

SAN LUIS OBISPO COUNTY PENSION TRUST
ACTUARIAL EXPERIENCE STUDY
AS OF DECEMBER 31, 2013

July 14, 2014

Board of Trustees
San Luis Obispo County Pension Trust
1000 Mill Street
San Luis Obispo, CA 93408

Members of the Board:

Subject: Results of 2013 Experience Study

We are pleased to present our report on the results of the 2013 Experience Study for the San Luis Obispo County Pension Trust (SLOCPT). We have reviewed each of the actuarial assumptions and compared them to actual experience over a five-year period ending December 31, 2013. This report summarizes our findings. It is our recommendation that changes be made to the actuarial assumptions and methods used for the SLOCPT actuarial valuations.

This experience investigation study was conducted in accordance with generally accepted actuarial principles and practices, and in full compliance with the Actuarial Standards of Practice as issued by the Actuarial Standards Board. Ms. Thompson is a member of and meets the Qualification Standards of the American Academy of Actuaries. She has extensive experience performing experience investigations for public sector retirement systems.

We wish to thank the SLOCPT staff for their assistance in providing data for this study.

Sincerely,



Leslie L. Thompson, FSA, FCA, MAAA, EA
Senior Consultant

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SECTION I

EXECUTIVE SUMMARY

Executive Summary

The purpose of this report is to review actual experience for the five year period of January 1, 2009 to December 31, 2013 and to compare this to the current actuarial assumptions and methods. If the actual experience shows significant deviations from the assumptions, or our expectations for future experience have changed significantly, we offer recommendations for changes in the assumptions or methods.

Following is a brief summary of the current assumptions and recommended changes. The actuarial impact of these changes will be shown later in the report.

Economic Assumptions:

- ***Inflation rate***
 - Currently 2.75%
 - Five-year average in national CPI-U is 2.08%, ten-year average is 2.37%, twenty-year average is 2.37%
 - Component of investment return assumption, salary increase assumption, and assumed payroll growth rate
 - Local inflation (Los Angeles and San Francisco regions) basis for cost-of-living assumption
 - Wurts is predicting 2.4% over the next 10 years
 - We recommend no change to the assumed inflation rate
 - We recommend no change to the cost-of-living assumptions
- ***Investment return rate***
 - Currently 7.25%
 - Average market return of 12.93% for last five years and 5.71% for last ten years
 - Rate is net of administrative and investment expenses
 - Therefore, assumed rate is composed of a 2.75% inflation assumption and an assumed 4.50% net real return
 - Higher than Wurts estimate of 6.7%
 - Lower than most common rate of 8.00% for large public retirement systems
 - We recommend no change in the assumed investment return rate
- ***Salary increase rate***
 - Salary increases are comprised of price inflation, overall “productivity” increases, and merit/promotional component
 - We assume 2.75% inflation, plus 0.50% across-the-board productivity increases, plus additional service-related merit increases during first seven years of service
 - Overall assumption was decreased last study to reflect lower expected increases for the foreseeable future
 - Actual merit increases fit assumption well but inflation has been lower than expected
 - We recommend no change to the wage inflation (2.75% inflation plus 0.50% productivity) or overall salary increase assumption

- ***Payroll growth rate***
 - Rate at which total SLOCPT's payroll is expected to grow
 - Current assumed payroll growth rate is 3.75%
 - Only affects funding period, not liability
 - Will be lower than expected salary increases for the average member, because members who terminate, retire, etc. are usually replaced with lower-paid members
 - Assumes no membership growth, per GASB 25
 - In last ten years, payroll grew 2.75% when adjusted for population changes
 - Payroll is assumed to increase more slowly than the 3.75% wage inflation assumption, due to the impact of baby boomers retiring in large numbers over the next 10-15 years
 - We recommend no change to this assumption

Demographic Assumptions:

- ***Post-retirement mortality rates (non-disabled retirees and beneficiaries)***
 - Current tables: RP-2000 with generational mortality improvements using scale AA, a 105% multiplier and white collar adjustment
 - 64 male deaths and 125 female deaths (excludes disabled)
 - Expected 73 male deaths and 121 female deaths
 - A/E ratio (actual to expected deaths) for males is 88% and females is 103%
 - A/E ratios in study two years ago were 91% for males, 108% for females
 - We recommend no change to this assumption
- ***Active member mortality rates***
 - Current rates include probability of ordinary death, line-of-duty death, and death while eligible for retirement or disability
 - 9 male deaths and 5 female deaths
 - Expected 7 male deaths and 5 female deaths
 - A/E ratio for males is 129% and for females is 100%
 - We recommend no change to this assumption
- ***Disabled mortality rates***
 - 11 male deaths and 2 female deaths; expected 9 male and 3 female deaths
 - 122% A/E ratio for males, 67% for females
 - At the last study, the A/E for males was 125% and 100% for females
 - We recommend no change to this assumption
- ***Retirement rates***
 - ***Miscellaneous***
 - 445 retirements during five-year period; expected 487
 - These numbers exclude retirements of previously terminated members
 - Current tables produce an A/E ratio of 91%
 - We recommend no change to this assumption
 - ***Probation***
 - 14 retirements during five-year period: expected 14

- These numbers exclude retirements of previously terminated members
 - Current tables produce an A/E ratio of 97%
 - We recommend a change to this assumption
 - **Safety**
 - 45 retirements during five-year period: expected 40
 - These numbers exclude retirements of previously terminated members
 - Current tables produce an A/E ratio of 113%
 - We recommend no change to this assumption
- **Vested Termination rates**
 - **Miscellaneous**
 - Members who terminate with five or more years of service and elect to receive a deferred benefit instead of a refund: actual number was 114 and expected was 131
 - A/E ratio equals 87%
 - Ratios over 100% for this assumption are conservative
 - We recommend no change to this assumption
 - **Probation**
 - Members who terminate with five or more years of service and elect to receive a deferred benefit instead of a refund: actual number was 2 and expected was 10
 - A/E ratio equal to 20%
 - Ratios over 100% for this assumption are conservative
 - We recommend no change to this assumption
 - **Safety**
 - Members who terminate with five or more years of service and elect to receive a deferred benefit instead of a refund: actual number was 12 and expected was 12
 - A/E ratio equals 100%
 - Ratios over 100% for this assumption are conservative
 - We recommend no change to this assumption
- **Disability**
 - **Miscellaneous and Probation (Non-Duty)**
 - The expected number of non-duty disabilities for the five-year period was 9, the actual was 8; A/E ratio is 89%
 - We recommend no change to this assumption
 - **Safety (Duty)**
 - The expected number of duty disabilities for the five-year period was 5, the actual was 1; A/E ratio is 20%
 - We recommend no change to this assumption
- **Refunds**
 - **Miscellaneous**
 - Refunds with less than five years of service: expected number was 212 and actual was 189; A/E ratio is 89%

- Refunds with five or more years of service: expected number was 47 and actual was 43; A/E ratio is 91%
 - Ratios over 100% are conservative
 - We recommend no change to this assumption
 - **Probation**
 - Refunds with less than five years of service: expected number was 12 and actual was 3; A/E ratio is 25%
 - Refunds with five or more years of service: expected number was 5 and actual was 5; A/E ratio is 100%
 - Ratios over 100% are conservative
 - We recommend no change to this assumption
 - **Safety**
 - Refunds with less than five years of service: expected number was 10 and actual was 7; A/E ratio is 70%
 - Refunds with five or more years of service: expected number was 3 and actual was 1; A/E ratio is 33%
 - Ratios over 100% are conservative
 - We recommend no change to this assumption
- **Other assumptions**
 - Percent married, decrement timing, spouse age difference, retirement age for deferred vested, amortization period, etc.
 - These assumptions are reasonable or conservative
 - We recommend no change to these assumptions
 - No experience for Tier 2. All demographic assumptions for Tier 2 and Tier 3 match Tier 1 except for retirement rates.
- **Actuarial methods**
 - Entry Age Normal actuarial cost method still appropriate
 - Most widely used method among public, statewide plans
 - Actuarial asset method (five-year smoothing) still appropriate (with the exception of 10-year smoothing for 2008 asset losses)
 - Closed 30 year level-percent-of-pay amortization still appropriate and meets CAAP Model or Acceptable practices; consider change to amortization methodology when the 2008 asset loss is fully recognized
- **Summary of recommendations**
 - We recommend changes to the Tier 2 retirement assumption from Tier 1 rates to match Tier 3 rates
 - We recommend changes to the DROP methodology to reflect actual experience

SECTION II

INTRODUCTION

Introduction

In determining liabilities, contribution rates and funding periods for retirement plans, actuaries must make assumptions about the future. Among the assumptions that must be made are:

- Retirement rates
- Mortality rates
- Turnover rates
- Disability rates
- Investment return rate
- Salary increase rates
- Inflation rate

For some of these assumptions, such as the mortality rates, past experience provides important evidence about the future. For other assumptions, such as the investment return rate, the link between past and future results is much weaker. In either case, though, actuaries review the assumptions periodically and determine whether these assumptions are consistent with actual past experience and with anticipated future experience.

In conducting experience studies, actuaries generally use data over a period of several years. This is necessary in order to gather enough data so that the results are statistically significant. In addition, if the study period is too short, the impact of the current economic conditions may lead to misleading results. It is known, for example, that the health of the general economy can impact salary increase rates and withdrawal rates. Using results gathered during a short-term boom or bust will not be representative of the long-term trends in these assumptions. Also, the adoption of legislation, such as plan improvements or changes in salary schedules, will sometimes cause a short-term distortion in the experience. For example, if an early retirement window was opened during the study period, we would usually see a short-term spike in the number of retirements followed by a dearth of retirements for the following two-to-four years. Using a longer period prevents giving too much weight to such short-term effects. On the other hand, using a much longer period would water down real changes that may be occurring, such as mortality improvement or a change in the ages at which members retire. In our view, using a five-year period is reasonable.

In an experience study, we first determine the number of deaths, retirements, etc. that occurred during the period. Then we determine the number expected to occur, based on the current actuarial assumptions. The number “expected” is determined from using the probability of the occurrence at the given age, times the “exposures” at that same age. For example, let’s look at a rate of retirement of 50% at age 55. The number of exposures can only be those members who are age 55 and eligible for retirement at that time. Thus they are considered “exposed” to that assumption. Finally we calculate the A/E ratio, where “A” is the actual number (of retirements, for example) and “E” is the expected number. If the current assumptions were “perfect”, the A/E ratio would be 100%. For some assumptions (e.g. termination), an A/E ratio greater than 100% is conservative (i.e. generates actuarial gains for the System) while for other assumptions (e.g. retirement) an A/E ratio less than 100% is conservative.

When the A/E ratio varies much from 100%, it is a sign that new assumptions may be needed. Of course we not only look at the assumptions as a whole, but we also review how well they fit the actual results by sex, by age, and by service.

Finally, the actuary "graduates" or smoothes the results since the raw results can be quite uneven from age to age or from service year to service year.

ORGANIZATION OF REPORT

Section III contains our findings and recommendations for each actuarial assumption. The impact of adopting our recommendations on liabilities and contribution rates is shown in Section IV. Section V summarizes the recommended changes. Section VI presents a summary of all the actuarial assumptions and methods, including the recommended changes.

SECTION III

ANALYSIS OF EXPERIENCE AND RECOMMENDATIONS

Analysis of Experience and Recommendations

This section begins by discussing the economic assumptions: inflation, the investment return rate, the salary increase assumption, and the payroll growth rate. Next, the discussion will turn to the demographic assumptions: mortality, disability, retirement and termination. Finally, the analysis will include a review of the actuarial methods used in the valuation.

INFLATION RATE

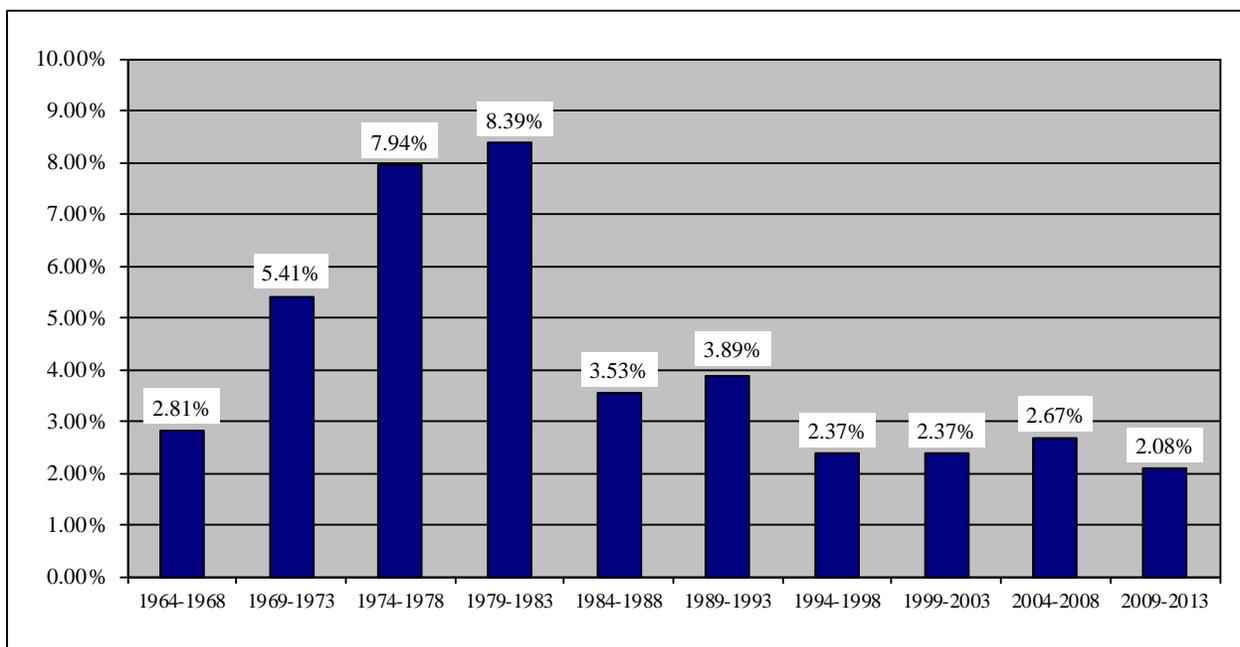
By “inflation”, we mean price inflation, as measured by annual increases in the Consumer Price Index (CPI). This inflation assumption underlies all of the other economic assumptions used in an actuarial valuation, including the investment return, individual salary increases, payroll growth and COLA assumptions.

San Luis Obispo County Pension Trust currently assumes a 2.75% price inflation assumption. The last time the inflation assumption was changed was in 2011 when the assumption was decreased from 3.75% to 2.75%.

Over the five-year period from January 1, 2009 through December 31, 2013, the CPI-U has increased at an average rate of 2.08%. However, the assumed inflation rate is only weakly tied to past results, and this has been a period of relatively low inflation.

The chart below shows the average annual inflation in each of the ten consecutive five-year periods ending December 31 over the last fifty years.

Average Annual Inflation (CPI-U) over 5 year periods



The table below shows the average inflation over various periods, ending December 2013:

Periods Ending December 2013	Average Annual Increase in CPI-U
Last five (5) years	2.08%
Last ten (10) years	2.37%
Last fifteen (15) years	2.37%
Last twenty (20) years	2.37%
Last thirty (30) years	2.82%
Since 1913 (first available year)	3.20%

Source: Bureau of Labor Statistics, CPI-U, all items, not seasonally adjusted

As shown above, inflation has been relatively low over the last twenty years, compared to prior periods. There has been a steady decline in inflation statistics over the last 25 years.

However, the assumed inflation rate is only weakly tied to past results, so it is helpful to use other sources of information to gain insight into expectations for the future. Inflation trends run in economic cycles, experiencing periods of relatively high rates and period of relatively lower rates of increase.

Investment Consulting Firms

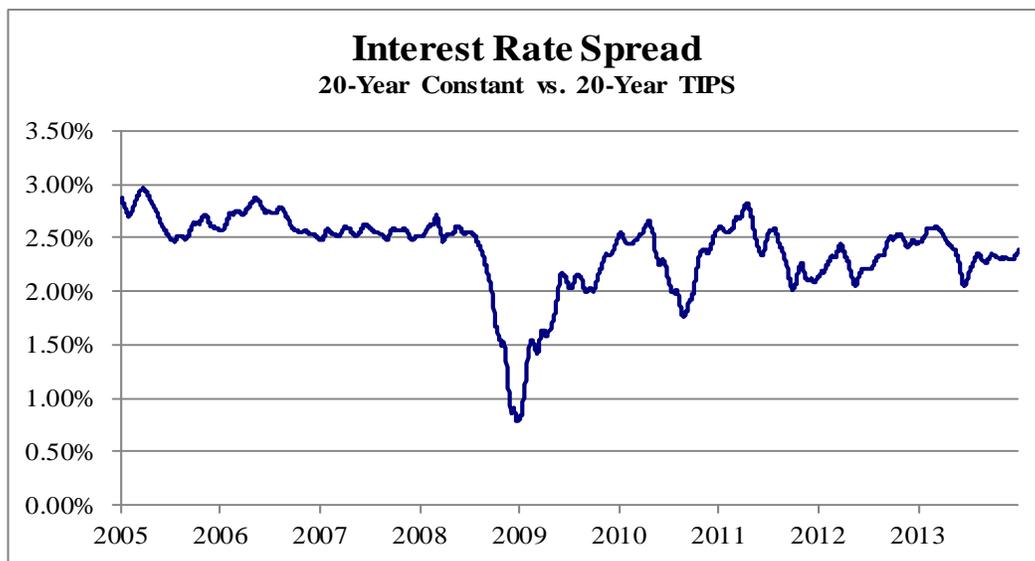
Most investment consulting firms develop an underlying inflation assumption for their forecasting and derivation of forward-looking capital market assumptions. The 2013 capital market assumption sets for eight investment consulting firms were examined, including New England Pension Consulting (NEPC), Hewitt Ennis Knupp, J. P. Morgan, Mercer, Pension Consulting Alliance (PCA), RV Kuhns, BNY Mellon and Towers Watson. The average assumption for inflation among these firms was 2.59%, with a range of 2.30% to 3.00%. Wurts Associates, the plan's investment managers, assume 2.40% inflation over the next 10 years (*January 2014 Capital Market Assumptions*). It should be noted that investment consulting firms typically set their assumptions based on a five to ten year outlook, while actuaries must make projections encompassing a longer time period. This horizon difference may create a difference between the inflation assumption in the valuation and the inflation assumption used by the investment consultant.

Bond Market

Another source of information about future inflation is the market for US Treasury bonds. Comparing the yields for conventional Treasury securities and Treasury Inflation-Protected Securities (TIPS) provides a useful measure of the market's expectation of future inflation. Conventional Treasury securities compensate its holders by providing a nominal yield with two components, the real rate of interest plus inflation compensation. Since TIPS already adjust for inflation, the yield only includes the real rate of interest. Therefore the difference roughly reflects the inflation expectation for that maturity horizon.

For example, the December 31, 2013 yield for 20-year TIPS was 1.36% plus actual inflation. The yield for 20-year non-indexed US Treasury bonds was 3.72%. Simplistically, this means that on that day the bond market was predicting that inflation over the next twenty years would average 2.36% (3.72% – 1.36%) per year.

Below is a chart with the historical spread between 20-year constant and 20-year inflation protected Treasury bonds.



The historical spread between the constant and inflation protected securities was relatively constant from 2005 up to the beginning of the crisis in the credit market. The decrease in the spread during the collapse of the US investment markets and the subsequent volatility reflect differences in liquidity and the risk premiums that buyers of US Treasury securities require.

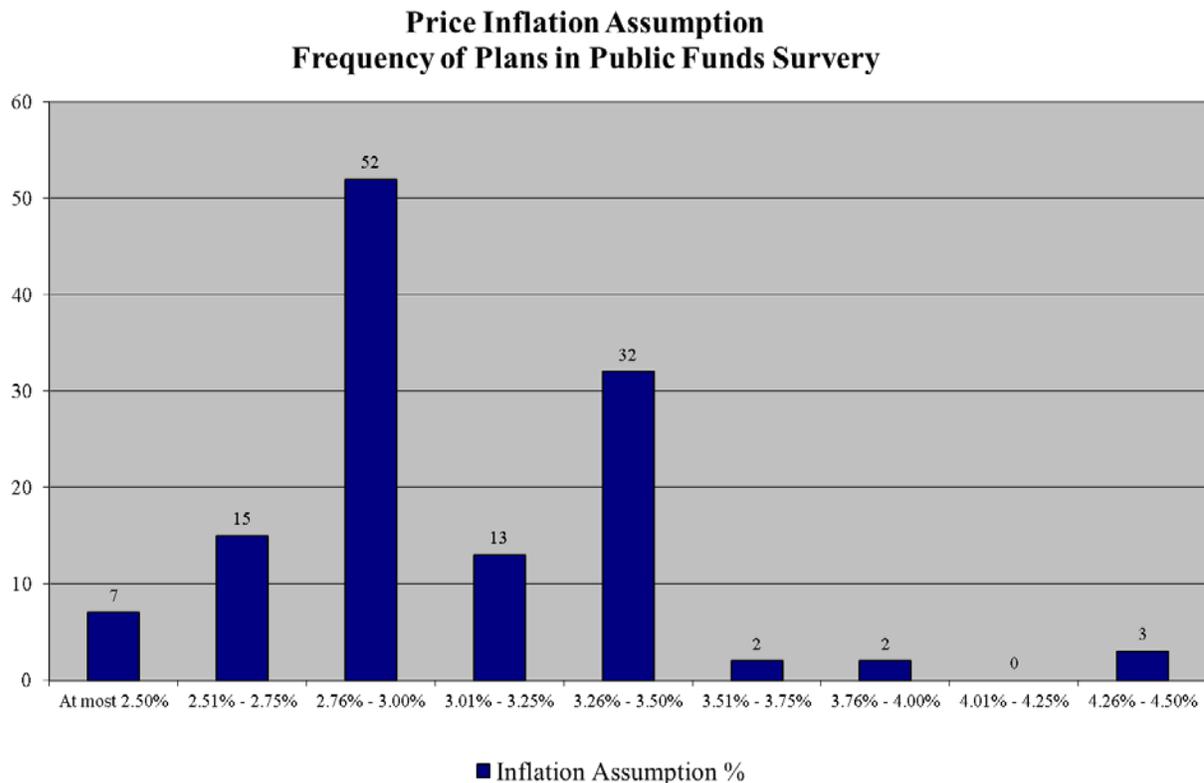
The Federal Reserve Bank of Cleveland has developed a model that combines information from a number of sources to address the shortcomings of the "break-even" rate illustrated above. Based on the results of its model, the Federal Reserve Bank of Cleveland reported in April 2014 that it estimates the 10-year expected inflation to be 1.87%, which implies expectations for inflation to be less than 2.00% on average for the next decade.

Other Sources of Inflation Forecasts

In the Social Security Administration's 2013 Trustees Report, the Office of the Chief Actuary is projecting a long-term average annual inflation rate of 2.80% under the intermediate cost assumption. (The inflation assumptions are 1.80% and 3.80% respectively in the low cost and high cost projection scenarios.) These inflation assumptions have remained unchanged for several years.

The Philadelphia Federal Reserve conducts a quarterly survey of the Society of Professional Forecasters. Its most recent forecast (first quarter of 2014) was for inflation over the next five years to average 2.10% and over the next ten years to average 2.30%.

Another source of information about this assumption is the Public Funds Survey that is prepared on behalf of the National Association of State Retirement Administrators (NASRA) and the National Council on Teacher Retirement (NCTR). This report surveys about 126 plans, including all of the largest public funds covering state employees or teachers.



Source: <http://www.publicfundsurvey.org/publicfundsurvey/actuarialassumptions.asp>

The current survey shows that the median inflation rate assumed for large public retirement systems in the U.S. is 3.00%, with the most prevalent assumption also at 3.00%. Approximately 59% of the surveyed systems use an assumption of 3.00% or less. The information in the Public Funds Survey for many of the systems is more than a year old and it is possible that some systems have subsequently updated their assumptions. In fact, several statewide public retirement systems have lowered this assumption in recent years.

Recommendation

Based on all of this information, we believe a reasonable long-term inflation assumption range is between 2.50% and 3.00%. The recommendation to the Board is to continue to use the 2.75% inflation assumption.

INVESTMENT RETURN RATE

Currently, San Luis Obispo County Pension Trust assumes an investment return rate of 7.25%, net of investment and administrative expenses. This is the rate used in discounting future payments and in calculating the actuarial present value of those payments. The current assumption assumes inflation of 2.75% per annum and an annual real rate of return of 4.50% net of expenses.

This assumption was last changed in 2011 when it was decreased from 7.75% to 7.25%.

Historical Information

The following chart shows the year-by-year returns, net of investment and administrative expenses, since 1999.



For the last five years, the average market return, net of investment and administrative expenses, has been 12.93% and over the last 10 years has been 5.71%. However, for this assumption, past performance, even averaged over five years or longer, is not a reliable indicator of future performance.

Asset Allocation

The actual asset allocation of the trust fund will significantly impact the overall performance, so returns achieved under a different allocation are not meaningful. More importantly, the real rates of return for many asset classes, especially equities, vary so dramatically from year to year that even a ten-year period is not long enough to provide reasonable guidance.

The current target asset allocation, as established by the Board, is shown below, with subcategories of assets allocated based on benchmark weights. In addition, the strategic asset allocation range is shown, which allows for some deviation from the target asset allocation.

Investment	Policy Target %
Large Cap US Equity	23%
Small/Mid Cap US Equity	4%
International Large - Equity	15%
Emerging Markets - Equity	8%
US Core Fixed Income	20%
Global Credit - Fixed	5%
TIPS	5%
Commodities	5%
Real Estate	10%
Private Equity/VC	5%
Total Allocation	100%

Source: Wurts Associates, Asset Allocation Study, February 2014

Capital Market Assumptions

The allocation of assets within the universe of investment options will significantly impact the overall performance. Therefore, it is meaningful to identify the range of expected returns based on the fund's targeted allocation of investments and an overall set of capital market assumptions.

Because GRS is a benefits consulting firm and does not provide investment advice, we reviewed capital market assumptions developed and published by the following eight independent investment consulting firms:

- BNY Mellon
- JP Morgan
- R.V. Kuhns
- NEPC
- PCA
- Hewitt Ennis Knupp
- Towers Watson
- Mercer

These investment consulting firms periodically issue reports that describe their capital market assumptions, that is, their estimates of expected returns, volatility, and correlations. While these assumptions are developed based upon historical analysis, many of these firms also incorporate forward looking adjustments to better reflect near-term expectations. The estimates for core investments (i.e. fixed income, equities, and real estate) are generally based on anticipated returns produced by passive index funds. Please note that the actuarial standards generally do not allow us to consider alpha that may be generated by active management.

We developed an estimate of the administrative and investment expense assumption of .25% used in the analysis below by reviewing the past five years of expenses in relation to total pension assets.

Using capital market assumptions for 2013 from these eight large investment consulting entities and using the above asset allocation targets for the Plan, the following range for assumptions was developed, net of investment and administrative expenses.

The following analysis assumes an inflation assumption of 2.75%, which is the recommended inflation rate assumption from the prior section of this report. If this assumption is modified, the results shown below will change accordingly.

The average expected return for this group is 7.23%, net of investment and administrative expenses and assuming a rate of inflation of 2.75%.

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2) - (3)	Actuary Inflation Assumption	Expected Nominal Return (4) + (5)	Plan Incurred Expenses Assumption	Expected Nominal Return Net of Expenses (6) - (7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	6.99%	3.00%	3.99%	2.75%	6.74%	0.25%	6.49%
2	7.07%	3.00%	4.07%	2.75%	6.82%	0.25%	6.57%
3	6.68%	2.50%	4.18%	2.75%	6.93%	0.25%	6.68%
4	6.99%	2.40%	4.59%	2.75%	7.34%	0.25%	7.09%
5	7.19%	2.50%	4.69%	2.75%	7.44%	0.25%	7.19%
6	7.59%	2.30%	5.29%	2.75%	8.04%	0.25%	7.79%
7	7.96%	2.51%	5.45%	2.75%	8.20%	0.25%	7.95%
8	8.07%	2.50%	5.57%	2.75%	8.32%	0.25%	8.07%
Average	7.32%	2.59%	4.73%	2.75%	7.48%	0.25%	7.23%

We have determined for each firm the expected nominal return rate, then subtracted that firm's expected inflation to arrive at their expected real return in col. (4). Then we added 2.75% for the plan's inflation assumption and 0.25% for expenses to get the expected nominal return, net of administrative and investment expenses. As the table shows, the average net one-year real return of the eight firms is 4.73% and the average expected nominal return is 7.23%, compared to the plan's assumptions of 4.50% and 7.25%, respectively.

The current investment consultant for San Luis Obispo County, Wurts Associates, provided their ten year arithmetic return forecast for various asset classes in the February 2014 Asset Allocation Study. Using these assumptions and the target asset allocation indicated above, the analysis below was developed, which corresponds in methodology with the results from the peer group above. The expected real return is 4.75% and expected nominal return is 7.25%.

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2) - (3)	Actuary Inflation Assumption	Expected Nominal Return (4) + (5)	Plan Incurred Expenses Assumption	Expected Nominal Return Net of Expenses (6) - (7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wurts	7.15%	2.40%	4.75%	2.75%	7.50%	0.25%	7.25%

Net of administrative and investment expenses

Expected volatility plays a key role in building future return expectations. For example, no volatility over a four year period, with a return of exactly 8% in each of those four years will show a return of 8%. However, a four year return pattern of 4%, 12%, 4%, 12% will return only 7.926%. The increasing volatility decreases the long term actual return.

In addition to examining the expected one-year return, it is important to review anticipated volatility of the investment portfolio and understand the range of long-term net return that could be expected to be produced by the investment portfolio. Therefore, the following table provides the 25th, 50th, and 75th percentiles of the 20-year geometric average of the expected nominal return, net of investment expenses.

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return			Probability of exceeding 7.25% *
	25th	50th	75th	
(1)	(2)	(3)	(4)	(5)
1	3.98%	5.78%	7.61%	29.4%
2	4.30%	5.97%	7.66%	30.4%
3	3.98%	5.89%	7.84%	31.8%
4	5.26%	6.66%	8.09%	39.1%
5	4.55%	6.43%	8.34%	38.6%
6	5.07%	7.00%	8.96%	46.5%
7	5.29%	7.18%	9.11%	49.0%
8	5.42%	7.30%	9.23%	50.8%
Average	4.73%	6.53%	8.35%	39.5%

**Plan's current return assumption net of expenses.*

Recommendation

Based on all of this information, we believe a reasonable investment return assumption range is between 7.00% and 7.75%. The recommendation to the Board is to continue to use the 7.25% investment return assumption.

SALARY INCREASE RATES

The current salary increase rates assumed for the valuation vary by service. The assumed increase rates range from 8.50% for new members to 3.75% for members with seven or more years of service.

Generally, the salary scale assumption consists of a wage inflation assumption that represents the increases for long-service employees plus a component for merit and promotion increases for members early in their career. Historically, wage inflation almost always exceeds price inflation. This is because wage inflation is in theory the result of (a) price inflation, and (b) productivity gains being passed through to wages. For the last ten years, for the economy as a whole, wage inflation has outpaced price inflation by about 0.30%, and for the last twenty years, wage inflation has exceeded price inflation by about 0.79%. Since 1951, wage inflation has been about 1.00% a year larger than price inflation.

Wage Inflation

Salary increases for longer-service employees are almost entirely driven by wage inflation. Many of the factors that result in pay increases are largely inapplicable or have diminished importance for longer-service employees. Thus, longer service employees' wages are assumed to grow at the overall rate of wage inflation. Wage inflation is currently assumed to be 3.25% (2.75% price inflation plus 0.50% productivity increases). Actual experience observed in the study indicates productivity increases of about 0.15% above the observed price inflation during a period that has seen small wage increases in the economy as a whole. Since we recommended no change to the price inflation assumption and we don't expect wage inflation to remain this low as the economy continues its recovery, we recommend no change to the wage inflation assumption.

Merit and Promotion

Salary increases for shorter-service employees typically include wage inflation and a component for merit and promotion increases. The current assumption includes merit increases during the first seven years of employment of up to 5.25% above wage inflation. Data observed in the study indicate merit increases were generally in line with the current assumptions, as shown below:

Service Index	Actual Merit Increase	Expected Merit Increase
1	5.21%	5.25%
2	4.85%	5.00%
3	4.34%	4.00%
4	3.39%	3.00%
5	1.83%	2.00%
6	1.23%	1.00%
7	0.57%	0.50%
>7	0.00%	0.00%

For example, active members with one year of service received an average merit increase of 5.21% compared to our current assumption of 5.25%. And merit increases for member with seven years of service were 0.57% compared to the assumption of 0.50%. Therefore, we recommend no change to the assumption regarding merit increases for the first seven years.

PAYROLL GROWTH RATE

The salary increase rates discussed above are assumptions applied to individuals. These rates are used in projecting future benefits. A separate payroll growth assumption, currently 3.75% is used in determining the charge needed to amortize the unfunded actuarial accrued liability. The amortization payments are calculated to be a level percentage of payroll, so as payroll increases over time, these charges also increase. The amortization payment is dependent on the rate at which payroll is assumed to increase.

Payroll can grow at a rate different from the average pay increase for individual members. There are two reasons for this. First, when older, longer-service members terminate, retire or die, they are generally replaced with new members who have a lower salary. Because of this, in most populations that are not growing in size, the growth in total payroll will be smaller than the average pay increase for members. Second, payroll can grow due to an increase in the size of the group. However, GASB 25 prohibits systems from using anticipated membership growth in setting the payroll growth assumption.

Over the last ten years, payroll growth has averaged 2.75% per year. However, the active membership has decreased over the last ten years so after adjusting for the membership changes, payroll growth has averaged 2.75%. We recommend no change to the current payroll growth assumption.

POST-RETIREMENT MORTALITY RATES

When choosing an appropriate mortality assumption, actuaries typically use standard mortality tables, unlike when choosing other demographic assumptions. They may choose to adjust these standard mortality tables, however, to reflect various characteristics of the covered group, and to provide for expectations of future mortality improvement (both up to and after the measurement date). If the plan population has sufficient credibility to justify its own mortality table, then the use of such a table also could be appropriate. Factors that may be considered in selecting and/or adjusting a mortality table include the demographics of the covered group, the size of the group and the statistical credibility of its experience, and future mortality improvement.

The mortality table currently being used for non-disabled retirees and beneficiaries receiving benefits is a standard table published by the Society of Actuaries called the RP-2000 Combined Mortality table, with a white collar adjustment, a 105% multiplier, and a mechanism to automatically model future improvements in mortality each year. This type of table (or series of tables) is called generational mortality. By doing this, future mortality rates will be projected to continually decrease each year in the future. Therefore, the life expectancy at age 60 for someone reaching 60 now will not be as long as the life expectancy for someone reaching 60 in 2020, and

her life expectancy will not be as long as someone reaching 60 in 2040, etc. The table has separate rates for males and females.

The issue of future mortality improvement is one that the governing bodies of our profession have recently become more concerned about. This has resulted in recent changes to the relevant Actuarial Standard of Practice, ASOP 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations. The standard now requires pension actuaries to make and disclose an assumption as to expected mortality improvement after the valuation date. In particular, the Internal Revenue Service now requires the use of generational mortality for plans in the private sector that are covered under the provisions of the Pension Protection Act of 2006 (PPA).

The generational improvements are currently modelled by using Scale AA, another standard mortality improvement table used in both pension and life insurance work to convert a table to a generational set of tables. Scale AA was released in conjunction with the RP-2000 tables, and was the most current projection table published by the profession and recommended for use when SLOCPT adopted the change to use generational tables. The Society of Actuaries has recently been working on updating both the RP-2000 tables and the projection scale tables based on more recent experience but those tables are not yet ready for general use. Therefore, we recommend no change to the current mortality or generational improvement assumption. The current projection tables are one-dimensional in that they are only based on the age of the member. That means, for instance, the life expectancy of a 60 year old retiree today is different than the life expectancy of a 60 year old retiree in 2020 but the rate at which mortality is improving is the same for both members. The new tables are two-dimensional in that they are also based on the year of birth of the member. Under that scenario, the rate of improvement for the 60 year old in 2020 will be greater than the rate of improvement for the 60 year old retiree today and the implementation of those new tables may result in an increase in liabilities and costs.

There were 64 deaths among the male retirees and 125 deaths among female retirees during the last five years. (These figures exclude deaths among beneficiaries and disabled retirees.) Based on the current tables, we expected 73 and 121 deaths respectively. This produced A/E ratios of 88% for males and 103% for females. Unlike a static mortality table where an A/E ratio between 110% and 120% is generally desired to allow for a margin, an A/E ratio of 100% is desirable when using generational mortality because the margin is built into future mortality rates. To illustrate the impact of future generational improvements under the current assumption, if we assume the same set of exposures and actual deaths for the next five years, we would expect these A/E ratios to be 93% for males and 106% for females five years from now. The results of this analysis are shown in the following tables:

Post-Retirement Mortality (non-disabled) – Males					
RP-2000 White Collar with Generational Improvements					
		Based on last 5 years		Based on next 5 years*	
Age	Actual deaths	Expected deaths	A/E ratio	Expected deaths	A/E ratio
50 - 54	0	0	N/A	0	N/A
55 - 59	2	2	100%	1	200%
60 - 64	5	6	83%	6	83%
65 - 69	9	9	100%	9	100%
70 - 74	11	8	138%	7	157%
75 - 79	5	10	50%	9	56%
80 - 84	10	15	67%	15	67%
85 - 89	15	12	125%	11	136%
90 and over	7	11	64%	11	64%
Totals	64	73	88%	69	93%

* Assumed based on the same group of exposures and actual deaths

Post-Retirement Mortality (non-disabled) – Females					
RP-2000 White Collar with Generational Improvements					
		Based on last 5 years		Based on next 5 years*	
Age	Actual deaths	Expected deaths	A/E ratio	Expected deaths	A/E ratio
50 - 54	4	0	N/A	0	N/A
55 - 59	5	2	250%	2	250%
60 - 64	8	7	114%	7	114%
65 - 69	9	12	75%	12	75%
70 - 74	17	13	131%	13	131%
75 - 79	11	14	79%	13	85%
80 - 84	19	20	95%	19	100%
85 - 89	27	24	113%	24	113%
90 and over	25	29	86%	28	89%
Totals	125	121	103%	118	106%

* Assumed based on the same group of exposures and actual deaths

DISABLED MORTALITY RATES

This is a minor assumption, and it has little impact on the liabilities. There were 11 male deaths and 2 female deaths among the disabled retirees during the five-year study period. This produced A/E ratios of 122% and 67% respectively. At the time of the last experience study, the A/E ratios were 125% for males, 100% for females. The current assumption is the standard RP-2000 Disabled Mortality Table, projected to 2020 with an 80% multiplier for males and a 50% multiplier for females with a one year setback. This is a static table (as opposed to generational) since disabled members are expected to show less improvement in future mortality. We recommend no change to this assumption. The results of this analysis are shown below:

Disability Mortality – Males			
		RP-2000 Disabled Projected to 2020	
Age	Actual deaths	Expected deaths	A/E ratio
50 - 54	1	1	100%
55 - 59	3	1	300%
60 - 64	2	2	100%
65 - 69	2	2	100%
70 - 74	1	1	100%
75 - 79	1	1	100%
80 - 84	1	1	100%
85 - 89	0	0	N/A
90 and over	0	0	N/A
Totals	11	9	122%

Disability Mortality – Females			
		RP-2000 Disabled Projected to 2020	
Age	Actual deaths	Expected deaths	A/E ratio
50 - 54	1	0	N/A
55 - 59	1	1	100%
60 - 64	0	1	0%
65 - 69	0	1	0%
70 - 74	0	0	N/A
75 - 79	0	0	N/A
80 - 84	0	0	N/A
85 - 89	0	0	N/A
90 and over	0	0	N/A
Totals	2	3	67%

ACTIVE MORTALITY RATES

A separate mortality table is used for active members. The results of this analysis are shown below:

		RP-2000 Projected to 2020	
	Actual Deaths	Expected Deaths	A/E ratio
Males	9	7	129%
Females	5	5	100%
Total	14	12	117%

The current assumption is the standard RP-2000 Employee Mortality Table projected to 2020 setback 1 year with a 90% multiplier for males and setback 3 years with a 50% multiplier for females. This is also a static mortality table. Since the counts are so small and the credibility of actual experience is not statistically significant, we recommend no change to this assumption.

DISABILITY RATES

Disability is an assumption with a minor impact on the liabilities of the trust. The A/E ratio on a combined basis for Miscellaneous and Probation members (combined since these are all assumed to be non-duty disabilities) was 89% and 20% for Safety members (assumed to be all duty-related). This assumption is based on actual plan experience instead of a standard table since experience can differ significantly for each population based on various factors such as occupation, local culture, plan requirements for meeting the definition of disability, etc. The Board adopted significant decreases to this assumption as of the last experience study and we recommend no change to this assumption. The results of this analysis are shown below:

		Current Assumption	
	Actual Disabilities	Expected Disabilities	A/E ratio
Miscellaneous	6	9	67%
Probation	2	0	N/A
Safety	1	5	20%

RETIREMENT RATES

We currently use retirement rates that vary by age. For this assumption, A/E ratios under 100% are conservative (fewer actual retirements generally leads to a retirement gain for the Plan). There were 445 retirements during the five-year period for Miscellaneous members, 14 retirements for Probation members, and 45 retirements for Safety members. This includes only members who retired from active status. It excludes those who were inactive for over a year before retiring.

The analysis shows A/E ratios of 91% for Miscellaneous members, 97% for Probation members, and 113% for Safety members. In the last study, the A/E was 88% for Miscellaneous, 167% for Probation, and 185% for Safety. The Board adopted changes to this assumption as of the last experience study (decrease Miscellaneous rates and increase Probation and Safety rates). The results of the current analysis are shown below:

Retirement (Current Assumption)									
	Miscellaneous			Probation			Safety		
Age	Actual	Expected	A/E ratio	Actual	Expected	A/E ratio	Actual	Expected	A/E ratio
Under 50	1	0	N/A	0	0.0	N/A	0	0.0	N/A
50	5	12	42%	2	1.1	182%	7	7.4	95%
51	5	9	56%	0	1.1	0%	8	6.7	119%
52	8	10	80%	0	0.8	0%	4	4.1	98%
53	12	11	109%	0	0.6	0%	4	3.1	129%
54	15	15	100%	0	0.5	0%	3	3.2	94%
55	22	22	100%	2	0.7	286%	4	3.6	111%
56	24	23	104%	0	0.6	0%	2	2.2	91%
57	26	29	90%	1	1.0	100%	5	1.6	313%
58	17	28	61%	1	1.0	100%	0	1.0	0%
59	24	27	89%	2	0.6	333%	3	1.3	231%
60	40	32	125%	0	0.6	0%	1	0.8	125%
61	28	28	100%	1	0.8	125%	2	1.2	167%
62	49	49	100%	1	1.2	83%	0	0.8	0%
63	48	37	130%	1	1.0	100%	1	1.0	100%
64	24	26	92%	0	1.0	0%	0	0.8	0%
65	34	42	81%	2	1.6	125%	1	1.0	100%
66	26	19	137%	1	0.2	500%	0	0.0	N/A
67	9	9	100%	0	0.0	N/A	0	0.0	N/A
68	10	8	125%	0	0.0	N/A	0	0.0	N/A
69	3	4	75%	0	0.0	N/A	0	0.0	N/A
70	6	18	33%	0	0.0	N/A	0	0.0	N/A
Over 70	9	29	31%	0	0.0	N/A	0	0.0	N/A
Total	445	487	91%	14	14.4	97%	45	39.8	113%

The experience reflects retirements only within Tier 1 (depending on the bargaining unit of each member, Miscellaneous members began entering Tier 2 as early as December 2010 and Safety members began entering Tier 2 as early as September 2011). Since Tier 2 is new, there is no experience yet on which to base a retirement assumption. Tier 3 was also recently implemented for all members hired after January 1, 2013. We recommend no change to the retirement assumption for Tier 1 members.

Tier 2 currently uses the same retirement assumption as Tier 1. For prior modelling purposes we assumed slightly lower retirement rates for Tier 3 based on their smaller projected benefits and we recommend no change to these Tier 3 rates. However, preliminary valuation modelling has shown the total normal cost rate for Tier 2 to be closer to the normal cost of Tier 3 than to Tier 1 reflecting the lower value of their benefits. Therefore, we recommend changing the retirement rates for Tier 2 to match the rates for Tier 3 to reflect their anticipated retirement behavior. See the table of rates in Section VI for the recommended changes to these rates.

We also reviewed the retirement experience of sworn Safety vs. non-sworn Safety members between the ages of 50 to 55 since the non-sworn members retire with smaller benefits at these ages. Although we did see some evidence that the sworn members are retiring at an earlier age, we don't think the results are statistically significant enough to recommend a separate set of rates for these two groups. We will continue to monitor these groups in future studies and may recommend a change if the different retirement patterns persist.

We reviewed the DROP methodology, comparing actual experience against the valuation assumptions. The valuation methodology was conservative—assuming each retiree would elect the most valuable DROP retirement benefit. Now that enough experience has emerged, we altered the DROP methodology to reflect much more closely the number of members electing retirement (including DROP) each year. This change is also consistent with the findings of the recent actuarial audit. This change in DROP methodology decreased the accrued liability of the plan.

TERMINATION RATES

Termination rates reflect members who leave for any reason other than death, disability or service retirement. They apply whether the termination is voluntary or involuntary, and whether the member takes a refund or keeps his/her account balance on deposit in the Pension Trust. The current termination rates reflect the member's age and service, and we want to continue this practice. Rates are currently broken down into three distinct subgroups:

- Rates for members who withdraw with less than five years of service and are assumed to take a refund
- Rates for members who withdraw with five or more years of service and are assumed to take a refund
- Rates for members who withdraw with five or more years of service and are assumed to leave their contributions on deposit and receive a deferred vested retirement benefit.

In the aggregate for all three withdrawal decrements, the current assumptions produce an A/E ratio for Miscellaneous members of 89%, for Probation members of 37%, and for Safety members of 80%. For this assumption, A/E ratios over 100% are conservative (when there are more terminations than expected, the Plan usually experiences a gain).

This experience study almost completely overlaps the period during which the economy was recovering from the Great Recession. During this time, most plans saw fewer terminations as members elected to remain in their current job. However, as the economy improves, there is a trend towards more terminations again. The Board adopted changes to this assumption as of the last experience study (decrease the rates for members who withdraw with less than five years of service, and decrease vested termination rates). In light of the continued recovery, we recommend no change to all three sets of assumptions. The results are shown on the following tables:

Refunds with Less Than 5 Years of Service – Males and Females									
Age	Miscellaneous			Probation			Safety		
	Actual	Expected	A/E ratio	Actual	Expected	A/E ratio	Actual	Expected	A/E ratio
Under 20									
20 - 24	5	7	71%	0	1	0%	1	1	100%
25 - 29	34	47	72%	0	6	0%	2	4	50%
30 - 34	41	46	89%	2	3	67%	2	3	67%
35 - 39	20	28	71%	1	1	100%	1	1	100%
40 - 44	17	20	85%	0	1	0%	0	1	0%
45 - 49	16	17	94%	0	0	N/A	0	0	N/A
50 - 54	19	18	106%	0	0	N/A	1	0	N/A
55 - 59	18	16	113%	0	0	N/A	0	0	N/A
60 and over	19	13	146%	0	0	N/A	0	0	N/A
Totals	189	212	89%	3	12	25%	7	10	70%

Refunds with 5 or More Years of Service – Males and Females									
Age	Miscellaneous			Probation			Safety		
	Actual	Expected	A/E ratio	Actual	Expected	A/E ratio	Actual	Expected	A/E ratio
Under 20	0	0	N/A	0	0	N/A	0	0	N/A
20 - 24	0	0	N/A	0	0	N/A	0	0	N/A
25 - 29	1	6	17%	1	1	100%	0	0	N/A
30 - 34	3	14	21%	0	2	0%	0	1	0%
35 - 39	7	10	70%	2	1	200%	0	1	0%
40 - 44	9	11	82%	2	1	200%	0	1	0%
45 - 49	9	6	150%	0	0	N/A	0	0	N/A
50 - 54	3	0	N/A	0	0	N/A	0	0	N/A
55 - 59	4	0	N/A	0	0	N/A	1	0	N/A
60 and over	7	0	N/A	0	0	N/A	0	0	N/A
Totals	43	47	91%	5	5	100%	1	3	33%

Vested Terminations – Males and Females									
	Miscellaneous			Probation			Safety		
Age	Actual	Expected	A/E ratio	Actual	Expected	A/E ratio	Actual	Expected	A/E ratio
Under 20	0	0	N/A	0	0	N/A	0	0	N/A
20 - 24	0	0	N/A	0	0	N/A	0	0	N/A
25 - 29	10	3	331%	0	1	0%	3	1	517%
30 - 34	20	14	141%	1	2	54%	2	2	108%
35 - 39	16	17	95%	1	2	50%	3	2	145%
40 - 44	19	25	75%	0	2	0%	2	3	58%
45 - 49	20	36	55%	0	2	0%	2	4	46%
50 - 54	15	36	42%	0	1	0%	0	0	N/A
55 - 59	8	0	N/A	0	0	N/A	0	0	N/A
60 and over	6	0	N/A	0	0	N/A	0	0	N/A
Totals	114	131	87%	2	10	20%	12	12	97%

Most of these results are consistent with our expectation that there have been fewer terminations during this period as the economy begins to recover. The one exception are the vested termination rates for Miscellaneous members between the ages of 25 to 35. It's possible these results are skewed by the expected implementation of AB 340 which affected all the County retirement plans in California. However, these members have relatively little service upon their termination and are many years away from retirement so their potential liability impact is very small. So again, we recommend no change to the assumption but will continue to monitor this particular experience and may recommend a change to these rates in the next experience study.

Aggregate Terminations – Males and Females									
	Miscellaneous			Probation			Safety		
Age	Actual	Expected	A/E ratio	Actual	Expected	A/E ratio	Actual	Expected	A/E ratio
Under 20	0	0	N/A	0	0	N/A	0	0	N/A
20 - 24	5	7	71%	0	1	0%	1	1	100%
25 - 29	45	56	80%	1	8	13%	5	5	109%
30 - 34	64	74	86%	3	7	44%	4	6	68%
35 - 39	43	55	78%	4	4	100%	4	4	98%
40 - 44	45	56	80%	2	4	51%	2	5	37%
45 - 49	45	59	76%	0	2	0%	2	4	46%
50 - 54	37	54	69%	0	1	0%	1	0	N/A
55 - 59	30	16	188%	0	0	N/A	1	0	N/A
60 and over	32	13	246%	0	0	N/A	0	0	N/A
Totals	346	390	89%	10	27	37%	20	25	79%

OTHER ASSUMPTIONS AND REFUNDS

There are other assumptions made in the course of a valuation, such as the percentage of members who are married, the age difference between husbands and wives, the retirement age for vested terminations, the number of vested terminations who become Reserve members vs Reciprocal members, decrement timing, amortization period, etc. We reviewed these, and believe the current

assumptions are generally realistic or conservative. We recommend no changes to any these assumptions.

ACTUARIAL METHODS

We have reviewed the actuarial cost method being used—the Entry Age Normal cost method—and we continue to believe that this is the method of choice for this plan, since this method usually does the best job of keeping costs level as a percentage of payroll. We also believe the method used to determine the actuarial value of assets (AVA) is appropriate, since it phases in the recognition of asset gains and losses over a five-year period (with the exception of the 2008 asset loss that was smoothed over a ten year period), and reduces fluctuations in the funding period and the contribution rate. Both of these methods are very common in the public sector retirement community and meet the Model practices definition under the California Actuarial Advisory Panel (CAAP) Guidelines that were issued in March 2013. Therefore, we recommend no change to these methods.

The current funding policy is a level-percent-of-pay amortization using a closed period of 30 years from January 1, 2010 (26 years remaining as of the January 1, 2014 valuation). The level-percent-of-pay is a CAAP Model practice but the single fixed period is deemed a CAAP Acceptable practice. To meet their Model practice, CAAP recommends using multiple layers of amortization with a new layer created each year to amortize any new unfunded or surplus liability over a 20 year closed period. We recommend no change in the amortization policy at this time but recommend that the change be considered once the 2008 asset loss is fully recognized. At that point, the current amortization period will be down to 22 years and any increased volatility from the new policy would be insignificant. In fact, once the current period drops to under 20 years, the new policy would start to decrease volatility as the new layers are amortized over longer periods.

SECTION IV

SUMMARY AND ACTUARIAL IMPACT OF RECOMMENDATIONS

Summary of Recommendations

We recommend changes to the following assumptions:

- Retirement:
 - Change Tier 2 rates to match Tier 3 rates instead of Tier 1
 - Impact is to delay retirement, decrease costs

- Modify the DROP methodology

The impact of these changes is shown below based on the January 1, 2013 valuation results. The changes are not expected to lead to an increase in the total required contribution or the charged contribution rate.

	New Assumptions (1)	Baseline (2)	Impact (3)
Actuarial Liabilities and Funded Ratio			
• Actuarial Accrued Liability (000s)			
- Active Members	\$ 605,215	\$ 623,662	\$ (18,447)
- Retirees and Beneficiaries	\$ 788,046	788,046	0
- Inactive, Vested	<u>56,293</u>	<u>56,293</u>	0
- Total	\$1,449,554	\$1,468,001	\$ (18,447)
• Actuarial Value of Assets (000s)	\$1,122,151	\$1,122,151	\$ -
• Unfunded Actuarial Accrued Liability (UAAL) (000s)	\$ 327,403	\$ 345,850	\$ (18,447)
• Funded Ratio	77.4%	76.4%	1.0%
Annual Required Contribution			
• Total Normal Cost	23.08%	23.38%	-0.30%
• Member Contributions	14.61%	14.61%	0.00%
• County Normal Cost	8.47%	8.77%	-0.30%
• Amortization Payment	11.17%	11.80%	-0.63%
• Total County Cost (ARC)	19.64%	20.57%	-0.93%
Impact on Charged Rate			
• Total Charged Rate*	35.24%	35.24%	0.00%
• Total Required Rate	34.25%	35.18%	-0.93%
• Rate Difference	-0.99%	-0.06%	-0.93%

* Includes 1.0% increase to charged rate effective January 1, 2014

SECTION V

SUMMARY OF ASSUMPTIONS
AND METHODS INCORPORATING
THE RECOMMENDED ASSUMPTIONS

Summary of Assumptions and Methods Incorporating the Recommended Assumptions

I. Valuation Date

The valuation date is December 31st of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. Actuarial Cost Method

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using an individual entry age actuarial cost method having the following characteristics:

- (i) the annual normal costs for each active member, payable from the date of entry into the system to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement;
- (ii) each annual normal cost is a constant percentage of the member's year-by-year projected covered pay.

Deferred and Reciprocal Member Actuarial Accrued Liability. Data provided includes date of birth, service credit, reciprocal status, and hourly pay rates at termination. The estimated benefit was used to compute the liabilities for reserve members. For reciprocal members, the estimated benefits were projected with 3.75% inflation to compute those liabilities.

Amortization of Unfunded Actuarial Accrued Liabilities is done as a level percent of payroll over a closed 30 year period (27 years as of January 1, 2013) for funding computations.

III. Actuarial Value of Assets

The funding value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (less than) expected investment income. The asset losses that occurred in 2008 are smoothed over a ten year period with recognition accelerated if a contribution margin develops. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). Returns are measured net of all administrative expenses.

IV. Actuarial Assumptions

A. Economic Assumptions

1. Investment return: 7.25%, compounded annually, net of administrative expenses. This is made up of a 2.75% inflation rate and a 4.50% real rate of return.
2. Salary increase rate: Inflation rate of 2.75% plus productivity increase rate of 0.5% plus an additional service-related merit component as shown below:

% Merit Increases in Salaries Next Year	
Service Index	Rate
1	5.25%
2	5.00%
3	4.00%
4	3.00%
5	2.00%
6	1.00%
7	0.50%

3. Cost-of-living increases:

Assumed to increase the full 2.75% each year (2% for tier 2)

4. Payroll growth:

3.75% per year

5. Contribution accumulation: Member contribution rates are recalculated on an actuarial basis at each actuarial study. Contributions are credited with 6.75% interest, compounded biweekly.

B. Demographic Assumptions

1. Mortality after termination or retirement -

- a. Healthy males – RP-2000 with generational mortality improvements using Scale AA, a 105% multiplier and white collar adjustment
- b. Healthy females - RP-2000 with generational mortality improvements using Scale AA, a 105% multiplier and white collar adjustment

See sample rates below:

Ages	% Dying Within Next Year Retirees	
	Men	Women
45	0.12%	0.09%
50	0.16%	0.13%
55	0.27%	0.24%
60	0.48%	0.46%
65	0.97%	0.85%
70	1.66%	1.49%
75	2.94%	2.43%
80	5.47%	4.13%
85	10.03%	7.20%

2. Mortality rates of active members - RP-2000 Employee Mortality Tables, projected to 2020 using scale AA, setback one year with a 90% multiplier for males, and setback three years with a 50% multiplier for females, as shown below for selected ages:

Ages	% of Active Members Dying Within Next Year	
	Men	Women
30	0.03%	0.01%
35	0.06%	0.01%
40	0.08%	0.02%
45	0.10%	0.03%
50	0.13%	0.05%
55	0.17%	0.07%
60	0.29%	0.14%
65	0.48%	0.21%
70	0.65%	0.30%

3. Disability mortality after termination or retirement- RP-2000 Disabled Mortality Tables, projected to 2020 using scale AA, with no setback with an 80% multiplier for males and setback one year with a 50% multiplier for females, as shown below for selected ages:

Ages	% of Disabled Members Dying Within Next Year	
	Men	Women
30	1.63%	0.29%
35	1.63%	0.30%
40	1.54%	0.28%
45	1.39%	0.28%
50	1.61%	0.37%
55	1.93%	0.63%
60	2.44%	0.94%
65	3.03%	1.20%
70	3.70%	1.60%

4. Retirement –

- a. As shown below for Tier 1 members for selected ages (rates are only applied to members eligible for retirement):

Age	Percent of Eligible Active Members Retiring Within Next Year		
	Miscellaneous	Probation	Safety
50	4.0%	7.5%	12.0%
51	3.0%	7.5%	14.0%
52	3.0%	7.5%	10.0%
53	3.0%	7.5%	10.0%
54	4.0%	7.5%	12.0%
55	6.0%	10.0%	15.0%
56	6.0%	12.0%	12.0%
57	8.0%	12.0%	12.0%
58	8.0%	12.0%	12.0%
59	8.0%	12.0%	18.0%
60	10.0%	15.0%	25.0%
61	10.0%	15.0%	30.0%
62	20.0%	20.0%	40.0%
63	20.0%	20.0%	50.0%
64	20.0%	20.0%	75.0%
65	40.0%	40.0%	100.0%
66	30.0%	20.0%	
67	25.0%	20.0%	
68	25.0%	40.0%	
69	25.0%	50.0%	
70	100.0%	100.0%	

Current deferred vested members are assumed to retire at the later of age 60 (age 55 for Reserve Members) or attained age.

- b. As shown below for Tier 2 and future Tier 3 members for selected ages (rates are only applied to members eligible for retirement):

Age	Percent of Eligible Active Members Retiring Within Next Year		
	Miscellaneous	Probation	Safety
50	3.0%	7.5%	9.0%
51	3.0%	7.5%	9.0%
52	3.0%	7.5%	10.0%
53	3.0%	7.5%	10.0%
54	3.0%	7.5%	10.0%
55	6.0%	7.5%	10.0%
56	6.0%	7.5%	10.0%
57	6.0%	7.5%	10.0%
58	6.0%	9.0%	11.0%
59	6.0%	9.0%	15.0%
60	8.0%	10.0%	20.0%
61	8.0%	10.0%	25.0%
62	20.0%	20.0%	30.0%
63	20.0%	20.0%	40.0%
64	20.0%	20.0%	60.0%
65	40.0%	40.0%	100.0%
66	30.0%	20.0%	
67	25.0%	20.0%	
68	25.0%	40.0%	
69	25.0%	50.0%	
70	100.0%	100.0%	

5. Rates of separation from active membership (for causes other than death or retirement) - As shown below for selected ages:

Sample Ages	% of Active Members Separating Within Next Year			
	Miscellaneous and Probation Members			
	Disability	Withdrawal < 5 years	Withdrawal ≥ 5 years	Vested Termination
20	0.01%	12.50%	8.50%	3.50%
25	0.01%	11.00%	7.75%	3.50%
30	0.01%	9.50%	3.75%	4.00%
35	0.04%	8.00%	2.00%	3.50%
40	0.06%	7.00%	1.25%	3.00%
45	0.09%	6.00%	0.50%	3.00%
50	0.11%	6.00%	0.00%	2.50%
55	0.14%	6.00%	0.00%	2.00%
60	0.16%	6.00%	0.00%	2.00%

Sample Ages	% of Active Members Separating Within Next Year			
	Safety Members			
	Disability	Withdrawal < 5 years	Withdrawal ≥ 5 years	Vested Termination
20	0.03%	5.20%	1.50%	3.00%
25	0.03%	5.00%	1.50%	2.00%
30	0.13%	4.70%	1.00%	1.50%
35	0.23%	4.00%	0.50%	1.50%
40	0.33%	3.50%	0.50%	1.50%
45	0.43%	2.50%	0.00%	1.50%
50	0.53%	1.50%	0.00%	1.50%
55	0.63%	0.00%	0.00%	1.50%
60	0.73%	0.00%	0.00%	1.50%

Rates are not applied after the member is eligible for reduced or unreduced retirement benefits. 100% of the Safety disabilities and 0% of the Miscellaneous and Probation disabilities are duty-related.

40% of Vested Terminations are assumed to be Reciprocal.

Based on Member Contribution Totals provided by Pension Trust, we are assuming that 10% of members' contribution account balances are for supplemental/additional benefits.

C. Other Assumptions

Member refunds. All or part of the employee contribution rate is subject to potential "Pick Up" by the employer. Our understanding is that "Pick Ups", and related interest, are subject to refund.

Deferral Age. The assumed retirement age for future Reserve and Reciprocal members is age 57.

Active Death. 100% of active deaths are assumed to be duty related.

Survivor Benefits. Marital status and spouses' census data were imputed with respect to active and deferred members.

Marital Status - 70% of men and 50% of women were assumed married at retirement.

Spouse Census - Women were assumed to be 3 years younger than men for active employees.

Disability Benefits. Benefits are not assumed to be offset by Social Security benefits.

Line-of-Duty Death. Social Security offset equal to 27.5% of Final Compensation.

IRC Section 415 Limits. We are assuming that IRC Section 415 limits, although applicable to this plan, will not impact any individual benefits.