

# **Valley Transportation Authority ATU Local 265 Pension Plan**

**Actuarial Experience Study for  
January 1, 2012 through  
December 31, 2016**

**Produced by Cheiron**

**October 2017**

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October 26, 2017

Board of Pensions  
Santa Clara Valley Transportation Authority  
3331 North First Street  
San Jose, CA 95134-1906

Dear Members of the Boards:

The purpose of this report is to present an Actuarial Experience Study of the Valley Transportation Authority Amalgamated Transit Union, Local 265 Pension Plan (VTA, the Plan) covering actuarial experience from January 1, 2012 through December 31, 2016. This report includes analyses and recommendations of economic and demographic assumptions to be used beginning with the January 1, 2018 actuarial valuation.

If you have any questions about the report or would like additional information, please let us know.

Sincerely,  
Cheiron



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Consulting Actuary



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## SECTION I - EXECUTIVE SUMMARY

Actuarial assumptions (economic and demographic) are intended to be long-term in nature, and should be both individually reasonable and consistent in the aggregate. The purpose of this experience study is to evaluate whether or not the current assumptions adequately reflect the long-term expectations for the Valley Transportation Authority Amalgamated Transit Union, Local 265 Pension Plan (VTA, the Plan), and if not, to recommend adjustments. It is important to note that frequent and significant changes in the actuarial assumptions are not typically recommended, unless there are known fundamental changes in expectations of the economy, or with respect to the Plan's membership, plan provisions, or assets that would warrant such frequent or significant changes.

### SUMMARY OF ECONOMIC ASSUMPTION ANALYSIS

The specific economic assumptions analyzed in this report are price inflation, wage inflation, and the discount rate. These assumptions have a significant impact on the contribution rates in the short-term and the risk of negative outcomes in the long-term.

The current economic assumptions adopted by the Board of Pensions at the November, 2016 meeting include a 7.00% long-term nominal rate of return on Plan assets, an annual increase in prices measured by the Consumer Price Index (CPI) of 2.75%, and annual wage increase of 3.00%. This results in a real return assumption of 4.25% (7.00% nominal return minus 2.75% price inflation).

The current real return expectation is consistent with the current long-term capital market expectations of NEPC, the Plan's investment consultant, and slightly more conservative than the long-term expectations of a survey of other investment consultants. Other data presented in this report indicate that the inflation and wage growth expectations adopted by the Board are also reasonable.

However, the current real return assumption is higher than the expectations provided by NEPC for the short term (five-seven years), as well as the expectations provided by another consultant active in California public plans and a broader survey over a 10-year time horizon. If the current asset target is maintained and these projections are realized, the Board can expect a pattern of actuarial asset losses in the near term.

### SUMMARY OF DEMOGRAPHIC ASSUMPTION ANALYSIS

This experience study specifically analyzes and makes the following recommendations for the demographic assumptions.

- **Merit salary increases** – A slight adjustment to pay increases in the early years of service, with no change to the ultimate merit increase, is proposed.
- **Retirement rates** – Separate unisex age-based rates of retirement are proposed for members with less than 25 years of service compared to members with 25 years of service or more, rather than the prior age-based rates by gender. Lower rates are proposed

**VALLEY TRANSPORTATION AUTHORITY ATU LOCAL 265 PENSION PLAN  
ACTUARIAL EXPERIENCE STUDY AS OF DECEMBER 31, 2016**

**SECTION I - EXECUTIVE SUMMARY**

for those with less than 25 years of service and higher rates for those with 25 years of service or more.

- **Termination rates** – A slight adjustment to termination rates in the early and later years of service is proposed.
- **Disability rates** – Higher flat rates of disability are proposed for males and females.
- **Mortality rates** – RP-2014 Blue Collar mortality tables for healthy annuitants and non-annuitants and RP-2014 Disabled mortality tables for disabled annuitants, with generational improvement for all members using MP-2017 is proposed.

The recently completed mortality study by the Society of Actuaries found that mortality rates had improved faster than reflected in the tables adopted as part of the prior experience study. The study recommended future projections of mortality improvement commensurate with recent experience in the short-term tapering to a long-term expected rate of improvement by 2033. The recommended change to mortality rates for VTA reflects both the experience of the Plan over the past 10 years, and the application of the generational rates of improvement projected in the future.

The recommendation to change mortality assumptions has the largest impact on contribution rates. The following table details the impact of each proposed assumption change on the actuarial cost and funded ratio, based on the valuation results as of January 1, 2017.

| <b>Table I-1<br/>Estimated Impact of Assumption Changes</b>                 |  |  |                         |
|---|--|--|-------------------------|
|   | <b>Employer Contribution<br/>(Beg. of Fiscal Year)</b> | <b>Employer Contribution as<br/>a Percentage of Payroll<br/>(Paid Throughout FY)</b> | <b>Funded<br/>Ratio</b> |
| <b>January 1, 2017 Valuation Results</b>                                    | <b>\$28,523,868</b>                                    | <b>22.08%</b>  | <b>75.4%</b>            |
| <b>Impact of Individual Assumption Changes:</b>                             |  |  |                         |
| Mortality Rates and<br>Projected Improvements                               | \$2,957,391  | 2.29%  | -2.5%                   |
| Retirement Rates  | (110,714)  | -0.08%   | 0.0%                    |
| Disability Rates  | (244,672)  | -0.19%   | 0.3%                    |
| Termination Rates   | (235,337)  | -0.17%   | 0.1%                    |
| Merit Salary Increases  | (189,732)  | -0.06%   | 0.0%                    |
| Incidence of Transfer   | 437,680  | 0.34%  | 0.0%                    |
| <b>Total Impact of Assumption Changes</b>                                   | <b>\$2,614,616</b>                                     | <b>2.13%</b>   | <b>-2.1%</b>            |
| <b>Estimated January 1, 2017 Results<br/>Reflecting Revised Assumptions</b> | <b>\$31,138,484</b>                                    | <b>24.21%</b>  | <b>73.3%</b>            |

The body of this report provides additional detail and support for our conclusions and recommendations.

**VALLEY TRANSPORTATION AUTHORITY ATU LOCAL 265 PENSION PLAN  
ACTUARIAL EXPERIENCE STUDY AS OF DECEMBER 31, 2016**

**SECTION II - CERTIFICATION**

The purpose of this report is to provide the results of an Actuarial Experience Study of the Valley Transportation Authority Amalgamated Transit Union, Local 265 Pension Plan (VTA, the Plan) covering actuarial experience from January 1, 2012 through December 31, 2016. This report is for the use of the VTA Board of Pensions in selecting assumptions to be used in actuarial valuations beginning January 1, 2018.

In preparing our report, we relied on information (some oral and some written) supplied by VTA. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

To the best of our knowledge, this report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices that are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared for the VTA Board of Pensions for the purposes described herein. This report is not intended to benefit any other party, and Cheiron assumes no duty or liability to any such party.

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**SECTION III - ECONOMIC ASSUMPTIONS**  
**PRICE INFLATION**

The economic assumptions used in actuarial valuations are intended to be long-term in nature, and should be both individually reasonable and consistent with each other. The specific assumptions analyzed in this report are:

- **Price inflation** – used indirectly as an underlying component of other economic assumptions.
- **Wage inflation** – across the board wage growth used to project benefits and to amortize the unfunded liability as a level percentage of expected payroll.
- **Discount rate** – used both to project long-term asset growth and to discount future cash flows in calculating the liabilities and costs of the Plan.

In order to develop recommendations for each of these assumptions, we considered historical data, both nationally and for the Plan, and expectations for the future, as expressed by the Plan’s investment consultant and the Boards.

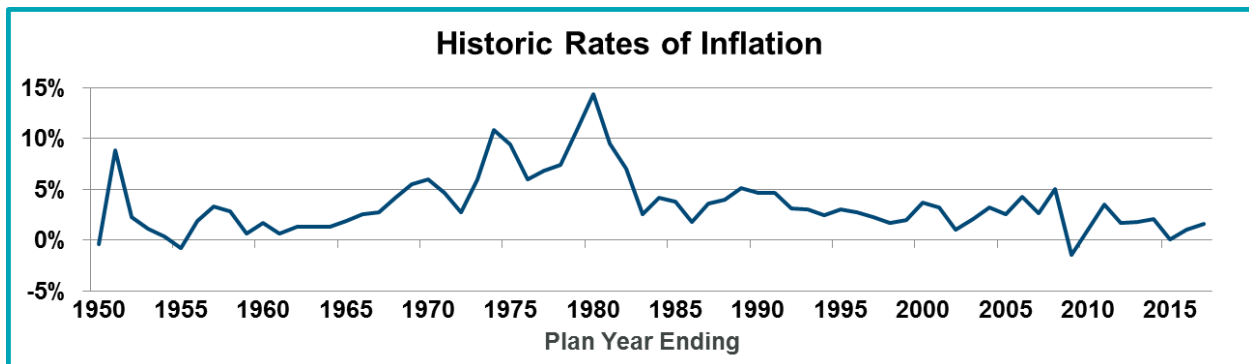
**PRICE INFLATION**

Long-term price inflation rates are the foundation of other economic assumptions. In a growing economy, wages and investments are expected to grow at the underlying inflation rate plus some additional real growth rate, whether it reflects productivity in terms of wages or risk premiums in terms of investments.

**Historical Data**

Chart III-1 below shows inflation for the U.S. by individual year since 1950.

**Chart III-1**



Over the 50 years ending June 2017, the geometric average inflation rate for the U.S. has been about 4.1%, but this average is heavily influenced by the high inflation rates in the 1970s and early 1980s. Over the last 30 years, the geometric average inflation rate has been 2.6%.

**SECTION III - ECONOMIC ASSUMPTIONS  
PRICE INFLATION**

**Future Expectations**

A measure of the market consensus of expected future inflation rates is the difference in yields between conventional treasury bonds and Treasury Inflation-Protected Securities (TIPS) at the same maturity. Table III-1 shows the yields on both types of bonds and the break-even inflation rate as of June 2017. Break-even inflation is the level of inflation needed for an investment in TIPS to “break even” with an investment in conventional treasury bonds of the same maturity.

| <b>Table III-1</b>  |                               |                       |                                 |
|---|-------------------------------|-----------------------|---------------------------------|
| <b>Break-Even Inflation<br/>Based on Treasury Bond Yields</b> |                               |                       |                                 |
| <b>Time to<br/>Maturity</b>                                   | <b>Conventional<br/>Yield</b> | <b>TIPS<br/>Yield</b> | <b>Break Even<br/>Inflation</b> |
| <b>5 Years</b>  | 1.8%                          | 0.1%                  | 1.7%                            |
| <b>10 Years</b>   | 2.2%                          | 0.5%                  | 1.7%                            |
| <b>20 Years</b>   | 2.5%                          | 0.8%                  | 1.7%                            |
| <b>30 Years</b>   | 2.8%                          | 0.9%                  | 1.9%                            |

Data Source Federal Reserve, Constant Maturity Yields, Monthly Series

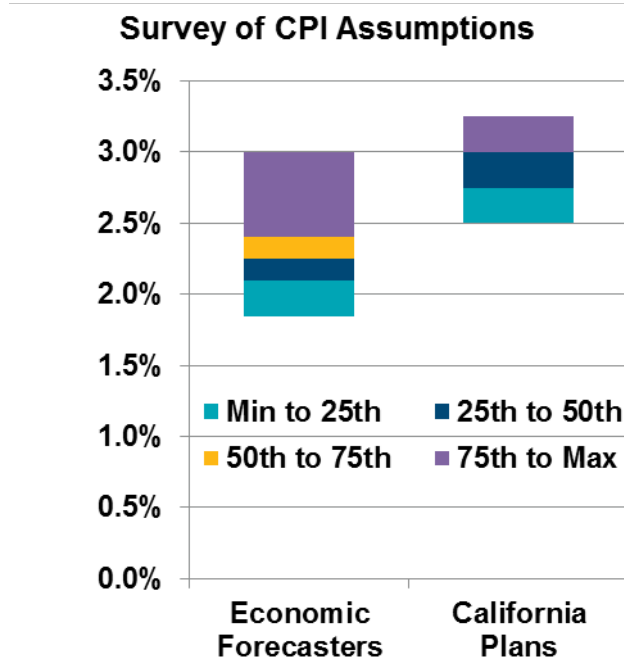
The Federal Reserve Bank of Philadelphia publishes a quarterly survey of professional economic forecasters that includes their forecasts of inflation over the next 10 years. The survey for the third quarter of 2017 shows a median inflation forecast of 2.25%; a minimum forecast of about 1.8% and a maximum forecast of 3.0%.

Chart III-2 on the next page shows the distribution of the current 10-year forecasts for CPI-U from the professional survey published by the Federal Reserve Bank of Philadelphia compared to the assumptions used by California public pension plans. The most common assumption in California public pension plans is 3.00% (used by 13 of the 35 systems in the survey). We note that all of the inflation assumptions used by California public pension plans are in or above the top quartile of the 10-year forecast published by the Federal Reserve.



SECTION III - ECONOMIC ASSUMPTIONS  
PRICE INFLATION

Chart III-2



Finally, NEPC uses an inflation assumption of 2.50% for the next 5-7 years, and 2.75% for the next 30 years.

Based on all of these considerations, we believe a reasonable range for long-term price inflation for use in the Plan's actuarial valuations is between 2.25% and 3.00%. Therefore, we believe the Board's current inflation assumption of 2.75% is reasonable. If, at the time of the next review of economic assumptions, the markets and forecasters continue to indicate lower expectations of future inflation, further reductions in the assumption could be considered.

**SECTION III - ECONOMIC ASSUMPTIONS  
WAGE INFLATION**

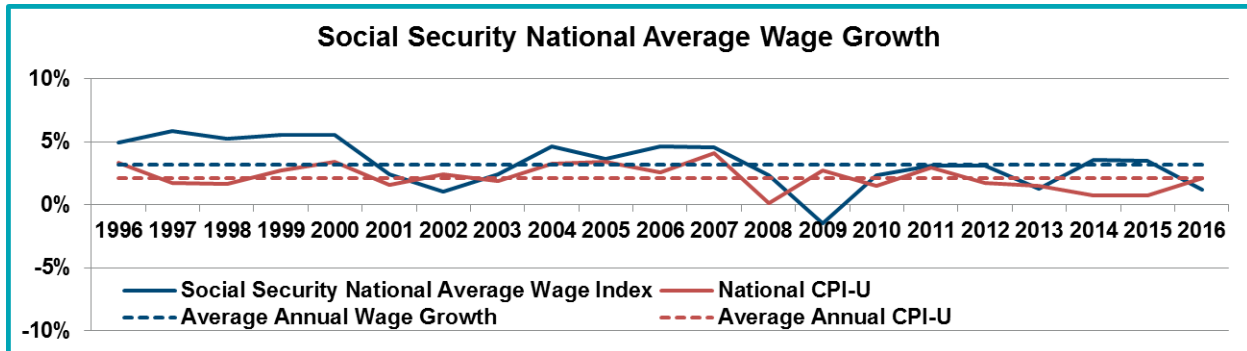
**WAGE INFLATION**

Wage inflation can be thought of as the annual across-the-board increase in wages. Individuals often receive salary increases in excess of the wage inflation rate, and we study these increases as a part of the merit salary scale assumption. Wage inflation generally exceeds price inflation by some margin reflecting the history of increased purchasing power.

Wage inflation is used in the actuarial valuation as the minimum expected salary increase for an individual and, for purposes of amortizing the unfunded actuarial liability, the rate at which payroll is expected to grow over the long term, assuming a stable active member population.

Chart III-3 shows the increase in national average wages (as reported by the Social Security Administration) compared to inflation from 1996 through 2016.

**Chart III-3**



Over this period, national wage inflation averaged approximately 3.2% compared to annual price inflation of 2.1%. Note the significant drop in 2008 and 2009 as well as the recent decline in national average wage growth in 2013.

Since 1990, mean wage growth (as measured by the Social Security Administration) averaged 1.13% per year. However, over the same time period the increase in the median real wage was only 0.77% per year, as much of the growth in wages was clustered at the top end of the wage scale. In addition, real median weekly wages for local government employees have increased by only 0.36% from 2000-2016 and real median wages in the transportation industry have remained flat since 2000, based on the Bureau of Labor Statistics (BLS) Current Population Survey.

Usually we recommend that long range gains due to productivity, the collective bargaining process or other pressures should be assumed to be zero or minimal. While productivity tends to increase in many sectors of the economy, any long-term assumption of salary growth beyond inflation carries with it an assumed improvement in relative standard of living.

**SECTION III - ECONOMIC ASSUMPTIONS**  
**WAGE INFLATION**

It is acceptable to assume some additional level of base payroll increase beyond general inflation. Potential reasons contributing to the increase may include the presence of strong union representation in the collective bargaining process, competition in hiring among other similar employers, and regional factors – such as the local inflation index exceeding the national average, as has sometimes proven the case in parts of California. Also, the Social Security Administration projects real wage growth of 0.6% - 1.8% going forward in their Social Security solvency projections.

However, governmental entities - and particularly public transit agencies - remain under financial stress, and other areas of employee compensation – most notably health care costs and pension contributions – have continued to increase faster than the CPI. Cheiron agrees with the Board's recent action to maintain a small non-inflationary base payroll growth assumption of 0.25% annually.

**SECTION III - ECONOMIC ASSUMPTIONS  
DISCOUNT RATE**

**DISCOUNT RATE (RATE OF RETURN)**

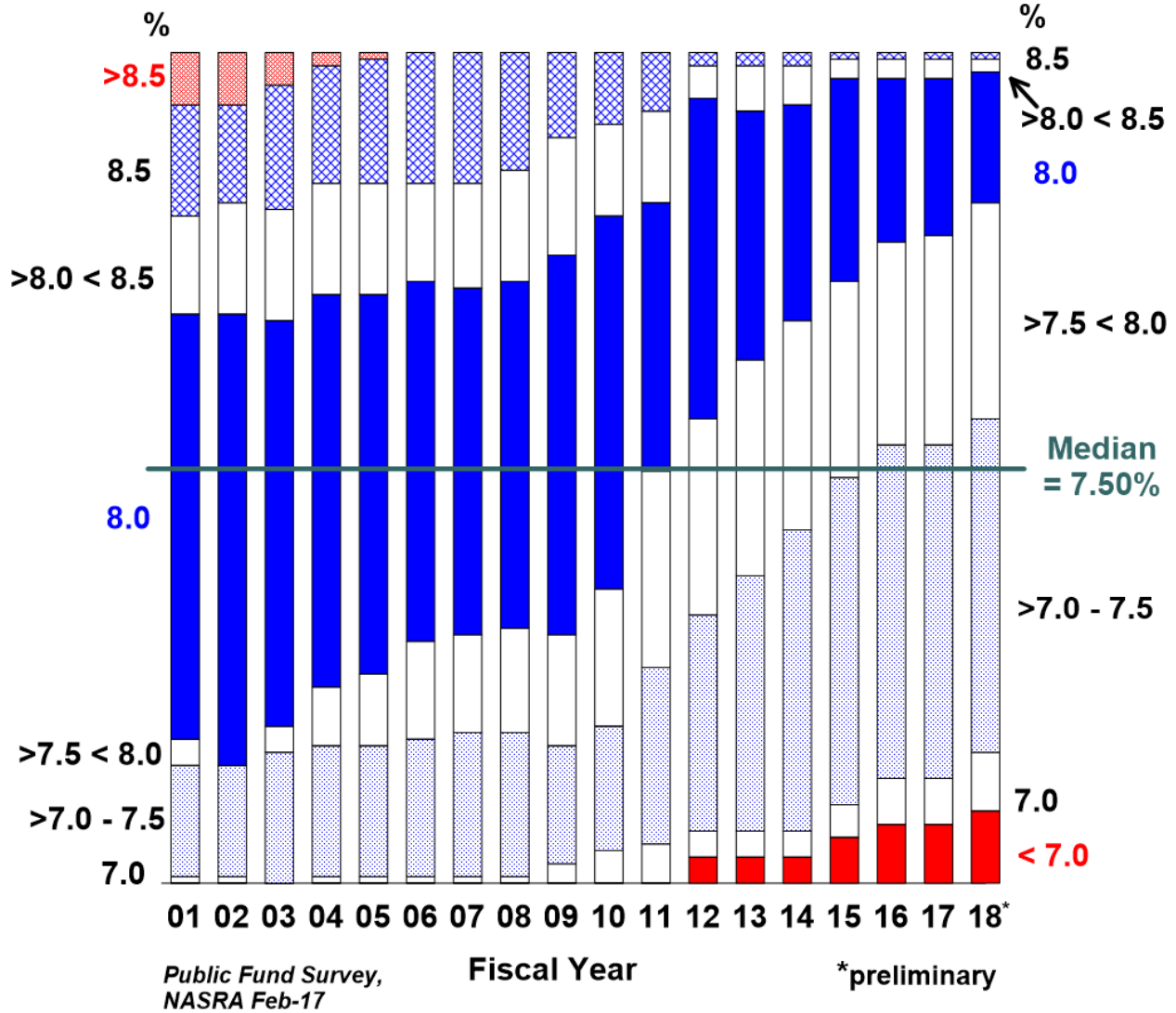
The discount rate assumption is generally the most significant of all the assumptions employed in actuarial valuations. The discount rate is based on the long-term expected return on plan investments. In the short-term, a higher discount rate results in lower expected contributions. However, over the long term, actual contributions will depend on actual investment returns and not the discount rate (or expected investment returns). If actual investment returns are lower than expected, contribution rates will increase in the future. It is important to set a realistic discount rate so that projections of future contributions for budgeting purposes will not be biased, particularly to be too low.

**Other Large Public Retirement Plans**

Based on the Public Fund Survey, developed by the National Association of State Retirement Administrators (NASRA) covering most of the largest public retirement systems in the country, there has been a general movement over at least the last decade to reduce the discount rate used in actuarial valuations. Chart III-4 on the next page shows the change in the distribution of assumptions since 2001. The median assumption is now 7.50% and the number of plans using a discount rate of 7.00% or lower has increased significantly.

SECTION III - ECONOMIC ASSUMPTIONS  
 DISCOUNT RATE

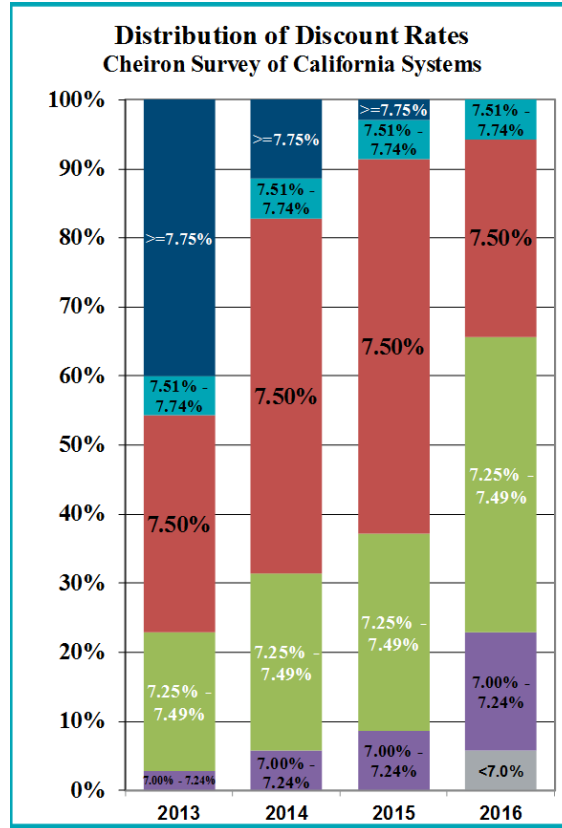
Chart III-4



In our survey of California retirement systems, the median assumption is even lower at 7.25 percent with 13 of the 35 systems using the median rate. Chart III-5 on the following page shows the change in discount rate assumptions for California systems from 2013 to 2016.

SECTION III - ECONOMIC ASSUMPTIONS  
 DISCOUNT RATE

Chart III-5



**Target Asset Allocation and Future Expectations**

Table III-2 on the next page shows the target allocation based on the Boards' current policy along with the capital market assumptions provided by the Plan's investment consultant (NEPC), and those from another investment consultant active in California public plans, as well as a survey of multiple investment consultants published by Horizon Actuarial Services. The table divides the expectations into short-to-medium expectations (5-10 years) versus longer-term assumptions (20-30 years).

**SECTION III - ECONOMIC ASSUMPTIONS  
 DISCOUNT RATE**

| <b>Table III-2<br/>VTA Portfolio Return Expectations</b> |                |                  |              |                           |
|--|----------------|------------------|--------------|---------------------------|
| <b>Consultant</b>  | <b>Nominal</b> | <b>Inflation</b> | <b>Real</b>  | <b>Standard Deviation</b> |
| <b>NEPC (5-7 Year)</b>                                   | 5.80%          | 2.50%            | 3.30%        | 11.20%                    |
| <b>Consultant #1 (10-year)</b>                           | 5.70%          | 2.10%            | 3.60%        | 11.52%                    |
| <b><u>Horizon (Survey, 10-year)</u></b>                  | <u>6.11%</u>   | <u>2.24%</u>     | <u>3.87%</u> | <u>10.68%</u>             |
| <b>Average</b>   | 5.87%          | 2.28%            | 3.59%        | 11.13%                    |
| <b>NEPC (30-year)</b>                                    | 7.00%          | 2.75%            | 4.25%        | 11.20%                    |
| <b><u>Horizon (Survey, 20-year)</u></b>                  | <u>7.23%</u>   | <u>2.31%</u>     | <u>4.92%</u> | <u>10.68%</u>             |
| <b>Average</b>   | 7.11%          | 2.53%            | 4.58%        | 10.94%                    |
| <b>Average (Short &amp; Long-Term)</b>                   | 6.49%          | 2.41%            | 4.09%        | 11.03%                    |

Based on these assumptions, we calculated an average expected geometric real (i.e. the return above inflation) of 4.58% percent under the long-term assumptions, but only a 3.59% real return under the shorter-term expectations. The average real return taken across both time periods – 4.09% - is slightly below the Board’s current real return assumption of 4.25%.

The returns above were modeled based on the expected returns of the portfolio benchmark indices, which are expected to have minimal expenses. The actuarial standards on selecting a return assumption (ASOP 27) state that in general superior or inferior returns (net of fees) should not be assumed for active versus passive management, therefore we do not recommend a significant adjustment to the modeled returns for the fees of the asset managers. However, a slight margin is appropriate to reflect the investment-related expenses other than those of the investment managers, which would include the investment advisor and custodian.

The recently adopted discount rate of 7.00% is consistent with the long-term expectations of the Board’s investment consultant, and is more conservative than the long-term assumptions shown in the broader survey above. We therefore find the current discount rate to be a reasonable assumption. However, there are a number of factors that suggest that the near-term expected rate of return should be discussed.

- Many investment consultants expect poor rates of return in the immediate and near-term future. They reason that there is little in the way of yields on fixed income, and that the equity markets are fully valued.

**SECTION III - ECONOMIC ASSUMPTIONS  
DISCOUNT RATE**

- If NEPC and much of the investment community are correct in their projections, we can expect returns below the 7.00% assumed rate for a number of years. This will result in actuarial losses and increases in employer contribution rates. However, these losses may be partially offset by gains on the liabilities from wage inflation below the assumed level (2.75%).
- We believe that near- and mid-term return projections should be considered along with long-term projections. Fund performance is usually measured over five to 10 years; longer measurement periods are often considered less relevant because of the potential for changes in the economy and in the investment markets.

As a result, the prospect of several years of actuarial losses, in line with the shorter-term NEPC and other assumptions, and the resulting impact on the District contribution rates should be communicated to their staff for use in planning. In addition, it would be reasonable for the Board to consider additional reductions in the real return assumption, and we recommend that the Boards and staff continue to conduct at least a brief discussion of this assumption annually, in consultation with the Plan's actuary and investment consultant, to determine if further changes are appropriate.



## SECTION IV - DEMOGRAPHIC ASSUMPTIONS MERIT SALARY INCREASES

Demographic assumptions are used to predict membership behavior, including rates of retirement, termination, disability, and mortality. These assumptions are based primarily on the historical experience of the Plan, with some adjustments where future experience is expected to differ from historical experience and with deference to standard tables where the Plan experience is not fully credible and a standard table is available. For purposes of this study, merit salary increases and administrative expenses are also considered demographic assumptions because the assumptions are based primarily on the Plan's historical experience.

### MERIT SALARY INCREASES

Salary increases consist of three components: Increases due to cost-of-living maintenance (price inflation), increases related to non-inflationary pressures on base pay (such as productivity increases or wage inflation), and increases in individual pay due to merit, promotion, and longevity. Increases due to cost-of-living (price inflation) and non-inflationary base pay factors (wage inflation) were addressed in the economic assumptions section of this report.

The merit salary increase assumption is analyzed by average pay and service. Generally, newer employees are more likely to earn a longevity increase or receive a promotion, so their salary increases tend to be greater than those for longer service employees. Two difference approaches were used to analyze the merit increases: a *longitudinal* study and a *transverse* study.

A *longitudinal* study reviews the average increases in pay for each level of service. To analyze the merit component, we subtracted the Plan's real wage growth – as measured by the base wage increases reflected in the most recent years of historical experience, 2014 through 2017, for members with 10 or more years of service. Longitudinal studies, which use changes in pay collected over several years need to consider the effects of inflation, negotiations, and management decisions during the term of the study in order to be reliable.

Chart IV-1 on the following page analyzes the longitudinal study of pay patterns for members. Our charts generally show the current assumption (red line) compared to the actual experience (blue line) and the proposed assumption (green line). The red and green lines overlap where there no proposed change to the assumption.

In a *transverse* study of longevity and promotion pay increases: salaries are examined at one point in time (the valuation date), as opposed to being observed over a number of years (a *longitudinal* study). A transverse study serves as a reliable way to assess average increases in pay due to merit. With a homogeneous group of any size at all, the pattern of promotions and longevity increases during the career of an average employee is visible in this analysis.

Chart IV-2 illustrates the transverse study of current pay patterns for members with current pay data. Only increases due to merit (promotion and longevity) are considered here. In the graph, the average pay of the active members of the Plan as of January 1, 2017 is plotted against service. A curve is then fitted to the average pay data, and this curve is used to determine a pay increase due to merit. The current assumption for merit salary increases is 12% increases for the first four years of service and 0.25% thereafter. We propose a slight adjustment to pay increases in the early years of service, with no change to the ultimate merit increase. Details of the proposed merit salary increase assumption can be found in the appendix of this report.

SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
 MERIT SALARY INCREASES

Chart IV-1

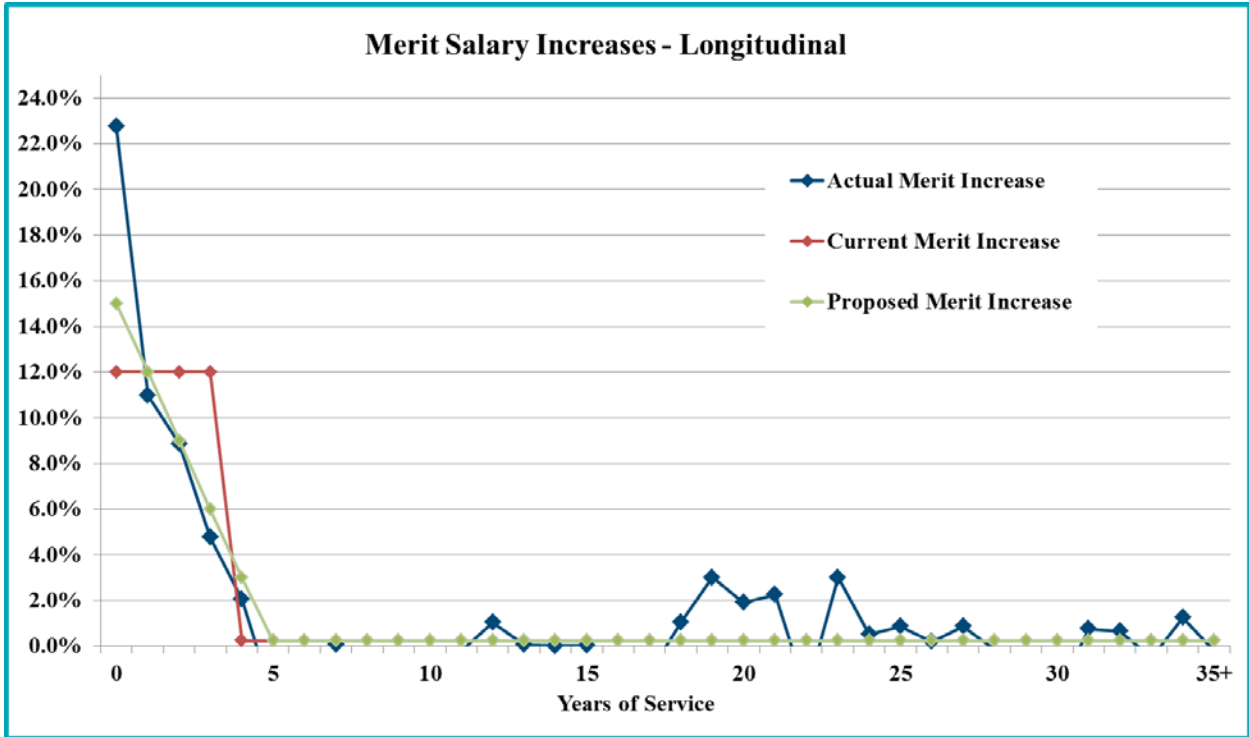
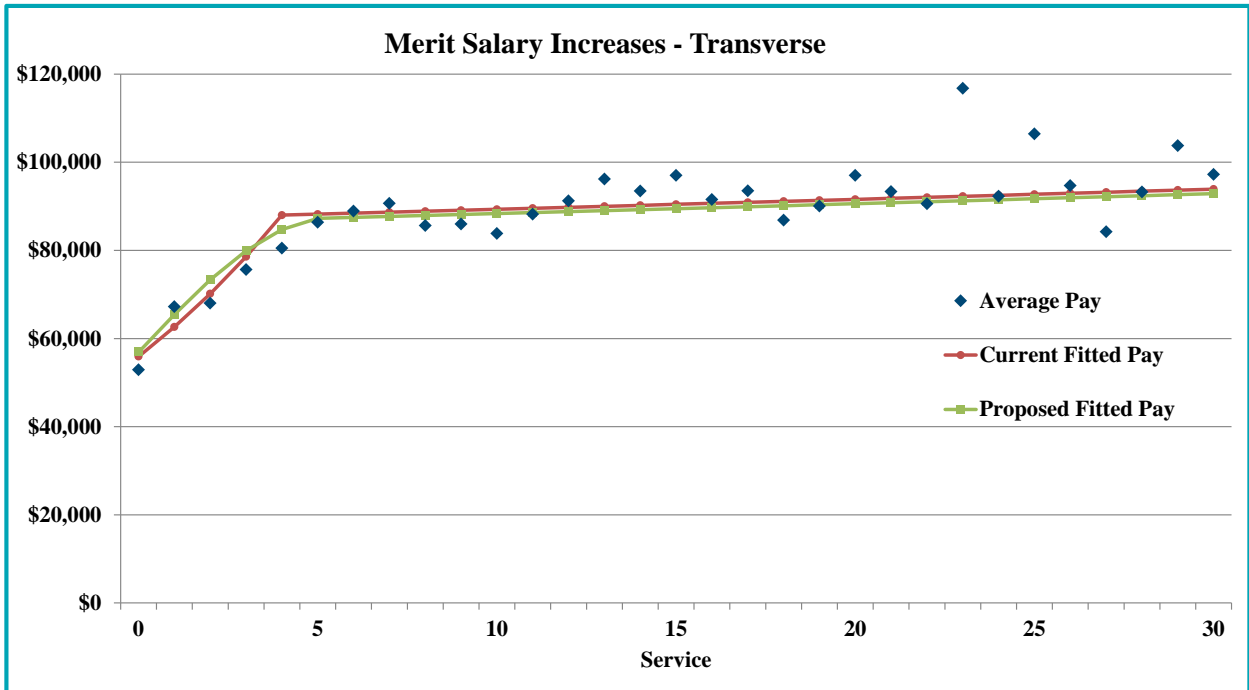


Chart IV-2



**SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
RETIREMENT RATES**

**ANALYSIS OF OTHER DEMOGRAPHIC ASSUMPTIONS**

For all of the remaining demographic assumptions, we determined the ratio of the actual number of decrements compared to the expected number of decrements (A/E ratio or actual-to-expected ratio). If the assumption is perfect, this ratio will be 100 percent. Otherwise, any recommended assumption change should move from the current A/E ratio towards 100 percent unless future experience is expected to be different than the experience during the period of study.

We also calculate an r-squared statistic for each assumption. R-squared measures how well the assumption fits the actual data and can be thought of as the percentage of the variation in actual data explained by the assumption. Ideally, r-squared would equal 1.00 although this is never the case. Any recommended assumption change should increase the r-squared compared to the current assumption making it closer to 1.00 unless the pattern of future decrements is expected to be different from the pattern experienced during the period of study.

In addition, we calculated the 90% confidence interval, which represents the range within which the true decrement rate during the experience study period fell with 90% confidence. (If there is insufficient data to calculate a confidence interval, the confidence interval is shown as the entire range of the graph.) We generally propose assumption changes when the current assumption is outside the 90% confidence interval of the observed experience. However, adjustments are made to account for differences between future expectations and historical experience, to account for conservative bias in the selection of the assumption. For mortality rates, we compare the Plan's experience to that of a standard table, and adjust the tables to bring the proposed assumption closer to an A/E ratio of 100% if needed.

**RETIREMENT RATES**

The current retirement rates, which vary by age and gender, are applied to all members who are eligible to retire. We reviewed the experience of the past five years when studying this assumption.

Generally, at any given age, members with more service are more likely to retire than members with fewer years of service. We reviewed the Plan's actual retirement rates based on age and service. We recommend separate assumptions by age for members with less than 25 years of service and members with 25 or more years of service. Also, we found that the retirement rates were not materially different between males and females and no longer recommend separate rates by gender.

For new members hired on or after January 1, 2016 subject to the provisions defined under PEPRA, we recommend using the same assumptions as used for Classic members since we do not yet have any actual experience to support a different set of assumptions. Given that PEPRA members are eligible to retire earlier than Classic members, at age 52, we propose extending the age 55 rates to age 52 until actual experience unfolds and supports otherwise.

**VALLEY TRANSPORTATION AUTHORITY ATU LOCAL 265 PENSION PLAN  
ACTUARIAL EXPERIENCE STUDY AS OF DECEMBER 31, 2016**

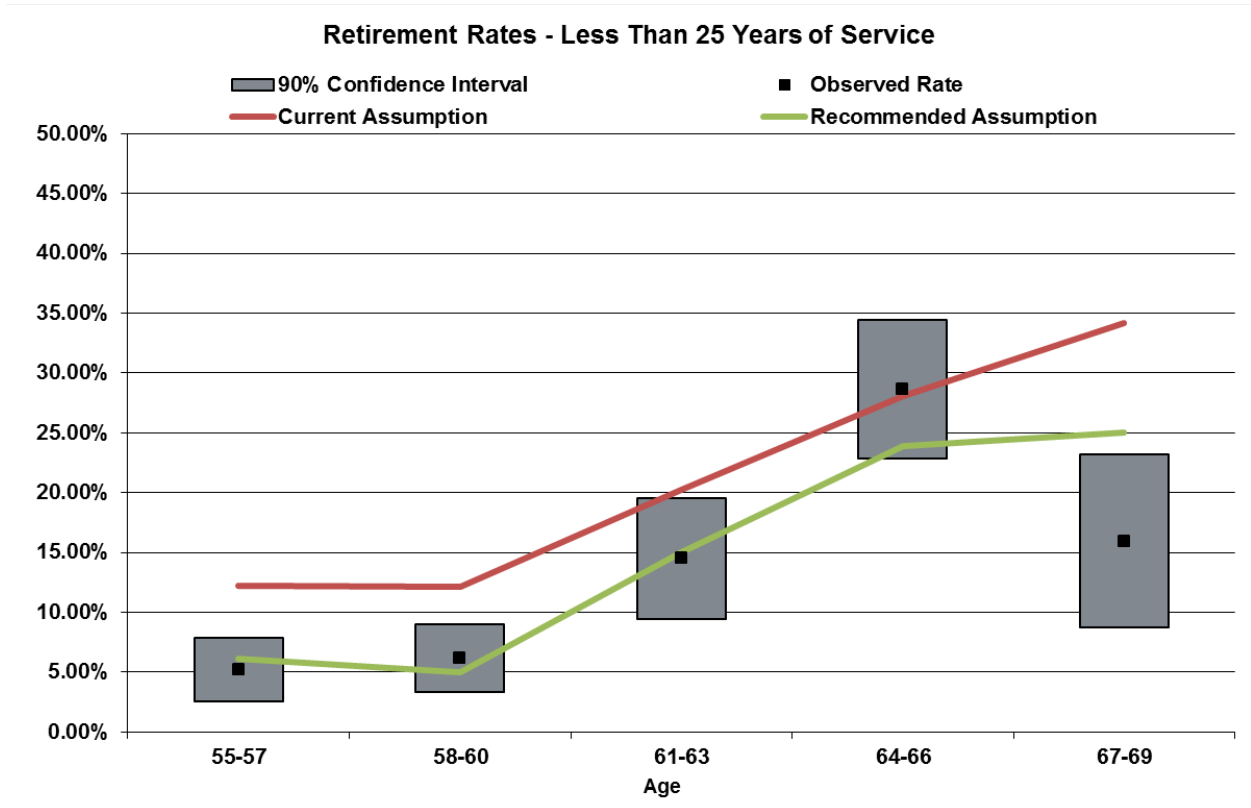
**SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
RETIREMENT RATES**

Table IV-R1 on the next page shows the calculation of actual-to-expected ratios and the r-squared statistic for members with less than 25 years of service. Chart IV-R1 shows the information graphically along with the 90% confidence interval. For members with less than 25 years of service, the data shows lower actual retirements than expected under the current assumption. The proposed assumption decreases the aggregate assumed rate of retirement and increases the aggregate A/E ratio from 69% to 101%. The r-squared statistic increases from 0.74 to 0.85.

See Appendices A and B for a full listing of the proposed and prior retirement rates. The ultimate retirement age remains at 70.

| Table IV-R1<br>Retirement Rates - Less Than 25 Years of Service |            |             |               |               |                           |             |
|---|------------|-------------|---------------|---------------|---------------------------|-------------|
| Age   | Exposures  | Retirements |               |               | Actual to Expected Ratios |             |
|   |            | Actual      | Current       | Recommended   | Current                   | Recommended |
| 55-57   | 191        | 10          | 23            | 12            | 43%                       | 85%         |
| 58-60   | 195        | 12          | 24            | 10            | 51%                       | 123%        |
| 61-63   | 131        | 19          | 27            | 20            | 72%                       | 97%         |
| 64-66   | 164        | 47          | 46            | 39            | 102%                      | 120%        |
| 67-69   | 69         | 11          | 24            | 17            | 47%                       | 64%         |
| <b>Total</b>  | <b>750</b> | <b>99</b>   | <b>143</b>    | <b>98</b>     | <b>69%</b>                | <b>101%</b> |
| <b>R-squared</b>  |            |             | <b>0.7420</b> | <b>0.8458</b> |                           |             |

**Chart IV-R1**



**VALLEY TRANSPORTATION AUTHORITY ATU LOCAL 265 PENSION PLAN  
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**SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
RETIREMENT RATES**

Table IV-R2 shows the calculation of actual-to-expected ratios and the r-squared statistic for members with 25 years of service or more. Chart IV-R2 shows the information graphically along with the 90% confidence interval. For members with 25 or more years of service, the data shows higher actual retirements than expected under the current assumption. The proposed assumption increases the aggregate assumed rate of retirement and decreases the aggregate A/E ratio from 135% to 109%. The r-squared statistic increases from 0.54 to 0.70.

| Table IV-R2<br>Retirement Rates - 25 or More Years of Service |            |             |               |               |                           |             |
|---|------------|-------------|---------------|---------------|---------------------------|-------------|
| Age   | Exposures  | Retirements |               |               | Actual to Expected Ratios |             |
|   |            | Actual      | Current       | Recommended   | Current                   | Recommended |
| 55-57   | 295        | 49          | 34            | 47            | 143%                      | 104%        |
| 58-60   | 256        | 47          | 30            | 41            | 159%                      | 115%        |
| 61-63   | 181        | 48          | 36            | 41            | 133%                      | 116%        |
| 64-66   | 79         | 20          | 22            | 21            | 92%                       | 94%         |
| 67-69   | 28         | 12          | 9             | 11            | 130%                      | 113%        |
| <b>Total</b>  | <b>839</b> | <b>176</b>  | <b>131</b>    | <b>162</b>    | <b>135%</b>               | <b>109%</b> |
| <b>R-squared</b>  |            |             | <b>0.5389</b> | <b>0.6969</b> |                           |             |

**Chart IV-R2**



**SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
TERMINATION RATES**

Termination rates reflect the frequency at which active members leave employment for reasons other than retirement, death, or disability. Currently, termination rates are based on service for male and female members. The termination rates do not apply once members are eligible to retire. We reviewed the experience of the past five years when studying this assumption.

For males and females, we determined the ratio of the actual number of terminations at each service compared to the expected number of terminations (A/E ratio). If the assumption is perfect, this ratio will be 100 percent. Adjustments are made to account for differences between future expectations and historical experience, to account for the past experience represented by the current assumption, and to maintain a neutral to slight conservative bias in the selection of the assumption.

Table IV-T1 on the following page shows the calculation of actual-to-expected ratios and the r-squared statistic for male members, and Chart IV-T1 shows the information graphically. For male members, the data shows actual terminations were higher than expected in the early years of service under the current assumption. The proposed rates increase the expected terminations in the first three years of service and remain unchanged thereafter. The proposed assumption slightly increases the aggregate assumed rate of termination and decreases the aggregate A/E ratio from 106% to 97%. The r-squared statistic increases from 0.68 to 0.90.

Table IV-T2 shows the calculation of actual-to-expected ratios and the r-squared statistic for female members, and Chart IV-T1 shows the information graphically. For female members, the data shows actual terminations in the earlier years of service were lower than expected under the current assumption. The proposed rates decrease the expected terminations in the first five years of service and remain unchanged thereafter. The proposed assumption slightly decreases the aggregate assumed rate of termination and increases the aggregate A/E ratio from 71% to 81%. The r-squared statistic increases from 0.70 to 0.85.

See Appendices A and B for a full listing of the proposed and prior termination rates.

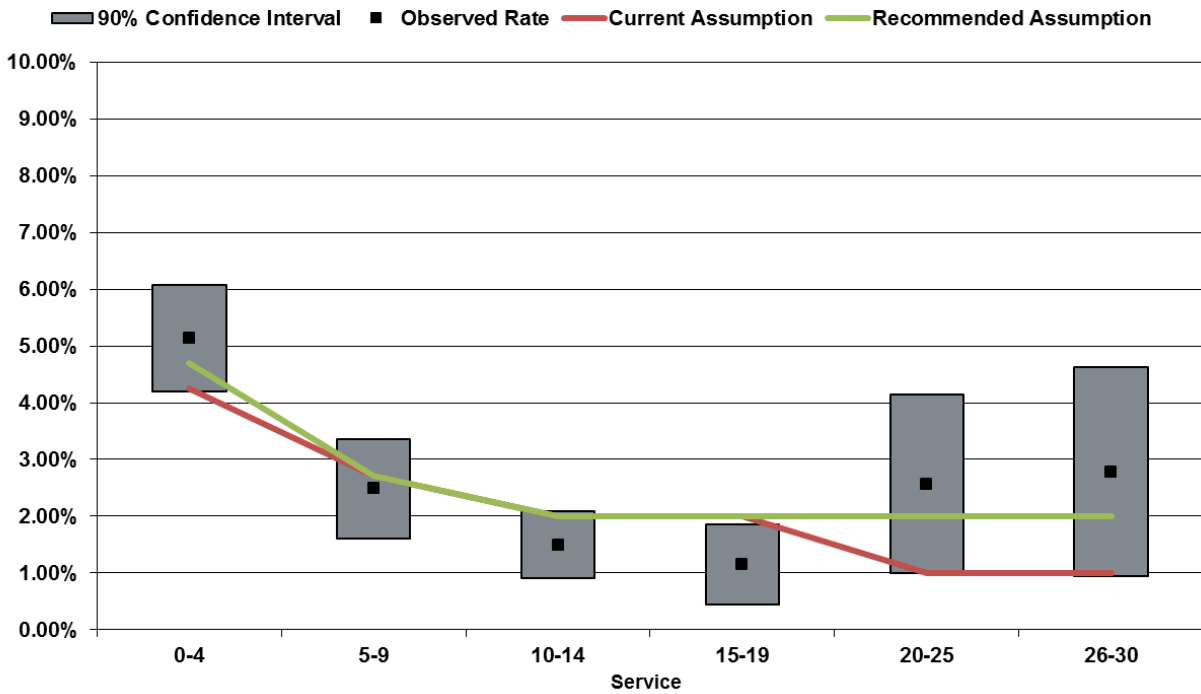
VALLEY TRANSPORTATION AUTHORITY ATU LOCAL 265 PENSION PLAN  
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SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
 TERMINATION RATES

| Table IV-T1<br>Termination Rates - Years of Service, Male |              |             |               |               |                           |             |
|---|--------------|-------------|---------------|---------------|---------------------------|-------------|
| Service   | Exposures    | Retirements |               |               | Actual to Expected Ratios |             |
|   |              | Actual      | Current       | Recommended   | Current                   | Recommended |
| 0-4   | 1,481        | 76          | 63            | 70            | 121%                      | 109%        |
| 5-9   | 846          | 21          | 23            | 23            | 91%                       | 91%         |
| 10-14   | 1,140        | 17          | 23            | 23            | 75%                       | 75%         |
| 15-19   | 611          | 7           | 12            | 12            | 57%                       | 57%         |
| 20-25   | 273          | 7           | 3             | 5             | 256%                      | 128%        |
| 26-30   | 216          | 6           | 2             | 4             | 278%                      | 139%        |
| <b>Total</b>  | <b>4,567</b> | <b>134</b>  | <b>126</b>    | <b>137</b>    | <b>106%</b>               | <b>97%</b>  |
| <b>R-squared</b>  |              |             | <b>0.6776</b> | <b>0.9023</b> |                           |             |

Chart IV-T1

Termination Rates - Years of Service, Male



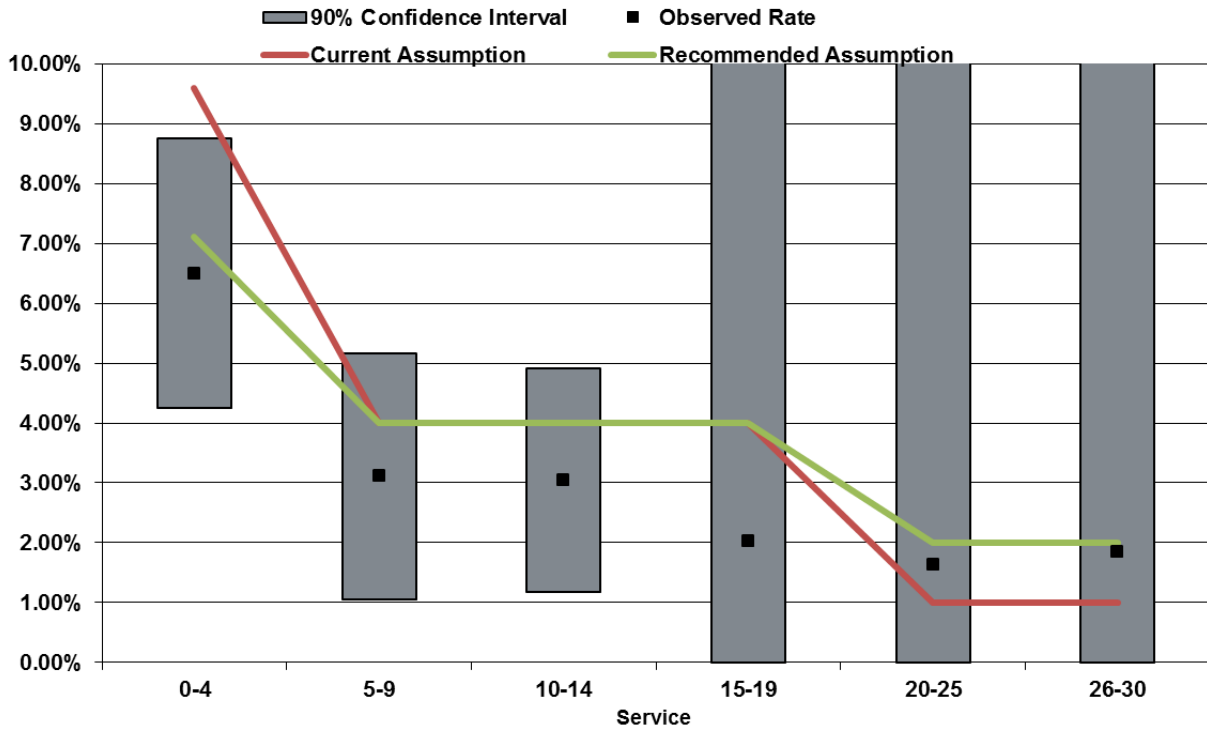
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SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
 TERMINATION RATES

| Table IV-T2<br>Termination Rates - Years of Service, Female |              |             |               |               |                           |             |
|---|--------------|-------------|---------------|---------------|---------------------------|-------------|
| Service   | Exposures    | Retirements |               |               | Actual to Expected Ratios |             |
|   |              | Actual      | Current       | Recommended   | Current                   | Recommended |
| 0-4   | 323          | 21          | 31            | 23            | 68%                       | 91%         |
| 5-9   | 193          | 6           | 8             | 8             | 78%                       | 78%         |
| 10-14   | 230          | 7           | 9             | 9             | 76%                       | 76%         |
| 15-19   | 148          | 3           | 6             | 6             | 51%                       | 51%         |
| 20-25   | 61           | 1           | 1             | 1             | 164%                      | 82%         |
| 26-30   | 54           | 1           | 1             | 1             | 185%                      | 93%         |
| <b>Total</b>  | <b>1,009</b> | <b>39</b>   | <b>55</b>     | <b>48</b>     | <b>71%</b>                | <b>81%</b>  |
| <b>R-squared</b>  |              |             | <b>0.7006</b> | <b>0.8517</b> |                           |             |

Chart IV-T2

Termination Rates - Years of Service, Female





**SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
DISABILITY RATES**

This section analyzes the incidence of disability. All members are eligible for disability benefits after earning 10 years of eligibility service. We combined the experience of the past five years with that of the prior five-year period in order to have a more robust dataset to review when studying this assumption.

Table IV-D1 on the following page shows the calculation of actual-to-expected ratios and the r-squared statistic for male members, and Chart IV-D1 shows the information graphically. For male members, the data shows actual incidence of disability was higher than expected under the current assumption. The current rate of disability for males is 0.50% from ages 30 to 64, with 0.00% assumed at all other ages. The proposed assumption is 0.80% for all ages for those who are eligible for disability benefits. The proposed assumption decreases the aggregate A/E ratio from 163% to 102%. The r-squared statistic increases from 0.42 to 0.55.

Table IV-D2 shows the calculation of actual-to-expected ratios and the r-squared statistic for female members, and Chart IV-D2 shows the information graphically. For female members, the data shows actual incidence of disability was more than double of what was expected under the current assumption. The current rate of disability for females is 1.25% from ages 30 to 64, with 0.00% assumed at all other ages. The proposed assumption is 2.25% for all ages for those who are eligible for disability benefits. The proposed assumption decreases the aggregate A/E ratio from 225% to 125%. The r-squared statistic actually decreases however from 0.70 to 0.64.

In addition to disability rates, an assumption is made as to the type of disability occurring, Occupational versus Total and Permanent disability. Based on all disabilities in the most recent valuation data, 81% are Occupational disabilities and 19% are Total and Permanent disabilities. Given the low occurrence of disability each year, it is reasonable to assume no change to the current assumption that 75% of disabilities are assumed to be Occupational and 25% Total and Permanent.

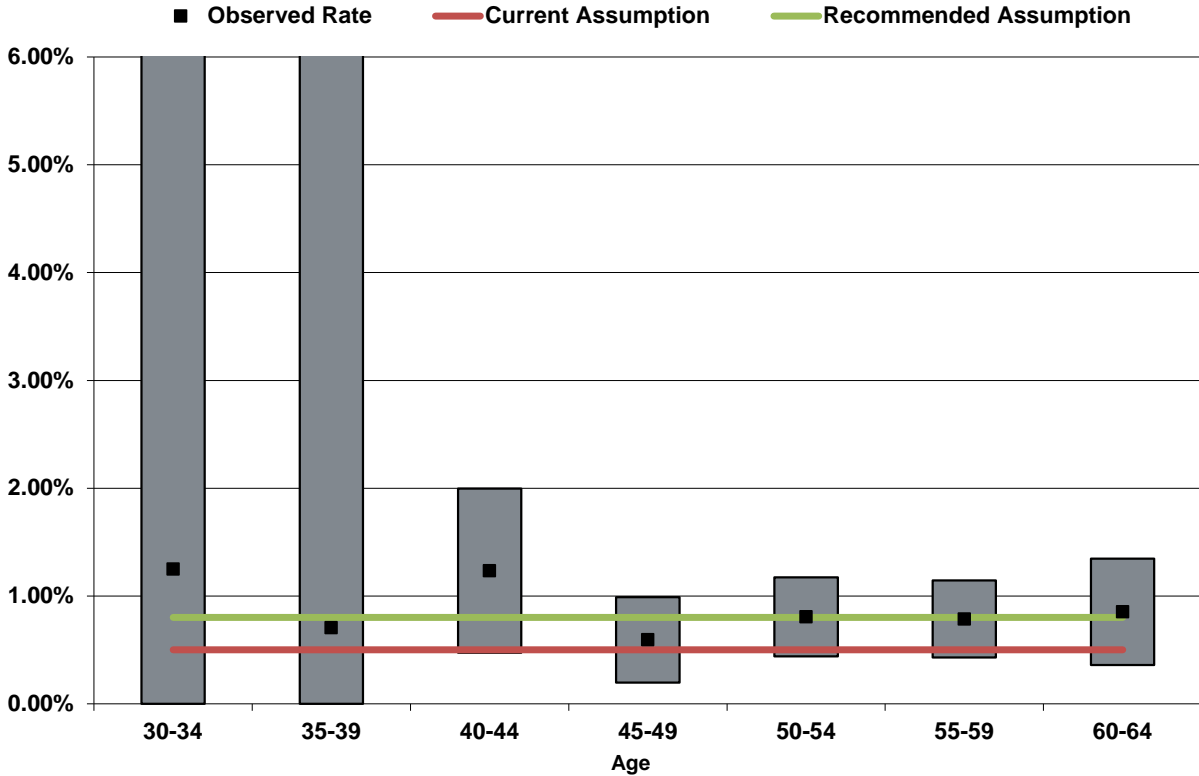
See Appendices A and B for a full listing of the proposed and prior disability rates.

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SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
 DISABILITY RATES

| Table IV-D1<br>Disability Incidence Rates - Male |              |              |               |               |                           |             |
|--|--------------|--------------|---------------|---------------|---------------------------|-------------|
| Age Band   | Exposures    | Disabilities |               |               | Actual to Expected Ratios |             |
|  |              | Actual       | Current       | Recommended   | Current                   | Recommended |
| 30-34  | 80           | 1            | 0             | 1             | 250%                      | 156%        |
| 35-39  | 284          | 2            | 1             | 2             | 141%                      | 88%         |
| 40-44  | 567          | 7            | 3             | 5             | 247%                      | 154%        |
| 45-49  | 1,012        | 6            | 5             | 8             | 119%                      | 74%         |
| 50-54  | 1,613        | 13           | 8             | 13            | 161%                      | 101%        |
| 55-59  | 1,654        | 13           | 8             | 13            | 157%                      | 98%         |
| 60-64  | 938          | 8            | 5             | 8             | 171%                      | 107%        |
| <b>Total</b>                                     | <b>6,148</b> | <b>50</b>    | <b>31</b>     | <b>49</b>     | <b>163%</b>               | <b>102%</b> |
| <b>R-squared</b>                                 |              |              | <b>0.4157</b> | <b>0.5492</b> |                           |             |

Chart IV-D1  
 Disability Incidence - Male

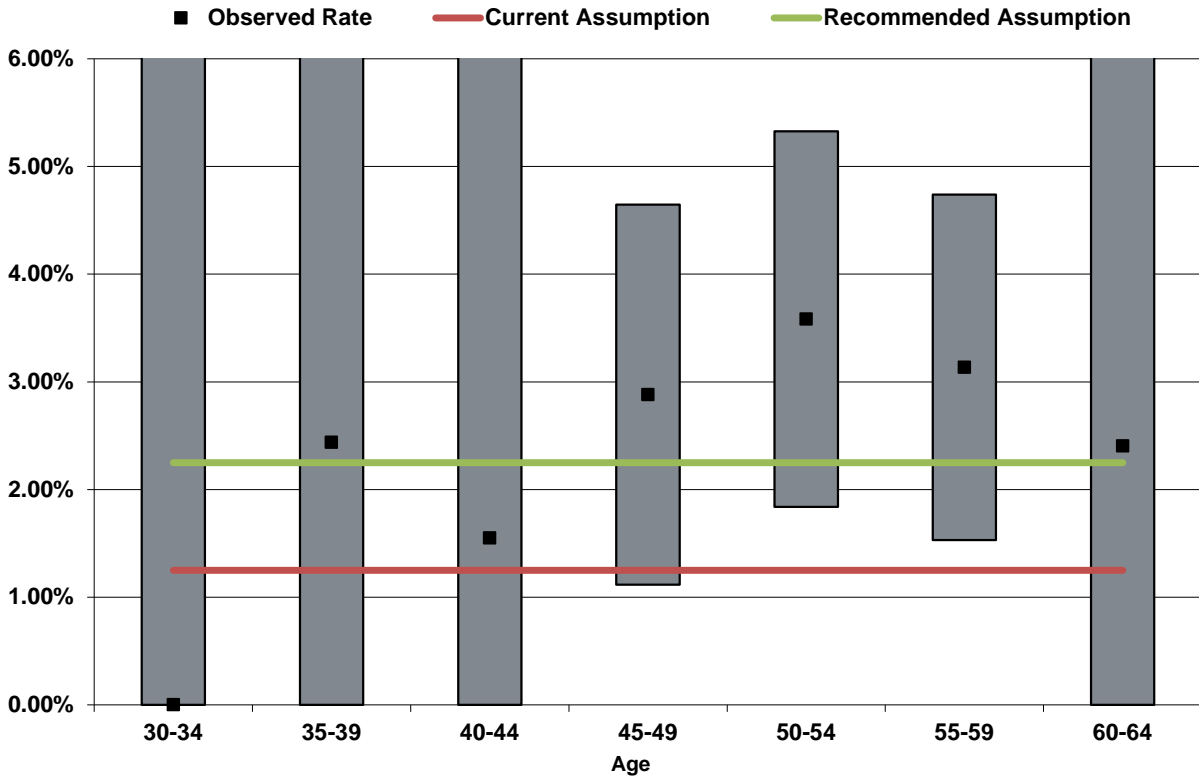


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SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
 DISABILITY RATES

| Table IV-D2<br>Disability Incidence Rates - Female |              |              |               |               |                           |             |
|--|--------------|--------------|---------------|---------------|---------------------------|-------------|
| Age Band   | Exposures    | Disabilities |               |               | Actual to Expected Ratios |             |
|  |              | Actual       | Current       | Recommended   | Current                   | Recommended |
| 30-34  | 28           | 0            | 0             | 1             | 0%                        | 0%          |
| 35-39  | 82           | 2            | 1             | 2             | 195%                      | 108%        |
| 40-44  | 129          | 2            | 2             | 3             | 124%                      | 69%         |
| 45-49  | 243          | 7            | 3             | 5             | 230%                      | 128%        |
| 50-54  | 307          | 11           | 4             | 7             | 287%                      | 159%        |
| 55-59  | 319          | 10           | 4             | 7             | 251%                      | 139%        |
| 60-64  | 208          | 5            | 3             | 5             | 192%                      | 107%        |
| <b>Total</b>                                       | <b>1,316</b> | <b>37</b>    | <b>16</b>     | <b>30</b>     | <b>225%</b>               | <b>125%</b> |
| <b>R-squared</b>                                   |              |              | <b>0.6955</b> | <b>0.6403</b> |                           |             |

Chart IV-D2  
 Disability Incidence - Female



## SECTION IV - DEMOGRAPHIC ASSUMPTIONS MORTALITY RATES

Post-retirement mortality assumptions are typically developed separately by gender for both healthy annuitants and disabled annuitants. Pre-retirement mortality assumptions are developed separately for males and females. Unlike most of the other demographic assumptions that rely exclusively on the experience of the plan, for mortality, standard mortality tables and projection scales serve as the primary basis for the assumption.

The Society of Actuaries recently completed an extensive mortality study and issued a set of mortality tables named the RP-2014 mortality tables and a mortality improvement projection scale named the MP-2017 scale. We used these tables as the basis for our analysis.

The steps in our analysis are as follows:

1. Select a standard mortality table that is based on experience most closely matching the anticipated experience of the Plan.
2. Compare actual Plan experience to what would have been predicted by the selected standard table for the period of the experience study.
3. Determine if an adjustment to the standard table is needed, either fully or partially adjusted depending on the level of credibility for the Plan's experience. This table, with or without adjustment, is called the base table.
4. Select an appropriate standard mortality improvement projection scale and apply it to the base table.

We combined the experience of the past five years with that of the prior five-year period in order to have a more robust dataset to review when studying the mortality assumption.

Mortality assumptions are developed separately for active employees, healthy annuitants, and disabled annuitants. Within each of these groups, mortality rates are developed separately for males and females. Unlike most of the other demographic assumptions that rely exclusively on the experience of the plan, for mortality, standard mortality tables are used with standard modifications so that the aggregate experience matches the plan's experience.

Historically, we have proposed assumption changes when the Actual-to-Expected (A/E) ratio for the current assumption is less than 100%. However, for this study we are recommending a change in this approach going forward, where the proposed assumptions are intended to track closely to actual experience (i.e., an A/E ratio close to 100%). However, as described below, this new approach also includes an expectation that the assumed mortality rates will automatically become more conservative each year, since the actual mortality rates are also expected to decrease over time.

**SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
MORTALITY RATES**

In the prior study, the Plan elected to use the following assumptions:

**Healthy Active, Retired, Vested, and Beneficiary Mortality**

- The Retired Pension (RP) 2000 Combined Healthy Blue Collar Tables published by the Society of Actuaries (projected from 2000 to 2025 using 50% of scale BB), with a one year setback for females.

**Disabled Participant Mortality**

- The Mortality Table for Disabled Members Not Receiving Social Security Benefits published by the Pension Benefit Guaranty Corporation (PBGC), with no age adjustments or projection of future improvement.

Since the prior study, the Society of Actuaries' Retirement Plans Experience Committee (RPEC) has released a new mortality improvement scale, Scale MP-2017. The mortality improvements included in the most recently used projection scale - Scale BB - were found to produce some unsatisfactory results in projecting mortality.

Scale MP-2017 reflects more up-to-date data and represents the Society of Actuaries' most advanced actuarial methodology in incorporating mortality improvement trends with actual recent mortality rates, by using rates that vary not only by age but by calendar year – known as a two-dimensional approach to projecting mortality improvements. Scale MP-2017 was designed with the intent of being applied to mortality on a generational basis. The effect of this is to build in an automatic expectation of future improvements in mortality.

This is a different approach from building in a margin for conservatism in the current rates to account for the expectation that the same rates will be applied in future years, when mortality experience has improved. Recent reports issued by RPEC suggest that using generational mortality is a preferable approach, as it allows for an explicit declaration of the amount of future mortality improvement included in the assumptions.

RPEC has also recently released a new set of base mortality rate tables – the RP-2014 tables, which are intended to replace the RP-2000 tables and are based on a recent study of US defined benefit plan mortality experience. Separate tables were produced for Blue and White Collar workers. We are recommending the following assumptions:

**Healthy Active, Retired, Vested, and Beneficiary Mortality**

- RP-2014 Healthy Employee and Annuitant Blue Collar mortality tables with generational improvements using Scale MP-2017.

**Disabled members**

- RP-2014 Disabled Annuitant mortality tables with generational improvements using Scale MP-2017.

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**SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
MORTALITY RATES**

Table IV-M1 below shows our proposed mortality rates across all statuses compared to current rates. The amount of mortality experience for all members is fairly limited. To improve the credibility of the data, we have aggregated the experience of the past five years with that of the prior experience study (2007-2011). To perform our comparisons, the RP-2014 mortality rates were projected back from 2014 to their base year (2006) then projected to the midpoint of the combined 10-year study period (2012) using Scale MP-217.

Rather than weighting the experience based on the number of members living and dying, we have weighted the experience based on benefit size. This approach has been recommended by RPEC, since members with larger benefits are expected to live longer, and a benefit-weighted approach helps avoid underestimating the liabilities.

Our proposed base mortality tables for all actives, healthy and disabled retired members are based on the standard RP-2014 mortality tables without adjustment factors. The proposed A/E ratio for healthy annuitant males is close to 100%, at 101%. This group has the largest exposures and actual mortality experience. The data for the other groups is not considered statistically fully credible, because the number of deaths and exposures is relatively small, even over the ten-year period from 2007-2016. As such, we are comfortable that the ratio of actual to expected deaths within some groups is higher or lower than 100%. Therefore, we propose no adjustments to the standard tables to match each group's experience.

Additional detail of mortality experience for healthy annuitant can be found in the tables and charts that follow: Table IV-M2 and Chart IV-M2 for males, Table IV-M3 and Chart IV-M3 for females.

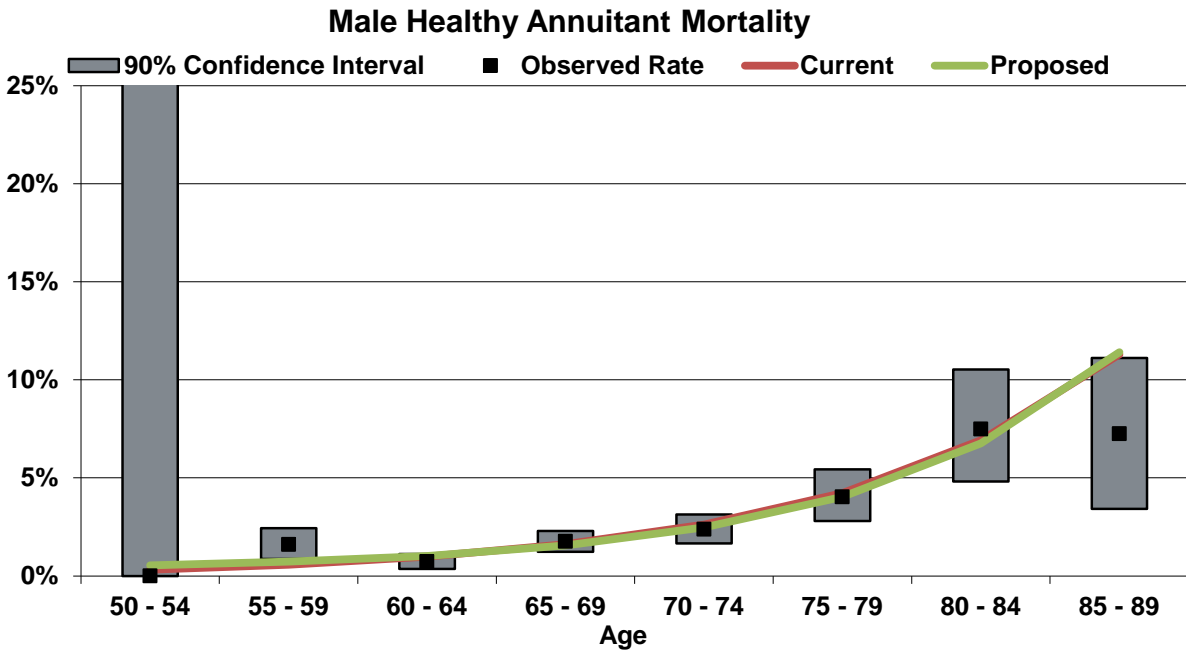
| <b>Table IV-M1<br/>Mortality Experience (2007 - 2016)</b> |               |               |                    |                  |                    |                     |  |            |
|---|---------------|---------------|--------------------|------------------|--------------------|---------------------|--|------------|
|   | Exposures     | Actual Deaths | Weighted Exposures | Weighted Deaths  |                    |                     | Benefit-Weighted Actual/Expected Ratio |            |
|   |               |               |                    | Actual Deaths    | Current Assumption | Proposed Assumption | Current                                | Proposed   |
| <b>Active Members</b>                                     |               |               |                    |                  |                    |                     |  |            |
| Male  | 11,670        | 27            | 843,236,164        | 1,825,512        | 3,432,632          | 2,916,114           | 53%                                    | 63%        |
| Female  | 2,538         | 7             | 151,750,672        | 364,757          | 318,827            | 222,326             | 114%                                   | 164%       |
| <b>Total Actives</b>                                      | <b>14,208</b> | <b>34</b>     | <b>994,986,837</b> | <b>2,190,269</b> | <b>3,751,459</b>   | <b>3,138,440</b>    | <b>58%</b>                             | <b>70%</b> |
| <b>Healthy Annuitants</b>                                 |               |               |                    |                  |                    |                     |  |            |
| Male  | 5,946         | 144           | 13,894,316         | 248,359          | 246,768            | 245,423             | 101%                                   | 101%       |
| Female  | 1,577         | 19            | 3,378,071          | 32,433           | 34,812             | 40,319              | 93%                                    | 80%        |
| <b>Total Retirees</b>                                     | <b>7,523</b>  | <b>163</b>    | <b>17,272,387</b>  | <b>280,792</b>   | <b>281,580</b>     | <b>285,742</b>      | <b>100%</b>                            | <b>98%</b> |
| <b>Disabled Annuitants</b>                                |               |               |                    |                  |                    |                     |  |            |
| Male  | 1,111         | 33            | 1,368,541          | 38,939           | 53,482             | 52,971              | 73%                                    | 74%        |
| Female  | 901           | 16            | 1,019,758          | 19,305           | 18,803             | 22,003              | 103%                                   | 88%        |
| <b>Total Disabled</b>                                     | <b>2,012</b>  | <b>49</b>     | <b>2,388,298</b>   | <b>58,244</b>    | <b>72,285</b>      | <b>74,974</b>       | <b>81%</b>                             | <b>78%</b> |

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SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
 MORTALITY RATES

| Table IV-M2<br>Healthy Annuitant Mortality - Base Table for Males |              |               |                    |                 |                |                |             |             |
|---|--------------|---------------|--------------------|-----------------|----------------|----------------|-------------|-------------|
| Age Band  | Exposures    | Actual Deaths | Weighted Exposures | Weighted Deaths |                |                | A/E Ratios  |             |
|   |              |               |                    | Actual          | Current        | Proposed       | Current     | Proposed    |
| 50 - 54   | 88           | -             | 298,241            | -               | 946            | 1,626          | 0%          | 0%          |
| 55 - 59   | 697          | 10            | 2,315,474          | 37,057          | 13,249         | 16,865         | 280%        | 220%        |
| 60 - 64   | 1,419        | 11            | 4,196,676          | 30,868          | 41,042         | 42,497         | 75%         | 73%         |
| 65 - 69   | 1,696        | 35            | 3,784,859          | 66,686          | 61,424         | 58,942         | 109%        | 113%        |
| 70 - 74   | 1,083        | 29            | 2,000,987          | 47,726          | 52,483         | 49,647         | 91%         | 96%         |
| 75 - 79   | 570          | 26            | 855,036            | 34,531          | 36,106         | 34,470         | 96%         | 100%        |
| 80 - 84   | 228          | 19            | 278,194            | 20,849          | 19,270         | 18,799         | 108%        | 111%        |
| 85 - 89   | 117          | 10            | 119,077            | 8,635           | 13,455         | 13,578         | 64%         | 64%         |
| 90 +  | 48           | 4             | 45,772             | 2,006           | 8,794          | 9,000          | 23%         | 22%         |
| <b>Total</b>  | <b>5,946</b> | <b>144</b>    | <b>13,894,316</b>  | <b>248,359</b>  | <b>246,768</b> | <b>245,423</b> | <b>101%</b> | <b>101%</b> |

Chart IV-M2

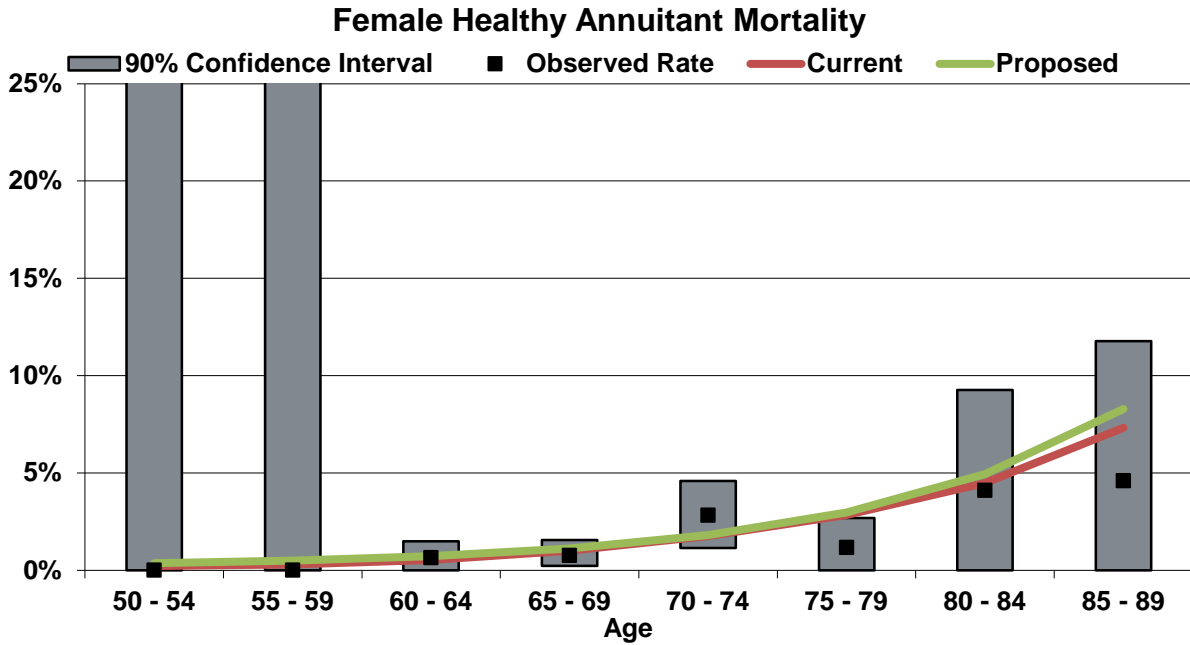


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SECTION IV - DEMOGRAPHIC ASSUMPTIONS  
 MORTALITY RATES

| Table IV-M3<br>Healthy Annuitant Mortality - Base Table for Females |              |               |                    |                 |               |               |            |            |
|---|--------------|---------------|--------------------|-----------------|---------------|---------------|------------|------------|
| Age Band  | Exposures    | Actual Deaths | Weighted Exposures | Weighted Deaths |               |               | A/E Ratios |            |
|   |              |               |                    | Actual          | Current       | Proposed      | Current    | Proposed   |
| 50 - 54   | 32           | -             | 94,532             | -               | 204           | 337           | 0%         | 0%         |
| 55 - 59   | 244          | -             | 665,209            | -               | 1,994         | 3,273         | 0%         | 0%         |
| 60 - 64   | 406          | 2             | 1,010,857          | 6,551           | 5,245         | 7,249         | 125%       | 90%        |
| 65 - 69   | 450          | 3             | 838,324            | 6,305           | 8,401         | 9,382         | 75%        | 67%        |
| 70 - 74   | 262          | 5             | 459,796            | 12,950          | 8,056         | 8,335         | 161%       | 155%       |
| 75 - 79   | 112          | 3             | 209,550            | 2,455           | 5,957         | 6,236         | 41%        | 39%        |
| 80 - 84   | 54           | 5             | 82,713             | 3,386           | 3,704         | 4,091         | 91%        | 83%        |
| 85 +  | 17           | 1             | 17,090             | 786             | 1,251         | 1,416         | 63%        | 55%        |
| <b>Total</b>  | <b>1,577</b> | <b>19</b>     | <b>3,378,071</b>   | <b>32,433</b>   | <b>34,812</b> | <b>40,319</b> | <b>93%</b> | <b>80%</b> |

Chart IV-M3





**SECTION IV - DEMOGRAPHIC ASSUMPTIONS**  
**OTHER DEMOGRAPHIC ASSUMPTIONS**

**BENEFIT SERVICE/TERMINAL CASHOUTS**

Currently, a 7.0% load to future expected service retirements is reflected to account for anticipated sick and vacation leave cash outs, and a small negative adjustment reflecting potential periods of inactive service between the valuation date and the retirement date. A 5.0% reduction to future expected disability retirements is reflected to account for anticipated sick and vacation leave cash outs, with a larger negative adjustment reflecting potential periods of inactive service between the valuation date and the date of retirement.

We reviewed a sample of actual retirement and disability benefit calculations from 2012 to 2016 to determine whether these adjustments are still reasonable. For service retirements during this time period, the average ratio of the actual to expected service was 99%. Expected service was calculated from valuation service to the date of retirement. However, for disability retirements the average ratio of the actual to expected service was only 93%. This result appears reasonable since members who receive a disability benefit are much more likely to experience periods of inactive service.

We also reviewed terminal cashouts of unused sick leave and vacation leave which increase a member's final average compensation but is not otherwise reported throughout a member's active career in the valuation data. During this time period, these cashouts resulted in an average increase of 8% for service retirements and 5% for disability retirements in the final average compensation.

The compound impact from benefit service adjustment and terminal cashouts for service retirements is approximately a 7% increase to future expected benefits. The impact on disability retirements is approximately a 2% decrease to future expected benefits. There are fewer incidences of disability retirements to study for this assumption. As such, we recommend no change to the current assumptions of a 7% load and a 5% reduction to service and disability retirements, respectively.

**FAMILY COMPOSITION**

The current assumption is that 85% of active members have beneficiaries eligible for pre-retirement death benefits and that male spouses are four years older than their wives. In their most recent experience study, CalPERS assumed that 85% of public employees were married, with male spouses three years older than their wives. Since we have limited spouse data, we recommend the use of CalPERS' marriage assumption of 85% for eligibility for pre-retirement death benefits. We also recommend maintaining the current age difference assumption of four years, for both pre-retirement deaths and for valuing survivor benefits for current retirees with missing spouse dates of birth.

**SECTION IV - DEMOGRAPHIC ASSUMPTIONS**  
**OTHER DEMOGRAPHIC ASSUMPTIONS**

**PLAN ADMINISTRATIVE EXPENSES**

An allowance of \$290,000 for Plan administrative expenses was assumed in the annual cost calculation in the prior valuations since 2014. The Plan's administrative expenses in during the last two years have averaged approximately \$300,000. We recommend increasing the Plan's expected administrative expenses to \$300,000 to account for any additional administrative costs from the implementation of the PEPRA plan provisions and of employee contributions.

**COMMENCEMENT AGE FOR DEFERRED VESTED MEMBERS:**

Currently, members with a deferred vested benefit are assumed to commence receiving benefits at age 65. Deferred members who continue working for VTA after a transfer in the normal line of career advancement are assumed to commence receiving benefits at age 59. For the period of this study, the actual average commencement age for deferred members not working for VTA was 65 and for deferred members working for VTA after a transfer was 59. We recommend no change to these assumptions.

**TRANSFER TO A VTA NORMAL LINE OF CAREER ADVANCEMENT POSITION:**

The current assumption for members with at least 10 years of service to transfer to VTA administrative positions in line of career advancement is 40%. There is no transfer assumption for members with less than 10 years of service. An analysis showed approximately 28% of all terminations over the past 10 years transferred to VTA positions in the normal line of career advancement. Of those with at least 10 years of service, approximately 56% transferred to VTA positions. For those with less than 10 years of service, approximately 24% transferred. We propose an assumption that 50% of members who terminate with at least 10 years of service will go on to other qualified employment at VTA and that 25% of members who terminate with less than 10 years of service will complete such a transfer.

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**APPENDIX A - SUMMARY OF PROPOSED ASSUMPTIONS**

The recommended assumptions have not yet been adopted by the Board. The demographic assumptions are based on an experience study covering the period from January 1, 2012 through December 31, 2016, with the exception of the mortality and the disability assumptions which are based on experience from January 1, 2007 through December 31, 2016.

**1. Rate of Return**

The annual rate of return on all Plan assets is assumed to be 7.00% net of investment expenses.

**2. Cost-of-Living**

The cost-of-living as measured by the Consumer Price Index (CPI) will increase at the rate of 2.75% per year.

**3. Plan Expenses**

An allowance of \$300,000 for Plan administrative expenses has been included in the annual cost calculated.

**4. Increases in Pay**

Assumed pay increases for active Participants consist of the compounded rate increases due to salary growth, 3.00%, and increases due to longevity and promotion.

Longevity and promotion increases by years of service are assumed to be:

| <b>Years of Service</b> | <b>Rate of Increase</b> |
|-------------------------|-------------------------|
| 0                       | 15.00%                  |
| 1                       | 12.00%                  |
| 2                       | 9.00%                   |
| 3                       | 6.00%                   |
| 4                       | 3.00%                   |
| 5+                      | 0.25%                   |

**APPENDIX A - SUMMARY OF PROPOSED ASSUMPTIONS**

**5. Healthy Active and Retired Participant Mortality**

RP-2014 Healthy Employee and Annuitant Blue Collar mortality tables with generational improvements using Scale MP-2017.

**6. Disabled Participant Mortality**

RP-2014 Disabled Annuitant mortality tables with generational improvements using Scale MP-2017.

**7. Family Composition**

85% of active Members are assumed to be married. Male spouses are assumed to be four years older than their wives.

**8. Benefit Service/Terminal Cashouts**

Based on a review of a sample of actual retirement benefit calculations from 2012-2016, future service retirement liabilities are increased by 7.0% and future disability retirement liabilities are decreased by 5.0% to reflect anticipated sick and vacation cash outs and reductions in Benefit Service due to the loss of certain periods of Inactive Service.

**VALLEY TRANSPORTATION AUTHORITY ATU LOCAL 265 PENSION PLAN  
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**APPENDIX A - SUMMARY OF PROPOSED ASSUMPTIONS**

**Demographic Rates**

Demographic rates – including retirement rates among eligible Members, rates of disability, and rates of termination from causes other than death, disability, and rates of termination from causes other than death, disability, and service retirement – were studied in this experience study for calendar years 2012-2016. The rates shown on the following pages are recommended as a result of this study.

**9. Service Retirement**

Retirement is assumed to occur in accordance with the rates shown in the following table:

| Age | Less Than<br>25 Years of<br>Service | 25 or More<br>Years of<br>Service |
|-----|-------------------------------------|-----------------------------------|
| 52  | 8.0%                                | 16.0%                             |
| 53  | 8.0%                                | 16.0%                             |
| 54  | 8.0%                                | 16.0%                             |
| 55  | 8.0%                                | 16.0%                             |
| 56  | 5.0%                                | 16.0%                             |
| 57  | 5.0%                                | 16.0%                             |
| 58  | 5.0%                                | 16.0%                             |
| 59  | 5.0%                                | 16.0%                             |
| 60  | 5.0%                                | 16.0%                             |
| 61  | 15.0%                               | 16.0%                             |
| 62  | 15.0%                               | 27.0%                             |
| 63  | 15.0%                               | 27.0%                             |
| 64  | 20.0%                               | 27.0%                             |
| 65  | 25.0%                               | 27.0%                             |
| 66  | 25.0%                               | 27.0%                             |
| 67  | 25.0%                               | 38.0%                             |
| 68  | 25.0%                               | 38.0%                             |
| 69  | 25.0%                               | 38.0%                             |
| 70+ | 100.0%                              | 100.0%                            |

VALLEY TRANSPORTATION AUTHORITY ATU LOCAL 265 PENSION PLAN  
ACTUARIAL EXPERIENCE STUDY AS OF DECEMBER 31, 2016

APPENDIX A - SUMMARY OF PROPOSED ASSUMPTIONS

10. Termination

The following service-based turnover rates are assumed:

| Years of Service | Male Rate | Female Rate |
|------------------|-----------|-------------|
| 0                | 8%        | 13%         |
| 1                | 5%        | 8%          |
| 2                | 4%        | 6%          |
| 3                | 3%        | 5%          |
| 4-7              | 3%        | 4%          |
| 8-19             | 2%        | 4%          |
| 20+              | 2%        | 2%          |

No terminations are assumed for participants who are eligible for retirement.

50% of Members terminating with at least 10 years of service are assumed to transfer to VTA administrative positions in line of career advancement. 25% of Members terminating with less than 10 years of service are assumed to transfer to VTA administrative positions in line of career advancement. Pay for these Members is assumed to increase by 4.50% per year from the date of termination until the assumed retirement date, which is assumed to be age 59.

Benefits for these who do not transfer are assumed to begin at age 65.

11. Disability

Disability rates are as follows:

| Male Rate | Female Rate |
|-----------|-------------|
| 0.80%     | 2.25%       |

Disability rates are not applied until a member has at least 10 years of eligibility service. 75% of disabilities are assumed to be Occupational, the remainder Total and Permanent. Disabled Participants are assumed not to return to active service.

**APPENDIX B - SUMMARY OF PRIOR ASSUMPTIONS**

**Actuarial Assumptions**

The actuarial assumptions have been adopted by the Board based on recommendations included in an Experience Study performed by EFI Actuaries covering the period from 2007 through 2011. The rate of return and inflation assumptions in this report was adopted by the Board of Pensions, at the November, 2016 Board of Pensions meeting.

**12. Rate of Return**

The annual rate of return on all Plan assets is assumed to be 7.00% net of investment expenses.

**13. Cost-of-Living**

The cost-of-living as measured by the Consumer Price Index (CPI) will increase at the rate of 2.75% per year.

**14. Plan Expenses**

An allowance of \$290,000 for Plan administrative expenses has been included in the annual cost calculated. In the prior valuation, this assumption was \$290,000 as well.

**15. Increases in Pay**

Assumed pay increases for active Participants consist of the compounded rate increases due to salary growth, 3.00%, and increases due to longevity and promotion.

Longevity and promotion increases are assumed to be 12% per year for the first four years of service and 0.25% per year, thereafter.

**APPENDIX B - SUMMARY OF PRIOR ASSUMPTIONS**

**16. Active and Retired Participant Mortality**

Rates of mortality for active and retired Members and their spouses, beneficiaries, and survivors are given by the Retired Pensioners (RP) 2000 Combined Healthy Blue Collar Tables published by the Society of Actuaries (projected from 2000 to 2025 using 50% of scale BB), with a one year set-back for females. The use of the projected mortality table is intended to account for mortality improvements prior to and after the valuation date.

**17. Disabled Participant Mortality**

Rates of mortality for all disabled Members are given by the Mortality Table for Disabled Members Not Receiving Social Security Benefits published by the Pension Benefit Guaranty Corporation (PBGC), with no age adjustment or projection of future improvement.

**18. Family Composition**

85% of active Members are assumed to be married. Male spouses are assumed to be four years older than their wives.

**19. Benefit Service/Terminal Cashouts**

Based on a review of a sample of actual retirement benefit calculations from 2007-2011, future service retirement liabilities are increased by 7.0% and future disability retirement liabilities are decreased by 5.0% to reflect anticipated sick and vacation cash outs and reductions in Benefit Service due to the loss of certain periods of Inactive Service.



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APPENDIX B - SUMMARY OF PRIOR ASSUMPTIONS

Demographic Rates

Demographic rates – including retirement rates among eligible Members, rates of disability, and rates of termination from causes other than death, disability, and rates of termination from causes other than death, disability, and service retirement – were studied in EFI’s Actuarial Experience Study for calendar years 2007-2011. The rates shown on the following pages were developed as a result of that Study.

20. Service Retirement

Retirement is assumed to occur in accordance with the rates shown in the following table:

| Age | Male Rate | Female Rate |
|-----|-----------|-------------|
| 55  | 17.5%     | 25.0%       |
| 56  | 8.4%      | 7.5%        |
| 57  | 8.4%      | 7.5%        |
| 58  | 8.4%      | 7.5%        |
| 59  | 12.6%     | 20.0%       |
| 60  | 12.6%     | 20.0%       |
| 61  | 12.6%     | 20.0%       |
| 62  | 24.5%     | 20.0%       |
| 63  | 24.5%     | 20.0%       |
| 64  | 24.5%     | 20.0%       |
| 65  | 28.0%     | 20.0%       |
| 66  | 35.0%     | 25.0%       |
| 67  | 35.0%     | 25.0%       |
| 68  | 35.0%     | 25.0%       |
| 69  | 35.0%     | 25.0%       |
| 70+ | 100.0%    | 100.0%      |

**VALLEY TRANSPORTATION AUTHORITY ATU LOCAL 265 PENSION PLAN  
ACTUARIAL EXPERIENCE STUDY AS OF DECEMBER 31, 2016**

**APPENDIX B - SUMMARY OF PRIOR ASSUMPTIONS**

**21. Termination**

The following service-based turnover rates are assumed:

| Years of Service | Male Rate | Female Rate |
|------------------|-----------|-------------|
| 0                | 10%       | 25%         |
| 1                | 3%        | 8%          |
| 2                | 3%        | 7%          |
| 3                | 3%        | 6%          |
| 4                | 3%        | 5%          |
| 5-7              | 3%        | 4%          |
| 8-19             | 2%        | 4%          |
| 20+              | 1%        | 1%          |

No terminations are assumed for participants who are eligible for retirement.

40% of Members terminating with at least 10 years of service are assumed to transfer to VTA administrative positions in line of career advancement. Pay for these Members is assumed to increase by 4.50% per year from the date of termination until the assumed retirement date, which is assumed to be age 59.

Benefits for these who do not transfer are assumed to begin at age 65.

**22. Disability**

Disability rates are as follows:

| Age   | Male Rates | Female Rates |
|-------|------------|--------------|
| 20-29 | 0.00%      | 0.00%        |
| 30-64 | 0.50%      | 1.25%        |
| 65+   | 0.00%      | 0.00%        |

Disability rates are not applied until a member has at least 10 years of eligibility service. 75% of disabilities are assumed to be Occupational, the remainder Total and Permanent. Disabled Participants are assumed not to return to active service.



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