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HALIFAX REGIONAL WATER COMMISSION EMPLOYEES' PENSION PLAN

REPORT ON THE ACTUARIAL VALUATION AS AT JANUARY 1, 2014

(REGISTRATION NO. 0344614)

JUNE 2014

Prepared by:

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SUMMARY OF RESULTS

Going Concern Financial Position	January 1, 2014
Going concern value of assets	74,037,700
Going concern liability	(101,147,900)
Going concern excess / (unfunded liability)	(27,110,200)

Solvency Financial Position	January 1, 2014
Market value of assets	74,183,900
Net contributions / benefit payments in transit	(146,200)
Present value of special payments	13,446,400
Estimated wind-up expenses	(200,000)
Solvency assets	87,284,100
Solvency liabilities	(77,321,300)
Solvency excess / (deficiency)	9,962,800
Transfer ratio	95.8%

Wind-up Financial Position	January 1, 2014
Market value of assets	74,183,900
Net contributions / benefit payments in transit	(146,200)
Estimated Wind-up expenses	(200,000)
Wind-up assets	73,837,700
Total wind-up liabilities	(114,947,700)
Wind-up surplus / (deficiency)	(41,110,000)

Funding Requirements (annualized)	January 1, 2014	
	% of Payroll	$
Estimated contributory payroll for 2014 service		21,432,800
Total value of benefits for active Members	26.58%	5,697,900
Employee contributions (from active Members)	12.95%	2,776,500
Matching employer contributions	12.95%	2,776,500
Cost of benefits for disabled Members	0.68%	144,900
Minimum special payments in 2014 towards amortization of unfunded actuarial liabilities		$2,952,200
Total employer cost in 2014		$5,873,600

SECTION I INTRODUCTION AND PURPOSE OF VALUATION

At the request of the Halifax Regional Water Commission, we have completed an actuarial valuation of the *Halifax Regional Water Commission Employees' Pension Plan* as at January 1, 2014. The last actuarial valuation was performed as of January 1, 2011.

The purposes of this actuarial valuation are as follows:

- to provide funding recommendations for the purpose of accumulating assets to provide for Plan benefits in advance of their actual payment;
- to meet the statutory filing requirements under the Nova Scotia *Pension Benefits Act* and the *Income Tax Act*; and
- to determine whether the Plan is funded on a solvency valuation basis in accordance with the Nova Scotia *Pension Benefits Act*.

In this report, we have first provided the valuation results, along with an actuarial opinion with recommended funding levels for use until the next valuation. The data, actuarial assumptions and methodology used in valuing both the assets and the actuarial liabilities are provided by way of Appendices for ease of reference.

The intended users of this report are the Halifax Regional Water Commission, the Nova Scotia Superintendent of Pensions and the Canada Revenue Agency. This report is not intended or necessarily suitable for purposes other than those listed above. Any party reviewing this report for other purposes should have their own qualified professional assist in their review to ensure that the party understands the assumptions, results and uncertainties inherent in our estimates.

The next valuation of the Plan must be completed as at a date no later than January 1, 2017.

SECTION II PLAN CHANGES AND SUBSEQUENT EVENTS

This pension plan is one which may be described as a “best average salary” defined benefit plan. This means that each member’s retirement pension is calculated as a specified percentage of his or her average salary during the best five consecutive years of membership in the Plan.

The last valuation of the Plan was prepared as at January 1, 2011. There were no changes to the Plan between the last actuarial valuation and this valuation effective January 1, 2014.

A more detailed description of the current provisions of the Plan is contained in Appendix D, at the end of this report.

Subsequent Events and Financial Reporting

There have been changes to the going concern assumption since the last valuation. The discount rate has been reduced from 6.00% to 5.50% per year to reflect our long-term expectation of investment returns. Our assumption with respect to the rate of increase in the maximum pension has been reduced from 3.75% to 3.00% per year. The mortality assumption has also been strengthened to reflect mortality experience in Canadian pension plans through mortality tables issued by the Canadian Institute of Actuaries. These changes have, in aggregate, increased going concern liabilities by $14,653,000.

The solvency assumptions have also been changed to reflect market conditions at the valuation date.

The actuarial assumptions used in the valuation are provided in Appendix B.

We are not aware of any events subsequent to the valuation date that would have a material impact on the results of this valuation.

SECTION III FINANCIAL POSITION OF THE PLAN

A. Going Concern Basis: Financial Position as at January 1, 2014

Our calculations show that the total actuarial present value as at January 1, 2014 for all benefits accrued to active, terminated and retired Members is $101,147,900 (rounded to the nearest $100). This compares to going concern assets of $74,037,700 and results in an unfunded actuarial liability of $27,110,200 as at January 1, 2014. The valuation balance sheet shown below summarizes these liability figures and the corresponding asset values as of January 1, 2014 and as at January 1, 2011 for comparative purposes.

FINANCIAL POSITION – GOING CONCERN BASIS

	January 1, 2011	January 1, 2014
Going concern assets		
Market value of assets as at valuation date	$54,839,100	$74,183,900
Smoothing adjustment	2,484,600	n/a
Net contributions / benefit payments in transit	(8,600)	(146,200)
Total going concern assets	$57,315,100	$74,037,700
Going concern actuarial liabilities		
Active Members	$38,468,800	$54,398,100
LTD Members	2,404,800	3,757,500
Pensioners (i.e., retired Members receiving a pension)	27,478,400	39,271,900
Survivor pensions	2,267,200	2,843,700
Deferred pensions	713,200	539,300
Additional voluntary contributions (includes conversion accounts)	369,700	337,400
Total going concern actuarial liabilities	$71,702,100	$101,147,900
Going concern excess / (unfunded liability)	**($14,387,000)**	**($27,110,200)**

As shown above, the January 1, 2014 actuarial valuation has revealed an unfunded liability in the amount of $27,110,200. This compares to a going concern unfunded liability at the previous valuation of $14,387,000. Special payment requirements in respect of the unfunded liability are detailed in Section IV – Funding Requirements.

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Sensitivity Analysis

In accordance with the Canadian Institute of Actuaries' Standards of Practice, below we show the impact on the going concern actuarial liability as at January 1, 2014 of a one percentage point drop in the discount rate assumption (i.e., from 5.50% per annum to 4.50% per annum) with all other assumptions unchanged.

GOING CONCERN SENSITIVITY

	Impact 1% Drop
Total Going Concern Actuarial Liability	$122,281,900

The change would have the impact of increasing the plan liabilities by $21,134,000, or 20.9% as at January 1, 2014.

Reconciliation of Going Concern Financial Position

The reconciliation provides an independent cross-check of the calculations performed, and also determines the chief reasons leading to the change in the surplus and/or unfunded liabilities (deficiencies) that have occurred since the previous valuation date.

Although a complete analysis down to the final dollar can be made, such an analysis requires the processing of a considerable amount of detailed data relating to the Plan; the expense of which would not normally be justified unless there were special circumstances. However, it is possible to make an approximate analysis along broader lines and, under normal circumstances, this type of analysis will produce meaningful results.

The table below summarizes the results of our reconciliation of change in financial position over the past three years under consideration.

RECONCILIATION OF GOING CONCERN FINANCIAL POSITION

January 1, 2011 to January 1, 2014	
Going concern excess / (unfunded liability) as at January 1, 2011:	($14,387,000)
Add:	
▪ Special payments plus interest	5,016,600
▪ Investment experience	1,600,800
▪ Pension indexing less than expected under the actuarial assumptions	446,000
▪ Miscellaneous sources of gain	354,200
▪ Salary increases less than expected under the actuarial assumptions	93,200
Deduct:	
▪ Change in demographic assumptions	(7,409,000)
▪ Change in economic assumptions	(7,244,000)
▪ Interest on market value of unfunded liability at valuation rate	(3,096,400)
▪ Change in smoothing adjustment	(2,484,600)
Going concern excess / (unfunded liability) as at January 1, 2014:	**($27,110,200)**

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B. Solvency Basis: Financial Position as at January 1, 2014

The financial position of the Plan on a solvency basis as of January 1, 2014 is as follows:

FINANCIAL POSITION – SOLVENCY BASIS

	January 1, 2011	January 1, 2014
Solvency assets		
Market value of assets as at valuation date	$54,839,100	$74,183,900
Net contributions / benefit payments in transit	(8,600)	(146,200)
Estimated wind-up expenses	(200,000)	(200,000)
Total solvency assets	$54,630,500	$73,837,700
Solvency liabilities		
Active Members	$26,648,700	$35,079,000
LTD Members	2,063,000	3,245,100
Pensioners (i.e., retired Members receiving a pension)	26,200,900	35,557,900
Survivor pensions	2,187,800	2,594,600
Deferred pensions	690,100	507,300
Additional voluntary contributions (includes conversion accounts)	369,700	337,400
Total solvency liabilities	$58,160,200	$77,321,300
Solvency excess / (deficit) excluding present value of special payments:	**($3,529,700)**	**($3,483,600)**
Present value of 5 years' worth of unfunded liability special payments	$6,872,500	$13,446,400
Solvency excess / (deficiency)	**$3,342,800**	**$9,962,800**

As shown above, the solvency valuation has revealed a solvency deficit of $3,483,600, prior to the inclusion of the present value of any special payments as at January 1, 2014. With the inclusion of 5 years' of special payments, there is a solvency excess of $9,962,800.

Sensitivity Analysis

In accordance with the Canadian Institute of Actuaries' Standards of Practice, below we show the impact on the solvency liability as at January 1, 2014 of a one percentage point drop in the discount rate assumption. All other assumptions were kept unchanged.

SOLVENCY SENSITIVITY

	Impact 1% Drop
Total Solvency Actuarial Liability	$88,862,800

The change would have the impact of increasing the liabilities by $11,541,500 or 14.9% as at January 1, 2014.

Incremental Cost

In accordance with the Canadian Institute of Actuaries' Standard of Practice, we have estimated the incremental cost of the solvency liability as at January 1, 2014. This is the present value of the expected aggregate change in solvency liability between January 1, 2014 and the next valuation date, adjusted upwards for expected benefit payments. The next valuation is expected to be as at January 1, 2017.

The estimated incremental cost as at January 1, 2014 is $17,557,000. The estimated incremental cost does not impact the funding requirements of the Plan under the Nova Scotia *Pension Benefits Act* and is for information purposes only.

The methodology for calculating the incremental cost was to determine the solvency liability as at the end of the cost period, allowing for new benefits expected to accrue in the interim. New benefits include future pension accruals and future qualification for early retirement benefits. The present value of this future liability (adjusted for the impact of benefit payments) was then compared to the current solvency liability to determine the incremental cost.

C. Transfer Ratio as at January 1, 2014

The Regulations under the Nova Scotia *Pension Benefits Act* also require the determination of a "transfer ratio". This transfer ratio is used to determine whether transfers of commuted values to terminating members can be made in full, immediately. The transfer ratio is the ratio of the solvency assets (at market value or at a value that averages fluctuations in market value), plus any receivable income (i.e., contributions/benefits in transit), to the solvency liabilities. As at January 1, 2014 the transfer ratio was 95.8% (i.e., ($74,183,900 – 146,200) divided by $77,321,300).

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If the transfer ratio is less than 100% then, unless certain conditions are met, a portion of a terminated member's commuted value cannot be paid in a lump sum, but instead must be held back and paid with interest within 5 years. For this plan, the portion is 4.2%. The two conditions that allow full payment of the commuted value are:

- if an additional contribution is remitted to the fund equal to the portion of the commuted value that should be held back, or
- if the portion that should be held back for each terminating member is less than 5% of the Canada Pension Plan earnings ceiling (YMPE) in the year of termination (i.e., less than $2,625 in 2014), and the aggregate of the portions that should be held back for all members who terminated since the last valuation date is less than 5% of the assets of the plan.

D. Hypothetical Wind-up Basis: Financial Position as at January 1, 2014

The financial position of the Plan on a wind-up basis as of January 1, 2014 is as follows:

FINANCIAL POSITION – WIND-UP BASIS

	January 1, 2011	January 1, 2014
Wind-up assets		
Market value of assets as at valuation date	$54,839,100	$74,183,900
Net contributions / benefit payments in transit	(8,600)	(146,200)
Estimated wind-up expenses	(200,000)	(200,000)
Total wind-up assets	$54,630,500	$73,837,700
Wind-up liabilities		
Active Members	$48,193,300	$61,422,400
LTD Members	3,524,800	5,140,600
Pensioners (i.e., retired Members receiving a pension)	32,052,100	44,227,100
Survivor pensions	2,534,000	3,043,600
Deferred pensions	833,600	776,600
Additional voluntary contributions (includes conversion accounts)	369,700	337,400
Total wind-up liabilities:	$87,507,500	$114,947,700
Wind-up excess / (deficiency)	**($32,877,000)**	**($41,110,000)**

As shown above, on a wind-up basis there is a wind-up deficiency of $41,110,000 after providing for the settlement of all accrued benefit entitlements as at January 1, 2014, and the inclusion of grow-in benefits.

SECTION IV FUNDING REQUIREMENTS

A. Current Service Costs

The Plan's current service cost is the value of the benefits accruing to Members in the year following the valuation, determined on a going concern basis.

The table below summarizes the results of the Plan's current service cost for the 12-month period following January 1, 2014. According to the Plan Rules, this cost should be shared equally by the employer and the Plan Members.

CURRENT SERVICE COSTS

	% of Payroll	$
Estimated contributory payroll for 2014 service		$21,432,800
Total value of benefits for active Members	26.58%	$5,697,900
Employee contributions (from active Members)	12.95%	$2,776,500
Matching employer contributions	12.95%	$2,776,500
Cost of benefits for disabled Members	0.68%	$144,900

The cost of benefits accruing in respect of the year following the valuation date is $5,697,900. This amounts to 26.58% of active contributory payroll. Of this, 0.68% is in respect of benefit accruals for Members on LTD, and will be funded by contributions to the fund by the employer in this amount. The employee and employer contributions in respect of active Members should therefore be set at a flat 12.95% of earnings (amounting to $2,776,500 each) for a total of 25.90% of earnings.

Sensitivity Analysis

Below we show the impact on the 2014 current service cost as at January 1, 2014 of a one percentage point drop in the discount rate assumption. All other assumptions were kept unchanged.

CURRENT SERVICE COST SENSITIVITY

	Impact 1% Drop
Total Current Service Cost	$7,638,100

The change in the discount rate would have the impact of increasing the current service cost by $1,940,200 or 34.1% as at January 1, 2014. The resulting current service cost would amount to employee and employer contributions in respect of active Members of 17.41% of earnings (for a total of 34.82% of earnings), and 0.81% in respect of benefit accruals for Members on LTD.

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B. Special Payments

In addition to current service contributions, special payments are required in order to amortize the Plan's going concern unfunded liability.

The following table summarizes the required special payments as at January 1, 2014:

ANNUAL SPECIAL PAYMENTS

Payment Type	Date Established	Term Remaining	Annual Payment	Going Concern Present Value of Special Payments
Going Concern	January 1, 2003	4 years	15,600	56,200
Going Concern	January 1, 2006	7 years	358,200	2,095,800
Going Concern	January 1, 2011	12 years	1,154,700	10,245,900
Going Concern	January 1, 2014	15 years	*1,423,700	14,712,300
Total			**$2,952,200**	**$27,110,200**

* This payment is determined as the amount required to amortize the January 1, 2014 unfunded liability (after accounting for the previously scheduled January 1, 2003, January 1, 2006 and January 1, 2011 unfunded liability special payments) over a period of 15 years.

SECTION V ACTUARIAL OPINION

The following represent our primary conclusions as a result of our actuarial valuation as at January 1, 2014:

1. As at the valuation date there exists a Plan going concern unfunded liability of $27,110,200. This unfunded liability must be amortized with minimum special payments of $2,952,200 per annum for 4 years, followed by $2,936,600 per annum for 3 years, followed by $2,578,400 per annum for 5 years, followed by $1,423,700 for 3 years.

2. The Plan has a solvency excess of $9,962,800 (after including the present value of 5 years' of scheduled special payments).

3. The cost of benefits accruing in respect of the year following the valuation date is $5,697,900, which amounts to 26.58% of active contributory payroll. Required employee contributions are 12.95% of payroll for each of the next three years in order to cover current year cost. Employer contributions are 12.95% of contributory payroll, with a further 0.68% of contributory payroll required to fund benefits for Members on LTD.

4. The adequacy and appropriateness of this funding level should be reviewed at the next actuarial valuation of this Plan, which should take place as of January 1, 2017 at the latest.

5. If the Plan were to be wound up on the valuation date, the value of Plan assets would be less than the Plan's wind-up liabilities by an amount of $41,110,000.

6. The maximum employer contribution permitted in 2014 is estimated to be $44,031,400 and is equal to the wind-up deficit of $41,110,000 plus the expected employer current service cost of $2,921,400 (i.e., 2,776,500 + 144,900).

7. The transfer ratio of the Plan is 95.8%.

8. For purposes of paragraph 147.2(2)(d) of the Income Tax Act, the excess surplus based on the going concern valuation was nil as of January 1, 2014.

9. We are not aware of any events that occurred between the valuation date and the date this report was completed that would have a material impact on the results of this valuation. Any investment experience occurring between the valuation date and the report date, which differs from the assumption made, is not reported on in this valuation report and will be reported on in a future valuation.

10. In our opinion,

    a. the data on which the valuation is based are sufficient and reliable for the purposes of the valuation as described in Section I;

    b. the assumptions described herein are appropriate for the purposes of the valuation;

    c. the methods employed in the valuation are appropriate for the purposes of the valuation; and

    d. this report has been prepared, and our opinions given, in accordance with accepted actuarial practice.

Nonetheless, emerging experience, differing from the assumptions, will result in gains or losses which will be revealed in future valuations.

Respectfully submitted,

Peter C. Hayes, FSA FCIA

Jeff Turnbull, FSA FCIA

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APPENDIX A PLAN ASSETS

The pension plan assets are structured under a master trust arrangement whereby the Plan funds are invested in the same manner as the HRM pension fund, however, a sub-account for HRWC is tracked for administrative purposes. At January 1, 2014, the market value of the fund (per the Northern Trust Financial Statements) amounted to $74,183,868.

Reconciliation of Plan Assets

A summary of pension fund transactions for the period January 1, 2011 to January 1, 2014 is summarized below:

RECONCILIATION OF PLAN ASSETS

	2011	2012	2013
January 1	$54,839,109	$56,984,728	$65,265,066
Employee Contributions – Current Service	1,629,524	2,052,128	2,087,335
Employee Contributions – Other	30,267	16,124	19,238
Employer Contributions – Current Service	1,722,224	2,144,824	2,180,035
Employer Contributions – Other	1,534,249	1,528,500	1,528,500
Net Investment Income	507,204	5,760,723	6,373,391
Pensions Paid	(2,571,070)	(2,704,090)	(2,972,990)
Refunds, Transfers Out	(706,779)	(517,871)	(296,708)
December 31	**$56,984,728**	**$65,265,066**	**$74,183,868**

Performance of Plan Assets

The net rate of return on the pension fund's assets over the past three years is shown below:

ANNUALIZED RATES OF RETURN

Year Ending	Net of Expenses Return
December 31, 2011	0.91%
December 31, 2012	9.89%
December 31, 2013	9.58%
3 year average	**6.71%**

The average rate of return since the last valuation was 6.71% net of expenses.

It should be noted that these returns do not remove the impact of the timing of cash flows. They do, however, accurately reflect the actual rate of growth of the pension fund. Thus, there may be differences between these returns and the time weighted rates of return reported by the fund manager.

APPENDIX B ACTUARIAL METHODS AND ASSUMPTIONS

A. Valuation of Assets

Going Concern assets are measured on a market value basis at this valuation. The table below summarizes the calculation of the actuarial asset value at January 1, 2014, rounded to the nearest $100:

ACTUARIAL ASSET VALUE

	January 1, 2014
Market value of assets	$74,183,900
Net contributions / benefit payments in transit	(146,200)
Actuarial value of assets	**$74,037,700**

B. Going Concern Valuation

For the purposes of a going concern valuation, we select actuarial assumptions with a long term focus. That is, we anticipate that the Pension Plan will continue indefinitely into the future. Actuarial assumptions are selected giving consideration to historical trends, future expectations and Pension Plan specific experience, where possible. The assumptions chosen are expected to produce a stable pattern of funding and meet the plan sponsor’s desire to minimize potential for significant shortfalls or deficits in the future.

The purpose of this part of our analysis is to determine an appropriate method and series of assumptions to make proper allowance for the Plan's future liabilities by way of payment of pensions and other benefits. In making these calculations, assumptions must be made:

- as to the probability that a particular payment will be made at a certain time (for example, depending upon whether or not the individual concerned survives to that date), and
- the expected amount of each such payment.

In order to do this, we make a series of assumptions in connection with the many factors which will have a bearing upon the future financial operation of the Pension Plan. These include the following:

- future rates of mortality (and the corresponding life expectancies of the Plan Members and their spouses),
- future rates of employee turnover (withdrawal from the Plan),
- future rates of salary increase for members of the Plan,
- future rates of entitlement to disability benefits amongst the members of the Plan,
- the proportion of those plan members who are married (and in respect of whom a survivor’s pension would be payable to that individual’s surviving spouse in the event of the member’s death).

Finally, we give consideration to the rate of interest that will be earned on the assets of the pension fund in future years.

As part of our process of analysis, all of these factors have received consideration. Where applicable, we have taken into account the actual experience of this pension plan. However, it should be noted that, from a statistical point of view, actual experience data developed from a single pension plan has limited validity unless the number of Plan Members is very large. Therefore, it becomes necessary to take into account statistics developed from many other larger pension plans.

The assumptions used in the current valuation have been revised from the last valuation to reflect plan experience and changes in future expectations.

Going Concern Discount Rate Assumption

The discount rate assumption, net of expenses, has been decreased from 6.00% to 5.50% per annum.

The economic assumptions (i.e., those related to interest rates and inflation) for this valuation are based on reasonable expectations with respect to the relationships among key economic variables over the long term, as well as the expected impact of those economic variables on the investment performance of the pension fund given the fund's investment policy.

We have taken a "best estimate" approach to the determination of the discount rate, based on the expected future investment return on the assets of the pension plan. In particular, our approach consists of:

- determining the best estimate of long-term, expected future investment returns for the various asset classes in which the Plan invests;
- combining these best estimate long-term, expected future investment returns to reflect the Plan's investment policy, thereby creating an "expected" fund return that is a weighted average of the asset class returns;
- including an allowance for additional return due to active versus passive management, and the impact of rebalancing and diversification, which we have considered appropriate in the circumstance as a result of stochastic modelling specific to the Plan's target asset mix;
- and making appropriate provision for expenses and a provision for adverse deviation.

The result of our analysis is depicted in the following table:

DISCOUNT RATE

Development of Discount Rate	
Unadjusted "best estimate" return	5.72%
Less fees	(0.60%)
Plus value added return from active management	0.60%
Plus "rebalancing and diversification effect"	0.45%
Less Provision for Adverse Deviation	(0.67%)
Equals discount rate	5.50%

Going Concern Mortality Assumption

We have changed the mortality table for this valuation to the CPM2014Publ generational mortality table projected with Scale CPM-B. The change in our mortality assumption reflects the need to recognize longer life expectancies of Canadian pensioners. The mortality table used in the last valuation – the UP94@2020 table – was the standard used in Canada for several years.

In the following table we have provided a comparison of life expectancies under each of mortality tables used in the previous and current valuations, respectively, for males and females at selected ages:

COMPARISON OF MORTALITY UNDER PREVIOUS AND CURRENT VALUATION ASSUMPTION

Age	Life Expectancy For Male under Previous Assumption	Life Expectancy For Male under Current Assumption	Life Expectancy For Female under Previous Assumption	Life Expectancy For Female under Current Assumption
25	56.8	61.8	60.0	64.7
35	47.1	51.7	50.1	54.4
45	37.5	41.7	40.4	44.1
55	28.1	31.9	30.7	34.1
65	19.4	22.6	21.8	24.5
75	12.0	13.9	14.0	15.6
85	6.4	6.9	7.6	8.2

We expect to review the mortality assumption from time to time, both to reflect trends in mortality, as well as the development of new actuarial tables and standards.

Salary Scale Assumption

The salary scale assumption used for this valuation has remained at 3.90% per annum, the same rate as that used in the previous valuation.

Maximum Pension Increase Assumption

Pensions are capped by regulation at $2,770.00 per year of service for retirements occurring in 2014. It is expected that this maximum will be increased in accordance with an average wage index from 2014 onward. For purposes of the valuation, we have assumed that the maximum pension will increase after 2014 by 3.00% per annum, versus the 3.75% per annum assumed in the January 1, 2011 actuarial valuation.

Going Concern Actuarial Methods

The actuarial cost method used in conducting this valuation is the projected unit credit cost method. This is the same method as was used in the previous valuation.

In using this method, as a first step, a calculation is made of the liability in respect of all benefits that have accrued to members on account of service up to and including the valuation date. This represents the "accrued liability". It should be noted that this calculation takes into account projected future pay increases for each member up to and including expected retirement date. It should be noted that in performing our calculations, we have made allowance for excess contributions under the 50% Rule for post-reform service and minimum benefits for pre-reform service.

As a completely separate process, the current year cost has been calculated (using exactly the same actuarial assumptions). This represents the additional cost of the benefits that will accrue in respect of the 12 month period following the valuation date. This is compared with the amount of the required employee contributions over that period. The difference represents the required employer contribution necessary in order for those benefits to be properly funded.

For an individual member, the funding pattern produced by the projected unit credit cost method is one that increases (both in dollar terms and as a percentage of salary) over time. However, for the group as a whole, if the average age remains constant (which can occur through the retirement of older members and the addition of new, younger members) and salary levels increase in accordance with the salary scale, the contribution rate recommended under this method will remain relatively constant. If the plan's average age increases, on the other hand, the current year cost will also increase. Such increases would be revealed in future valuations.

The following table details the actuarial assumptions that have been used in the going concern valuation (including, in each case, the source of the statistics used for this purpose):

GOING CONCERN VALUATION ACTUARIAL ASSUMPTIONS

	January 1, 2014
Interest:	Pre-retirement: 5.50% per annum Post-retirement: 3.50% per annum
Retirement Age:	40% at age 65 60% at age Rule of 85
Withdrawals:	None
Salary Scale:	3.90% per annum
Maximum Pension:	$2,770.00 in 2014
Increase in Maximum Pension:	3.00% per annum after 2014
Percentage Married:	100%
Spouse's Age:	Males 3 yrs older
Interest on Employee Contributions:	4.00% per annum
Pre-retirement Mortality:	None
Post-retirement Mortality:	CPM2014Publ, projected with Scale CPM-B
Funding Method:	Projected Unit Credit

C. Solvency Valuation

The Nova Scotia Pension Benefits Act prescribes a solvency valuation. A solvency valuation permits the regulator to assess the solvency of the Plan should it terminate or wind-up effective on the valuation date. That is, an assessment is made as to whether the assets of the pension fund would be sufficient if no further benefits were provided and all members were paid their entitlements. If solvency assets are not sufficient to fund solvency liabilities (i.e., the Plan has a solvency deficiency), then special payments are required in order to eliminate the deficiency.

For active members not eligible for immediate retirement (i.e., those under age 55), the interest rate used for calculating solvency liabilities was 3.10% per annum for the first 10 years and 4.60% per annum thereafter. This rate was in accordance with the Section 3500 of the Canadian Institute of Actuaries ("CIA") Standards of Practice – Pension Commuted Values with rates in effect for the month of January 2014. The mortality assumption used was the UP94 generational projected with Scale AA.

For retired lives and active members 55 or older, the solvency liabilities were calculated using an interest rate of 3.89% per annum and the UP94 generational mortality table projected with Scale AA. These assumptions represent the estimated basis for settlement of the Plan's obligations for retired lives by the purchase of insured annuities on the valuation date, and are in accordance with the Canadian Institute of Actuaries Educational Note entitled "Assumptions for Hypothetical Wind-Up and Solvency Valuations with Effective Dates Between December 31, 2013 and December 30, 2014".

In accordance with the CIA Transfer Value Recommendations, the retirement age assumption incorporates the retirement age which provides the maximum value (we have determined this to be age 65 for those less than age 55 on the valuation date and current age for those greater than age 55 on the valuation date).

Note that the solvency valuation does not make any assumptions about future pay increases or future termination of employment, since all members are assumed to terminate on the valuation date. The actuarial assumptions for the solvency valuation are described in the following table:

SOLVENCY VALUATION ACTUARIAL ASSUMPTIONS

	January 1, 2014
Interest:	For actives <55, 3.10% per annum for the first 10 years, 4.60% per annum thereafter
	For pensioners, deferred members and actives > 55, 3.89% per annum
Retirement Age:	For actives < 55, deferral to Normal Retirement Date (NRD)
	For actives > 55, immediately with reductions from earlier of Rule of 85 (assuming projected age, not service) and NRD
Withdrawals:	Immediately
Salary Scale:	None
Maximum Pension:	$2,770.00 per year of service
Increase in Maximum Pension:	n/a
Percentage Married:	100%
Spouse's Age:	Males 3 yrs older
Interest on Employee Contributions:	n/a
Pre-retirement Mortality:	None
Post-retirement Mortality:	UP94 generational mortality, projected with Scale AA
Funding Method:	Termination

D. Wind-up Valuation

The wind-up valuation liability assumptions are the same as the solvency valuation with the exception of the following:

- The wind-up valuation must account for the future value of pension benefit indexing.
- The wind-up valuation must account for the grow-in provisions of the Pension Benefits Act, where grow-in implies that on wind-up, for a Member whose age plus service total more than 55, membership is assumed to continue past the valuation date for purposes of determining early retirement benefits.

WIND-UP VALUATION ACTUARIAL ASSUMPTIONS

	January 1, 2014
Interest:	For actives <55, 1.70% per annum for the first 10 years, 2.60% per annum thereafter
	For pensioners, deferred members and actives > 55, 1.89% per annum
Retirement Age:	For actives < 55 points (points = age plus service), deferral to Normal Retirement Date (NRD)
	For actives > 55 points, deferral to whichever of i) or ii) produces the greater value, where i) is the earliest unreduced retirement date using projection of both age and service, and ii) is the earliest reduced retirement date, with appropriate Plan early retirement reductions
Withdrawals:	Immediately
Salary Scale:	None
Maximum Pension:	$2,770.00 per year of service
Increase in Maximum Pension:	n/a
Percentage Married:	100%
Spouse’s Age:	Males 3 yrs older
Interest on Employee Contributions:	n/a
Pre-retirement Mortality:	None
Post-retirement Mortality:	UP94 generational mortality, projected with Scale AA
Funding Method:	Termination

APPENDIX C MEMBERSHIP DATA

Records were submitted to us electronically by Ms. Cheryl Little of the Halifax Regional Water Commission. They indicate that the total active membership of the Pension Plan, as of January 1, 2014 was 361, including 351 full-time Members and 10 Members in receipt of long-term disability benefits from the group insurance plan. This represents a net increase of 53 since the previous valuation. Schedule C1 summarizes the changes in active membership since the last valuation.

Schedules C2 through to C4 summarize basic information for the total full-time groups for males and females. The data received contained pertinent information for each Member, such as birth date, date of employment, years of service, rates of pay and accumulated contributions plus interest.

There were 8 deferred vested Members as of the valuation date, representing a decrease of 1 since the previous valuation.

The data were reviewed by us as to accuracy and reasonableness. By comparing the data to that provided in previous years we are satisfied that the data are complete. In addition, we performed various checks of reasonableness on dates of employment, plan membership, and birth. We also compared lists of active Members with lists of inactive and retired Members to check for duplicates. In all cases, we found the data to be sufficient and reliable for the purpose of the valuation. Appendix E contains a confirmation by the Halifax Regional Water Commission as to the accuracy and completeness of the data provided.

Data in respect of retired Members and survivors were submitted to us electronically as well. Again, the data were checked for reasonableness and completeness. The data were found to be sufficient and reliable for the purpose of the valuation.

Schedules C5 and C6 summarize pensioner data. The total number of retirees receiving payments from the fund as of the valuation date was 92. There were 28 survivors receiving survivors' benefits from the fund. Included are 5 survivors that receive cost-of-living adjustments on the portion of their pension purchased from Confederation Life. The changes in the number of individuals receiving pensions since the last valuation are summarized in Schedule C1.

SCHEDULE C1 - RECONCILIATION OF MEMBERSHIP

Active (including LTD)	Males	Females	Total
Number at January 1, 2011	**220**	**88**	**308**
Plus:			
New Entrants	78	34	112
Less:			
Retirements	11	5	16
Terminations*	24	18	42
Deaths	0	1	1
Number at January 1, 2014	**263**	**98**	**361**

* Note that terminations include those that have moved to deferred pensioner status.

Pensions in Pay	Pensioners		Survivors		Total
	M	F	M	F	
Number at January 1, 2011	**67**	**17**	**1**	**23**	**108**
Plus:					
New Retirees	11	5	-	-	16
New Retirees due to Marriage Breakdown	-	1	-	-	1
New Survivors	-	-	1	5	6
Less:					
Deaths	8	1	0	2	11
Number at January 1, 2014	**70**	**22**	**2**	**26**	**120**

Schedule C2 – Salary Age / Service Distribution for Active Members

Age	Service	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	Total
	Sum of salaries	371,481									371,481
20-24	Member count	7									7
	Average salary	53,069									53,069
	Sum of salaries	1,845,412	209,534								2,054,946
25-29	Member count	35	4								39
	Average salary	52,726	52,383								52,691
	Sum of salaries	1,808,294	808,283	155,823							2,772,400
30-34	Member count	32	14	3							49
	Average salary	56,509	57,734	51,941							56,580
	Sum of salaries	1,948,330	1,029,860	400,143	173,343						3,551,677
35-39	Member count	35	16	7	3						61
	Average salary	55,667	64,366	57,163	57,781						58,224
	Sum of salaries	1,510,738	828,811	310,815	398,814	192,915	135,499				3,377,591
40-44	Member count	24	13	5	6	3	2				53
	Average salary	62,947	63,755	62,163	66,469	64,305	67,749				63,728
	Sum of salaries	873,107	743,933	254,594	368,331	374,950	344,346	53,868			3,013,129
45-49	Member count	16	12	5	6	5	5	1			50
	Average salary	54,569	61,994	50,919	61,389	74,990	68,869	53,868			60,263
	Sum of salaries	790,681	778,768	287,444	254,559	382,202	808,961	172,664			3,475,280
50-54	Member count	11	13	4	3	7	10	2			50
	Average salary	71,880	59,905	71,861	84,853	54,600	80,896	86,332			69,506
	Sum of salaries	310,152	518,861	52,321	310,719	259,317	112,804		271,961		1,836,136
55-59	Member count	5	7	1	5	4	2		3		27
	Average salary	62,030	74,123	52,321	62,144	64,829	56,402		90,654		68,005
	Sum of salaries	249,027	55,345		120,948	107,894	60,803	74,742		149,332	818,090
60-64	Member count	3	1		2	2	1	1		2	12
	Average salary	83,009	55,345		60,474	53,947	60,803	74,742		74,666	68,174
	Sum of salaries		47,705						54,168		101,873
65-69	Member count		1						1		2
	Average salary		47,705						54,168		50,936
	Sum of salaries				60,200						60,200
>70	Member count				1						1
	Average salary				60,200						60,200
Total salaries		9,707,222	5,021,099	1,461,140	1,686,915	1,317,280	1,462,413	301,273	326,130	149,332	21,432,803
Total member count		168	81	25	26	21	20	4	4	2	351
Average salary		57,781	61,989	58,446	64,881	62,728	73,121	75,318	81,532	74,666	61,062
Average age		**42.3**									

SCHEDULE C3 – SALARY AGE / SERVICE DISTRIBUTION FOR ACTIVE MEMBERS – FEMALE ONLY

Age	Service	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	Total
20-24	Sum of salaries	97,105								97,105
	Member count	2								2
	Average salary	48,552								48,552
25-29	Sum of salaries	513,218								513,218
	Member count	10								10
	Average salary	51,322								51,322
30-34	Sum of salaries	458,485	288,706	47,398						794,588
	Member count	8	5	1						14
	Average salary	57,311	57,741	47,398						56,756
35-39	Sum of salaries	483,993	327,632	224,385	111,814					1,147,823
	Member count	9	5	4	2					20
	Average salary	53,777	65,526	56,096	55,907					57,391
40-44	Sum of salaries	492,794	250,758	54,168	271,199	80,167				1,149,087
	Member count	7	4	1	4	1				17
	Average salary	70,399	62,690	54,168	67,800	80,167				67,593
45-49	Sum of salaries	313,235	321,763	47,307	136,478		119,119			937,902
	Member count	6	6	1	2		2			17
	Average salary	52,206	53,627	47,307	68,239		59,559			55,171
50-54	Sum of salaries	169,056	103,133	113,864	50,913	44,559	91,957	172,664		746,146
	Member count	3	2	2	1	1	1	2		12
	Average salary	56,352	51,566	56,932	50,913	44,559	91,957	86,332		62,179
55-59	Sum of salaries					50,287	59,118		101,837	211,242
	Member count					1	1		1	3
	Average salary					50,287	59,118		101,837	70,414
60-64	Sum of salaries	39,570				54,168				93,738
	Member count	1				1				2
	Average salary	39,570				54,168				46,869
Total salaries		2,567,454	1,291,991	487,123	570,404	229,182	270,194	172,664	101,837	5,690,849
Total member count		46	22	9	9	4	4	2	1	97
Average salary		55,814	58,727	54,125	63,378	57,295	67,549	86,332	101,837	58,669
Average age		**41.1**								

SCHEDULE C4 – SALARY AGE / SERVICE DISTRIBUTION FOR ACTIVE MEMBERS – MALE ONLY

Age	Service	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	Total
20-24	Sum of salaries	274,376									274,376
	Member count	5									5
	Average salary	54,875									54,875
25-29	Sum of salaries	1,332,194	209,534								1,541,728
	Member count	25	4								29
	Average salary	53,288	52,383								53,163
30-34	Sum of salaries	1,349,810	519,577	108,425							1,977,812
	Member count	24	9	2							35
	Average salary	56,242	57,731	54,212							56,509
35-39	Sum of salaries	1,464,337	702,229	175,758	61,530						2,403,853
	Member count	26	11	3	1						41
	Average salary	56,321	63,839	58,586	61,530						58,631
40-44	Sum of salaries	1,017,944	578,053	256,647	127,614	112,749	135,499				2,228,505
	Member count	17	9	4	2	2	2				36
	Average salary	59,879	64,228	64,162	63,807	56,374	67,749				61,903
45-49	Sum of salaries	559,872	422,169	207,287	231,853	374,950	225,227	53,868			2,075,227
	Member count	10	6	4	4	5	3	1			33
	Average salary	55,987	70,362	51,822	57,963	74,990	75,076	53,868			62,886
50-54	Sum of salaries	621,626	675,636	173,580	203,646	337,643	717,004				2,729,134
	Member count	8	11	2	2	6	9				38
	Average salary	77,703	61,421	86,790	101,823	56,274	79,667				71,819
55-59	Sum of salaries	310,152	518,861	52,321	310,719	209,030	53,686		170,125		1,624,894
	Member count	5	7	1	5	3	1		2		24
	Average salary	62,030	74,123	52,321	62,144	69,677	53,686		85,062		67,704
60-64	Sum of salaries	209,457	55,345		120,948	53,726	60,803	74,742		149,332	724,352
	Member count	2	1		2	1	1	1		2	10
	Average salary	104,729	55,345		60,474	53,726	60,803	74,742		74,666	72,435
65-69	Sum of salaries		47,705						54,168		101,873
	Member count		1						1		2
	Average salary		47,705						54,168		50,936
>70	Sum of salaries				60,200						60,200
	Member count				1						1
	Average salary				60,200						60,200
Total salaries		7,139,768	3,729,108	974,017	1,116,511	1,088,098	1,192,219	128,609	224,293	149,332	15,741,954
Total member count		122	59	16	17	17	16	2	3	2	254
Average salary		58,523	63,205	60,876	65,677	64,006	74,514	64,305	74,764	74,666	61,976
Average age		**42.8**									

Schedule C5 – Pensioners

Age	Females		Males		Total	
	Number	Monthly Pension	Number	Monthly Pension	Number	Pension
55-59	7	24,757	6	26,370	13	51,127
60-64	6	12,455	18	50,620	24	63,075
65-69	3	4,953	18	39,099	21	44,052
70-74	4	3,505	18	40,656	22	44,162
75-79	0	0	4	5,164	4	5,164
80-84	1	987	3	6,583	4	7,569
85-89	0	0	2	4,615	2	4,615
90-94	1	2,527	1	3,228	2	5,755
Total:	**22**	**49,184**	**70**	**176,336**	**92**	**225,519**
Average Age:67.8						
Average Monthly Pension: 2,451						

Schedule C6 – Survivors

Age	Females		Males		Total	
	Number	Monthly Pension	Number	Monthly Pension	Number	Pension
55-59	1	897	0	0	1	897
60-64	2	1,946	0	0	2	1,946
65-69	5	5,966	1	594	6	6,560
70-74	2	3,601	0	0	2	3,601
75-79	0	0	0	0	0	0
80-84	5	5,124	0	0	5	5,124
85-89	4	4,190	1	489	5	4,678
90-94	5	2,801	0	0	5	2,801
95-99	2	874	0	0	2	874
Total:	**26**	**25,400**	**2**	**1,083**	**28**	**26,483**
Average Age: 79.9						
Average Monthly Pension: 946						

APPENDIX D SUMMARY OF PLAN PROVISIONS

Plan Summary

This pension plan is one of the type which is described as a "best average salary" plan.

This means that each member's retirement pension is calculated as a specified percentage of his or her average salary during the best five years of membership in the plan. For this Plan, the specified percentage is 2% for each year of credited service under the Plan.

The plan also provides for early retirement with full benefits whenever a member's age plus years of service total at least 85 (provided the member has attained age 55); for the payment of a pension to the surviving spouse of a deceased member; and for provision of a disability pension.

Effective Date

January 1, 1972

Eligibility

All employees (Full-time and Part-time) are eligible to join the Plan on their date of employment.

Normal Retirement Date

The Normal Retirement Date of a member shall be the first of the month coincident with or next following the 65th birthday.

Early Retirement Dates

Members may retire within the ten years prior to Normal Retirement Date. A reduction to the pension, reflecting the earlier start date, will apply. An unreduced pension is available to Members retiring with the “Rule of 85” (see below).

Delayed Retirement

Members who continue in employment past Normal Retirement Date continue to accrue benefits under the Plan and begin to receive a pension on actual retirement date.

Contributions

Employee	-	Required	=	Contributions are a percentage of the member's earnings as is required to fund the benefits accruing in the current year on an equally-shared basis with the Commission.
	-	Optional	=	Additional voluntary contributions to the plan are permitted.
Employer	-		=	Contributions as recommended by the Actuary to meet proper funding requirements, predicated on an equally-shared basis with Plan Members.

Retirement Benefits

Normal Retirement

An annual pension payable in monthly installments based on the member's best earnings averaged over the highest five consecutive years of earnings. The basic benefit would be 2% of the member's best average salary times years of pensionable service.

Early Retirement

The amount of pension payable is the actuarial equivalent of a pension payable on the earliest date that the member could have retired without a reduction of benefits.

Rule of 85

A member may retire earlier than his Normal Retirement Date, providing he has attained age 55, any time after the first day of the month following the date upon which the sum of his age plus years of Service with the Commission totals 85. He shall receive a pension of an annual amount equal to that stated above under Normal Retirement Pension.

Normal Form of Pension

Single Members: single life pension guaranteed for ten years (amount payable in respect of pre-1992 benefits is the actuarial equivalent of a pension payable to a member with a Spouse).

Members with a Spouse: 60% joint and last survivor pension with payments reducing upon member's death.

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Death Benefits

Death Before Retirement

In respect of credited service prior to June 1, 1998

Single Members -	The beneficiary is entitled to receive the total amount of the member's contributions plus interest compounded annually to the end of the month in which the death occurs.
Members with a Spouse -	A lifetime pension equal to 60% of the member's accrued pension shall be payable monthly to the member's surviving spouse commencing on the first day of the month following the member's death, provided that the spouse satisfies the eligibility requirements.

In respect of credited service after June 1, 1998

The commuted value of the Member’s accrued pension.

Death After Retirement

Members Receiving the Normal Form of Benefits for Married Members -	Sixty percent of the member's monthly payments will be continued to the member's surviving spouse, provided that the spouse satisfies the eligibility requirements.
Members Receiving the Normal Form of Benefits for Single Members -	The monthly payments will be continued to the beneficiary until a total of 120 monthly payments have been made to the member and beneficiary.
Members Receiving Optional Forms of Benefits -	Death benefits will be payable in accordance with the optional form of pension elected.

Termination Benefits

Subject to any statutory limitations, a member with two or more years of Continuous Service or Plan Membership may elect to receive either:

(a) A paid-up deferred pension commencing on the member's Normal Retirement Date in an amount equal to the pension accrued to date of termination, or

(b) Transfer the value of benefit to the member's new employer's pension plan, a Retirement Savings Plan, or purchase a deferred annuity.

A member with less than two years of Plan Membership or Continuous Service will receive a cash payment equal to the member's contributions with interest calculated to the end of the month in which termination occurs.

Disability Benefits

If the member qualifies for benefits under the long-term disability plan, the Commission shall make the required contributions so that the employee will continue to accrue additional pension benefits right through to age 65 if disability continues until then. A disabled employee who does not qualify for LTD benefits may be eligible to receive a disability pension from this plan.

A member who is Totally and Permanently Disabled, as defined by the Canada Revenue Agency, and not in receipt of LTD benefits may retire at any time prior to Normal Retirement Date and receive a Disability Pension. The Disability Pension shall be equal to the member's accrued pension without reduction for early retirement.

A member who is considered totally and permanently disabled by the Commission but not as defined by the Canada Revenue Agency may be eligible for an improved early retirement pension at any time prior to Normal Retirement Date. The amount of pension is the member's accrued benefit subject to the Canada Revenue Agency's minimum early retirement reduction requirements.

Cost-of-Living Adjustments

A cost-of-living adjustment equal to the lesser of 2% and the percentage increase in the Consumer Price Index during the preceding calendar year is guaranteed under the pension plan. This adjustment will apply to pensions being paid directly from the Fund, as well as deferred vested benefits. The Plan also provides additional increases on an ad hoc basis.

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APPENDIX E EMPLOYER CERTIFICATION

On behalf of the Halifax Regional Water Commission, I hereby certify that the employee data provided to Eckler Ltd. for the purposes of the actuarial valuation of the *Halifax Regional Water Commission Employees' Pension Plan* as at January 1, 2014 are accurate and complete.

Cheryl Little
Name

Signature

Controller
Title

June 27/14
Date