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Wichita Employees' Retirement System Investigation of Experience

January 1, 2009 through December 31, 2013





Cavanaugh Macdonald

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The experience and dedication you deserve

July 15, 2014

The Board of Trustees
Wichita Employees' Retirement System
City Hall, 12th Floor
455 N. Main Street
Wichita, KS 67202

Dear Members of the Board:

It is a pleasure to submit this report of our investigation of the experience of the Wichita Employees' Retirement System (WER) for the calendar years 2009 through 2013. The results of this investigation are the basis for recommended changes in actuarial assumptions for the actuarial valuation to be performed as of December 31, 2014.

The purpose of this report is to communicate the results of our review of the current actuarial methods and the economic and demographic assumptions. Several of our recommendations represent changes from the prior methods or assumptions and are designed to better anticipate the emerging experience of the System.

We have provided financial information showing the estimated impact of the recommended assumptions, if they had been reflected in the December 31, 2013 actuarial valuation. We believe the recommended assumptions provide a reasonable estimate of future anticipated experience affecting WER. Nevertheless, the emerging costs will vary from those presented in this report to the extent that actual experience differs from that projected by the actuarial assumptions. Future actuarial measurements may differ significantly from the current measurements presented in this report due to factors such as the following:

- Plan experience differing from the actuarial assumptions,
- Future changes in the actuarial assumptions,
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as potential additional contribution requirements due to changes in the plan's funded status) and
- Changes in the plan provisions or accounting standards.

Due to the scope of this assignment, we did not perform an analysis of the potential range of such measurements.

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In preparing this report, we relied without audit on information (some oral and some in writing) supplied by the System's staff. This information includes, but is not limited to, statutory provisions, employee data, and financial information. In our examination, we have found the data to be reasonably consistent and comparable with data used for other purposes, unless otherwise noted. Since the experience study results are dependent on the integrity of the data supplied, the results can be expected to differ if the underlying data is incomplete or missing. It should be noted that if any data or other information is inaccurate or incomplete, our determinations might need to be revised.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices which are consistent with the Actuarial Standards of Practice promulgated by the Actuarial Standards Board and the applicable Guides to Professional Conduct, amplifying Opinions, and supporting Recommendations of the American Academy of Actuaries.

We further certify that the assumptions developed in this report satisfy ASB Standards of Practice, in particular, No. 27 (Selection of Economic Assumptions for Measuring Pension Obligations) and No. 35 (Selection of Demographic and Other Non-economic assumptions for Measuring Pension Obligations).

We would like to acknowledge the help in the preparation of the data for this investigation given by the staff. We look forward to our discussions and the opportunity to respond to your questions and comments at your next meeting.

I, Patrice A. Beckham, FSA, am a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

I, Brent A. Banister, FSA, am a member of the American Academy of Actuaries and a Fellow of the Society of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

We herewith submit the following report and look forward to discussing it with you.

Respectfully submitted,

A handwritten signature in blue ink that reads 'Patrice Beckham'.

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

A handwritten signature in blue ink that reads 'Brent A. Banister'.

Brent A. Banister, PhD, FSA, EA, FCA, MAAA
Chief Pension Actuary



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SECTION 1 – BOARD SUMMARY

Overview

Any actuarial valuation is based on certain underlying assumptions. Determining the actuarial contribution rate is highly dependent on these assumptions that the actuary uses to project the future benefit payments and then to discount the future benefits to determine the present value. Thus, the assumptions are critical in assisting the system in adequately funding the benefits in advance of retirement.

To assess the reasonableness of the assumptions used in the valuation, they should be studied regularly, a process called an investigation of experience (or experience study).

Summary of Results

This section describes the key findings of this investigation of the experience of the Wichita Employees’ Retirement System for the period January 1, 2009 through December 31, 2013. We are recommending several changes to the assumptions. We will refer to our recommended assumptions as the “proposed” assumptions.

The following table shows a summary of the results of the study.

Assumption	Recommendation
Inflation	Decrease from 3.5% to 3.25%
Investment Return	No Change
Wage Growth	No Change
Mortality	No Change
Retirement	Modify Plan 2 assumption to partially reflect experience
Disability	Eliminate assumption
Termination	Change to service-based rates
Probability of Refund	No Change
Salary Scale	No Change
Sick Leave Load	Reduce from 4% to 2.5%

If adopted, the new assumptions would result in a small decrease in the unfunded actuarial liability and a very small (0.01%) decrease in the actuarial contribution rate. This is discussed further in the Financial Impact section at the end of the Executive Summary.

Actuarial Methods

Section 2 discusses the actuarial methods used in the valuation process. The actuarial cost method, asset smoothing method and amortization methodology form the basis of the System’s funding policy. We are not recommending any changes to any of the methods. However, we do believe it would be worthwhile to discuss the current methodology



SECTION 1 – BOARD SUMMARY

used to amortize the unfunded actuarial liability (UAL) to make sure the Board fully understands the implications of an open amortization period.

Economic Assumptions

Section 3 discusses the economic assumptions: price inflation, general wage growth (composed of price inflation, and productivity) and the investment return assumption. We recommend that the Board reduce the inflation assumption from 3.50% to 3.25%. Price inflation is a component of the general wage growth assumption, but we recommend the Board maintain the current 4.00% general wage growth assumption (price inflation plus productivity). The result is an increase in the productivity assumption from 0.50% to 0.75%. No change to the investment return assumption is recommended at this time.

Mortality

Overall, the actual number of deaths from healthy retirees during the study period was lower than expected (A/E ratio of 92% for males and 98% for females). However, in the last experience study, the A/E ratios for males and females using the current assumption were 103% and 88%, respectively. Looking even further back to the 1998 – 2003 experience study, the A/E ratio for males was 105% and for females was 100%. If the current experience is aggregated with that from 1998 to 2008, the A/E ratio for the entire 15-year period is 100% for males and 96% for females. Although the A/E ratio for females is less than 100%, the size of the group is relatively small and therefore, volatility in the results is to be expected and was indeed observed over the various five-year periods.

Healthy Retirees - Males

	Actual	Expected	A/E Ratio
1998-2003	99	94	105%
2004-2008	98	95	103%
2009-2013	98	107	92%
Total	295	296	100%

Healthy Retirees - Females

	Actual	Expected	A/E Ratio
1998-2003	46	46	100%
2004-2008	44	50	88%
2009-2013	64	65	98%
Total	154	161	96%

While we believe the current assumption is still reasonable, the actual experience has varied significantly over the last three experience studies. There may be reasons to adopt an assumption that reflects



SECTION 1 – BOARD SUMMARY

better mortality, i.e., people are living longer, now rather than waiting until the next study is completed. We plan to discuss this with the Board at the meeting in July.

Retirement

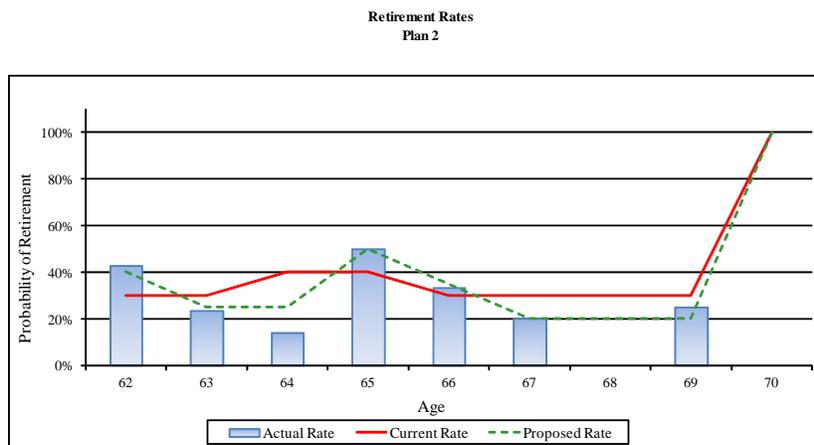
Previous experience studies had little actual experience for Plan 2 members given the effective date of the Plan (1981). Therefore, the expectation has been that the current retirement rates will need to be adjusted as actual experience unfolds. This is the first experience study in which the data for Plan 2 was sufficient to provide results that has some credibility.

The number of retirements during the study period was 197 compared to the expected number of 166. However, the City offered an early retirement incentive program in the fourth quarter of 2011 which resulted in a spike in retirements in 2011 and a significant drop in retirements in 2012. For purposes of our analysis, experience in 2011 and 2012 was excluded as it was not considered credible.

Based on the remaining data, the actual number of retirements for Plan 2 members was lower than expected, based on the assumptions (85 actual compared to 99 expected for an A/E ratio of 86%). In addition, the fit of the assumption to actual experience was not as close as we prefer, particularly for those eligible for unreduced benefits. Therefore, we are recommending the rates of retirement be modified to better reflect experience for Plan 2, recognizing that they will need to be fine tuned in the future as more data becomes available. The following graph shows the results for Plan 2 members who are eligible for normal retirement (unreduced benefits).



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	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Total Count	55	55	58
Actual/Expected		100%	95%

There were 30 retirements under the early retirement provision compared to 45 expected (A/E ratio of 67%). The utilization of early retirement by Plan 2 members is very limited. Therefore, we are also recommending the assumption for early retirement be modified to better fit the observed experience.

The DROP experience for Plan 2 members was also limited. Based on the observed experience some Plan 2 members with less than 33 years of service are electing into the DROP. This is not generally in the member’s best interest and we prefer not to use an assumption in the valuation that anticipates that members will make poor financial decisions. Of those Plan 2 members with more than 33 years of service, eight out of 11 elected DROP, an election percentage of 73%. Our assumption is that 70% of those members will elect DROP and the remaining group will retire. The actual experience was very close to the assumption so we recommend the current assumption be retained.

Disability

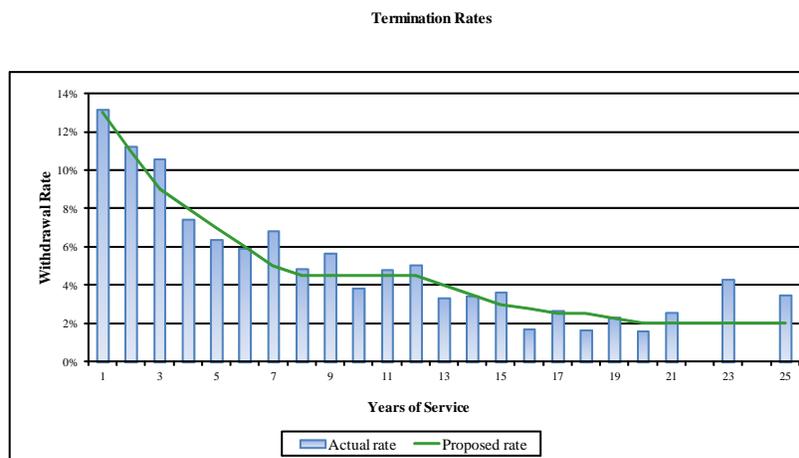
Over the five-year study period, there were only four disability retirements compared to 16 expected. This is consistent with experience in the prior study (five actual vs. 17 expected). Given the small size of the group and the very low number of disability retirements, we recommend the disability assumption be eliminated.



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Termination

Currently one assumption is used for the first four years of service and then the assumption moves to an age based table. Based on the current assumption, the actual number of terminations was below the number anticipated by the assumptions (A/E ratio of 93%). The current assumption splits the dataset into multiple groups with some groups having a small number of exposure. This creates more volatility in the results and makes it difficult to develop assumptions that accurately reflect future experience. We performed further analysis which indicated there is a very strong correlation to years of service. As a result, we are recommending the assumption be changed to a pure service-based set of rates (see following graph). The resulting A/E ratio on the proposed assumption is 103%.



	Actual	Expected - Proposed Assumptions
Total Count	378	367
Actual/Expected		103%

Probability of Refund Upon Vested Termination

The actual number of refunds for vested members at termination was very close to the number anticipated by the assumption. We are recommending the current assumption be retained.

Probability of Refund		
Actual	Expected	A/E
66	67	99%



SECTION 1 – BOARD SUMMARY

Individual Salary

Section 9 discusses the individual salary increase due to promotion and longevity – the merit component of salary increases. Overall, the results of our salary study show actual increases close to those expected given the general economy during the study period. Specifically, actual general wage growth in the United States over the study period was around 2.0% while the assumed rate was 4.0%. Therefore, we would expect actual wage increases to be about 2.0% lower than the current assumption would estimate. After the expected results were adjusted for the lower wage growth during the study period, actual salary increases were close to those assumed (3.22% actual versus 3.49% expected). We recommend the current assumption be retained.

Miscellaneous Assumptions

There are a number of miscellaneous assumptions that are used in the valuation including the sick leave load and Plan 3 election to Plan 2. A review of actual retirements during the study period indicated that conversion of sick leave to additional years of service resulted in an increase in the benefit amount of about 1.6%. The prior study showed an increase of around 3%. Based on the evidence in both studies we recommend the load used in the valuation be reduced from 4% to 2.5%.

Although actual experience indicates that about 90% of members who become vested will elect to become Plan 2 members, we prefer to be conservative with respect to this assumption. Therefore, we recommend the current assumption be retained, i.e., all Plan 3 members will elect to become members of Plan 2 upon reaching vested status.

Financial Impact

Overall, the net financial impact of the proposed changes in assumptions is very small. The following exhibit is designed to give the reader an idea of how the proposed changes would impact WER as a whole. Note that the proposed changes increase the expected annual cost of benefits (Normal Cost percentage) and decrease the Actuarial Liability.

The financial impact was evaluated by performing additional valuations with December 31, 2013 valuation data and reflecting the proposed assumption changes. This allows us to assess the relative financial impact of the various proposed changes. Note that the relative impact of the various assumption changes by component is dependent on the order in which they are evaluated.



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	Normal Cost %	Actuarial Liability	Actuarial Contribution
12/31/13 Valuation	13.0%	\$582.4	16.9%
Assumption Changes			
Rates of Retirement	0.1	1.3	0.3
Disability	0.1	1.4	0.2
Termination	0.1	(0.9)	0.0
Sick leave load	<u>(0.2)</u>	<u>(4.5)</u>	<u>(0.6)</u>
Subtotal	0.1	(2.7)	(0.1)
12/31/13 Valuation with Changes	13.1%	\$579.7	16.8%



SECTION 2 – ACTUARIAL METHODS

The systematic financing of a pension plan requires that contributions be made in an orderly fashion while a member is actively employed, so that the accumulation of these contributions, together with investment earnings should be sufficient to provide promised benefits and cover administration expenses. The actuarial valuation is the process used to determine when money should be contributed and in what amount, i.e., as part of the budgeting process.

The actuarial valuation will not impact the amount of benefits paid or the actual cost of those benefits. In the long run, actuaries cannot change the costs of the pension plan, regardless of the funding method used or the assumptions selected. However, actuaries will influence the incidence of costs by their choice of methods and assumptions.

Actuarial Cost Method

The valuation or determination of the present value of all future benefits to be paid by the Plan reflects the assumptions that best appear to describe anticipated future experience. The choice of a funding method does not impact the determination of the present value of future benefits. The funding method determines only the incidence of cost. In other words, the purpose of the funding method is to allocate the present value of future benefits into annual costs. In order to do this allocation, it is necessary for the funding method to “break down” the present value of future benefits into two components: (1) that which is attributed to the past (2) and that which is attributed to the future. The excess of that portion attributable to the past over the plan assets is then amortized over a period of years. Actuarial terminology calls the part attributable to the past the “past service liability” or the “actuarial liability”. The portion of the present value of future benefits allocated to the future is commonly known as the “present value of future normal costs”, with the specific piece of it allocated to the current year being called the “normal cost”. The difference between the plan assets and actuarial liability is called the “unfunded actuarial liability”.

There are various actuarial cost methods, each of which has different characteristics, advantages and disadvantages. The System currently uses the Entry Age Normal (EAN) actuarial cost method. The rationale of the EAN funding method is that the cost of each member’s benefit is determined to be a level percentage of his salary from date of hire to the end of his employment with the employer. This level percentage multiplied by the member’s annual salary is referred to as the normal cost and is that portion of the total cost of the employee’s benefit which is allocated to the current year. The portion of the present value



SECTION 2 – ACTUARIAL METHODS

of future benefits allocated to the future is determined by multiplying this percentage times the present value of the member's assumed earnings for all future years, including the current year. The EAN actuarial liability is then developed by subtracting from the present value of future benefits that portion of costs allocated to the future. To determine the unfunded actuarial liability, the value of plan assets is subtracted from the entry age normal actuarial liability. The current year's cost to amortize the unfunded actuarial liability is developed by applying an amortization factor.

It is to be expected that future events will not occur exactly as predicted by the actuarial assumptions in each year as assumptions are long-term estimates. Actuarial gains/losses from experience under this actuarial cost method can be directly calculated and are reflected as a decrease/increase in the unfunded actuarial liability. Consequently, the gain/loss results in a decrease/increase in the amortization payment, and therefore, the actuarial contribution rate.

The EAN actuarial cost method develops a normal cost rate which tends to be stable and less volatile than other methods. This method is used by most public sector plans. In addition, the EAN method is the required cost method for the calculations under the new Governmental Accounting Standards that will be effective for fiscal year-end 2014. **We recommend that WER continue using the Entry Age Normal method.**

Actuarial Value of Assets

In preparing an actuarial valuation, the actuary must assign a value to the assets of the fund. An adjusted market value, referred to as the actuarial value of assets, is often used to smooth out the volatility in the market value. This is because most plan sponsors would rather have annual costs remain relatively smooth, as a percentage of payroll, rather than a cost pattern that is extremely volatile.

The actuary does not have complete freedom in assigning this value. Basic actuarial principles promulgated by the American Academy of Actuaries, called Actuarial Standards of Practice, require any methodology used in assessing the value of assets to:

- Take into account fair market value;
- Produce a result which is not consistently above or below the fair market value;



SECTION 2 – ACTUARIAL METHODS

- Fall within a reasonable range around the market value;
- Recognize differences between the actuarial and market values of assets within a reasonable period of time.

These rules or principles prevent the asset valuation methodology from being used to distort annual funding patterns. No matter what asset valuation method is used, it is important to note that, like a funding method or actuarial assumptions, the asset valuation method does not affect the true cost of the plan; it only impacts the incidence of cost.

WER values assets, for actuarial valuation purposes, based on the principle that the difference between actual and expected investment returns should be subject to partial recognition, to smooth out fluctuations in the total return achieved by the fund from year to year. This philosophy is consistent with the long-term nature of a retirement system. Under this method, the actuarial value of the assets is the expected value of assets plus 25% of the difference between the market value and expected value. The expected value is last year's actuarial value of assets and subsequent cash flows into and out of the fund accumulated with interest at the actuarial assumed rate of return. This methodology is equivalent to using a weighted average of 75% of the expected value and 25% of actual market value. This methodology was first adopted by the Board in conjunction with the December 31, 2002 valuation.

Actuaries do not have complete freedom in determining the actuarial value of assets. The American Academy of Actuaries has published guidance regarding the calculation of a smoothed value of assets, *Actuarial Standard of Practice No. 44 (ASOP 44), Selection and Use of Asset Valuation Methods for Pension Valuations*. ASOP 44 provides that the asset valuation method should bear a reasonable relationship to the market value. Furthermore, the asset valuation method should be likely to satisfy both of the following criteria: (1) produce values within a reasonable range around market value and (2) recognize differences from market value in a reasonable amount of time. In lieu of both of these, the standard will be met if either of the following requirements is satisfied: (1) there is a sufficiently narrow range around the market value or (2) the method recognizes differences from market value in a sufficiently short period. These principles prevent the asset valuation method from being used to distort annual funding patterns. In our opinion, the current asset valuation method does not



SECTION 2 – ACTUARIAL METHODS

meet the ASOP 44 requirements without adding a “corridor” which requires the actuarial value of assets to fall within 80% to 120% of pure market value. If the smoothing method produces a value outside the corridor, it is not used and the actuarial value of assets is set to the corridor value that applies. We believe the current method will meet actuarial standards of practice if the corridor described earlier is added to the methodology.

The current method provides an appropriate level of smoothing but, in our opinion, does not meet current actuarial standards. **We recommend the current asset valuation method be retained, but that the resulting actuarial value of assets be no less than 80% of market value nor greater than 120% of market value.**

Amortization of UAL

As described above, actuarial liabilities are the portion of the actuarial present value of future benefits that are not included in future normal costs. Thus it represents the liability that, in theory, should have been funded through historical normal costs. Unfunded actuarial liabilities (UAL) exist when actuarial liabilities exceed plan assets. These deficiencies can result from (i) plan improvements that have not been completely paid for, (ii) experience not being as favorable as expected, (iii) assumption changes that increase liabilities or (iv) contributions less than the actuarial rate. If the actuarial value of assets (AVA) exceeds the actuarial liability (AL), “surplus” exists.

There are a variety of different methods that can be used to amortize the UAL/surplus. Each results in a different payment stream, and therefore, has cost implications. For each methodology, there are three characteristics:

- The period over which the UAL is amortized,
- The rate at which the amortization amount increases, and
- The number of components of UAL with separate amortization bases.

There is no formal requirement for the amortization period. However, Governmental Accounting Standard Number 25, which was applicable prior to fiscal year 2014, set the maximum amortization period for financial reporting purposes at 30 years. The 30-year maximum period



SECTION 2 – ACTUARIAL METHODS

essentially evolved as a “de facto” funding standard for public sector plans.

The amortization period can be either fixed or open. If it is a fixed or closed amortization period, the number of years declines by one each year. Alternatively, if the amortization period is an open or rolling period, the amortization period does not decline but is reset to the same number of years in each future valuation.

The annual amortization amount can be a level dollar amount or a level percentage of payroll. All non-public pension plans, pursuant to the Internal Revenue Code, must use level dollar amortization to pay off their unfunded actuarial liability for purposes of IRS minimum and maximum funding. This is similar to the method in which a home owner pays off a mortgage. The liability, once calculated, is financed by a constant fixed dollar amount, based on a predetermined number of years, until the liability is extinguished. This results in the liability steadily decreasing while the payments, though remaining level in dollar terms, in all probability decrease as a percentage of payroll. (Even if a plan sponsor’s population is not growing or even slightly diminishing, inflationary increases will usually be sufficient to increase the aggregate payroll).

The rationale behind the level percentage of payroll amortization method is that since normal costs are calculated to be a level percentage of pay and contributions to fund the System are determined as a percent of payroll, the unfunded actuarial liability should be paid off in the same manner. When this method of amortizing the unfunded actuarial liability is adopted, the initial amortization payments are lower than they would be under a level dollar amortization payment method, but the payments increase at a fixed percentage so that ultimately the annual payment far exceeds the level dollar payment. The expectation is that total payroll will increase as rapidly as the payment so the amortization payments will remain constant, as a percentage of payroll. In the initial years, the level percentage of payroll amortization payment is often less than the interest accruing on the unfunded actuarial liability meaning that, even if there are no experience losses, the dollar amount of the unfunded actuarial liability will increase. If the plan sponsor is paying off the unfunded actuarial liability over a long period, such as 30 years, it is possible that the unfunded liability will grow for over half the period, then gradually reduce and still be completely paid off by the 30th year.



SECTION 2 – ACTUARIAL METHODS

Use of the level percentage of payroll amortization has its advantages and disadvantages. From a budgetary standpoint, it makes sense to develop UAL contribution rates that are level as a percentage of payroll and are consistent with the development of the normal cost. However, this approach clearly results in slower funding of the UAL.

The UAL may be amortized as one amount or components may be amortized separately where a new amortization base is established each year which is equal to the unexpected change in the UAL. It is more common to use one amount or base, although recently we have seen more systems moving to the “layered” approach where the UAL is composed of multiple amortization bases, each with their own payment schedule.

Currently, WER amortizes the UAL/surplus over a rolling 20-year period. Prior to the December 31, 2009 valuation, the System had surplus assets for many years. With surplus assets, amortizing the UAL payment over an open period is actually more conservative because less of the surplus is used each year. However, when there is a UAL, a rolling 20-year amortization delays fully funding the liability. **We suggest we have further discussions with the Board about the long-term implication of an open amortization period and various options for amortizing the emerging UAL. This would fit into the development of a formal funding policy for the system, which we highly recommend.**



SECTION 3 – ECONOMIC ASSUMPTIONS

Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*, provides guidance to actuaries giving advice on selecting economic assumptions for measuring obligations under defined benefits plans. The standard recognizes that because no one knows what the future holds, the best an actuary can do is to use professional judgment to estimate possible future economic outcomes. These estimates are based on a mixture of past experience, future expectations, and professional judgment. The actuary should consider a number of factors, including the purpose and nature of the measurement, and appropriate recent and long-term historical economic data. However, the standard explicitly advises the actuary not to give undue weight to recent experience.

The Actuarial Standards Board adopted a revised edition of ASOP 27 recently, which will be effective for valuations beginning after September 30, 2014. The new revised ASOP 27 calls for the actuary to select a “reasonable” assumption. For this purpose, an assumption is reasonable if it has the following characteristics:

- (a) It is appropriate for the purpose of the measurement;
- (b) It reflects the actuary’s professional judgment;
- (c) It takes into account historical and current economic data that is relevant as of the measurement date;
- (d) It reflects the actuary’s estimate of future experience, observation of the estimates inherent in market data, or a combination of both;
- (e) It has no significant bias except when provisions for adverse deviation or plan provisions that are difficult to measure are included.

In our opinion, the economic assumptions recommended in this report have been developed in accordance with the ASOP No. 27. The following table shows our recommendations for the economic assumptions.

Economic Assumption	Current Assumption (Annual Rate)	Proposed Assumption (Annual Rate)
Consumer Price Inflation	3.50%	3.25%
Investment Return ⁽¹⁾	7.75%	7.75%
Wage Growth (includes inflation and productivity)	4.00%	4.00%
Real Wage Inflation (wage growth less price inflation)	0.50%	0.75%
Payroll Growth	4.00%	4.00%

⁽¹⁾Net of investment and administrative expenses.



1. Consumer Price Inflation

Use in the Valuation:

When we refer to inflation in this report, we are referring to price inflation. The inflation assumption has an indirect impact on the results of the actuarial valuation through the development of the assumptions for investment return, general wage increases and the payroll increase assumption.

The long-term relationship between inflation and investment return has long been recognized by economists. The basic principle is that the investors demand a “real return” – the excess of actual investment returns over inflation. If inflation rates are expected to be high, investors will demand investment returns that are also expected to be high enough to exceed inflation, while lower inflation rates will result in lower demand and expected investment returns, at least in the long run.

The current assumption for inflation is 3.5% per year. It was lowered from 4.0% in the last experience study.

Historical Perspective:

The data for inflation shown below is based on the national Consumer Price Index, US City Average, All Urban Consumers (CPI-U) as published by the Bureau of Labor Statistics.

Although economic activities, in general, and inflation in particular, do not lend themselves to prediction on the basis of historical analysis, historical patterns and long term trends are a factor to be considered in developing the inflation assumption.

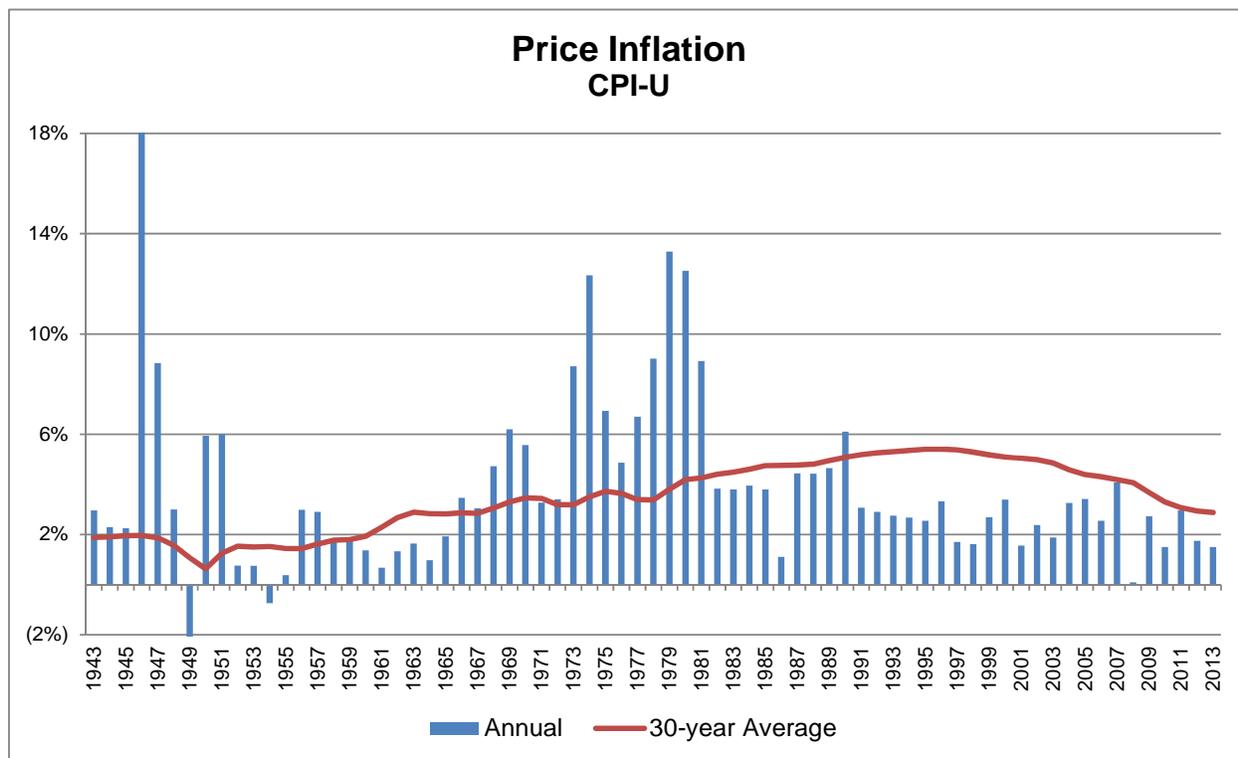
There are numerous ways to review historical data, with significantly different results. The following table shows the compound annual inflation rate for various periods ended in December 2013.



SECTION 3 – ECONOMIC ASSUMPTIONS

Period	Number of Years	Annualized Rate of Inflation	Annual Standard Deviation
1926 – 2013	87	3.02%	3.91%
1953 – 2013	60	3.68	2.80
1963 – 2013	50	4.14	2.81
1973 – 2013	40	4.23	3.04
1983 – 2013	30	2.87	1.15
1993 - 2013	20	2.42	0.94
2003 - 2013	10	2.39	1.24

Additional historical information is shown in the following graph which illustrates the historical annual change in price inflation, measured as of December 31st for each of the last 70 years, as well as the 30-year rolling average at each year.





SECTION 3 – ECONOMIC ASSUMPTIONS

Over more recent periods, measured from December 31, 2013, the average annual rate of increase in the CPI-U has been 3.00% or lower. The period of high inflation from 1973 to 1981 has a significant impact on the averages over periods which include these years. Further, the average rate of 3.02% over the entire 87 year period is close to the average rate of 2.87% for the prior 30 years (1983 to 2013). However, the volatility of the annual rates in more recent years has been markedly lower as indicated by the significantly lower annual standard deviations (see earlier table). Many experts attribute the lower average annual rates and lower volatility to the increased efforts of the Federal Reserve since the early 1980's to stabilize price inflation.

Forecasts of Inflation

Additional information to consider in formulating this assumption is obtained from measuring the spread on Treasury Inflation Protected Securities (TIPS) and from the prevailing economic forecasts. The spread between the nominal yield on treasury securities (bonds) and the inflation indexed yield on TIPS of the same maturity is referred to as the “breakeven rate of inflation” and represents the bond market’s expectation of inflation over the period to maturity. The table below provides the calculation of the breakeven rate of inflation as of December 31, 2013.

Years to Maturity	Nominal Bond Yield	TIPS Yield	Breakeven Rate of Inflation
10	3.04%	0.80%	2.24%
20	3.72	1.36	2.36
30	3.96	1.64	2.32

Although many economists forecast lower inflation than the assumptions used by retirement plans, they are generally looking at a shorter time horizon than is appropriate for a pension valuation. To consider a longer, similar time frame, we looked at the expected increase in the CPI by the Office of the Chief Actuary for the Social Security Administration. In the most recent report (May 2013), the projected average annual increase in the CPI over the next 75 years was estimated to be 2.80%,



SECTION 3 – ECONOMIC ASSUMPTIONS

under the intermediate cost assumptions. The lower cost assumption used a forecast of 1.80% and the high cost assumption was 3.80%, indicating a reasonable range for their projections of 1.80% to 3.80%.

Recommendation: Given the longer term perspective for pension funding, we believe that a range between 2.50% and 4.00% is reasonable for an actuarial valuation of a retirement system. Based on the information presented above, we believe it is reasonable to reduce the inflation assumption. Given that the inflation assumption was lowered by 0.50% in the last experience study we prefer to make a less dramatic change in the current study. **Therefore, we recommend that the long-term price inflation assumption be lowered from 3.50% to 3.25%.**

Consumer Price Inflation	
Current Assumption	3.50%
Recommended Assumption	3.25%



SECTION 3 – ECONOMIC ASSUMPTIONS

2. Investment Return

Use in the Valuation

The investment return assumption is one of the primary determinants in the calculation of the expected cost of the System’s benefits, providing a discount of the future benefit payments that reflects the time value of money. This assumption has a direct impact on the calculation of liabilities, normal costs, and contribution rates. The current investment return assumption is 7.75% per year, net of investment related and administrative expenses.

Forward Looking Analysis

A dynamic forward looking analysis of expected investment return is an appropriate analysis to perform in setting this assumption. In assessing the future expectation of investment returns, we prefer to utilize the capital market assumptions of the investment professionals assisting the Board in determining its investment policies and asset allocations (Callan Associates). Using the capital market assumptions and asset allocation outlined on page 6 of Callan’s March 2014 presentation entitled “2014 Asset Allocation Update”, an expected range of returns over various time horizons was developed, adjusted for the use of the recommended 3.25% inflation assumption.

The target asset allocation is summarized in the following chart:

Asset Class	Target Allocation
Broad US Equity	40%
Broad International Equity	22%
Broad US Fixed Income	22%
TIPS	3%
Real Estate	5%
Timber	5%
Commodities	3%
Total	100%

The rate of return is subject to significant year-to-year volatility as measured by the standard deviation. Volatility over time will lower the mean rate of return, but diversification by asset class will reduce the volatility and narrow the range of expected total returns for the entire portfolio. The results are summarized in the following table:



SECTION 3 – ECONOMIC ASSUMPTIONS

Expected Investment Return Adjusted for 3.25% Inflation

Horizon In Years	Percentile Results for Real Rate of Return				
	5 th	25 th	50 th	75 th	95 th
1	-11.42%	-0.49%	7.90%	17.01%	31.49%
5	-1.22%	4.06%	7.90%	11.88%	17.87%
10	1.37%	5.17%	7.90%	10.70%	14.86%
30	4.08%	6.32%	7.90%	9.51%	11.86%
50	4.93%	6.67%	7.90%	9.15%	10.96%

The geometric mean return is 7.90%, but due to the volatility associated with the asset allocation, the range of probable outcomes is quite large. For example, in the first year there is a 5% chance the rate of return will be less than -11.42% and a 5% chance it will be greater than 31.49%. As the time horizon lengthens, the range of the cumulative compound average results narrows.

Over a 50-year time horizon, we estimate there is a 50% chance the rate of return will be more that 7.90% and a 50% chance it will be less than 7.90%. Likewise, there is a 25% chance the rate or return will be less than 6.67% and a 25% chance the return will be greater than 9.15% (bold numbers on the bottom line in the table above).

Investment Expenses

The analysis in the preceding section utilized Callan’s capital market assumptions which were developed to be net of fees, assuming a passive investment strategy. To the extent that WER uses an active management approach, it is reasonable to assume that such a strategy will produce sufficient additional returns to offset the expense of active management over the long term. Consequently, there is no need to adjust the results of the prior section for investment expenses.

Administrative Expenses

WER does incur certain administrative expenses that are paid from the trust. The table below shows the ratio of administrative expenses to assets during the study period.

Year	Admin. Expense (\$M)	Market Assets (\$M)	Expense Ratio
2009	\$0.51	\$375.9	0.14%
2010	0.49	432.3	0.11
2011	0.51	465.3	0.11
2012	0.47	444.6	0.10
2013	0.47	479.7	0.10



SECTION 3 – ECONOMIC ASSUMPTIONS

This information, which was taken from the System’s Comprehensive Annual Financial Reports (CAFRs), indicates that administrative expenses have averaged around 0.11% of the System’s assets.

This assumption does not have a direct impact on the actuarial valuation results, but it does provide a measure of gross return on investments that will be needed to meet the actuarial assumption used for the valuation. For example, if the investment return assumption is set equal to 7.75%, then the System would need to earn a gross return on its assets of 7.86% in order to net the 7.75% for funding purposes.

Based upon this model and the current inflation assumption, the following results occur:

Components of Return	Percentile Results		
	25 th	50 th	75 th
Real Rate of Return	3.42%	4.65%	5.90%
Assumed Inflation	3.25%	3.25%	3.25%
Administrative Expenses	(0.11%)	(0.11%)	(0.11%)
Net Investment Return	6.56%	7.79%	9.04%

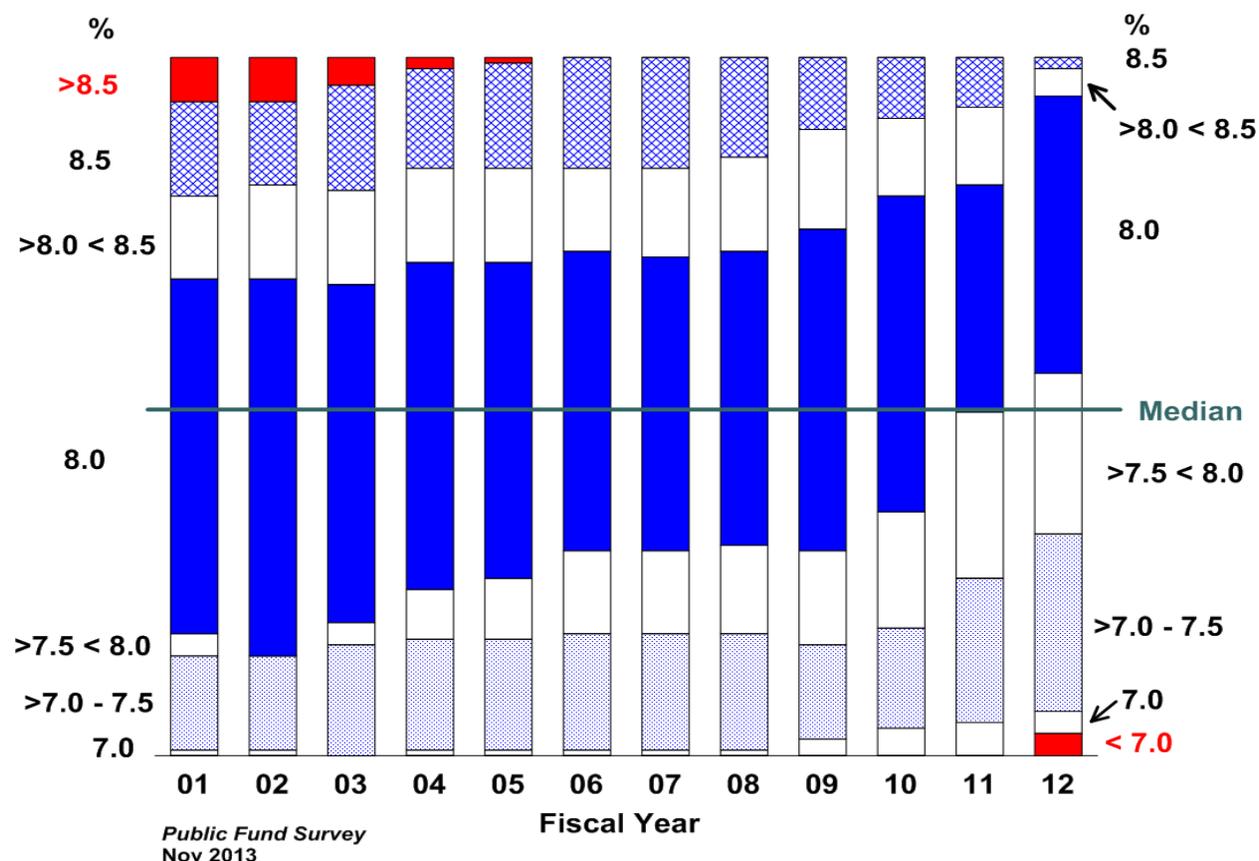
Based upon this model, there is about a 50% chance that the net return will be 7.75% or more over a 50-year period. Therefore, we believe the current assumption is reasonable.



SECTION 3 – ECONOMIC ASSUMPTIONS

Peer System Comparison

According to the *Public Fund Survey*, the median investment return assumption for the systems who participate is 7.75%.



Other Factors

The choice of assumptions depends on a system’s risk tolerance. The final determination on whether or not a set of assumptions was either conservative or aggressive will only be born out by future experience. We believe the current economic assumptions are neither aggressive nor conservative.

Recommendation

As discussed in the inflation section, we are recommending the inflation assumption be lowered from 3.50% to 3.25%. By maintaining the 7.75% investment return assumption, the real rate of return assumption is effectively being increased 0.25%. **Based on portfolio analysis and the recommended inflation assumption, we believe the 7.75% assumption is reasonable over the long term.** Nonetheless, the expected returns for the portfolio will still have considerable volatility.



SECTION 3 – ECONOMIC ASSUMPTIONS

3. Wage Growth

Use in the Valuation

Estimates of future salaries are based on two types of assumptions:

- 1) general wage increases, and
- 2) merit increases.

Rates of increase in the general wage level of the membership are directly related to inflation, while individual salary increases due to promotion and longevity occur even in the absence of inflation. The promotion and longevity assumptions, referred to as the merit scale, will be reviewed with the other demographic assumptions.

The current assumption for wage growth is for 0.50% above the inflation assumption, or 4.00%.

Historical Perspective

We have used statistics from the Social Security Administration on the National Average Wage back to 1951. There are numerous ways to review this data. The excess of wage growth over price inflation represents “productivity”, or the increase in the standard of living (also called the real wage inflation rate). Although real wage inflation has been very low in recent years, our focus remains on the long term. The following tables show the compounded wage growth over various periods, along with the comparable inflation rate for the same period. The differences represent the real wage inflation rate.

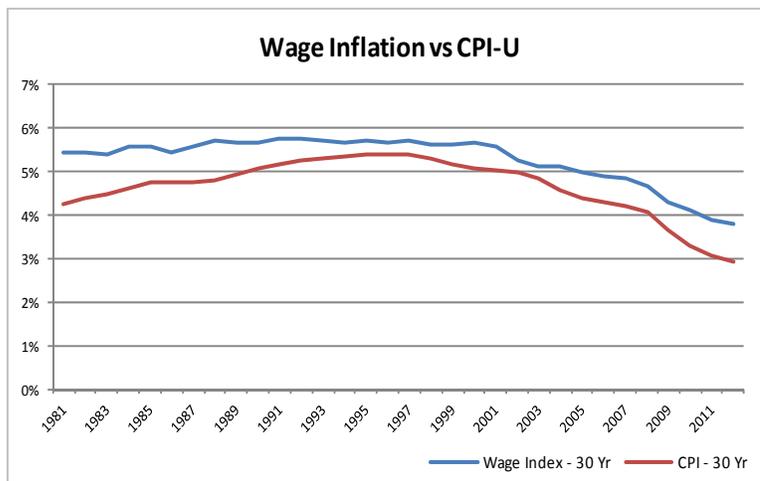
Decade	General Wage Growth	CPI Incr.	Real Wage Inflation
2003-2012	2.9%	2.5%	0.4%
1993-2002	4.7%	2.5%	2.2%
1983-1992	7.4%	3.8%	3.6%
1973-1982	5.2%	8.8%	(3.6)%
1963-1972	3.7%	3.3%	0.4%

Period	General Wage Growth	CPI Incr.	Real Wage Inflation
2003-2012	2.9%	2.5%	0.4%
1993-2012	3.4%	2.5%	0.9%
1983-2012	3.8%	2.9%	0.9%
1973-2012	4.7%	4.4%	0.3%
1963-2012	4.8%	4.1%	0.7%



SECTION 3 – ECONOMIC ASSUMPTIONS

Similar information over rolling 30-year periods is shown below:



The graph indicates that wage inflation has consistently been higher than price inflation over longer periods of time. We believe that trend is likely to continue in the future and should be reflected in the actuarial assumptions.

Forecasts of Future Wages: The wage index used for the historical analysis has been projected forward by the Office of the Chief Actuary of the Social Security Administration. In a report in May of 2013, the annual increase in the National Average Wage Index over the next 30 years under the intermediate cost assumption was 3.9%, 1.1% higher than the Social Security intermediate inflation assumption of 2.8% per year. The range of the assumed real wage inflation in the 2013 Social Security Trustees report was 0.5 to 1.7% per year.



SECTION 3 – ECONOMIC ASSUMPTIONS

Recommendation: Based on our professional judgment, we believe that a range between 0.50% and 1.50% is reasonable for the actuarial valuation. **We recommend that the long-term assumed real wage inflation be increased from 0.50% to 0.75% per year.**

Real Wage Inflation	
Current Assumption	0.50%
Recommended Assumption	0.75%

Based on our inflation assumption of 3.25%, it follows that the total general wage growth assumption remain at 4.00%.

General Wage Growth	
Current Assumption	4.00%
Recommended Assumption	4.00%

Payroll Increase Assumption: The UAL is amortized as a percentage of payroll in determining future contribution rates. For these calculations, the aggregate payroll of WER is expected to increase, without assuming an increase in the active membership. The payroll increase assumption is set equal to the wage growth assumption.

Payroll growth increases lower than expected have a negative effect on determining the UAL contribution rate, as a greater percentage of pay will be required to fund the UAL with smaller expected payroll in future years. Likewise, payroll growth increases greater than expected have a positive effect on determining the UAL contribution rate, as a lower percentage of pay will be required to fund the UAL. **We recommend the payroll increase assumption remain at 4.00%.**



SECTION 3 – ECONOMIC ASSUMPTIONS

Growth in Active Membership: We propose continuing the assumption that no future growth in active membership will occur. This assumption affects the amortization payment rate, which is the portion of the total contributions used to liquidate the unfunded actuarial liability. With no assumed growth in active membership, future salary growth due only to general wage increases is being anticipated. If increases should occur not only because of wage increases, but also because of additional active members, there will be a larger pool of salaries over which UAL contributions would spread which would result in a lower contribution rate.



SECTION 4 – MORTALITY

One of the most important demographic assumptions is mortality because this assumption predicts when retirement payments will stop. The life expectancies of current and future retirees are predicted on the assumed rates of mortality at each age. It is commonly known that rates of mortality have been declining throughout this century, which means people, in general, are living longer.

Because of potential differences in mortality, different assumptions are often used for healthy retirees, disabled retirees and active members. Therefore, experience for each group is typically studied separately.

Healthy Retirees

The current retiree mortality assumption is the RP-2000 Healthy Annuitant Mortality Table with generational mortality improvements. A two year age set forward is used for males (for example a 62 year old is treated as if he is 64 years old). No age adjustment is used for female mortality.

In examining the results of an experience study, if the A/E Ratio is greater than 100%, the assumptions have predicted fewer deaths than actually occurred, and therefore have built in some “margin” for future mortality improvements. The RP-2000 Table recognizes future mortality improvements using a different, more direct approach. It projects future mortality improvements on a “generational” basis, i.e., mortality rates are set by the year in which member reaches a particular age. By its “generational” approach, it directly reflects expected movement in mortality for all members, i.e., greater mortality improvements are anticipated for younger members, which we believe is more likely to occur. With the use of the RP-2000 Table, a “margin” (A/E ratio above 100%) is no longer required as the expected mortality improvements are built directly into the future mortality rates. As a result, assumptions are generally set to produce A/E ratios around 100%.

Given the relatively small number of exposure for WER, the results are not fully credible on their own, but they provide general insight into the appropriateness of the table. We also considered the results of the prior experience studies for healthy retirees in evaluating the current results. Although the A/E Ratio in this study is 92% for males and 98% for females, the A/E ratio in the last study was 103% for males and 88% for females. A summary of the mortality experience over the last three experience studies is shown in the following table:



SECTION 4 – MORTALITY

Healthy Retirees - Males			
	Actual	Expected	A/E Ratio
1998-2003	99	94	105%
2004-2008	98	95	103%
2009-2013	<u>98</u>	<u>107</u>	92%
Total	295	296	100%

Healthy Retirees - Females			
	Actual	Expected	A/E Ratio
1998-2003	46	46	100%
2004-2008	44	50	88%
2009-2013	<u>64</u>	<u>65</u>	98%
Total	154	161	96%

The A/E ratio for the 15-year period indicates the assumption has been a reasonable fit for the observed experience, particularly given the size of the group. However, there has been volatility in the results for both males and females. **We recommend keeping the current healthy retiree mortality assumption, but would like to discuss this in more detail with the Board.** While the next experience study may provide additional insight into the mortality trends which will help us to evaluate whether the mortality for the group is improving more quickly than anticipated under the current mortality table, it may be prudent to make a change in the mortality assumption now.

The Society of Actuaries (SOA) is expected to publish an updated mortality table later this year, called the RP 2014 Mortality Table. It will replace the RP 2000 Mortality Table as the most recent mortality table produced for purposes of valuing pension plans and will include an updated mortality improvement scale as well. The SOA reported that they found that actual mortality improvements since the RP 2000 Table was published were greater than anticipated by Scale AA, which was published with the RP 2000 Mortality Table for the purpose of projecting future mortality improvements. Given this general trend, the Board may want to consider strengthening the mortality assumption now by reducing the age adjustment for males and perhaps using an age setback for females.



SECTION 4 – MORTALITY

Beneficiaries

The mortality of beneficiaries applies to the survivors of members who have elected a joint and survivor option. There is never complete data on the mortality experience of beneficiaries prior to the death of the member because there is no requirement that the death be reported to the System. In addition, the dataset is small. **Therefore, we recommend the standard convention be followed and the mortality basis be set for beneficiaries to the same basis as is used for healthy retired members.**

Disabled Retirees

The valuation assumes that disabled members, in general, will not live as long as retired members who met the regular service retirement eligibility. There is an insufficient number of disabled retirees to provide statistically reliable results. The RP-2000 Disabled Tables for males and females are used to be consistent with the table used for Healthy Retirees. **We recommend maintaining the current assumption.**

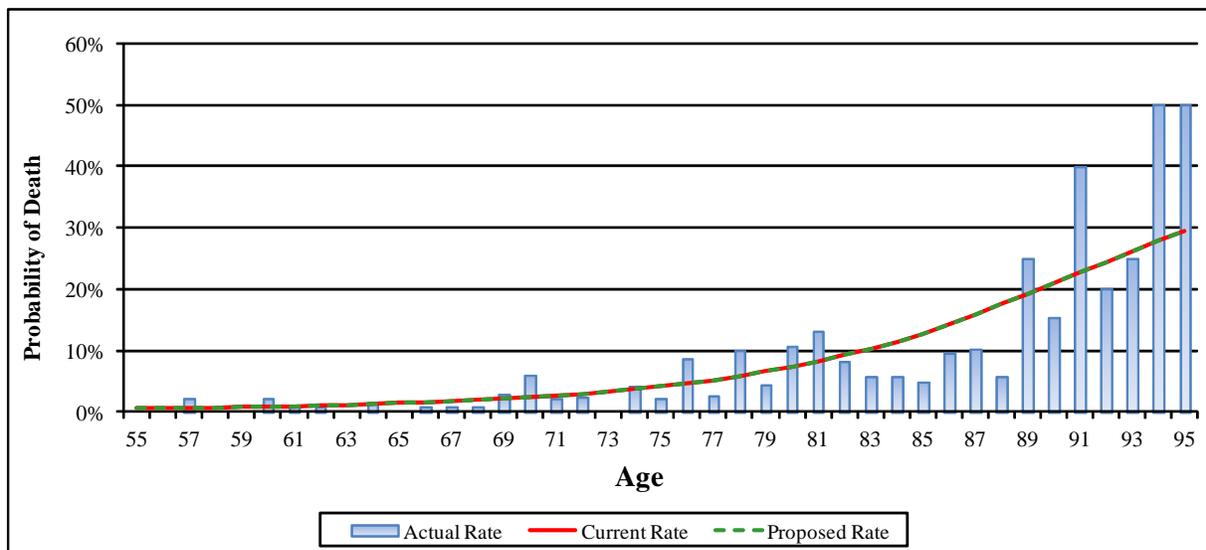
Active Members

This assumption predicts eligibility for death benefits prior to retirement, rather than the expected lifetime for pension payments. Mortality among active members has a small financial impact upon the System's liabilities. In groups of a smaller size, such as WER, the mortality rates for active members are often set on a consistent basis as the assumption used for healthy retirees. Given the small probability of death and the relatively low exposure at each age, the results are not credible on their own. **Therefore, we recommend the active member mortality utilize the same age adjustment as is used for healthy retired members and the RP-2000 Employee Table.**



SECTION 4 – MORTALITY

**Probability of Death - Healthy Retirees
Males**

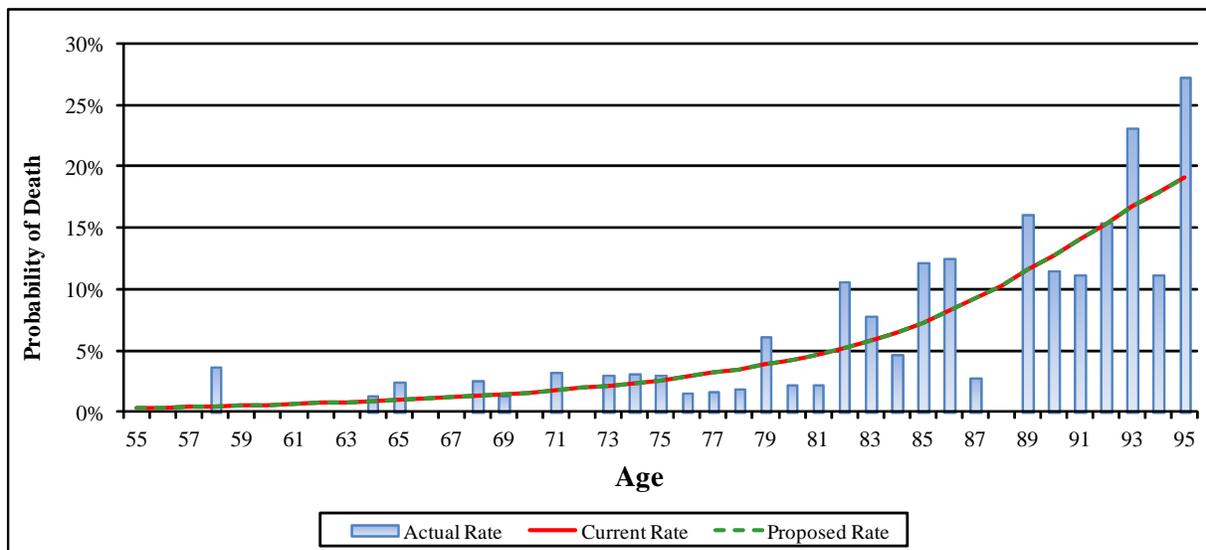


	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Total Count	98	107	107
Actual/Expected		92%	92%



SECTION 4 – MORTALITY

**Probability of Death - Healthy Retirees
Females**



	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Total Count	64	65	65
Actual/Expected		98%	98%



SECTION 5- RETIREMENT

Service retirement measures the change in status from active membership directly to retirement. This assumption does not include the retirement patterns of members who terminated from active membership years prior to their retirement. That experience is studied separately.

If a member is eligible to retire under either early reduced or normal retirement requirements, they may elect to participate in the DROP (Deferred Retirement Option Program). If such election is made, the member's benefit is computed based on years of service and final average salary as of the DROP election date. The monthly benefit, plus 5% annual interest, compounded monthly, is paid into the member's notional DROP account during the DROP period. The member and the employer continue to make contributions during the DROP period. At the end of the DROP period, the balance of the DROP account is paid to the member in a lump sum and the monthly benefit is paid to the employee each month going forward.

In the December 31, 2013 valuation there were only two Plan 1 members. Therefore, the Plan 1 retirement assumption is no longer material to the valuation process. Consequently, no analysis on this assumption was performed.

Results – Plan 2

The requirement for early retirement with a reduced benefit is age 55 with seven years of service. The requirement for retirement with a full (unreduced) benefit is age 62 and seven years of service.

Previous experience studies had little actual retirement experience for Plan 2 members since the effective date of the Plan (1981) meant that few people were eligible to retire. As was mentioned in the last experience study report, the expectation has been that it would be necessary to modify the current Plan 2 retirement assumption because it was set without the benefit of actual experience.

This is the first study period in which the data, although still limited, was sufficient to provide results that have some credibility. However, complicating the analysis of experience during this study period was the Wichita Employees' Retirement Incentive Program (WERIP) which was offered by the City in the fourth quarter of 2011. The WERIP resulted in a spike of retirements in 2011 and then a significant drop in retirement activity in 2012 as shown in the following table:



SECTION 5- RETIREMENT

Plan 2 Retirement Experience			
Year	Actual	Expected	A/E Ratio
2009	22	30	73%
2010	24	35	69%
2011	96	39	246%
2012	16	28	57%
2013	<u>39</u>	<u>34</u>	115%
Total	197	166	119%

Recommendation

We do not believe the experience in 2011 and 2012 was representative of the retirement experience expected in future years. Therefore, the experience in those years was excluded from our analysis. The resulting A/E ratio was 86% (85 actual vs. 99 expected). This finding, in addition to observing the pattern of actual versus assumed retirement ages, leads us to recommend some adjustments to the current assumed rates. We are recommending that the retirement rates for Plan 2 be decreased at some ages and increased at others to better fit the experience observed in the study period. The revised A/E ratio using the recommended assumption is shown in the table below:

Plan 2 Retirement Experience			
Ages	Actual	Expected	A/E Ratio
55 to 61	30	42	71%
62 to 70	55	58	95%

The proposed assumption was set with a focus on more closely matching the retirement experience for normal (unreduced) retirement as that has a more significant impact on the system's liabilities.

DROP Experience

For valuation purposes, we assume that 70% of members with 33 or more years of service in Plan 2 will elect DROP and the other 30% will retire. In past experience studies there has been little exposure in Plan 2 to evaluate the DROP assumption due to the effective date of Plan 2 (July 1, 1981 for new hires, although some Plan 1 members elected into Plan 2).

The DROP election experience for Plan 2 in the current study period, although somewhat limited, is summarized in the table below. There were 36 members with less than 33 years of service that elected DROP during the study period and eight members with 33 or more years of service who elected DROP.



SECTION 5- RETIREMENT

Plan 2 DROP Experience			
Age	Eligible	DROP	Percent
Age 62 with less than 33 YOS	142	36	25%
Age 62 with 33 or more YOS	11	8	73%

Generally speaking, if an employee in Plan 2 has less than 33 years of service, it is in his or her best financial interest to continue to accrue service in the retirement system and not elect into DROP. Despite the observed experience, we do not wish to use an assumption in the valuation that anticipates that members will make poor financial decisions (at least from the perspective of the System financing) in the future. Therefore, we are not recommending a DROP assumption be implemented for members with less than 33 years of service.

Of those Plan 2 members with 33 years of service, eight out of 11 (73%) elected into DROP. Our assumption is that 70% elect DROP and 30% retire. Once in DROP, we assume the member will work 36 months. Actual experience indicates the average DROP period was 38 months. **We recommend the current DROP assumption be retained.**

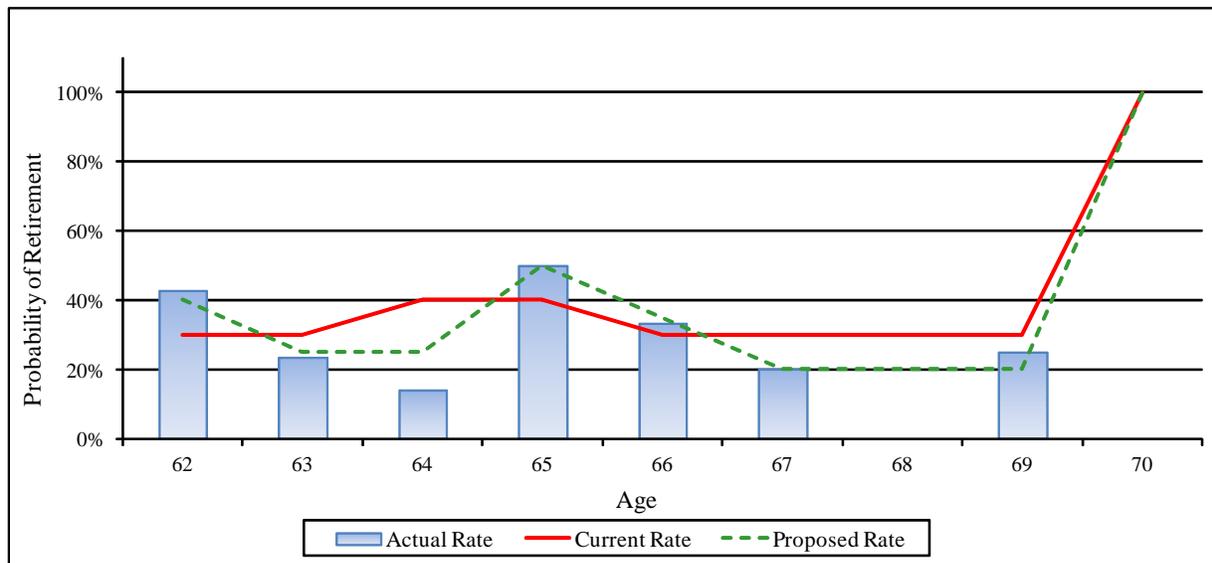
Inactive Vested Members

Currently, all inactive vested members from Plan 2 who leave their contributions with the System are assumed to retire at age 62. We reviewed the experience during the observation period and found that actual experience was close to that assumed. **We recommend the current assumption be retained.**



SECTION 5- RETIREMENT

**Retirement Rates
Plan 2**



	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Total Count	55	55	58
Actual/Expected		100%	95%



SECTION 6- DISABILITY

The size of the Retirement System, coupled with the small probability of disablement at most ages, does not permit credible derivation of age related disability rates. Furthermore, the number of disabilities has been small for the last three experience studies.

Results

The table below indicates the number of actual and expected disabilities during the current and prior study period and the resulting A/E Ratios.

Disability Experience

Disabilities	Actual	Expected	A/E Ratio
1999-2003	13	30	43%
2004-2008	5	17	29%
2009-2013	<u>4</u>	<u>16</u>	25%
	22	63	35%

Recommendation

The results of this study period are consistent with those of the prior study, i.e., the actual number of disabilities is much lower than expected. Given the size of the group and the very low number of disabilities, **we recommend eliminating the disability assumption.**



SECTION 7- TERMINATION OF EMPLOYMENT (WITHDRAWAL)

This section of the report summarizes the results of our study of terminations of employment for reasons other than death, retirement, or disability. Rates of termination can vary by both age and years of service. In general, rates of termination are highest at younger ages and in the early years of employment. WER currently uses a set of select and ultimate withdrawal rates. Select rates based on years of service are used for members with less than five years of service. The ultimate rates are age based and apply to all members with five or more years of service.

The number of withdrawals includes all members reported to have terminated employment. Some of these members subsequently receive refunds of contributions, some return to active membership and some leave their contributions with the System until retirement.

Results

The following charts show the actual and expected number of terminations for causes other than death, retirement, or disability, and the corresponding A/E Ratios.

Termination Experience (2009-2013)

Service	Actual	Expected	A/E Ratio
1	46	67	69%
2	40	56	71%
3	43	47	91%
4	32	40	80%
5 or more	<u>166</u>	<u>143</u>	116%
Total	327	353	93%

In general, the number of terminations for members with less than five years of service was lower than expected with A/E ratios ranging from 69% to 91%. For those with five or more years of service, the number of terminations was higher than that expected with an A/E ratio of 116%. However, the pattern observed did not indicate a strong correlation between rates of termination and age.

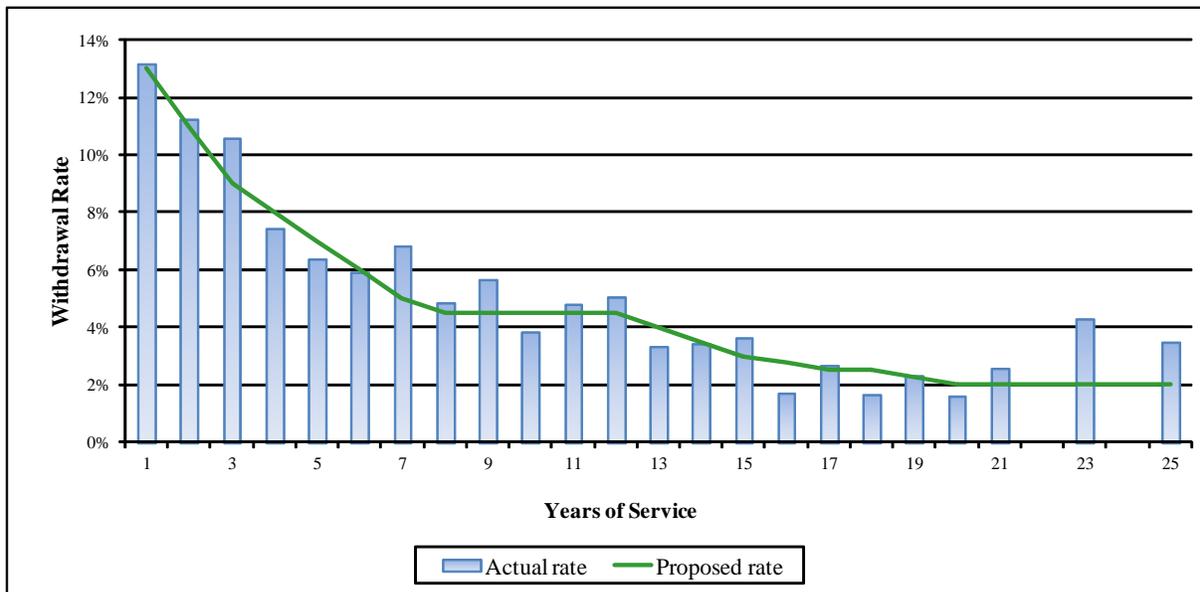
Recommendation

The current assumption splits the data into multiple subgroups resulting in exposures that are relatively small. We also analyzed the termination experience solely on service and observed a relatively strong correlation. **To simplify the termination assumption and provide a better fit to the actual overall experience, we recommend moving to a pure service-based assumption.** The A/E ratio on the proposed assumption is 103%.



SECTION 7- TERMINATION OF EMPLOYMENT (WITHDRAWAL)

Termination Rates



	Actual	Expected - Proposed Assumptions
Total Count	378	367
Actual/Expected		103%



SECTION 8- PROBABILITY OF REFUND UPON VESTED TERMINATION

This section of the report deals with the rates at which members elect a refund of their contribution balance upon termination of service. It only considers active members who will be vested when they terminate, but are not yet eligible for service retirement. Vesting requires seven years of service. Note that all non-vested members are assumed to take a refund at termination.

The current assumption, based on years of service, is shown below:

Years of Service	Percent Electing Refund
Under 15	60%
15-19	40%
20-24	20%
25 or more	0%

The longer the employee has been with the City, the lower the probability is that the member will take a refund.

Results

The following is a summary of vested members in Plan 2 who terminated employment and elected to take a refund of their employee contribution balance, thereby forfeiting any right to a benefit in the future.

Years of Service	Refunds	
	Actual	Expected
Under 15	50	58
15-19	9	7
20-24	2	2
25-29	<u>5</u>	<u>0</u>
Total	66	67

Recommendation

The A/E ratio in the prior study was 108% (54 actual refunds compared to 50 expected). In this study, the A/E ratio is 99% (66 actual divided by 67 expected). **Based on the results of both the current and prior experience studies, we recommend the current assumption be retained.**



SECTION 9- SALARY MERIT SCALE

Estimates of future salaries are based on assumptions for two types of increases:

1. Increases in each individual’s salary due to promotion or longevity (often called merit scale), and
2. Increases in the general wage level of the membership, which are directly related to price and wage inflation.

Earlier in this report, we recommended that the second of these rates, general wage inflation, be set at 4.00% (3.25% price inflation and 0.75% real wage growth).

Although future salary increases are the result of two components, it is difficult if not impossible, to isolate the true salary adjustment due to inflation and productivity. Therefore, the experience study reviewed total salary increases for the period.

Results

We compared individual salary increases for all members active in any two consecutive periods (e.g. 2008 and 2009, 2009 and 2010, etc.). Based on the current assumption, which is duration based (rates vary with years of service), the actual salary experience over the five-year period is shown below:

Year	Actual	Expected
2009	6.04%	5.61%
2010	1.80%	5.54%
2011	1.27%	5.50%
2012	3.86%	5.43%
2013	3.00%	5.36%
Total	3.22%	5.49%

The study period covered a very difficult economic period with severe budgetary constraints for most governmental employers. Consequently, it was not a surprise to observe actual salary increases that were significantly lower than expected. In addition, price and wage inflation during the study period were lower than the current assumption. When the current salary increase assumption is adjusted by using a 2.0% general wage increase rather than the 4.0% assumption, the resulting A/E ratio indicates a much better fit.

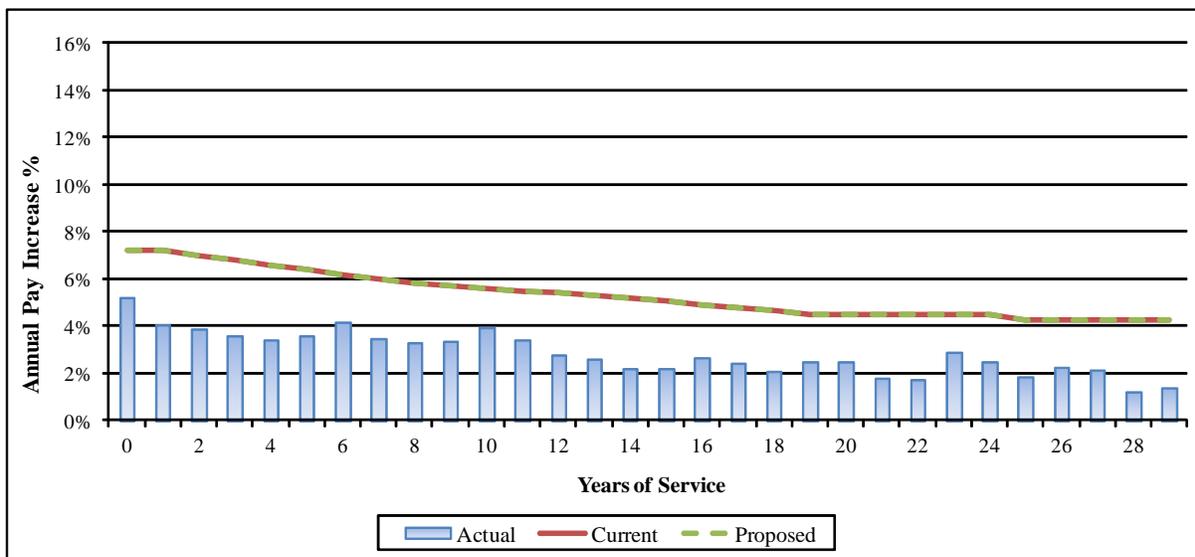
Recommendation

Since our general wage increase is 4.0% (the same as the current assumption), **we recommend maintaining the current total salary scale.**



SECTION 9- SALARY MERIT SCALE

Total Salary Scale



	Actual	Expected - Current Assumptions	Expected - Proposed Assumptions
Average Increase	3.22%	5.49%	5.49%



SECTION 10- ELECTION OF PLAN CHOICE BY PLAN 3 MEMBERS

Once Plan 3 members have seven years of service, they may elect to remain in the defined contribution plan (Plan 3b) or elect to participate in Plan 2. The valuation assumes that all members will elect into Plan 2 when they become vested.

The actual experience during the current study period is shown below:

	2009	2010	2011	2012	2013	Total
Plan 2	85	48	64	76	82	355
Plan 3b	11	8	7	13	12	51
Total	96	56	71	89	94	406
DB Election	89%	86%	90%	85%	87%	87%

As shown above, 87% of Plan 3 members elected to transfer to Plan 2. The remaining 13% elected to remain in Plan 3 (defined contribution plan). The experience has been fairly consistent from one study period to another.

For employees who expect to continue to work for the City, Plan 2 benefits have a higher value/cost and represent a better financial decision. In addition, actual election experience indicates the vast majority of Plan 3 members elect Plan 2. The current assumption assumes that all Plan 3 members will elect into Plan 2. Given that the employee and City contributions to Plan 3 are less than the normal cost for Plan 2, this assumption prevents an actuarial loss from occurring from the actual experience. **We recommend the current assumption be retained.**



SECTION 11- MISCELLANEOUS ASSUMPTIONS

Sick Leave Service

Upon retirement, accumulated unused sick leave hours are converted to bi-weekly service credits for the purpose of computing benefit amounts. Because the amount of unused sick leave cannot be determined until a member retires, an assumption is used to anticipate the increase in retirement benefits due to this plan provision. Currently, normal retirement benefits are increased by 4% to account for the inclusion of unused sick leave in calculating retirement benefits.

Our review of the increase in retirement benefits due to additional service for unused sick leave indicated an average increase over the study period of 1.6%. The prior experience study showed an increase of 3.0%. The experience in the last two studies indicates that actual experience is lower than the current assumption. **We recommend the 4% load for sick leave service be lowered to 2.5%.**

Marriage Assumption

Actual spousal information is provided for retirees and is used in the valuation. For current active members, whose marital status and spousal information may change before they reach retirement, an assumption is used. The proportion of actual members assumed to be married is 70%, with the male assumed to be three years older than the female. **The current assumptions are standard assumptions that are used widely by other retirement plans. We recommend they be retained.**

Indexation of Vested Deferred Pensions

The amount of pension for the deferred vested members is indexed with the increase in the National Average Wage, but not to exceed 5.5% per year. The current assumption is an annual increase of 4.0%.

Earlier we recommended the wage growth assumption remain at 4.00%. **As a result, we recommend this assumption remain at 4.00% to be consistent with the other economic assumptions.**



APPENDIX A: PROPOSED ACTUARIAL ASSUMPTIONS

ACTUARIAL COST METHOD

The actuarial cost method is a procedure for allocating the actuarial present value of pension benefits and expenses to time periods. The method used for the valuation is known as the Entry Age Normal actuarial cost method, and have the following characteristics:

- (i) The annual normal costs for each individual active member are sufficient to accumulate the value of the member's pension at time of retirement.
- (ii) Each annual normal cost is a constant percentage of the member's year-by-year projected covered compensation.

The Entry Age Normal actuarial cost method allocates the actuarial present value of each member's projected benefits on a level basis over the member's assumed pensionable compensation rates between the entry age of the member and the assumed exit ages.

The portion of the actuarial present value allocated to the valuation year is called the normal cost. The portion of the actuarial present value not provided for by the actuarial present value of future normal costs is called actuarial liability. Deducting actuarial assets from the actuarial liability determines the unfunded actuarial liability or (surplus). The unfunded actuarial liability/(surplus) is financed as a level percent of member payroll over an open 20-year period.

ACTUARIAL ASSUMPTIONS

Retirement System contribution requirements and actuarial present values are calculated by applying experience assumptions to the benefit provisions and membership information of the Retirement System, using the actuarial cost method.

The principal areas of risk which require experience assumptions about future activities of the Retirement System are:

- (i) Long-term rates of investment return to be generated by the assets of the System
- (ii) Patterns of pay increases to members
- (iii) Rates of mortality among members, retirees and beneficiaries
- (iv) Rates of withdrawal of active members
- (v) The age patterns of actual retirements



APPENDIX A: PROPOSED ACTUARIAL ASSUMPTIONS

In making a valuation, the monetary effect of each assumption is calculated for as long as a present covered person survives – a period of time which can be as long as a century.

Actual experience of the Retirement System will not coincide exactly with assumed experience. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experiences. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time to time, one or more of the assumptions are modified to reflect experience trends (but not random or temporary year-to-year fluctuations). A complete review of the actuarial assumptions was completed in 2014. The use of updated assumptions will be effective with the December 31, 2014 valuation.

Investment Rate of Return (net of administrative expenses): This assumption is 7.75% a year, compounded annually and consists of 3.25% long-term price inflation and a 4.50% real rate of return over price inflation. This assumption, used to equate the value of payments due at different points in time, was adopted by the Board and was first used for the December 31, 1981 valuation, although the allocation between inflation and real return has changed periodically, most recently in 2014.

Salary Increase Rates: These rates are used to project current pay amounts to those upon which a benefit will be based. This table was first used in the December 31, 2014 valuation.

Years of Service	Annual Rate of Salary Increase for Sample Service Durations			
	Inflation Component	Productivity Component	Merit and Longevity	Total
1	3.25%	0.75%	3.20%	7.20%
2	3.25	0.75	3.00	7.00
3	3.25	0.75	2.80	6.80
4	3.25	0.75	2.60	6.60
5	3.25	0.75	2.40	6.40
6	3.25	0.75	2.20	6.20
7	3.20	0.75	2.00	6.00
8	3.25	0.75	1.80	5.80
9	3.25	0.75	1.70	5.70
10	3.25	0.75	1.60	5.60
11	3.25	0.75	1.50	5.50
12	3.25	0.75	1.40	5.40
13	3.25	0.75	1.30	5.30
14	3.25	0.75	1.20	5.20
15	3.25	0.75	1.06	5.06
16	3.25	0.75	0.92	4.92
17	3.25	0.75	0.78	4.78
18	3.25	0.75	0.65	4.65
19	3.25	0.75	0.50	4.50
20	3.25	0.75	0.50	4.50
21	3.25	0.75	0.50	4.50
22	3.25	0.75	0.50	4.50
23	3.25	0.75	0.50	4.50
24	3.25	0.75	0.50	4.50
25	3.25	0.75	0.50	4.50
Over 25	3.25	0.75	0.25	4.25



APPENDIX A: PROPOSED ACTUARIAL ASSUMPTIONS

The salary increase assumptions will produce 4.0% annual increases in active member payroll (the inflation and productivity base rate) given a constant active member group size. This is the same payroll growth assumption used to amortize the unfunded actuarial liability. The real rate of return over assumed wage growth is 3.75% per year.

Changes actually experienced in average pay and total payroll have been as follows:

	Year Ended					5 Year (Average) Compounded Annual Increase
	12/31/13	12/31/12	12/31/11	12/31/10	12/31/09	
Average Payroll	0.8%	3.2%	(1.1)%	1.1%	5.5%	1.9%
Total Payroll	(0.2)%	2.3%	(10.0)%	(4.3)%	0.8%	(2.4)%

Mortality Table: This assumption is used to measure the probabilities of members dying and the probabilities of each pension payment being made after retirement.

Healthy Retirees

And Beneficiaries: RP-2000 Healthy Annuitant Table (ages set forward two years for males, zero for females)

Disabled Retirees: RP-2000 Disabled Table for Males and Females

Active Members: RP-2000 Employee Table (ages set forward two years for males, zero for females)

The RP-2000 Tables are used with generational mortality.

Sample Ages ⁽¹⁾	Present Value of \$1 Monthly for Life		Future Life Expectancy (Years)	
	Men	Women	Men	Women
50	\$136.27	\$141.98	30.4	34.6
55	128.67	135.41	25.7	29.7
60	118.41	127.04	21.2	25.1
65	150.86	116.91	16.9	20.7
70	91.20	104.80	13.0	16.7
75	75.12	90.90	9.7	13.0
80	58.98	75.76	6.9	9.8
85	44.42	60.20	4.8	7.1

(1) Reflects values from the basic table based on ages in 2000

This table was first used for the December 31, 2004 actuarial valuation.



APPENDIX A: PROPOSED ACTUARIAL ASSUMPTIONS

Rates of Retirement and Deferred Retirement Option Plan (DROP) Elections: These rates are used to measure the probability of eligible members retiring under either the regular retirement provisions or from the Deferred Retirement Option Plan.

Percent Retiring During Year

Retirement		
Age	Plan 1	Plan 2
55	15%	3%
56	15	3
57	15	3
58	15	3
59	15	3
60	40	3
61	40	20
62	20	40
63	20	25
64	20	25
65	100	50
66	N/A	35
67	N/A	20
68	N/A	20
69	N/A	20
70	N/A	100

In addition, the following assumptions would apply to members in this category:

Plan 1: 70% of members with 30 or more years of service will elect the DROP with an average DROP period of 48 months. The remaining 30% are assumed to retire immediately.

Plan 2: 70% of members with 33.33 or more years of service and are at least age 62 will elect the DROP with an average DROP period of 36 months.

All members of the retirement system were assumed to retire on or before age 70.

This assumption will first used in the December 31, 2014 actuarial valuation.



APPENDIX A: PROPOSED ACTUARIAL ASSUMPTIONS

Rates of Separation from Active Membership: This assumption measures the probabilities of a member terminating employment. The rates do not apply to members who are eligible to retire.

Years of Service	Probability of Terminating During Year
0	13.00%
1	13.00
2	11.00
3	9.00
4	8.00
5	7.00
6	6.00
7	5.00
8-12	4.50
13	4.00
14	3.50
15	3.00
16	2.75
17	2.50
18	2.50
19	2.25
20+	2.00

These rates will first used for the December 31, 2014 valuation.

Forfeiture of Vested Benefits: The assumption is that a percentage of the actuarial present value of vested termination benefits will be forfeited by a withdrawal of accumulated contributions.

Years of Service	Percent Forfeiting
Under 15	60%
15-19	40
20-24	20
25 or more	0

This table was first used for the December 31, 2004 actuarial valuation.

Rates of Disability: There is no disability assumption. This assumption will first be used in the December 31, 2014 valuation.

Administrative Expenses: Assumed to be paid from investment earnings.

Active Member Group Size: Assumed to remain constant.

Vested Deferred Pensions: Amounts are assumed to increase during the deferral period at 4.0% per year. This assumption was first used for the December 31, 2009 valuation.



APPENDIX A: PROPOSED ACTUARIAL ASSUMPTIONS

MISCELLANEOUS AND TECHNICAL ASSUMPTIONS

Marriage Assumption: 70% of non-retired participants are assumed to be married for purposes of death benefits. In each case, the male was assumed to be three years older than the female.

Pay Increase Timing: Assumed to be mid-year.

Decrement Timing: Decrements of all types are assumed to occur mid-year.

Eligibility Testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year at the start of the year in which the decrement is assumed to occur.

Benefit Service: Service calculated to the nearest month, as of the decrement date, is used to determine the amount of benefit payable.

Other: The turnover decrement does not operate during retirement eligibility.

Miscellaneous Loading Factors: The calculated normal retirement benefits are increased by 2.5% to account for the inclusion of unused sick leave in the calculation of Service. This assumption will be changed with the December 31, 2014 valuation.

Plan 3 Transfer Assumption: For purposes of the valuation, Plan 3 members are assumed to transfer to Plan 2 if they acquire 7 years of service. An additional reserve is held for this group and equals the excess, if any, of the actuarial value of assets over the market value of assets. This assumption was changed with the December 31, 2004 valuation.



APPENDIX B: CURRENT ACTUARIAL ASSUMPTIONS

ACTUARIAL COST METHOD

The actuarial cost method is a procedure for allocating the actuarial present value of pension benefits and expenses to time periods. The method used for the valuation is known as the Entry Age Normal actuarial cost method, and have the following characteristics:

- (i) The annual normal costs for each individual active member are sufficient to accumulate the value of the member's pension at time of retirement.
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- (iv) Rates of withdrawal of active members
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APPENDIX B: CURRENT ACTUARIAL ASSUMPTIONS

In making a valuation, the monetary effect of each assumption is calculated for as long as a present covered person survives – a period of time which can be as long as a century.

Actual experience of the Retirement System will not coincide exactly with assumed experience. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experiences. The result is a continual series of adjustments (usually small) to the computed contribution rate.

Investment Rate of Return (net of administrative expenses): This assumption is 7.75% a year, compounded annually and consists of 3.5% long-term price inflation and a 4.25% real rate of return over price inflation. This assumption, used to equate the value of payments due at different points in time, was adopted by the Board and was first used for the December 31, 1981 valuation, although the allocation between inflation and real return has changed periodically, most recently in 2009.

Salary Increase Rates: These rates are used to project current pay amounts to those upon which a benefit will be based. This table was first used in the December 31, 2009 valuation.

Years of Service	Annual Rate of Salary Increase for Sample Service Durations			
	Inflation Component	Productivity Component	Merit and Longevity	Total
1	3.50%	0.50%	3.20%	7.20%
2	3.50	0.50	3.00	7.00
3	3.50	0.50	2.80	6.80
4	3.50	0.50	2.60	6.60
5	3.50	0.50	2.40	6.40
6	3.50	0.50	2.20	6.20
7	3.50	0.50	2.00	6.00
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13	3.50	0.50	1.30	5.30
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17	3.50	0.50	0.78	4.78
18	3.50	0.50	0.65	4.65
19	3.50	0.50	0.50	4.50
20	3.50	0.50	0.50	4.50
21	3.50	0.50	0.50	4.50
22	3.50	0.50	0.50	4.50
23	3.50	0.50	0.50	4.50
24	3.50	0.50	0.50	4.50
25	3.50	0.50	0.50	4.50
Over 25	3.50	0.50	0.25	4.25



APPENDIX B: CURRENT ACTUARIAL ASSUMPTIONS

The salary increase assumptions will produce 4.0% annual increases in active member payroll (the inflation and productivity base rate) given a constant active member group size. This is the same payroll growth assumption used to amortize the unfunded actuarial liability. The real rate of return over assumed wage growth is 3.75% per year.

Changes actually experienced in average pay and total payroll have been as follows:

	Year Ended					5 Year (Average) Compounded Annual Increase
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Total Payroll	(0.2)%	2.3%	(10.0)%	(4.3)%	0.8%	(2.4)%

Mortality Table: This assumption is used to measure the probabilities of members dying and the probabilities of each pension payment being made after retirement.

Healthy Retirees

And Beneficiaries: RP-2000 Healthy Annuitant Table (ages set forward two years for males, zero for females)

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Active Members: RP-2000 Employee Table (ages set forward two years for males, zero for females)

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	Men	Women	Men	Women
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55	128.67	135.41	25.7	29.7
60	118.41	127.04	21.2	25.1
65	150.86	116.91	16.9	20.7
70	91.20	104.80	13.0	16.7
75	75.12	90.90	9.7	13.0
80	58.98	75.76	6.9	9.8
85	44.42	60.20	4.8	7.1

(1) Reflects values from the basic table based on ages in 2000

This table was first used for the December 31, 2004 actuarial valuation.



APPENDIX B: CURRENT ACTUARIAL ASSUMPTIONS

Rates of Retirement and Deferred Retirement Option Plan (DROP) Elections: These rates are used to measure the probability of eligible members retiring under either the regular retirement provisions or from the Deferred Retirement Option Plan.

Percent Retiring During Year

Retirement		
Age	Plan 1	Plan 2
55	15%	5%
56	15	5
57	15	5
58	15	5
59	15	5
60	40	5
61	40	5
62	20	30
63	20	30
64	20	40
65	100	40
66	N/A	30
67	N/A	30
68	N/A	30
69	N/A	30
70	N/A	100

In addition, the following assumptions would apply to members in this category:

Plan 1: 70% of members with 30 or more years of service will elect the DROP with an average DROP period of 48 months. The remaining 30% are assumed to retire immediately.

Plan 2: 70% of members with 33.33 or more years of service and are at least age 62 will elect the DROP with an average DROP period of 36 months.

All members of the retirement system were assumed to retire on or before age 70.

This assumption was first used in the December 31, 2009 actuarial valuation.



APPENDIX B: CURRENT ACTUARIAL ASSUMPTIONS

Rates of Separation from Active Membership: This assumption measures the probabilities of a member terminating employment. The rates do not apply to members who are eligible to retire.

Sample Ages	Years of Service	Probability of Terminating During Year
ALL	0	25.00%
	1	19.00
	2	14.00
	3	11.00
	4	9.00
25	Over 4	9.00
30		7.00
35		5.25
40		4.00
45		3.50
50		2.50
55		1.50
60		1.50

These rates were first used for the December 31, 2009 valuation.

Forfeiture of Vested Benefits: The assumption is that a percentage of the actuarial present value of vested termination benefits will be forfeited by a withdrawal of accumulated contributions.

Years of Service	Percent Forfeiting
Under 15	60%
15-19	40
20-24	20
25 or more	0

This table was first used for the December 31, 2004 actuarial valuation.

Rates of Disability: This assumption measures the probabilities of a member becoming disabled.

Sample Ages	% of Active Members Becoming Disabled During Next Year
25	0.02%
30	0.03
35	0.04
40	0.07
45	0.10
50	0.18
55	0.32
60	0.53

These rates were first used for the December 31, 2009 valuation. Disabilities are assumed to be non-duty related.



APPENDIX B: CURRENT ACTUARIAL ASSUMPTIONS

Administrative Expenses: Assumed to be paid from investment earnings.

Active Member Group Size: Assumed to remain constant.

Vested Deferred Pensions: Amounts are assumed to increase during the deferral period at 4.0% per year. This assumption was first used for the December 31, 2009 valuation.

MISCELLANEOUS AND TECHNICAL ASSUMPTIONS

Marriage Assumption: 70% of non-retired participants are assumed to be married for purposes of death benefits. In each case, the male was assumed to be three years older than the female.

Pay Increase Timing: Assumed to be mid-year.

Decrement Timing: Decrements of all types are assumed to occur mid-year.

Eligibility Testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year at the start of the year in which the decrement is assumed to occur.

Benefit Service: Service calculated to the nearest month, as of the decrement date, is used to determine the amount of benefit payable.

Other: The turnover decrement does not operate during retirement eligibility.

Miscellaneous Loading Factors: The calculated normal retirement benefits were increased by 4% to account for the inclusion of unused sick leave in the calculation of Service. This assumption was changed with the December 31, 2004 valuation.

Plan 3 Transfer Assumption: For purposes of the valuation, Plan 3 members are assumed to transfer to Plan 2 if they acquire seven years of service. An additional reserve is held for this group and equals the excess, if any, of the actuarial value of assets over the market value of assets. This assumption was changed with the December 31, 2004 valuation.



DEFINITION OF TERMS

Actuarial Accrued Liability	The difference between the actuarial present value of system benefits and the actuarial value of future normal costs. Also referred to as “accrued liability” or “actuarial liability.”
Actuarial Assumptions	Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate of rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
Accrued Service	Service credited under the system that was rendered before the data of the actuarial valuation.
Actuarial Equivalent	A single amount or series of amounts of equal actuarial value to another single amount or series of amounts, computed on the basis of appropriate actuarial assumptions.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of retirement system benefits between future normal cost and actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”
Experience Gain (Loss)	The difference between actual experience and actuarial assumptions anticipated experience during the period between two actuarial valuation dates.
Actuarial Present Value	The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.
Amortization	Paying off an interest-discounted amount with periodic payments of interest and principal, as opposed to paying off with lump sum payment.
Normal Cost	The actuarial present value of retirement system benefits allocated to the current year by the actuarial cost method.



DEFINITION OF TERMS

Unfunded Actuarial Accrued

Liability

The difference between actuarial accrued liability and the valuation assets. Sometimes referred to as “unfunded accrued liability” or “unfunded liability”.

Most retirement systems have unfunded actuarial accrued liability. They arise anytime new benefits are added and anytime an actuarial loss is realized.

The existence of unfunded actuarial accrued liability is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liability does not represent a debt that is payable today. What is important is the ability to amortize the unfunded actuarial accrued liability and make payments to finance it. Also of importance are trends in the amount or duration of payment.