime benefits	\$12,930,400	\$14,466,500
Active non-OTRFT Members (including LTD) accruing benefits in DBplus as at the valuation date		
Number	7,988	5,987
Percentage female/male	57%/43%	56%/44%
Average age	46.9	47.8
Average annual salary	\$53,355	\$56,899
Total annual accrued lifetime DBplus pension	\$4,722,500	\$1,909,200
Total annual prior plan/frozen DBprime benefits	\$36,387,000	\$37,847,200

	31.12.2020	31.12.2019
Deferred Pensioners		
Number	6,496	5,879
Percentage female/male	59%/41%	59%/41%
Average age	47.2	47.2
Average annual lifetime pension	\$3,800	\$3,900
Average annual bridge pension	\$800	\$800
Terminations in progress¹²		
Number	1,511	951
Percentage female/male	58%/42%	57%/43%
Average age	49.3	50.2
Number with pending pension	886	645
Average annual lifetime pension	\$3,100	\$2,400
Total contributions with interest	\$10,959,500	\$7,509,300
Number with pending payment	625	306
Average pending payment	\$35,500	\$62,400
Retired Members		
Number	19,500	18,911
Percentage female/male	53%/47%	52%/48%
Average age	72.5	72.3
Average annual lifetime pension payable	\$27,300	\$27,100
Average annual bridge pension	\$9,400	\$9,700
Number with bridge pension	2,910	2,785
Total pensions paid	\$531,927,400	\$513,255,400
Survivors		
Number	2,439	2,302
Percentage female/male	69%/31%	68%/32%
Average age	79.8	79.7
Average annual lifetime pension payable	\$14,800	\$14,400
Total pensions paid	\$36,102,700	\$33,141,100

¹² "Termination in progress" refers to members who have ceased employment, received a statement of benefit, but have not yet made an election.

	31.12.2020	31.12.2019
Non-vested Refunds		
Number	162	164
Percentage female/male	50%/50%	50%/50%
Average age	58.9	58.0
Total contributions with interest	\$909,200	\$899,900

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 31.12.2019	37,208	5,879	18,911	2,302	951	164	65,415
New entrants	5,374						5,374
Return to active	72	(67)	(1)		(3)	(1)	0
Return to deferred		7			(7)		0
Terminations:							
• Deferred pension	(1,390)	1,422			(32)		0
• In progress	(697)	(229)	(4)		931	(1)	0
• Paid out	(260)	(399)	(1)	(1)	(312)		(973)
Benefit Expired			(4)	(4)			(8)
Retirements	(922)	(128)	1,055		(5)		0
Deaths, no survivor	(27)	(10)	(173)	(153)	(16)		(379)
Deaths with survivor	(7)	(3)	(231)	241			0
Data corrections	140	24	3	(1)	4		170
Pensioner re-classified as survivor			(55)	55			
Mergers							
Total at 31.12.2020	39,491	6,496	19,500	2,439	1,511	162	69,599

The distribution of the active members (including LTD) accruing benefits in DBprime by age and pensionable service with average annual salary as at the valuation date is summarized as follows:

Age	Years of Pensionable Service								Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 +	
Under	88								88
	\$55,197								\$55,197
25 to 29	735	67							802
	\$60,289	\$66,718							\$60,826
30 to 34	1,340	571	62						1,973
	\$66,701	\$71,692	\$71,316						\$68,290
35 to 39	1,288	995	449	75					2,807
	\$75,468	\$78,922	\$80,008	\$77,439					\$77,471
40 to 44	988	917	669	400	51				3,025
	\$80,323	\$87,453	\$90,192	\$84,255	\$92,488				\$85,392
45 to 49	859	779	659	550	260	25			3,132
	\$88,418	\$94,584	\$96,352	\$95,072	\$94,621	\$90,829			\$93,324
50 to 54	640	675	648	644	326	172	82		3,187
	\$89,564	\$96,697	\$103,289	\$103,005	\$100,457	\$94,501	\$87,987		\$97,922
55 to 59	483	526	602	670	388	246	245	32	3,192
	\$94,403	\$100,776	\$98,257	\$100,205	\$101,865	\$97,022	\$90,996	\$77,515	\$98,076
60 to 64	233	320	349	483	283	175	185	90	2,118
	\$92,671	\$100,973	\$102,761	\$102,708	\$103,515	\$99,109	\$100,086	\$86,599	\$100,247
65 to 69	50	74	150	117	76	42	58	41	608
	\$107,948	\$113,177	\$106,564	\$106,247	\$109,014	\$101,960	\$112,330	\$113,398	\$108,421
70 +	5	3	9	10	10	6	10	7	60
	\$137,793	\$79,068	\$106,076	\$104,797	\$109,461	\$111,322	\$108,394	\$111,934	\$109,314
Total	6,709	4,927	3,597	2,949	1,394	666	580	170	20,992
	\$77,755	\$88,697	\$95,375	\$97,782	\$100,621	\$97,127	\$95,903	\$92,396	\$88,909

The distribution of the active OTRFT members and Non-OTRFT members (including LTD) accruing benefits in DBplus by age and service with average annual prior plan/DBplus benefits as at the valuation date is summarized as follows:

Age	Years of Service ¹³								Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 +	
Under 25	337	4							341
	\$302	\$447							\$303
25 to 29	1,071	148	8						1,227
	\$478	\$1,034	\$1,188						\$550
30 to 34	1,289	448	134	1					1,872
	\$558	\$1,249	\$1,669	*					\$809
35 to 39	1,310	519	370	94	6				2,299
	\$674	\$1,613	\$2,615	\$2,747	\$4,807				\$1,294
40 to 44	1,166	464	365	227	91	14	1		2,328
	\$764	\$2,023	\$2,972	\$4,941	\$6,701	\$9,011	*		\$2,056
45 to 49	1,121	504	397	226	166	63	16		2,493
	\$777	\$2,071	\$3,387	\$6,160	\$8,583	\$8,697	\$14,978		\$2,754
50 to 54	981	448	448	267	200	155	113	23	2,635
	\$792	\$2,153	\$3,488	\$5,514	\$10,348	\$12,609	\$16,892	\$14,818	\$4,193
55 to 59	883	442	435	303	224	149	224	99	2,759
	\$872	\$2,350	\$4,102	\$6,075	\$11,773	\$12,471	\$18,421	\$28,224	\$6,107
60 to 64	475	315	314	225	173	103	130	171	1,906
	\$932	\$2,367	\$4,439	\$6,124	\$9,230	\$12,783	\$20,344	\$24,679	\$7,208
65 to 69	138	122	117	83	56	22	35	30	603
	\$964	\$2,705	\$4,714	\$6,742	\$8,330	\$12,409	\$11,273	\$19,781	\$5,475
70 +	1	7	8	9	5	3	1	2	36
	*	\$2,844	\$3,866	\$3,588	\$3,268	\$6,416	*	*	\$5,297
Total	8,772	3,421	2,596	1,435	921	509	520	325	18,499
	\$695	\$1,939	\$3,449	\$5,622	\$9,609	\$11,976	\$17,997	\$24,588	\$3,354

* data suppressed for confidentiality

¹³ Based on continuous service from date of hire since credited service is not accumulated under DBplus
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The distribution of the inactive members by age as at the valuation date is summarized as follows:

Age	Deferred Pensioners		Retired Members		Survivors	
	Number	Average Pension	Number	Average Pension	Number	Average Pension
< 30	439	\$516	1	*	6	\$7,463
30 – 34	660	\$1,278				
35 – 39	767	\$2,100				
40 – 44	862	\$3,253			1	*
45 – 49	954	\$4,063			8	\$12,681
50 – 54	978	\$5,483	64	\$27,378	4	\$5,981
55 – 59	968	\$6,056	893	\$28,236	41	\$15,419
60 – 64	643	\$5,080	2,556	\$29,194	82	\$17,893
65 – 69	144	\$3,615	4,601	\$28,529	196	\$18,798
70 – 74	59	\$5,633	4,553	\$29,634	362	\$18,185
75 – 79	13	\$1,954	3,240	\$27,388	487	\$16,996
80 – 84	5	\$2,285	2,008	\$22,917	487	\$13,487
85 – 89	1	*	1,036	\$20,157	423	\$12,514
90 – 94	2	*	439	\$15,688	256	\$10,783
95 – 99	1	*	97	\$14,994	78	\$7,389
100 +			12	\$14,885	8	\$9,071
Total	6,496	\$3,810	19,500	\$27,278	2,439	\$14,802

* data suppressed for 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, 2022.

On February 28 and March 2, 2022 respectively, the Board and Sponsors' Committee approved amendments to the Plan to grant an additional year of pre-retirement Average Industrial Wage (AIW) indexing for DBplus benefits to January 1, 2025 (previously January 1, 2024) and to extend the conditional 3% early retirement reduction factor for DBplus members to January 1, 2025 (previously January 1, 2024), consistent with the Funding Policy.

Other amendments to the Plan since the date of the previous valuation do not have a material impact on the funded status of the Plan and we are not aware of any pending definitive or virtually definitive amendments coming into effect during the period covered by this report that would have a material impact on the funded status of the Plan.

The following is a summary of the main provisions of the Plan in effect on January 1, 2022. This summary is not intended as a complete description of the Plan.

A copy of the Plan Text can be found at the following location:
<https://www.caatpension.ca/about-us/member-policies>

The main provisions of Design One (DBprime) are as follows:

Background	<p>The Plan became effective July 1, 1967.</p> <p>Benefits are based on a set formula and are paid for by the members and participating employers.</p> <p>The Plan is named in Section 47 of the Regulations to the Pension Benefits Act (Ontario) as a jointly sponsored pension plan.</p>
Eligibility for Membership	<p>A full-time employee must join the Plan upon employment. On or after January 1, 2019, only members who are full-time employees and who are not Design Two employees may accrue benefits under the Design One provisions.</p>
Member Contributions	<p>Members who contribute to the Canada Pension Plan are required to contribute an amount equal to the sum of the following:</p> <ul style="list-style-type: none">• 11.2% of pensionable earnings up to the YMPE; plus• 14.8% of pensionable earnings in excess of the YMPE. <p>Contributions in respect of earnings above the earnings limit (\$193,715 in 2022) 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 (\$3,420.00 in 2022).</p> <p>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.</p>
Employer Contributions	<p>The employers are required to match the member contributions.</p>
Retirement Dates	<p>Normal Retirement Date</p> <ul style="list-style-type: none">• The normal retirement date is the last day of the month coincident with or next following the member's 65th birthday. <p>Early Retirement Date</p> <ul style="list-style-type: none">• A member may choose to retire early on the last day of the month coincident with or next following the earliest of<ul style="list-style-type: none">– Age 55;– Age 50 with 20 years of credited service; or– Age plus years of credited service totaling 85 years.

**Normal Retirement
Pension**

Basic Benefit

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.

Supplemental Benefit (payable to age 65)

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 0.25% 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 totaling 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 were 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.

The main provisions of Design Two (DBplus) are as follows:

Background

The Plan was amended effective June 1, 2018 by adding the Design Two provisions.

Effective June 1, 2018, the benefits, rights and obligations of Design Two employees shall be in accordance with the Design Two provisions.

Effective January 1, 2019, the benefits, rights and obligations of Other Than Regular Full-time (“OTRFT”) employees shall be in accordance with the Design Two provisions.

Eligibility for Membership

An OTRFT employee may elect to join on or after their date of hire. OTRFT employees who were members of the Plan on December 31, 2018 will accrue benefits under the Design Two provisions for service on and after January 1, 2019.

A Design Two full-time employee shall join on their date of hire (unless otherwise stated in the Plan provisions).

OTRFT Design Two employees may elect to join on or after their date of hire (or effective date of employer participation if later).

Member Contributions

An OTRFT member shall contribute 9% of pensionable earnings.

A Design Two member shall contribute 9% of pensionable earnings unless otherwise specified in the Plan text per their employer’s agreement, provided that the total member and employer contribution may not exceed 18% of pensionable earnings.

Member contributions may not exceed the maximum amount that may be permitted for registered pension plans, as specified under Section 8503(4)(a) of the Regulations of the Income Tax Act.

Members who are receiving benefits under a long term disability plan (“LTD”) or are disabled under the Worker’s Safety and Insurance Act (“WSIA”) are not required to contribute to the Plan, but may elect to do so as follows:

- 1) WSIA – no contributions for the first 12 months (contributions credited based on deemed earnings), thereafter member may elect to contribute based on actual WSIA benefits (as opposed to deemed earnings)
- 2) LTD – member may elect to contribute based on actual LTD benefits (as opposed to deemed earnings)

Employer Contributions

The employers are required to match the member contributions, unless otherwise specified in the Plan text per their employer’s agreement, provided that the total member and employer contribution may not exceed 18% of pensionable earnings.

Employer contributions may exceed member contributions for a set period in accordance with the Plan provisions for that employer.

Retirement Dates

Normal Retirement Date

- The normal retirement date is the last day of the month coincident with or next following the attainment of age 65.

Early Retirement Date

- A member may choose to retire early on the last day of the month coincident with or next following the attainment of age 50.

Normal Retirement Pension

Normal Retirement Pension = Base Benefit + AIW Benefit

Base Benefit

The product of 8.5% multiplied by the sum of member contributions and employer contributions remitted to the Plan under the Design Two provisions on behalf of that member.

AIW Benefit

AIW Benefit = AIW Adjusted Design Two Benefit – Base Benefit

Where “AIW Adjusted Design Two Benefit” is the value of a member’s Base Benefit adjusted by the increase in Average Industrial Wage which are contingent on the funded status of the Plan at the last filed valuation.

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 Base Benefit and AIW Benefit payable, however, will be reduced by 5% per year for each year and prorated for partial years that the member’s early retirement precedes the Normal Retirement Date.

For Early Retirement Dates before January 1, 2025, the Base Benefit and AIW Benefit payable will be reduced by 3% per year for each year and prorated for partial years that the member’s early retirement precedes the Normal Retirement Date. The continuation of this lesser reduction is contingent on the funded status of the Plan at the last filed valuation.

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 pension in the amount accrued to the member and payable at the member's Normal Retirement Date. Deferred pensions may commence on or after attainment of age 50 and will be reduced by 5% per year for each year and prorated for partial years that the member's early retirement precedes the Normal Retirement Date.

Pre-retirement and post-retirement indexation

Pensions in payment and deferred pensions in respect of Design Two benefits are contingent on the funded status of the Plan at the last filed valuation.

Single Employer Pension Plan (SEPP) to Jointly Sponsored Pension Plan (JSPP) mergers

A list of SEPPs merged into the Plan and their effective dates are provided in the Appendices of the Plan text.

Upon transfer of assets as per the relevant Merger Agreement, in general, SEPPs retain their past service benefits as determined under the SEPP. Eligibility for pension benefit increases as they relate to past service benefits vary by employer and member group but not to exceed increases provided under the Plan.

As at their effective dates, former SEPP active members will participate in either Design One or Design Two depending on the terms of the Merger Agreement. Under Design Two, the level of contribution rates can vary by employer and member group, with total member and employer contributions not to exceed 18% of pensionable earnings. Contribution rates are being phased-in for certain former SEPP sponsors and members who have joined the Plan. Otherwise, the provisions of the Plan apply under the relevant Design.

Appendix G

Plausible adverse scenarios

In this Appendix, the financial impact on the Plan's going concern results (i.e., going concern financial position at the valuation date and current service cost from the valuation date to the next valuation date) and hypothetical wind-up and solvency financial positions of plausible adverse scenarios that would pose threats to the Plan's future financial condition is illustrated for the following risks:

- Interest rate risk, the potential that interest rates will be lower than expected;
- Deterioration of asset values; and
- Longevity risk, the potential that pension plan members will live longer than expected.

The following table summarizes the going concern results, where we assumed for:

- Interest rate risk, an immediate parallel decrease in market interest rates of 80 basis points
- Deterioration of asset values, an immediate decrease of 10% in the market value of non-fixed income assets; and
- Longevity risk, that life expectancy from the valuation date at age 65 for a male and a female would increase by 1.6 years and 1.4 years, respectively.

Scenario (000's)	Going Concern Valuation Results As At 01.01.2022	Plausible Adverse Scenario Results As At 01.01.2022		
		Interest Rate Risk	Deterioration Of Asset Values	Longevity Risk
Market value of assets	\$17,978,000	\$18,459,700	\$16,593,700	\$17,978,000
Going Concern Financial Status				
Smoothed value of assets	\$16,008,800	\$16,105,200	\$15,732,000	\$16,008,800
Present value of future contributions	\$6,405,300	\$6,511,100	\$6,405,300	\$6,514,500
Actuarial Value of Assets	\$22,414,100	\$22,616,300	\$22,137,300	\$22,523,300
Total actuarial liability	\$18,044,700	\$18,659,700	\$18,044,700	\$18,683,200
Funding excess (shortfall)	\$4,369,400	\$3,956,600	\$4,092,600	\$3,840,100
Estimated Current Service Cost				
2022	\$415,800	\$433,700	\$415,800	\$430,300

Scenario (000's)	Hypothetical Wind-up and Solvency Position As At 01.01.2022	Plausible Adverse Scenario Results As At 01.01.2022		
		Interest Rate Risk	Deterioration Of Asset Values	Longevity Risk
Hypothetical wind-up position				
Wind-up assets net of termination expense provision	\$17,969,800	\$18,451,500	\$16,585,500	\$17,969,800
Wind-up liabilities	\$17,530,200	\$19,631,200	\$17,530,200	\$18,116,100
Wind-up excess (shortfall)	\$439,600	(\$1,179,700)	(\$944,700)	(\$146,300)

Solvency Financial Position

Reduction in wind-up liabilities due to excluded benefits	(\$1,955,000)	(\$2,299,400)	(\$1,955,000)	(\$2,112,000)
Solvency liabilities	\$15,575,200	\$17,331,800	\$15,575,200	\$16,004,100
Solvency surplus (shortfall)	\$2,394,600	\$1,119,700	\$1,010,300	\$1,965,700
Solvency ratio	1.16	1.07	1.07	1.13
Transfer ratio	1.03	0.94	0.95	0.99

The balance of this Appendix provides details of the plausible adverse scenarios selected and the determination of the impact on the going concern results.

Interest Rate Risk

The purpose of this scenario is to illustrate the sensitivity of the Plan's valuation results to the potential that interest rates will be lower than expected. For this purpose, we have assumed an immediate parallel decrease in market interest rates underlying fixed income investments, where fixed income investments include the categories as shown in the investment policy summarized in Appendix B.

For purposes of this scenario, using a methodology consistent with the one used to determine the going concern discount rate, we have determined that a parallel decrease in market interest rates of 80 basis points would have a non-trivial probability (between 1 in 10 and 1 in 20) of occurring within the year following the valuation date. For purpose of this scenario, we have assumed that such a decrease in market interest rates would occur immediately on the valuation date and would have the following impact on the value of assets and going concern assumptions:

Defined Term	Description
Market value of assets	The decrease in market interest rates has been assumed to affect only the market value of the fixed income investments. The decrease is assumed to have occurred immediately on the valuation date.
Smoothed value of assets	For purposes of determining the smoothed value of assets, 20% of the change in the market value of asset has been recognized in the smoothed value of assets.
Discount rate assumption	Going concern: It was assumed that the decrease in market interest rates affects only the expected return on assets for the fixed income portion of assets. The discount rate assumption was therefore decreased from 4.95% to 4.75%. Hypothetical wind-up/solvency: The discount rates used in the valuation were decreased by 80 basis points.
Other assumptions	Except as mentioned above, all assumptions used were the same as those used for this valuation. In particular, the discount rate used to value benefits assumed to be settled through a lump sum on a going concern basis was not changed.

Deterioration of Asset Values

The purpose of this scenario is to illustrate the sensitivity of the Plan's valuation results to a deterioration of asset values. For this purpose, we assumed an immediate reduction in the market value of the Plan's non-fixed income assets, where non-fixed income investments include the categories as shown in the investment policy summarized in Appendix B.

For purposes of this scenario, using a methodology consistent with the one used to determine the going concern discount rate, we have determined that a decrease of 10% in the market value of value of non-fixed income assets would have a non-trivial probability

(between 1 in 10 and 1 in 20) of occurring within the year following the valuation date. For purpose of this scenario, we have assumed that such a decrease would occur immediately on the valuation date and would have the following impact on the value of assets and valuation assumptions:

Defined Term	Description
Market value of assets	The decrease in the market value of the non-fixed income portion of assets is assumed to have occurred immediately on the valuation date.
Smoothed value of assets	For purposes of determining the smoothed value of assets, 20% of the change in the market value of assets has been recognized in the smoothed value of assets.
Going concern assumptions	This scenario is assumed to have no impact on the assumptions used for this valuation.
Hypothetical wind-up and solvency assumptions	This scenario is assumed to have no impact on the assumptions used for this valuation.

Longevity Risk

The purpose of this scenario is to illustrate the sensitivity of the Plan's valuation results to the potential that pension plan members will live longer than expected. For this purpose, we have determined that a plausible adverse scenario would be to assume that future mortality improvements¹⁴ will be in line with the average improvements experienced by the Canadian population over the most recent 15-year period available, with uniform improvement rates for all future years but varying by age¹⁵ and gender.

The table below summarizes the improvement rates under the plausible adverse scenario compared to those currently assumed under the CPM-B scale and is based on Canadian population experience from the Human Mortality Database (HMD) from 2002 to 2016.

¹⁴ i.e. starting one year after the valuation in this context

¹⁵ improvement rates below age 45 are set to those at age 45

Age	Males				Females			
	CPM-B			Adverse Scenario	CPM-B			Adverse Scenario
	2020	2025	2030+		2020	2025	2030+	
20	1.59%	1.20%	0.80%	1.68%	0.98%	0.89%	0.80%	1.47%
30	1.88%	1.34%	0.80%	1.68%	0.98%	0.89%	0.80%	1.47%
40	1.80%	1.30%	0.80%	1.68%	1.17%	0.98%	0.80%	1.47%
50	1.17%	0.98%	0.80%	1.76%	0.98%	0.89%	0.80%	1.34%
55	1.47%	1.13%	0.80%	1.67%	1.11%	0.96%	0.80%	1.14%
60	1.77%	1.28%	0.80%	1.75%	1.24%	1.02%	0.80%	1.34%
65	2.06%	1.43%	0.80%	2.11%	1.36%	1.08%	0.80%	1.65%
70	2.06%	1.43%	0.80%	2.48%	1.36%	1.08%	0.80%	1.77%
75	2.01%	1.41%	0.80%	2.66%	1.36%	1.08%	0.80%	1.93%
80	1.96%	1.38%	0.80%	2.63%	1.36%	1.08%	0.80%	2.03%
85	1.38%	1.03%	0.68%	2.32%	1.31%	0.99%	0.68%	1.98%
90	0.75%	0.62%	0.48%	1.68%	0.75%	0.62%	0.48%	1.60%
95	0.16%	0.25%	0.34%	1.04%	0.16%	0.25%	0.34%	1.12%
100	0.14%	0.22%	0.30%	0.64%	0.14%	0.22%	0.30%	0.80%
105	0.14%	0.22%	0.30%	0.38%	0.14%	0.22%	0.30%	0.55%

Appendix H

Plan administrator certification

With respect to the Report on the Actuarial Valuation for Funding Purposes as at January 1, 2022 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 reflect a margin for adverse deviations of 0.90% in the discount rate used to perform the going concern valuation.
- A copy of the official plan documents and of all amendments made up to January 1, 2022 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, 2020.
- All events subsequent to January 1, 2022 that may have an impact on the Plan have been communicated to the actuary.

March 25, 2022

Date



Signed

Derek Dobson

Name



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