

March 13, 2017

City of Rockville

Pension Plan
Experience Study 2011-2015



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Executive Summary

Pension plan funding has the goal of ensuring sufficient assets are on hand to pay benefits when due – even when the benefits are payable in sixty or more years in the future. To evaluate whether the funding is on track, plan sponsors should periodically evaluate the assumptions used in the valuation.

The City of Rockville (“the City”) charged Korn Ferry Hay Group with conducting an evaluation of the experience of The City of Rockville Employees Retirement System (ROCKERS) over the past five years, and based on that analysis setting out recommendations for actuarial assumptions to be used in future valuations.

Based on our study of the demographic and economic assumptions and the actual experience of active participants in Rockers, we recommend a number of proposed changes to the Plans’ demographic and economic assumptions.

Demographic Assumptions

In brief, the changes in demographic assumptions reflect **somewhat earlier retirements** for the Administrative (Admin) and Union employees (enrolled in either the Thrift or Defined Benefit (DB) plans) and **unchanged retirement** rates for the Police employees. Active Admin and Union employees are expected to **terminate at a somewhat higher rate** under the proposed assumptions as compared to the current assumptions.

We are also recommending a change to the mortality rates which are based on the RP-2000 mortality tables. We propose using a table of rates for healthy annuitant and disabled annuitant deaths that reflects actual experience of a large state governmental employer that we believe reasonably estimates the ROCKERS mortality. These mortality tables contain a sufficient margin for improvements in life expectancy and are appropriate tables for the City’s pension plans. The number of covered lives in the retirement plan is too few to develop City specific mortality tables, therefore the tables we have chosen are appropriate.

Economic Assumptions

Currently, salary growth assumptions differ for Police, the DB plan, and the Thrift plan. Since there are very few members left in the DB plan and since the split between Union and Admin is a better indicator of future pay increase, we propose replacing the DB and Thrift split with a Union and Admin split. The proposed Union, Admin, and Police tables were built using merit and promotion increases over the experience study period and adding expected future general wage

growth to those amounts. **On average, the salary growth rates that we propose are lower than the current rates.**

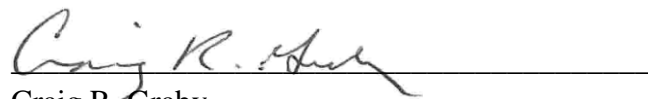
We recommend lowering the long-term inflation assumption from 2.75% to 2.50%. We recommend **reducing the investment return assumption from 7.50% to 7.00%.**

Actuarial Certification

To the best of our knowledge, this report is complete and accurate and all rates have been determined in conformance with generally accepted actuarial principles and on the basis of actuarial methods which are reasonable (taking into account past experience under the Plan and reasonable expectations) and which in combination represent our best estimate of anticipated experience under the plan.

The results shown in this report are reasonable actuarial results. However, a different set of results could also be considered reasonable actuarial results. The reason for this is that actuarial standards of practice describe a "best-estimate range" for each assumption, rather than a single best-estimate value. Thus, reasonable results differing from those presented in this report could have been developed by selecting different points within the best-estimate ranges for various assumptions.

The actuary certifying to this valuation is a member of professional actuarial organizations, and meets the General Qualification Standards of the American Academy of Actuaries for purposes of issuing Statements of Actuarial Opinion.



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Hay Group
March 13, 2017

Section 1 – Introduction

Hay Group conducted a demographic and economic experience study of the City of Rockville Employees Retirement System for Admin employees, Union employees and Police employees collectively the “Plans” for the period April 1, 2011 through July 1, 2015 (the evaluation period).

The purpose of this study was to determine the reasonableness and appropriateness of the demographic and economic assumptions of the Plans and to recommend changes to those assumptions as we deemed appropriate, in consultation with the City’s Retirement Board.

As detailed in this Report we analyzed the most recent five years of data for each assumption used in the determination of the Plans’ liabilities, actuarially determined contribution, and other actuarial analyses presented in our annual Actuarial Valuations of the Plans, and made recommendations for changes where appropriate.

The new actuarial assumptions will be used for both the City’s Defined Benefit Pension and the Retiree Benefit Trust (OPEB) valuations. This Report formalizes our findings and recommendations to the City Retirement Board. We have included in this report our proposed assumption changes, which we have utilized in our July 1, 2016 Defined Benefit Pension Plan valuation.

Background

For the Plans to operate on a sound actuarial basis, Plan assets together with expected future contributions must be adequate to cover the value of future promised benefit payments. Each year, as part of the actuarial valuation process, we, as the Plans’ actuary, project future benefits and determine the present value of such benefits. These projections serve as a basis for determining, as of the actuarial valuation date, each Plan’s unfunded actuarial accrued liability and the City’s normal cost.

These projections are based on numerous economic and demographic assumptions (as explained below). Since both the economic and demographic experience change over time, it is essential to conduct a periodic review of the experience and to adjust the assumptions in the valuation to reflect the most recent experience.

It is general practice to introduce some degree of conservatism in setting actuarial assumptions. However, the degree of conservatism varies widely among pension plans. Some plans set assumptions so that the pension plan contributions will be at least as great as the contributions needed in the most adverse foreseeable circumstances. Other plans set assumptions that are close to the actual experience but conservative enough to protect against small deviations from past experience. The latter, a moderately conservative approach, has been used by Korn Ferry Hay

Group in this study and the assumption revisions presented in this report were developed on that basis.

Section 2 of this Report describes the methodology that was used to analyze the data and develop the demographic rates. Section 3 presents the results of the analysis of the demographic experience, and the basis for the proposed demographic assumptions. Section 4 presents the results of the analysis of the economic experience, and the basis for the proposed economic assumptions. Appendix A shows the full set of rates to be used as part of the actuarial assumptions for actuarial valuations for plan years beginning on and after July 1, 2016.

Section 2 – Methodology

The specific objective of this actuarial experience study is the development of the demographic and economic assumptions, considering the experience of the Admin and Union employees separately from the Police employees.

Demographic assumptions

Demographic assumptions include the set of rates that predict certain events occurring to a group of employees or retirees. Events of significance to a retirement system are those that result in a commencement or termination of a benefit payment. The events affecting active employees include reasons for leaving the Plans such as retirement (retirement rates), becoming disabled (disability rates), terminating service (termination rates – also called withdrawal rates), or death (mortality rates). The events affecting annuitants include death (post disability or post retirement). If an annuitant were to return to service, or if a disabled annuitant were to recover, the benefit payments to the annuitant would stop. However, these events are not included in the analysis because the occurrences of these events are rare, and would not materially affect the calculation of the decrement rates. During our study of the evaluation period we analyzed the following demographic assumptions:

- The rates of terminations (separation from active duty for reasons other than death or disability) among active duty participants who are not eligible for retirement, and
- The rates of nondisabled retirements among active duty participants who are eligible for retirement.

Due to the small size of the data we did not examine emerging mortality or disability experience. Based on emerging mortality experience from other similar plans and large-scale actuarial studies of mortality we recommend adopting a modified version of the mortality tables of RP-2000 that reflect large governmental experience and contain a margin for future mortality improvements.

Economic assumptions

The economic assumptions cover the salary growth, inflation and investment return. These relatively few assumptions, compared to the larger number of demographic assumptions, generally have the most significant effect on the value of future benefits. The following economic assumptions were reviewed as part of the experience study and adjusted to keep pace with changes in the rate of general inflation:

- The salary growth rates specific for the Admin plans,
- The salary growth rates specific for the Union plans, and

- The salary growth rates specific for the Police plan.

Development of the assumptions begins with the analysis of actual experience over the evaluation period and a comparison to expected experience, analyzing the experience of each plan separately. Expected experience is derived by applying the current (most recent actuarial valuation) assumptions to past active duty populations for each plan. This analysis results in the calculation of the actual-to-expected ratio. The actual-to-expected ratio, which is developed separately for each completed years of service, and in total, gives a measure of how closely the assumption predicted what actually happened. If the actual-to-expected ratio is greater than 1.0, then the actuarial assumption under-predicted; if the actual-to-expected ratio is less than 1.0, then the assumption over-predicted the number of occurrences.

The product of the analysis is a set of proposed actuarial assumptions that produce an actual-to-expected ratio closer to 1.0, based upon the Plans' actual experience and our judgment as actuaries regarding the reliability of that experience as a predictor of future experience. When an actuarial experience analysis produces an actual-to-expected ratio which is close to 1.0 (e.g., in the range of 0.9 to 1.1), it will often be viewed as a match, and no adjustment to that assumption is warranted.

The demographic assumptions were developed by analyzing the actual experience of the participants in the Plans and comparing that experience to what was expected based on the demographic assumptions currently being used in the two actuarial valuations. During the normal valuation cycles, we were provided with the annual data files in order to perform the annual valuations. These files contain a "snap-shot" of the active employees participating in each Plan as well as the retired and survivors currently receiving benefit payments. The annual files also included terminated employees who are due a future benefit.

To determine the number of employees who left the City during the evaluation period, we matched consecutive annual files. For example, we matched the April 1, 2011 active member file to the April 1, 2012 active member file to determine who had left each plan during the plan year ending in 2012. In 2013, the plan year was changed April 1 to July 1, so the next period covered 1.25 years from April 1, 2012 through July 1, 2013. As appropriate, the expected number of decrements were adjusted to reflect the extra quarter of a year in this period. Thereafter, July 1, data files were matched through 2015.

Overall, we found that many of the actuarial assumptions of the Plans warranted some changes to better reflect a reasonable forecast of future experience based on currently available information.

Section 3 – Demographic Assumptions Analysis

Overview

The terminations from active employment for the City participants were analyzed by two categories, depending on the eligibility for plan benefits:

- Termination
- Retirement

In addition to the two categories above, we also recommended changes to the following categories based using large governmental data sets:

- Mortality
- Disability

Tables 1 and 2, below, compare the actual occurrences (*i.e.*, for terminations and retirements) that have occurred during the evaluation period to the expected results based on the current set of actuarial assumptions separately for each Plan. These Tables will be discussed in greater detail in the subsequent parts of this Section.

TABLE 1			
COMPARISON OF ACTUAL AND EXPECTED OCCURRENCES			
THRIFT AND DEFINED BENEFIT (DB) EMPLOYEE PLAN			
	Expected	Actual	Ratio Actual-to-Expected
Terminations	107.9	141	1.31
Retirement	48.4	54	1.12

TABLE 2			
COMPARISON OF ACTUAL AND EXPECTED OCCURRENCES			
POLICE PLAN			
	Expected	Actual	Ratio Actual-to-Expected
Terminations	8.6	10	1.16
Retirement	7.6	2	0.26

Based on our study, we recommend the following changes in demographic assumptions:

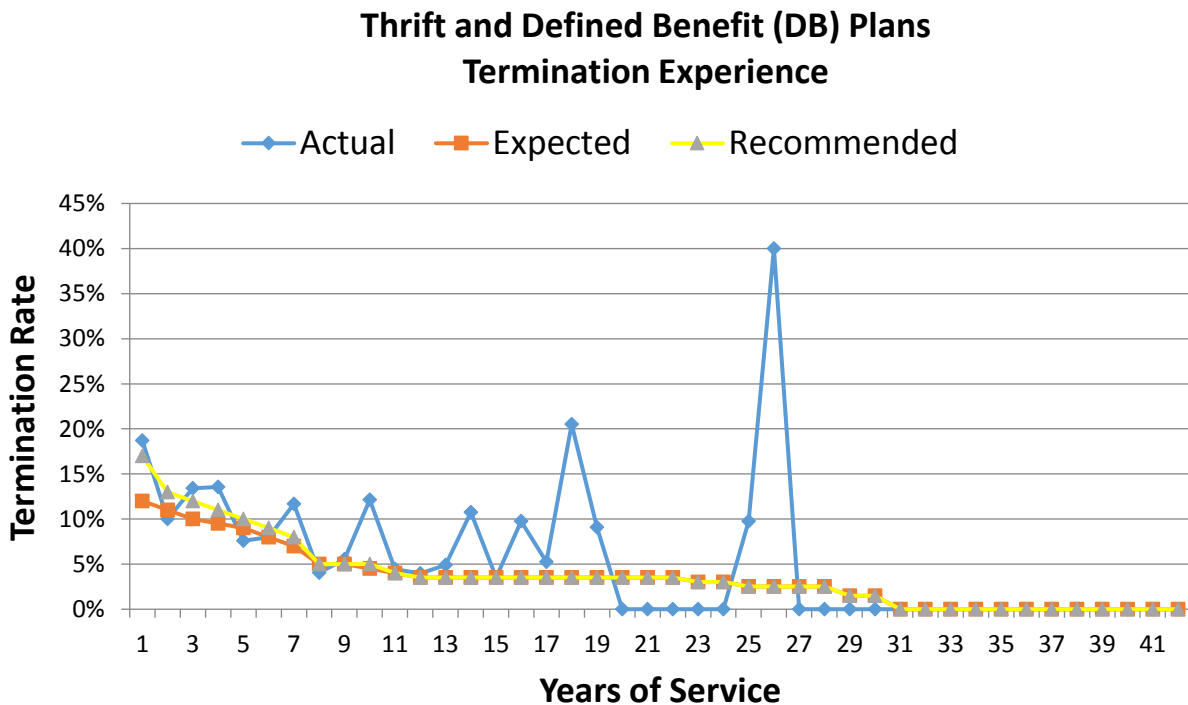
- Increase the termination assumptions (primarily in the earliest service periods) for all employees under the Thrift and DB plans.
- Leave unchanged the termination assumption for the employees in the Police plan.
- Increase the retirement assumptions at certain ages for employees under the Thrift and DB plans.
- Leave unchanged the retirement assumptions for employees under the Police plan.
- Update the healthy and disabled annuitant mortality tables to reflect more recent large governmental experience (including a margin for mortality improvement).
- Update the rates of disability to reflect more recent large governmental experience.

Nondisabled Termination Assumptions

Termination is the term commonly given to separations from active duty for reasons other than retirement, disability, or death. Terminations generally include members who cease to be on active status, whether or not they have a right to receive future Plan benefits (i.e., those who withdraw may or may not be vested in a benefit). For the City’s actuarial valuation purposes, different service based termination rates are currently applied to active participants depending upon the number of years of service they have completed. The current assumptions were adopted based on the prior experience study.

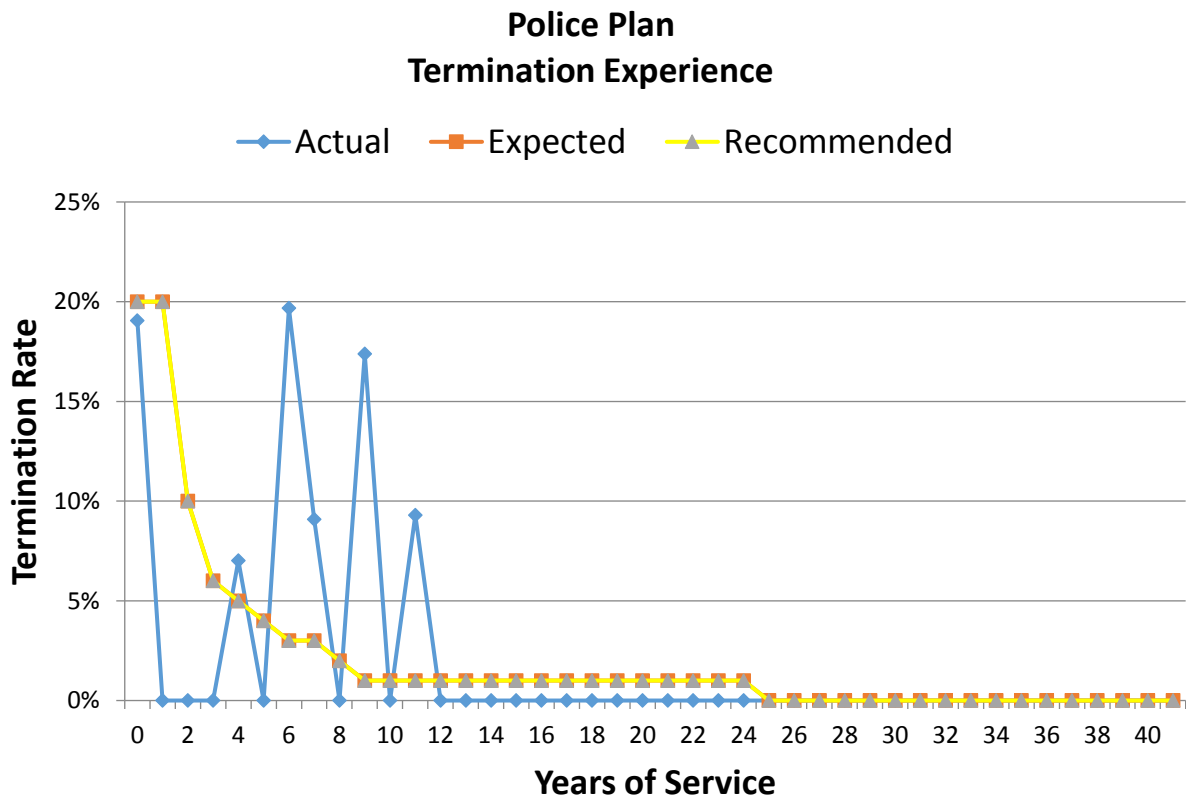
Thrift and Defined Benefit (DB) Employee Plan

Table 1, on page 7, shows that 107.9 employees were expected to leave during the evaluation period. During this period there were 141 actual terminations. Therefore, the actual-to-expected ratio was 131 percent. A ratio above 100 percent shows the actual withdrawal experience was greater than the expected rates. In developing our recommended rates we used smoothed actual experience to develop rates producing an actual-to-expected ratio closer to 1.0. The following chart shows the comparison of the actual, expected and proposed termination rates. Detailed rates based on completed years of service can be found in the Appendix.



Police Plan

Table 2, on page 7, shows that 8.6 Police employees were expected to leave during the evaluation period. During this period there were 10 actual terminations. Therefore, the actual-to-expected ratio was 116 percent. A ratio greater than 100 percent shows there were more terminations than expected. Since there were so few actual terminations, we left this assumption unchanged. Detailed rates based on completed years of service can be found in the Appendix.

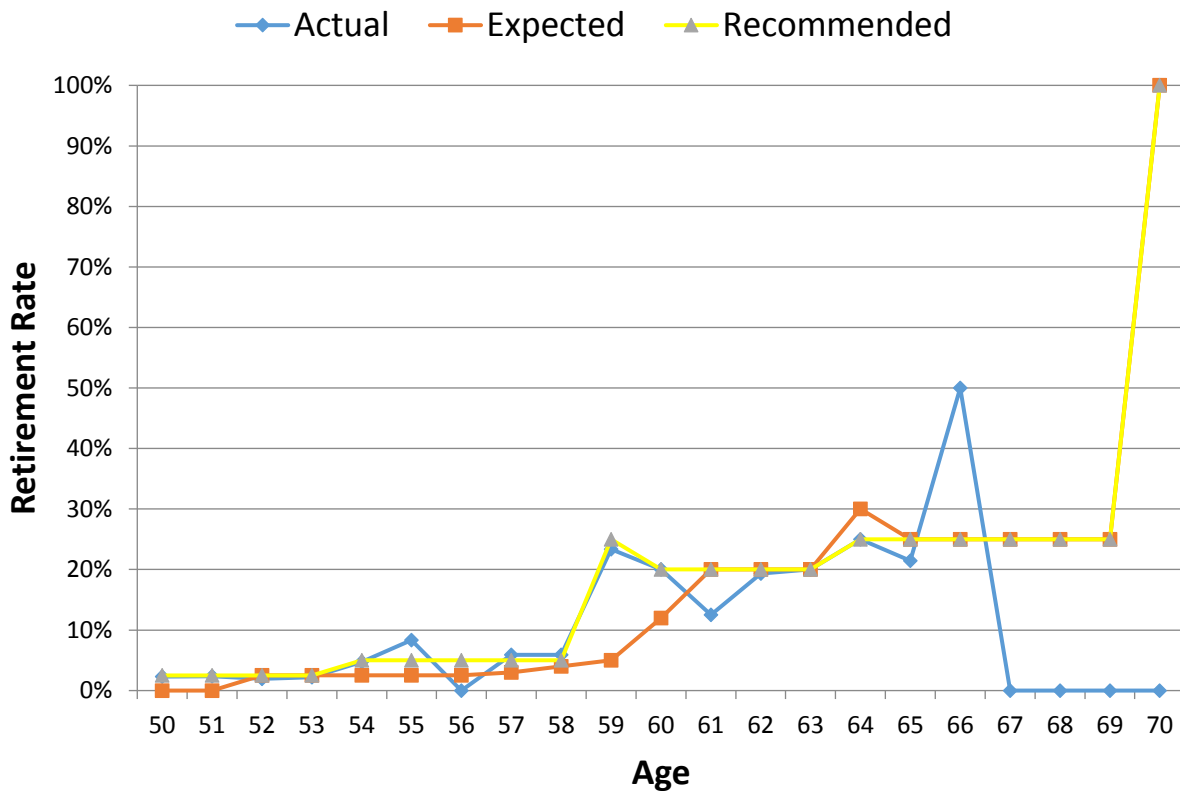


Nondisabled Retirement Assumptions

Thrift and Defined Benefit (DB) Employee Plan

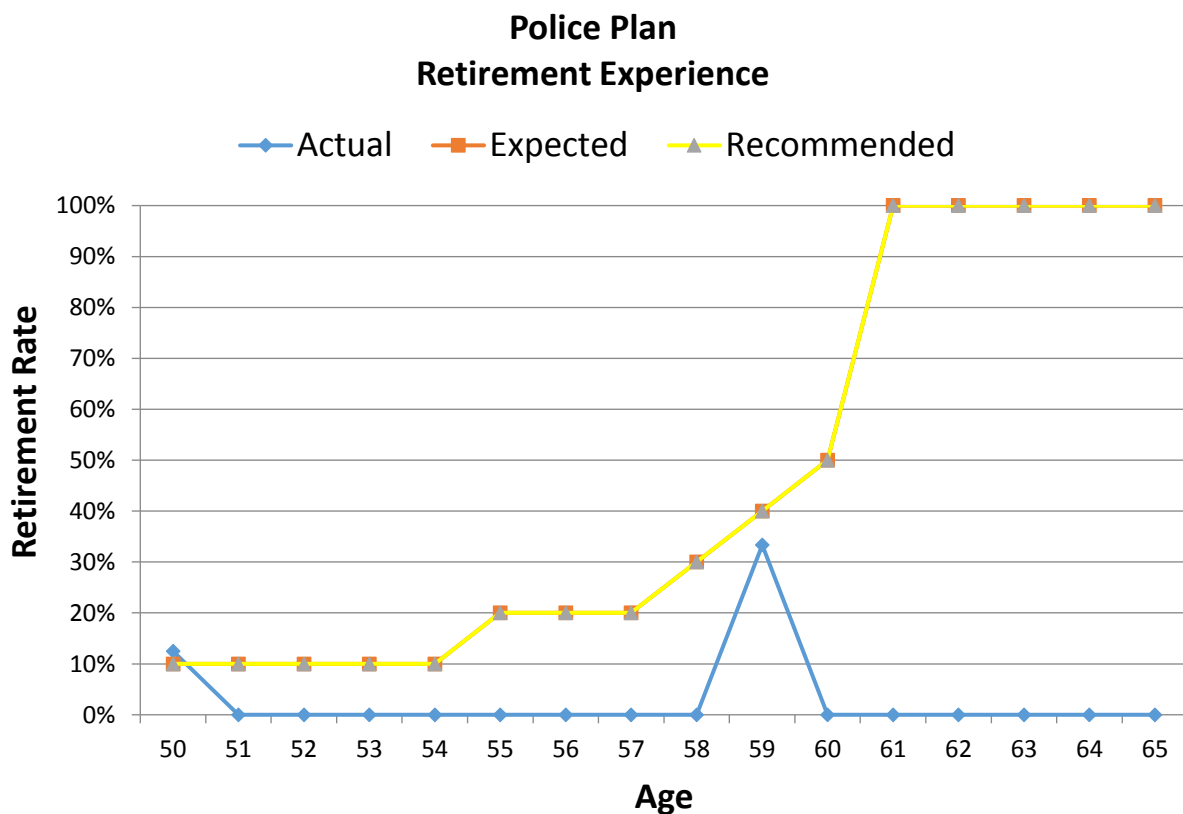
Table 1, on page 7, shows that based on current assumption 48.4 employees were expected to retire during the evaluation period. During this period there were 54 actual retirements. Therefore, the actual-to-expected ratio was 112 percent. A ratio greater than 100 percent shows there were more retirements than expected. Based on our analysis we increased many of the retirement rates at the earlier ages and left most retirement rates unchanged at later ages. All employees are still expected to retire at age 70 in our recommended assumption. Detailed age based comparisons and rates can be found in the Appendix.

Thrift and Defined Benefit (DB) Plans Retirement Experience



Police Plan

Table 2, on page 7, shows that 7.6 Police employees were expected to retire during the evaluation period. During this period there were 2 actual retirements. Therefore, the actual-to-expected ratio was 26 percent. A ratio less than 100 percent shows there were fewer retirements than expected. Since there were so few retirements and so few eligible to retire (35 exposures), we recommend no change to this assumption. To maintain a degree of conservatism we continue to assume all police employees will retire at age 61. Going forwards with more emerging experience we will modify this assumption. The following chart shows the comparison of the actual and expected/proposed retirement rates. Detailed age based comparisons and rates can be found in the Appendix.



Nondisabled Mortality Assumptions

Thrift and Defined Benefit (DB) Employee and Police Employee Plan

Occurrences of death are difficult to predict in a small population. The rate of death, the mortality assumption, is applied to the active population as well as the retirement population. The mortality assumption is used to predict how long the fund will be paying retirement benefits to the participants once they retire.

The recommendation of this study is to update the mortality to reflect large governmental experience that we believe reasonably predicts the Plans' mortality and includes appropriate margins for improvement.

Disability Retirement Assumptions

Thrift and Defined Benefit (DB) Employee and Police Employee Plan

Occurrences of disability are rare and difficult to predict in a small group. Because the disability numbers are small and hard to predict, we recommend adopting a table developed from large governmental experience.

Summary of Demographic Assumption Analysis

Withdrawal Rates

Based on the analysis of the withdrawal experience the current rates were increased for the Thrift and DB plans and left unchanged for the Police plan.

Retirement Rates

Based on the analysis of the retirement experience the current assumption was increased for certain ages in the Thrift and DB plans and left unchanged for the Police plan.

Mortality Rates

The recommendation of this study is to adopt new mortality tables based on large governmental plan experience.

Disability Rates

The recommendation of this study is to adopt a disability rate tables based on large governmental plan experience.

Section 4 - Economic Assumption Analysis

Overview

The economic assumptions for the City participants were analyzed by the following categories:

- Salary growth rate
- Inflation rate

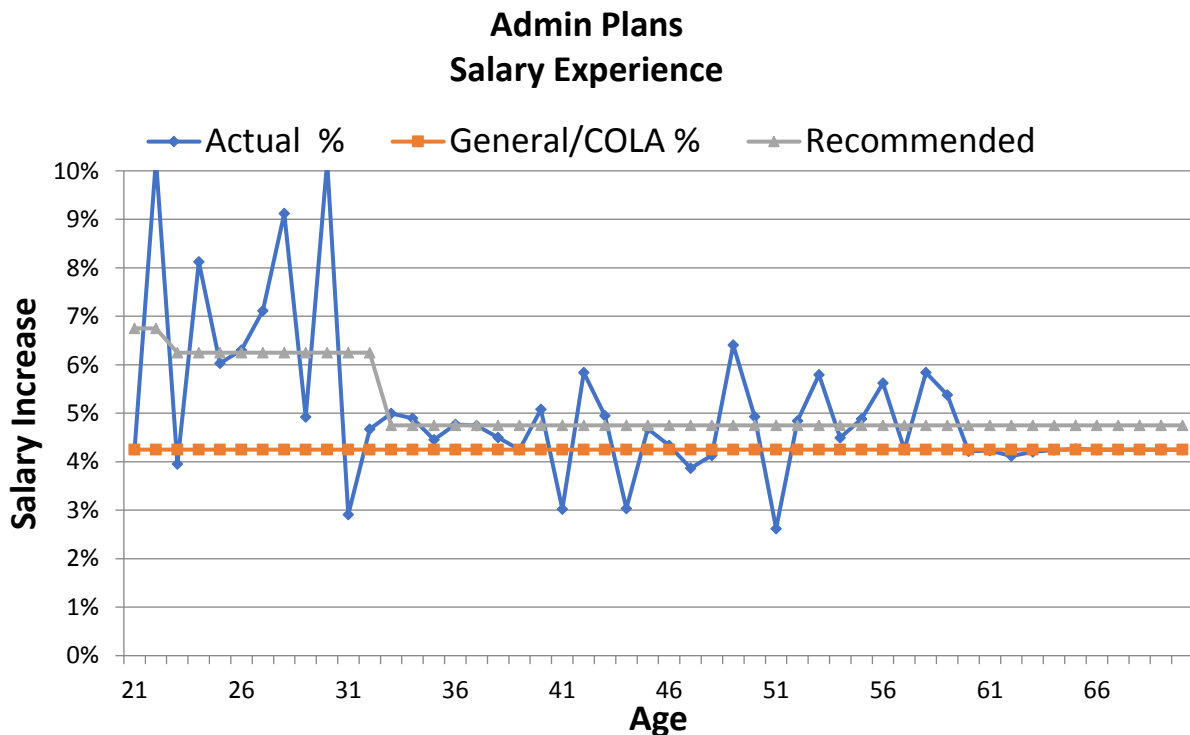
Based on our study, we made the following recommendations:

- Move from salary growth rates that reflect DB, Thrift, and Police plan participants to rates that differ based on Admin, Union, and Police.
- Build new salary growth rates using a three-step approach:
 - Determine the merit and promotion increases for each employee group based on the most recent salary data, and
 - Add the expected average general wage growth of 2.75% to 3.25% to the merit and promotion increases to create the total scale.
 - Add an expected cost-of-living adjustment (COLA) increase of 1% per year that is applied to all salary

Salary Growth Rate Assumptions

Admin Employees

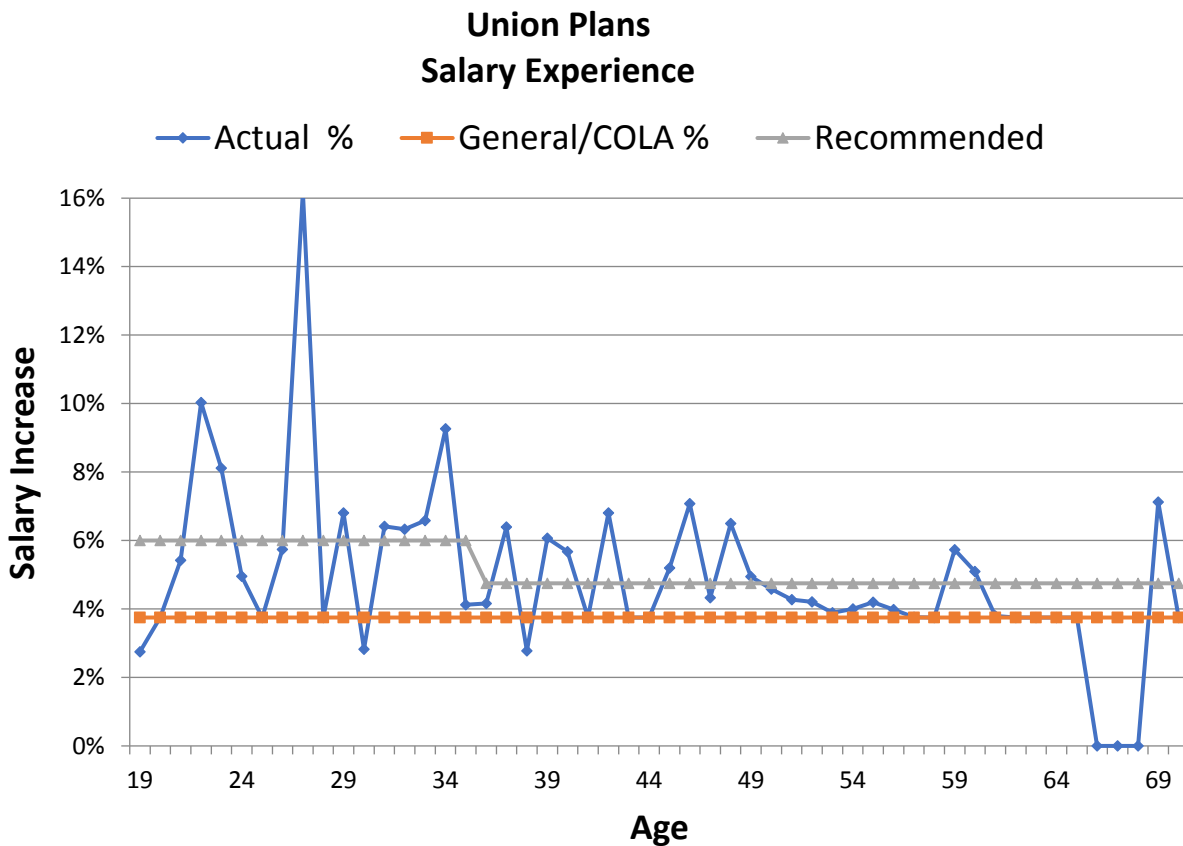
Since we are creating a new set of rates that did not exist last year, we did not calculate actual to expected ratios for the Admin employee group in the traditional manner. We developed the rates using the three-step process described above. The following chart shows the comparison of the actual (adjusted to common underlying general and COLA increases), general wage plus COLA and total proposed salary growth rates. Detailed age base comparisons and rates can be found in the Appendix.



There were spikes in salary increases a several ages. Most of these included relatively few people at those ages, so we smoothed the rates using an averaging method that included the two years before and two years after each age.

Union Employees

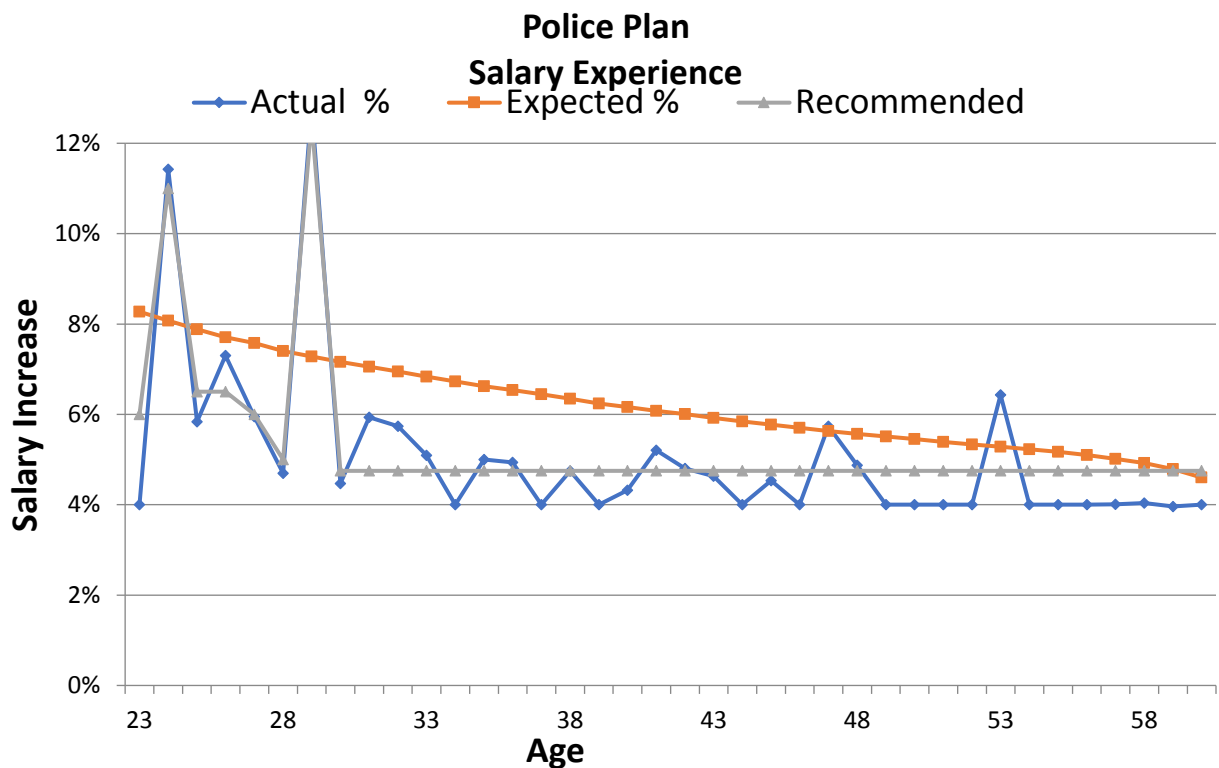
Since we are creating a new set of rates that did not exist last year, we did not calculate actual to expected ratios for the Union employee group in the traditional manner. We developed the rates using the three-step process described above. The following chart shows the comparison of the actual (adjusted to common underlying general and COLA increases), general wage plus COLA and total proposed salary growth rates. Detailed age base comparisons and rates can be found in the Appendix.



There were spikes in salary increases a several ages. Most of these included relatively few people at those ages, so we smoothed the rates using an averaging method that included the two years before and two years after each age. Also, the pay scale for Union employees ends at Step 16. A new hire will generally reach the end of general step increases after 15 years. Due to prior steps not being funded, we are using an assumption that the 2.75% step increases cease after 20 years of service for Union employees.

Police Employee Plan

Even though the Police salary growth rates existed last year, we are adopting a new building block approach to create the rates this year. Therefore, we did not calculate actual to expected ratios for the Police employees in the traditional manner. We developed the rates using the three-step process described above. The following chart shows the comparison of the actual (adjusted to common underlying general and COLA increases), expected (based on the current assumption) and total proposed salary growth rates. Detailed age base comparisons and rates can be found in the Appendix.



There were spikes in salary increases at some ages. Based on conversations about career patterns and increases, we gave the two spikes at earlier ages near full credibility. Also, the pay scale for Police ends at Step 16. A new hire will generally reach the end of general step increases after 15 years. Due to prior steps not being funded, we are using an assumption that the 3% step increases cease after 20 years of service for Police.

Inflation Rate Assumptions

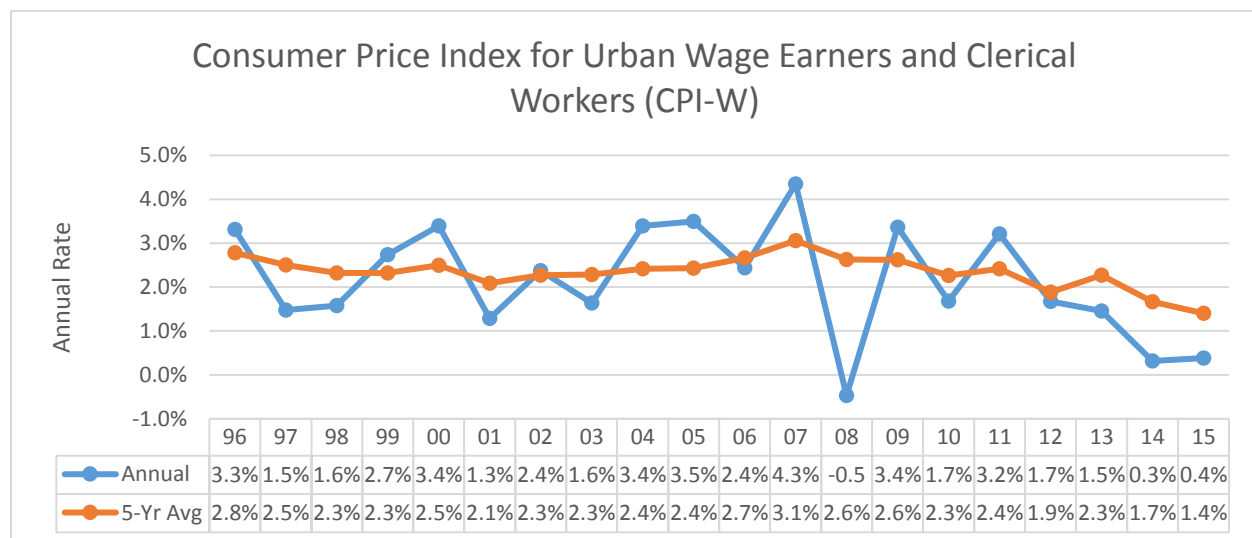
The inflation assumption is a common component of both salaries and investment return.

The most important set of rates in the valuation is the set of economic assumptions that include the prediction of future rates of investment return and general salary increases. The assumed rates of investment return and general salary increases are nominal rates and are therefore developed from an assessment of the underlying rate of inflation.

While inflation does not directly affect Rockers liabilities or assets (as it would if automatic COLAs applied), it is an important consideration in our review of both the investment return and general salary increase assumptions. Price inflation continues to be at historical lows. The Social Security Administration, for purposes of cost projections included in their most recent annual Trustees' Reports (based upon their "intermediate assumptions"), projects that future annual inflation will be at a rate of 2.6 percent. This is down from the prior report's assumption of 2.7 percent.

We believe, based upon historical inflation rates and our current expectations for the future that it is reasonable and appropriate to recommend lowering the anticipated annual inflation assumption from 2.75 percent to 2.50 percent.

While over the last 20 years the calendar year annual inflation rate has ranged from a low of -0.5 percent to a high of 4.3 percent, the rolling 5-year average has ranged between 1.4 percent and 3.1 percent. The current five-year average is 1.4 percent and the 10-year average is 1.8 percent.



Investment Return

The investment time horizon for the pension plan is over 30 years. While the recent experience is important to review, unlike the demographic assumptions and salary increase assumption, which reflect the decisions of the City, the investment performance is driven more by outside forces and factors. The key areas of the investment return that can be affected by decisions of the Retirement Board are selection of the asset allocation policy and selection of investment managers.

The pension plan assets are invested in a diversified portfolio of asset classes. The following table shows the asset allocation policy and actual allocation as of June 30, 2016.

Asset Class	Minimum	Target	Actual	Maximum
Large Cap Equity	13%	18%	17.71%	23%
Small Cap Equity	7%	12%	11.01%	17%
International Equity	15%	20%	19.21%	25%
Fixed Income	15%	20%	18.77%	25%
US TIPS	2.5%	7.5%	7.72%	12.5%
Real Estate	7.5%	12.5%	13.77%	15%
Global	5%	10%	11.36%	15%
Cash	0%	0%	0.46%	5%

The use of professional investment managers, selection of a portfolio of multiple asset classes and frequent monitoring of performance supports a long-term real investment return in the range of 4.00% to 5.00% per year. As the plan's funding requirements will result in limited liquidity needs in the next several years, it is reasonable to expect a real return around the middle of the range. We therefore recommend a real return assumption of 4.50%. This return, combined with the long-term inflation assumption of 2.50%, results in a recommended nominal investment return of 7.00%.

Appendix