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CONTRA COSTA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

Review of Economic Actuarial Assumptions for the December 31, 2009 Actuarial Valuation

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MARCH 2010

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March 2, 2010

Board of Retirement
Contra Costa County Employees' Retirement Association
1355 Willow Way, Suite 221
Concord, CA 94520

Re: Review of Economic Actuarial Assumptions
For the December 31, 2009 Actuarial Valuation

Dear Members of the Board:

We are pleased to submit this report of our review of the December 31, 2009 economic actuarial assumptions for the Contra Costa County Employees' Retirement Association. This report includes our recommendations and the analysis supporting their development.

Please note that December 31, 2009 is also the year of the Contra Costa County Employees' Retirement Association's triennial experience study. The non-economic actuarial assumption recommendations will be provided in a separate report once we complete our analysis.

We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

We look forward to reviewing this report with you and answering any questions you may have.

Sincerely,

Paul Angelo, FSA, EA, MAAA, FCA
Senior Vice President and Actuary

John Monroe, ASA, EA, MAAA
Vice President and Associate Actuary

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I. INTRODUCTION, SUMMARY, AND RECOMMENDATIONS

To project the cost and liabilities of the pension fund, assumptions are made about all future events that could affect the amount and timing of the benefits to be paid and the assets to be accumulated. Each year actual experience is compared against the projected experience, and to the extent there are differences, the future contribution requirement is adjusted.

If assumptions are changed, contribution requirements are adjusted to take into account a change in the projected experience in all future years. There is a great difference in both philosophy and cost impact between recognizing the actuarial deviations as they occur annually and changing the actuarial assumptions. Adjusting contributions as gains or losses occur without making a change in the assumptions is appropriate if the deviation from projections is considered temporary and if, over the long run, experience is expected to return to what was originally assumed. Changing assumptions reflects a basic change in thinking about the future, and it has a much greater effect on the current contribution requirements than the gain or loss for a single year.

The use of realistic actuarial assumptions is important to maintain adequate funding, while fulfilling benefit commitments to participants already retired and to those near retirement. The actuarial assumptions do not determine the "actual cost" of the plan. The actual cost is determined solely by the benefits and administrative expenses paid out, offset by investment income received. However, it is desirable to estimate as closely as possible what the actual cost will be so as to permit an orderly method for setting aside contributions today to provide benefits in the future, and to maintain equity among generations of participants and taxpayers.

This study was undertaken in order to review the economic actuarial assumptions. The study was performed in accordance with Actuarial Standard of Practice (ASOP) No. 27, "Selection of Economic Assumptions for Measuring Pension Obligations." This Standard of Practice puts forth guidelines for the selection of the economic actuarial assumptions utilized in a pension plan actuarial valuation.

Please note that the investment return assumption recommended in this report has been developed without taking into consideration the impact of any "excess earnings" as described in the Board's Interest Crediting and Excess Earnings Policy.

We are recommending a change in the investment return, inflation and "across the board" salary increase assumptions. The promotional and merit salary increase assumptions will be reviewed in the triennial experience study of non-economic assumptions being performed this year. Our recommendations for the economic actuarial assumptions for the December 31, 2009 Actuarial Valuation are as follows:

Investment Return - The estimated average future net rate of return on current and future assets of the Association as of the valuation date. This rate is used to discount liabilities.
Recommendation: Reduce the rate from 7.80% per annum to 7.75% per annum.

Inflation – Future increases in the cost-of-living index which drives investment returns and active member salary increases, as well as cost-of-living adjustments (COLAs) for retirees.
Recommendation: Reduce the rate from 3.75% to 3.50% per annum. We also recommend decreasing the assumed COLA for Tier 3 disability benefits and Tier 2 benefits from 3.75% to 3.50% per year.

Individual Salary Increases - Increases in the salary of a member between the date of the valuation to the date of separation from active service. This assumption has three components:

- Inflationary salary increases,
- Real "across the board" salary increases, and
- Promotional and merit increases.

Recommendation: Reduce the current inflationary salary increase assumption from 3.75% to 3.50%. Increase the current real "across the board" salary increase assumption from 0.50% to 0.75%. Please note that the promotional and merit increase assumption ranges from 0.75% to 7.50% for General and 0.75% to 8.00% for Safety. The promotional and merit increases will be reviewed as part of our triennial experience study of non-economic assumptions.

Terminal Pay – Additional pay elements that are expected to be received during the member's final average earnings period.
Recommendation: Our recommendation will be included in our triennial experience study of non-economic assumptions report.

Section II provides some background on basic principles and the methodology used for the review of the economic actuarial assumptions. A detailed discussion of each of the economic assumptions and reasons behind the recommendations is found in Section III.

II. BACKGROUND AND METHODOLOGY

For this study, we analyzed "economic" assumptions only. Our analysis of the "non-economic" assumptions for the December 31, 2009 valuation will be provided in a separate report at a later date. The primary economic assumptions are inflation, investment return, salary increases and terminal pay.

Economic Assumptions

Economic assumptions consist of:

Inflation - Increases in the price of goods and services. The inflation assumption reflects the basic return that investors expect from securities markets. It also reflects the expected basic salary increase for active employees and drives increases in the allowances of retired members.

Investment Return – Expected long term rate of return on the Association's investments after expenses. This assumption has a significant impact on contribution rates.

Salary Increases – In addition to inflationary increases, it is assumed that salaries will also grow by "across the board" real pay increases in excess of price inflation. It is also assumed that employees will receive raises above these average increases as they advance in their careers. These are commonly referred to as promotional and merit increases. Payments to amortize any Unfunded Actuarial Accrued Liability (UAAL) are assumed to increase each year by the price inflation rate plus any "across the board" pay increases that are assumed.

Terminal Pay – Additional pay elements that are expected to be received only during the member's final average earnings period. These items were included in earnable compensation in response to the Paulson Settlement.

The setting of these assumptions is described in Section III.

III. ECONOMIC ASSUMPTIONS

The investment return assumption is comprised of two components: (i) Inflation; and (ii) Real Rate of Return.

Inflation

Unless an investment grows at least as fast as prices increase, investors will experience a reduction in the inflation-adjusted value of their investment. There may be times when "riskless" investments return more or less than inflation, but over the long term, investment market forces will generally require an issuer of fixed income securities to maintain a minimum return which protects investors from inflation.

The inflation assumption is long term in nature, so it is set using primarily historical information. Following is an analysis of 15 and 30 year moving averages of historical inflation rates:

Historical Consumer Price Index – 1930 to 2009

(U.S. City Average - All Urban Consumers)

	25th Percentile	Median	75th Percentile
15 year moving averages	2.7%	3.5%	4.8%
30 year moving averages	3.3%	4.3%	5.0%

The average inflation rates have continued to decline gradually over the last several years due to the relatively low inflationary period in the 1990s and early 2000s. However, the inflation rates for the past few years have started to show some increase. Also, the later of the 15-year averages during the period are lower as they do not include the high inflation years of the mid-1970s and early 1980s.

CCCERA's investment consultant, Milliman USA, anticipates an annual inflation rate of 2.75%. Note that, in general, the investment consultants' time horizon for this assumption is shorter than the time horizon we use for the actuarial valuation.

In the 2009 public fund survey published by the National Association of State Retirement Administrators, the median inflation assumption used by 113 large public retirement funds in their 2008 valuations has remained unchanged from the 3.50% used in the 2007 valuations.

Based on all of the above information, we recommend that the current 3.75% annual inflation assumption be reduced to 3.50% for the December 31, 2009 actuarial valuation.

We are also recommending a change to the assumptions we use to value the post-retirement COLA benefit. The assumed COLA increase is 3.0%, except for Tier 3 disability benefits and Tier 2 benefits which are currently assumed to increase at a 3.75% rate. We recommend decreasing the assumed COLA for Tier 3 disability benefits and Tier 2 benefits from 3.75% to 3.50% per year.

Real Rate of Investment Return

This component represents the portfolio's incremental investment market returns over inflation. Theory has it that, as an investor takes a greater investment risk, the return on the investment is expected to also be greater, at least in the long run. This additional return is expected to vary by asset class and empirical data supports that expectation. For that reason, the real rate of return assumptions are developed by asset class. Therefore, the real rate of return assumption for a retirement system's portfolio will vary with the Board's asset allocation among asset classes.

Following is the Association's current target asset allocation and the assumed real rate of return assumptions by asset class. The column of returns (except for Alternative Investments) represents the average of a sample of real rate of return assumptions. The sample includes the expected annual real rate of returns provided to us by Milliman USA and by eight other investment advisory firms retained by Segal's public sector clients. We believe these assumptions reasonably reflect a consensus forecast of long term future real market returns. The Milliman assumption is used for CCCERA's Alternative Investments.

CCCERA Target Asset Allocation and Assumed Arithmetic Real Rate of Return Assumptions by Asset Class and for the Portfolio

Asset Class	Percentage of Portfolio	Average from a Sample of Consultants to Segal's Public Sector Clients' Real Rate of Return[1]
Domestic Large Cap Equity[2]	23.0%	6.45%
Domestic Small Cap Equity[2]	6.0%	6.98%
Developed International Equity[2]	18.0%	6.95%
Emerging Market Equity[2]	2.0%	9.29%
Domestic Bonds[3]	20.0%	1.77%
International Bonds[3]	4.0%	1.81%
High Yield Bonds	3.0%	4.37%
Long Duration Fixed Income	5.0%	3.19%
Real Estate	11.5%	4.83%
Alternative Investments	7.0%	9.20%[4]
Cash & Equivalents	0.5%	0.38%
Total	100.0%	5.26%[5]

(1) These are based on the projected arithmetic returns provided by the investment advisory firms serving the county retirement systems of Contra Costa, Alameda, San Diego, San Bernardino, Orange, Fresno, Sacramento, the LA City Employees' Retirement System and the City of Fresno Retirement Systems.

(2) The total allocation of 49% to global equity is allocated 23% to domestic large cap equity, 6% to domestic small cap equity, 18% to developed international equity and 2% to emerging market equity.

(3) The total allocation of 24% to global bonds is allocated 20% to domestic bonds and 4% to international bonds.

(4) Milliman's assumption is used for this class to more closely reflect the underlying investments made specifically for CCCERA.

(5) The real rate of return assumptions utilized by Milliman produce a 5.00% weighted average real rate of return for the portfolio.

These are based on projected arithmetic returns provided by the investment advisory firms.

Please note that the above are representative of "indexed" returns and do not include any additional returns ("alpha") from active management. This is consistent with the Actuarial Standard of Practice No. 27, Section 3.6.3.e, which states:

> "Investment Manager Performance – Anticipating superior (or inferior) investment manager performance may be unduly optimistic (pessimistic). Few investment managers consistently achieve significant above-market returns net of expenses over long periods."

The following are some observations about the returns provided above:

1. The investment consultants to our California public sector clients have each provided us with their expected real rates of return for each asset class, over various future periods of time. However, in general, the returns available from investment consultants are projected over time periods shorter than the durations of a retirement plan's liabilities.

2. Using an average of expected real rate of returns allows the Association's investment return assumption to include a broader range of capital market information and should help produce a more stable investment return assumption.

3. Therefore, we recommend that the 5.26% portfolio real rate of return be used to determine the Association's investment return assumption. This is 0.20% lower than the return that was calculated three years ago. This difference is due to changes in the real rate of return assumptions provided to us by the investment advisory firms (-0.27%) offset slightly by a change in the Association's target asset allocation (+0.07%).

Association Expenses

The real rate of return assumption for the portfolio needs to be adjusted for administrative and investment expenses expected to be paid from investment income. The following table provides these expenses for the five years ending December 31, 2008 as a percentage of the actuarial value of assets as of the end of the plan year.

Administrative and Investment Expenses as a Percentage of Actuarial Value of Assets*

Year Ending December 31	Administrative %	Investment %**	Total %
2004	0.11%	0.54%	0.65%
2005	0.12%	0.46%	0.58%
2006	0.11%	0.49%	0.60%
2007	0.12%	0.52%	0.64%
2008	0.11%	0.51%	0.62%
Average	0.11%	0.51%	0.62%

* As of the end of the plan year.

** Net of securities lending expenses because we do not assume any additional net return for this program. This effectively assumes that any securities lending expenses will be offset by related income.

The average expense percentage over this five year period is 0.62%. Based on this experience, we have increased the future expense assumption from 0.55% to 0.60%.

Risk Adjustment

The real rate of return assumption for the portfolio generally is adjusted to reflect the potential risk of shortfalls in the return assumptions. The Association's asset allocation also determines this portfolio risk, since risk levels are also expected to vary by asset class. This portfolio risk is incorporated into the real rate of return assumption through a risk adjustment.

The purpose of the risk adjustment is to increase the likelihood of achieving the actuarial investment return assumption in the long term. The 5.26% expected real rate of return developed earlier in this report was based on expected mean or average arithmetic returns. This means there is a 50% chance of the actual return in each year being at least as great as the average. The risk adjustment is intended to increase that probability.

Three years ago, the Board adopted an investment return assumption of 7.8%. That return implied a risk adjustment of 0.86%, reflecting a confidence level of 60% that the actual average return over 15 years would not fall below the assumed return, assuming that the distribution of returns over that period follows the normal statistical distribution.[1]

[1] Based on an annual portfolio return standard deviation of 12.06% provided by Milliman USA in 2006. The theory that long term investment returns follow a Normal distribution is debatable; however, we believe the Normal distribution assumption is not unreasonable for purposes of setting the risk adjustment.

If we use the same 60% confidence level to set this year's risk adjustment (based on a portfolio return standard deviation of 12.39%, provided by Milliman USA), the result is a risk adjustment of 0.84%. Together with the other investment return components, this produces a net investment return assumption of 7.32%, which is substantially lower than the current assumption of 7.80%.

As we have discussed in prior years, the risk adjustment model and associated confidence level is most useful as a means for comparing how the Association has positioned themselves over periods of time. Continued use of the 60% confidence level should be considered in context with other factors, including:

- As noted above, the confidence level is more of a relative measure than an absolute measure, and so can be reevaluated and reset for future comparisons.

- The confidence level is based on the standard deviation of the portfolio that is determined and provided to us by Milliman. The standard deviation is a statistical measure of the future volatility of the portfolio and so is itself based on assumptions about future portfolio volatility and can be considered somewhat of a "soft" number.

- A lower level of inflation should reduce the overall risk of failing to meet the investment return assumption. Lowering the confidence level to some extent could be justified as consistent with the change in the inflation assumption.

- As with any model, the results of the risk adjustment model should be evaluated for reasonableness and consistency. This is discussed in the following "Test of Risk Adjustment" section, including (1) a discussion of the relationship between the inflation assumption and the risk adjustment and (2) a comparison with assumptions adopted by similarly situated public sector retirement sections.

Taking into account the factors above, our recommendation is for a modest change in the net investment return assumption from 7.80% to 7.75%. This return implies a risk adjustment of 0.41%, reflecting a confidence level of 55% that the actual average return over 15 years would not fall below the assumed return.

Recommended Investment Return Assumption

The following table provides the calculated net investment return assumption that results from the previous discussion.

Calculation of Net Investment Return Assumption

Assumption Component	Value
Inflation	3.50%
Plus Portfolio real rate of return	5.26%
Minus Expense Adjustment	(0.60%)
Minus Risk Adjustment	(0.41%)
Total	7.75%

Based on this calculation, we recommend that the investment return assumption be decreased from 7.80% to 7.75%.

Test of Risk Adjustment

The original development of the risk adjustment component of our investment earnings assumption model arose from our experience with many retirement boards over many years. Quite simply, combining the Board's inflation assumption with the real return and expense components produced – and produces – a substantially higher assumed return than what the Boards actually adopt, regardless of the consulting actuary or the methods involved in the process.

In addition to the generally risk adverse attitude of retirement boards noted above, we believe another reason for this involves the inflation assumption. As noted earlier, the inflation assumption for actuarial valuations is generally longer term than that used by investment consultants. For many years, that has lead to higher actuarial valuation inflation assumptions. A higher inflation assumption has a conservative effect - higher current cost - on the wage increase and COLA assumption, but is less conservative as part of the investment earnings assumption. In effect, the risk adjustment compensates for this by offsetting the effect of the higher inflation assumption on assumed investment earnings.

One way to test the reasonableness of the risk adjustment incorporated in our recommendation is to compare our risk adjusted investment return against the expected net investment return that would result from using the average of all the capital market assumptions -- including the lower inflation assumption -- of the investment consultants in our sample.

Here is the comparison. It shows that the difference between our recommended return and that derived using the average of all the capital market assumptions of the investment consultants in our sample comes from the inflation assumptions and the risk adjustment.

Assumption Element:	Risk Adjusted Method	Average of Investment Consultant Sample	Difference
Inflation	3.50%	2.73%	0.77%
Risk Adjustment	-0.41%	0.00%	-0.41%
Real Rate of Return	5.26%	5.26%	0.00%
Expenses	-0.60%	-0.60%	0.00%
Total	7.75%	7.39%	+0.36%

The 0.36% (36 basis points) difference between the two calculations represents about 4% lower confidence level under the risk adjusted method. Note that this is generally consistent with the difference between the net investment return based on a 60% confidence level shown earlier (7.32%) and the recommended investment return assumption of 7.75%. This indicates that with the lower confidence level the risk adjustment offsets only about one-half of the effect of using an inflation assumption higher than that used in the capital market assumptions.

Comparing with Other Public Retirement Systems

One final test of the recommended investment return assumption is to compare it against those used by other public retirement systems, both in California and nationwide.

We note that this 7.75% investment return assumption is within the most common range for this assumption among most California public sector retirement systems. That range, with few exceptions, is from 7.75% to 8.00%. In particular two of the largest California systems, CalPERS and LACERA, use a 7.75% earnings assumption.

The following table compares the CCCERA recommended net investment return assumptions against those of the nationwide public retirement systems that participated in the National Association of State Retirement Administrators (NASRA) public fund survey published in 2009:

Assumption	CCCERA	NASRA Public Fund Survey Published in 2009		
		Low*	Median	High*
Net Investment Return	7.75%	7.25%	8.00%	8.50%
* After eliminating very lowest and highest as outliers				

As you can see, the recommended return assumption is below the median. The detailed survey results show 49 systems at 8.00%, 28 at 7.50% or 7.75%, and 30 at 8.25% or 8.50%. The survey also notes that "as with inflation assumptions, investment return assumptions for many plans have been reduced in recent years."

In summary, while we believe that both the risk adjustment model and other considerations indicate a lower earnings assumptions, the model result of 7.3% (leaving the confidence level unchanged) appears to be an unreasonably large change for a long term assumption. The recommended assumption of 7.75% continues to provide for some risk margin within the risk adjustment model and is consistent with the Association's current practice relative to other public systems.

Salary Increase Assumption

Salary increases impact plan costs in two ways: (i) by increasing members' benefits (since benefits are a function of the members' highest average pay) and future normal cost collections; and (ii) by increasing total active member payroll which in turn generates higher UAAL amortization payments (or greater rate credit demands if the UAAL is negative). These two impacts are discussed separately below.

As an employee progresses through his or her career, increases in pay are expected to come from three sources:

1. Inflation – Unless pay grows at least as fast as consumer prices grow, employees will experience a reduction in their standard of living. There may be times when pay increases lag or exceed inflation, but over the long term, labor market forces may require an employer to maintain its employees' standards of living.

   As discussed earlier in this report, we recommend decreasing the assumed rate of inflation to 3.50%. This inflation component will be used as part of the salary increase assumption.

2. Real "Across the Board" Pay Increases – These increases are typically termed productivity increases since they are considered to be derived from the ability of an organization or an economy to produce goods and services in a more efficient manner. As that occurs, at least some portion of the value of these improvements can provide a source for pay increases. These increases are typically assumed to extend to all employees "across the board." The State and Local Government Workers Employment Cost Index produced by the Department of Labor provides evidence that real "across the board" pay increases have averaged about 0.7% - 1.0% annually during the last 10 – 20 years.

   We also referred to the annual report on the financial status of the Social Security program published in May 2009. In that report, real "across the board" pay increases are forecast to be 1.1% per year under the intermediate assumptions.

   Considering these two factors, we recommend increasing the "across the board" salary increase assumption from 0.50% to 0.75% so that the combined inflation and "across the board" salary increase assumption remains unchanged at 4.25%.

3. Promotional and Merit Increases – As the name implies, these increases come from an employee's career advances. This form of pay increase differs from the previous two, since it is specific to the individual. For CCCERA, this assumption is structured as a function of an employee's service. The assumed increases range from 0.75% to 7.50% for General members and 0.75% to 8.00% for Safety members. This assumption is derived from employee-specific information as part of the triennial experience study.

   Recommended promotional and merit assumptions will be studied as part of our triennial experience analysis.

All three of these forces will be incorporated into a salary increase assumption which is applied in the actuarial valuation to project future benefits and future normal cost contribution collections.

Active Member Payroll

Projected active member payrolls are used to develop the UAAL contribution rate. Future values are determined as a product of the number of employees in the workforce and the average pay for all employees. The average pay for all employees increases only by inflation and real "across the board" pay increases. The promotional and merit increases are not an influence, because this average pay is not specific to an individual.

We recommend that the active member payroll increase assumption be 4.25% annually, consistent with the combined inflation and "across the board" salary increase assumptions. This is the same as used in the prior valuation.

Terminal Pay

In 1998, the Board of Retirement, in the course of actions related to the Paulson Settlement, determined that several additional pay elements were to be included as Earnable Compensation. These additional pay elements fall into two categories:

- Ongoing Pay Elements – Those that are expected to be received relatively uniformly over a member's employment years; and
- Terminal Pay Elements – Those that are expected to be received only during the member's final average earnings pay period.

The first category is recognized in the actuarial calculations by virtue of being included in the current pay of active members. The second category requires an actuarial assumption to anticipate its impact on a member's retirement benefit.

Data has been collected since 1998 to estimate terminal pay for active members as a percentage of current pay. Because of the uncertainty associated with terminal pay (e.g., vacation accrual and sell off policies, maximum vacation carryover, vacation usage, etc.) a range of estimates was determined. An assumption was then recommended for terminal pay.

The current terminal pay assumptions for members expected to retire are as follows:

Member Category	Terminal Pay Assumption
General Tier 1	11.50%
General Tier 2	3.25%
General Tier 3	7.00%
Safety Tier A	11.00%
Safety Tier C	3.75%

These assumptions will be reviewed as part of the triennial experience study.