

AUSTIN POLICE RETIREMENT SYSTEM

REPORT OF AN ACTUARIAL AUDIT

*Final Actuarial Audit Report in Accordance with Section 802.1012(h) of the Texas
Government Code*

AUGUST 20, 2014



August 20, 2014

Mr. Art Alfaro
Treasurer
City of Austin
700 Lavaca Street, Suite 940
Austin, TX 78701

Re: Final Actuarial Audit Report in Accordance with Section 802.1012(h) of the Texas Government Code

Dear Mr. Alfaro:

Gabriel, Roeder, Smith & Company (GRS) is pleased to present this report of an actuarial audit of the December 31, 2012 Actuarial Valuation of the Austin Police Retirement System (APRS). The following documents are intended to demonstrate that the City of Austin (the City) has complied with Section 802.1012 of the Texas Government Code which requires an actuarial audit of public retirement systems with total assets of at least \$100 million.

The following two documents will constitute the final actuarial audit report, as required by Section 802.1012(h) of the Texas Government Code:

1. This cover letter, and
2. Preliminary draft of the actuarial audit report, dated June 19, 2014.

Following the delivery of the preliminary draft of the actuarial audit report to APRS on June 19, 2014, GRS requested a response to the preliminary draft, as required by Section 802.1012(g) of the Texas Government Code. We were notified on August 13, 2014 that neither APRS, nor the retained actuary, would be providing a response to the preliminary draft of the actuarial audit report.

GRS is pleased to report to the City that, in our professional opinion, the December 31, 2012 Actuarial Valuation prepared by the retained actuary provides a fair and reasonable assessment of the financial position of APRS.

The preliminary draft of the actuarial audit report for APRS inadvertently referenced the Austin Fire Fighters Relief and Retirement Fund (AFRRF) in two instances. While discussing the "Actuarial Methods and Funding Policy" in the Executive Summary and in the body of the report, the statements should have read: "We believe that the application of the EAN Method that produces constant normal cost rate over the member's entire career would be more appropriate for APRS based on the fixed contribution rate that APRS receives from the City."

Mr. Art Alfaro
August 20, 2014
Page 2

The undersigned are independent actuaries and consultants. Mr. Falls is an Enrolled Actuary, a Fellow of the Society of Actuaries, and a Member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. Both Mr. Falls and Mr. Ward are experienced in performing valuations for large public retirement systems.

Respectfully submitted,
Gabriel, Roeder, Smith & Company



R. Ryan Falls, FSA, FCA, MAAA, EA
Senior Consultant



Lewis Ward
Consultant

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AUSTIN POLICE RETIREMENT SYSTEM
REPORT OF AN ACTUARIAL AUDIT

Preliminary Draft in Accordance with Section 802.1012(f) of the Texas Government Code

JUNE 19, 2014

June 19, 2014

Mr. Art Alfaro
Treasurer
City of Austin
700 Lavaca Street, Suite 940
Austin, TX 78701

Dear Mr. Alfaro:

Gabriel, Roeder, Smith & Company (GRS) is pleased to present this report of an actuarial audit of the December 31, 2012 Actuarial Valuation of the Austin Police Retirement System (APRS). We are grateful to the City of Austin (the City) staff, APRS staff, and Foster and Foster, the retained actuary, for their cooperation throughout the actuarial audit process.

This actuarial audit involves an independent verification and analysis of the assumptions, procedures, methods, and conclusions used by the retained actuary for APRS, in the valuation of APRS as of December 31, 2012, to ensure that the conclusions are technically sound and conform to the appropriate Standards of Practice as promulgated by the Actuarial Standards Board.

GRS is pleased to report to the City, in our professional opinion, the December 31, 2012 Actuarial Valuation prepared by the retained actuary provides a fair and reasonable assessment of the financial position of APRS.

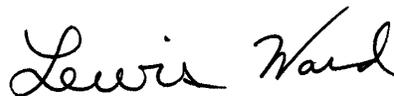
Throughout this report we included several suggestions for ways to improve the work product. We hope that the retained actuary and APRS find these items helpful. Thank you for the opportunity to work on this assignment.

Mr. Falls is an Enrolled Actuary, a Fellow of the Society of Actuaries, and a Member of the American Academy of Actuaries. He meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. Both Mr. Falls and Mr. Ward are experienced in performing valuations for large public retirement systems.

Respectfully submitted,
Gabriel, Roeder, Smith & Company



R. Ryan Falls, FSA, FCA, MAAA, EA
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Consultant

Table of Contents

Section	Item	Page
I	Executive Summary	2
II	General Actuarial Audit Procedure	5
III	Actuarial Assumptions	8
IV	Actuarial Methods and Funding Policy	17
V	Actuarial Valuation Results	23
VI	Content of Valuation Report	26
VII	Final Remarks	30

SECTION I

EXECUTIVE SUMMARY

Executive Summary

The City of Austin (the City) engaged Gabriel, Roeder, Smith & Company (GRS) for an actuarial audit of the recent actuarial valuations, studies and reports on the Austin Police Retirement System (APRS) performed by the retained actuary. The project commenced in November 2013.

The scope of this actuarial audit includes the following:

- Review and analysis of the calculation results, including an evaluation of the data used for reasonableness and consistency as well as a review of the mathematical calculations for completeness and accuracy, based on a detailed review of a representative sample of the current plan participants.
- Evaluation of the actuarial cost method and the actuarial asset valuation method in use and whether other methods may be more appropriate for APRS.
- Verification of the reasonableness of the calculation of the unfunded actuarial accrued liability and the amortization period used under the actuarial cost method.
- Review the demographic and economic actuarial assumptions for consistency, reasonableness and compatibility. Such assumptions shall include, but are not limited to: mortality, retirement and separation rates, levels of pay adjustments, rates of investment return and disability factors.
- Assessment of the adherence to Actuarial Standards of Practice (ASOPs) published by the American Academy of Actuaries.
- Assessment of the adherence to the Texas Pension Review Board (PRB) Guidelines for Actuarial Soundness.
- A full replication of the December 31, 2012 actuarial valuation results was not covered under the scope of this engagement.

This actuarial audit will satisfy the requirements of Section 802.1012 of the Texas Government Code which requires an actuarial audit of public retirement systems in Texas with total assets of at least \$100 million.

Summary of Findings

Based on our review, the actuarial valuations, studies, and reports of APRS are reasonable, used appropriate assumptions, complied with the Actuarial Standards of Practice, and complied with the Texas PRB Guidelines for Actuarial Soundness. We offer the following recommendations based on the valuation methods and assumptions used by the retained actuary in the December 31, 2012 actuarial valuation.

Actuarial Assumptions

- We recommend that the actuary consider adding a mortality improvement assumption or modifying the mortality assumption to provide further margin for mortality improvement.

Actuarial Methods and Funding Policy

- We believe that the application of the EAN Method that produces constant normal cost rate over the member's entire career would be more appropriate for APRS based on the fixed contribution rate that AFRRF receives from the City. We recommend that the retained actuary review their application of the EAN Method and consider the most appropriate application for APRS.
- We recommend a modification to the application of the actuarial cost method to eliminate the disconnect between the calculation of TPV and the member's expected future pay. We believe that the proposed method of determining the member's expected future pay is the most appropriate application of the Entry Age Normal actuarial cost method. Since the TPV is appropriately accounted for in the actuarial valuation, the implementation of this method for APRS should not have a significant impact on the majority of the valuation results, with the possible exception of the funding period.
- We recommend that the retained actuary calculate the normal cost rate using a payroll measure that reflects the expected decrement in the first year.

Actuarial Valuation Results

- We recommend that future analyses of actuarial gains and losses on the pension benefits be corrected to exclude the benefits payments associated with the Death Benefit Plan.
- We recommend that the retained actuary incorporate assumed increases in the IRC Section 415 Limit that are consistent with the assumption for core inflation.

Content of Valuation Report

- In order to improve the ability of the report to communicate the assumptions, methods and plan provisions incorporated into the December 31, 2012 actuarial valuation, we recommend that the retained actuary incorporate the noted enhancements into future actuarial valuation reports.

SECTION II

GENERAL ACTUARIAL AUDIT PROCEDURE

General Actuarial Audit Procedure

At the commencement of this engagement, GRS requested the information necessary to thoroughly review the work product of the retained actuary. Specifically, GRS received and reviewed the following items:

- Actuarial report as of December 31, 2012,
- Actuarial reports as of December 31, 2008, December 31, 2009, December 31, 2010, and December 31, 2011 (performed by a prior actuarial firm),
- Review of Actuarial Assumptions and Methods, dated June 17, 2013,
- APRS Employee Benefit Guide,
- APRS COLA Adjustment Policy, dated July 16, 2013,
- The original census data for plan participants and beneficiaries as of December 31, 2012 provided to the retained actuary by APRS for the actuarial valuation,
- A full set of census data for plan participants and beneficiaries as of December 31, 2012 used by the retained actuary for the actuarial valuation,
- APRS's Investment Policy Statement, approved by the Board on November 19, 2013,
- APRS Pension Law, effective September 1, 2011,
- Detailed calculations from the retained actuary for a sampling of 10 active plan participants as of December 31, 2012, and
- Detailed calculations from the retained actuary for a sampling of 12 inactive plan participants as of December 31, 2012.

In performing our review, we:

- Reviewed the plan document and applicable statutes to understand the benefits provided by APRS,
- Reviewed the appropriateness of the actuarial assumptions,
- Reviewed the actuarial valuation reports, and
- Reviewed the detailed liability calculation of the sample lives to ensure that the calculations were consistent with the stated plan provisions, actuarial methods and assumptions.

We believe that an actuarial audit should not focus on finding differences in actuarial processes and procedures utilized by the retained actuary and the auditing actuary. Rather, our intent is to identify and suggest improvements to the process and procedures utilized by APRS's retained actuary. In performing this actuarial audit, we attempted to limit our discussions regarding opinion differences and focus our attention on the accuracy of the calculations of the liability and costs, completeness and reliability of reporting, and compliance with the Actuarial Standards of Practice that apply to the work performed by APRS's retained actuary.

The actuarial audit findings, which follow, are based on our review of this information and subsequent correspondence with the retained actuary for clarification and further documentation.

Key Actuarial Concepts

An actuarial valuation is a detailed statistical simulation of the future operation of a retirement plan using the set of actuarial assumptions adopted by the Board. It is designed to simulate all of the dynamics of such a retirement plan for each current participant of the plan, including:

- Accrual of future service,
- Changes in compensation,
- Leaving the plan through retirement, disability, withdrawal, or death, and
- Determination of and payment of benefits from the plan.

This simulated dynamic is applied to each active member in the plan and results in a set of expected future benefit payments for that member. Discounting those future payments for the likelihood of survival at the assumed rate of investment return produces the Total Present Value of Plan Benefits (TPV) for that participant. The actuarial cost method will allocate this TPV between the participant's past service (actuarial accrued liability) and future service (future normal costs).

Guidelines for Actuarial Soundness

During our actuarial audit of APRS, we reviewed the actuarial valuation of APRS from the perspective of the Texas PRB Guidelines for Actuarial Soundness, as adopted September 28, 2011. The Guidelines are:

1. The funding of a pension plan should reflect all plan obligations and assets.
2. The allocation of the normal cost portion of the contributions should be level or declining as a percent of payroll over all generations of taxpayers, and should be calculated under applicable actuarial standards.
3. Funding of the unfunded actuarial accrued liability should be level or declining as a percent of payroll over the amortization period.
4. Funding should be adequate to amortize the unfunded actuarial accrued liability over a period not to exceed 40 years, with 15 to 25 years being a more preferable target. Benefit increases should not be adopted if all plan changes being considered cause a material increase in the amortization period and if the resulting amortization period exceeds 25 years.
5. The choice of assumptions should be reasonable, and should comply with applicable actuarial standards.

These key actuarial concepts will be discussed in more detail throughout this report.

SECTION III
ACTUARIAL ASSUMPTIONS

Actuarial Assumptions

Overview

The set of actuarial assumptions is one of the foundations upon which an actuarial valuation is based. An actuarial valuation is, essentially, a statistical projection of the amount and timing of future benefits to be paid under the retirement plan. In any statistical projection, assumptions as to future events will drive the process. Actuarial valuations are no exception.

The actuarial valuation report contains a description of the actuarial assumptions which were used in the actuarial valuation as of December 31, 2012. Additionally, the retained actuary prepared a Review of Actuarial Assumptions and Methods, dated June 17, 2013. We have reviewed these details in order to assess the reasonableness of the assumptions used in the actuarial valuation.

It is important to understand the nature of the retirement plan and the plan sponsor when assessing the reasonableness of the actuarial assumptions. No projection of future events can be labeled as “correct” or “incorrect”. However, there is a “range of reasonableness” for each assumption. We evaluated each individual assumption as follows:

- Whether or not they fall within the range of reasonableness, and
- If they fall within that range, whether they are reasonable for the actuarial valuation of the plan.

Actuarial assumptions for the valuation of retirement plans are of two types: (i) demographic assumptions, and (ii) economic assumptions. We have assessed the reasonableness of both types as part of this actuarial audit.

Demographic Assumptions

General

These assumptions simulate the movement of participants into and out of plan coverage and between status types. ASOP No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations, provides guidance to actuaries in selecting (including giving advice on selecting) demographic and other noneconomic assumptions for measuring pension obligations.

Key demographic assumptions are:

- turnover among active members,
- retirement patterns among active members, and
- healthy retiree mortality.

In addition, there are a number of other demographic assumptions with less substantial impact on the results of the process, such as:

- disability incidence and mortality among disabled benefit recipients,
- mortality among active members,
- percentage of members electing to enter DROP,

- distribution of form of payment selection, and
- percent of active members who are married and the relationship of the ages of participants and spouses.

Demographic assumptions for a retirement plan such as APRS are normally established by statistical studies of recent actual experience, called experience studies. Such studies underlie the assumptions used in the valuations.

Once it is determined whether or not an assumption needs adjustment, setting the new assumption depends upon the extent to which the current experience is an indicator of the long-term future. The measurement of experience is normally affected by simply counting occurrences of an event. For example, in reviewing retirement patterns, an actuary might count the number of actual retirees among males aged 50 with 20 years of service. These retirements would be compared against the number of total people in that group to generate a raw rate of retirement for that group.

- Full credibility may be given to the current experience. Under this approach the new assumptions are set very close to recent experience.
- Alternatively, the recent experience might be given only partial credibility. Thus, the new assumptions may be set by blending the recent experience with the prior assumption.
- If recent experience is believed to be atypical of the future, such knowledge is taken into account.

Finally, it may be determined that the size of the plan does not provide a large enough sample to make the data credible. In such cases, the experience of the plan may be disregarded and the assumption is set based upon industry standards for similar groups.

Review of Actuarial Assumptions and Methods

The current retained actuary did not develop most of the assumptions currently being used in the actuarial valuation. However, they did perform a review of the actuarial assumptions in a report dated June 17, 2013. As a result of the review, the retained actuary recommended a modification to the mortality assumption and the payroll growth assumption.

Normally, our review of the actuarial assumptions includes both a review of the assumptions themselves and the content and methodologies described in the most recent actuarial experience report. However, other than the assumption review described above, we did not receive a formal actuarial experience study report to review. Therefore, we will only provide our comments on the assumptions themselves.

Observations Regarding Mortality Assumption

The most important demographic assumption is mortality because this assumption is a predictor of how long pension payments will be made. The current mortality assumption is based on the RP-2000 Combined mortality tables for male and females (sex distinct) without projection for mortality improvements. These assumptions apply to all members, healthy active members, healthy inactive members, and disabled members. In the Review of Actuarial Assumptions and Methods, dated June 17, 2013, the retained actuary indicates that this assumption has a 10% margin for future mortality improvements.

In a period of time where actuaries are generally recommending the modification of mortality assumptions to improve the life expectancies of members, the retained actuary weakened the mortality assumption between the 2011 and 2012 valuations.

There has been much debate about the life expectancy of public safety personnel versus other general governmental workers. Anecdotal evidence would suggest that due to their physical demands and high stress careers, public safety retirees have shorter life expectancies than other governmental workers. However, we have seen empirical evidence that indicates this may not be reality. GRS works for numerous large statewide and municipal retirement systems that cover both general employees and public safety personnel. Recent studies we have performed in California, Utah and New York City show that post-retirement life expectancies for public safety personnel are not materially less than those for general employees and in some cases the life expectancies are even longer for public safety personnel.

The mortality assumption for healthy members used in the most recent actuarial valuations of the Austin Fire Fighters Relief and Retirement Fund (AFRRF) and City of Austin Employees' Retirement System (COAERS) both produce substantially longer life expectancies than the current assumption used for APRS. Specifically, the assumptions are:

- AFRRF as of December 31, 2011: RP2000 Combined Healthy Table (no collar adjustments) set back two years for males and females, with fully generational projection from the year 2000 using Scale AA
- COAERS as of December 31, 2012: RP2000 Healthy Mortality Table with the White Collar adjustment with multipliers based on plan experience, with fully generational projection from the year 2000 using Scale AA

We recommend that the actuary consider adding a mortality improvement assumption or modifying the mortality assumption to provide further margin for mortality improvement.

Observations on Remaining Demographic Assumptions

With the possible exception of the mortality assumption, it appears that the current demographic assumptions are reasonable. Below, we offer general observations and considerations for the retained actuary based on our experiences with similar plans.

Retirement – Members are eligible to retire after 23 years of service, at age 55 with 20 years of service, or at age 62. The rates at which participants are assumed to retire are based on the member's service with APRS if the member entered the plan prior to age 33. If the member entered the plan at age 33 or later then the retirement rates are based on age. APRS is a participant in the statewide Proportionate Retirement Program (PRP). We noted that the determination of the eligibility for a retirement benefit includes all PRP service, but the assumed rates of retirement are based solely on service with APRS. It is almost certain that the retirement patterns are different for members with PRP service, when compared with members with only APRS service, due to factors such as: (1) PRP benefits are generally smaller because a portion of their benefit is based on the final average earnings with the prior system, and (2) the duration of the member's entire career relative to only their service with APRS. We recommend that the retained actuary continue to gather data on the retirement patterns of the membership including the impact of PRP service. At the next experience study, we recommend that

retirement rates for members with PRP service be reviewed and a modified assumption be recommended, if appropriate.

Turnover – The rates at which members are assumed to withdraw (or turnover) prior to eligibility for retirement are based on the member's service. We believe that the turnover rate assumption is appropriate for APRS.

Disability Incidence – Very little retirement plan experience generally exists in order to set a reasonable assumption based on actual retirement plan experience. The current assumption for disability incidence is reasonable for this purpose.

Economic Assumptions

General

These assumptions simulate the impact of economic forces on the amounts and values of future benefits. Key economic assumptions are the assumed rate of investment return and assumed rates of future salary increase. All economic assumptions are built upon an underlying inflation assumption.

Inflation

Inflation refers to mean price inflation as measured by annual increases in the Consumer Price Index (CPI). This inflation assumption underlies most of the other economic assumptions. It primarily impacts investment return and salary increases.

This assumption is not explicitly described in the actuarial valuation report; however, based on correspondence during the actuarial audit, the retained actuary confirmed that the current explicit inflation assumption is 3.75%. We consider this assumption to be within the reasonable range, albeit the higher end of the range. As shown in the Review of Actuarial Assumptions and Methods, inflation over the past 30 years was less than 3.00% (inflation over the past 30 years was 2.92%) and for the past 20 years is less than 2.50%. We recommend that the retained actuary continue to monitor this assumption to ensure that it continues to be reasonable.

The Review of Actuarial Assumptions and Methods contained an analysis of historical inflation over many different time periods. However, it did not provide any forward looking indicators for inflation (this may have been beyond the scope of the assumption review). We would recommend that the inflation analysis in any future experience studies contain not only an analysis of historical inflation, but also an analysis of expected inflation, whether that analysis is a comparison of the yield spread between inflation protected and non-inflation projected treasuries, or survey of economists, or some other forward looking expectation of inflation. Many economists forecast inflation rates lower than the current 3.75% assumption, but some of these forecasts are often for shorter periods than are necessary in preparing an actuarial valuation.

Investment Return

The investment return assumption is one of the principal assumptions in any actuarial valuation of a retirement plan. It is used to discount future expected benefit payments to the valuation date to determine the liabilities of the retirement plan. Even a small change to this assumption can produce

significant changes to the liabilities and contribution rates. The current assumption incorporates inflation of 3.75% per annum, plus an annual real rate of return of 4.25%, net of investment fees and administrative expenses paid from the trust, for an assumed nominal rate of return of 8.00%.

We believe an appropriate approach to reviewing an investment return assumption is to determine the median expected portfolio return given the retirement plan's target allocation and a given set of capital market assumptions. We have reviewed the Investment Policy Statement approved by the Board on November 19, 2013. Based on the target allocations outlined in the Statement, we have modeled APRS's investment portfolio using the asset classes described below:

Asset Class	Target
Domestic Equity	30.0%
International Equity	15.0%
Core Fixed Income	5.0%
Non-Core Fixed Income	5.0%
Real Estate	15.0%
Timber	5.0%
Private Equity	12.5%
Hedge Funds	10.0%
Cash and Cash Equivalents	2.5%
Total	100.0%

Because GRS does not develop or maintain its own capital market assumptions, we reviewed assumptions developed and published by the following investment consulting firms:

- JP Morgan
- NEPC
- PCA
- Mercer
- RV Kuhns
- Towers Watson
- BNY Mellon
- HewittEnnisKnupp

These investment consulting firms issue reports that describe their capital market assumptions, which include their estimates of expected returns, volatility, and correlations. While these assumptions are developed based upon historical analysis, many of these firms also incorporate forward looking adjustments to better reflect near-term expectations.

Given the APRS's target allocation described above and the investment firms' capital market assumptions for 2013, the development of the average nominal return, net of investment fees and administrative expenses fees paid from the trust, is provided in the following table:

Investment Consultant	Investment Consultant Expected Nominal Return	Investment Consultant Inflation Assumption	Expected Real Return (2)-(3)	Actuary Inflation Assumption	Expected Nominal Return (4)+(5)	Plan Incurred Expense Assumption	Expected Nominal Return Net of Expenses (6)-(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	7.61%	3.00%	4.61%	3.75%	8.36%	0.45%	7.91%
2	7.86%	3.00%	4.86%	3.75%	8.61%	0.45%	8.16%
3	7.52%	2.40%	5.12%	3.75%	8.87%	0.45%	8.42%
4	7.87%	2.50%	5.37%	3.75%	9.12%	0.45%	8.67%
5	7.88%	2.50%	5.38%	3.75%	9.13%	0.45%	8.68%
6	8.31%	2.51%	5.80%	3.75%	9.55%	0.45%	9.10%
7	8.49%	2.30%	6.19%	3.75%	9.94%	0.45%	9.49%
8	9.64%	2.50%	7.14%	3.75%	10.89%	0.45%	10.44%
Average	8.15%	2.59%	5.56%	3.75%	9.31%	0.45%	8.86%

We determined, for each investment consulting firm, the expected nominal return rate based on APRS's target allocation and then subtracted that investment consulting firm's expected inflation to arrive at their expected real return in column (4). Then we added back APRS's current 3.75% inflation assumption and subtracted an estimated 0.45% for investment fees and administrative expenses (see discussion below) paid from the trust to arrive at an expected nominal return net of expenses. As the table shows, the resulting average arithmetic one-year return of the eight firms is 8.86%. It should be noted that the average administrative and investment expenses for the prior five fiscal years was higher than 0.45%. However, we reduced the offset for an estimate of the investment expenses related to active management. The reason for the reduced offset is the expectation that the managers will generate enough alpha to at least cover the cost of the active management. No additional alpha for active management is considered.

In addition to examining the expected one-year return, it is important to review anticipated volatility of the investment portfolio and understand the range of long-term net return that could be expected to be produced by the investment portfolio. Therefore, the following table provides the 25th, 50th, and 75th percentiles of the 20-year geometric average of the expected nominal return, net of investment fees paid from the trust, as well as the probability of exceeding the current 8.00% assumption.

Investment Consultant	Distribution of 20-Year Average Geometric Net Nominal Return			Probability of exceeding 8.00% *
	25th	50th	75th	
(1)	(2)	(3)	(4)	(5)
1	5.36%	7.19%	9.05%	38.4%
2	5.57%	7.42%	9.30%	41.7%
3	6.30%	7.88%	9.49%	48.0%
4	5.69%	7.75%	9.85%	46.8%
5	5.68%	7.75%	9.87%	46.8%
6	6.10%	8.18%	10.29%	52.3%
7	6.42%	8.53%	10.69%	56.7%
8	7.21%	9.41%	11.66%	66.7%
Average	6.04%	8.01%	10.03%	49.7%

*Plan's current return assumption net of expenses.

As the analysis shows, there is a 50% likelihood that the 20-year average net nominal return will be between 6.04% and 10.03%. This is our assessment of the best-estimate range under ASOP No. 27, Selection of Economic Assumptions for Measuring Pension Obligations, as it currently exists. Further, the average result of all eight firms indicates there is a 50% chance that the current target asset allocation will produce an average return that exceeds 8.00% over the next 20 years.

As a point of reference, the National Association of State Retirement Administrators published a survey in March 2013 of 126 large public retirement systems which reflects the nominal assumption in use, or announced for use, as of the date of the survey. The average investment return assumption for responding systems was 7.77%.

It should be noted that if a lower inflation assumption was used, the analysis would look notably different. For example if a 3.00% inflation assumption was used, the average one-year arithmetic return for the eight investment consultants would be 8.11%, with 5 of the 8 less than 8.00%. Also, the probability of meeting the 8.00% return over the next 20 years would decline to 40%. However, the current investment return assumption would still fall within our best-estimate range under the current Actuarial Standards of Practice (ASOP). Therefore, we believe that the current assumption is reasonable for this purpose.

There are changes to ASOP No. 27 which will significantly reduce the range from which the investment return assumption may be chosen. These changes will go into effect for valuations that occur on or after September 30, 2014. APRS may wish to discuss the possible impact of these changes with their retained actuary.

Expense Assumptions

As previously noted, the investment return assumption is stated as net of administrative fees and investment fees paid from the trust. Additionally, the assumed additional administrative expenses for participation in the Proportionate Retirement Program of 0.025% of payroll were added to the normal cost. This is a reasonable procedure for accounting for anticipated plan expenses. Further, the determination of the actual rate of return calculations and the actuarial value of assets presented in the actuarial valuation report are calculated consistently with this procedure.

Earnings Progression

In general, assumed rates of pay increase are often constructed as the total of three main components:

- Price Inflation – currently 3.75%
- Economic Productivity Increases (base pay increases above price inflation) – currently 0.25%
- Merit, Promotion, and Longevity – This portion of the salary increase assumption reflects components such as promotional increases as well as “step” increases and longevity pay. This portion of the assumption is not related to inflation.

In the context of a typical employer pay scale, pay levels are set for various employment grades, or “steps”. In general, this pay scale is adjusted as follows:

- The inflation and economic productivity assumptions, collectively referred to as wage inflation, reflect the overall increases of the entire pay scale, and
- The Merit, Promotion, and Longevity increase assumption reflects movement of members through the pay scale.

The Merit, Promotion, and Longevity portion of the salary increase assumption is based on the member’s service which is generally the most appropriate method for public safety workers. The salary scale assumption, in total, appears reasonable.

Summary

The set of actuarial assumptions and methods, taken in combination, is within the range of reasonableness and generally established in accordance with ASOP No. 27, Selection of Economic Assumptions for Measuring Pension Obligations, ASOP No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations, and the Texas PRB Guidelines for Actuarial Soundness.

We recommend that the actuary consider adding a mortality improvement assumption or modifying the mortality assumption to provide further margin for mortality improvement.

SECTION IV

ACTUARIAL METHODS AND FUNDING POLICY

Actuarial Methods and Funding Policy

Actuarial Cost Methods

The ultimate cost of a retirement system is equal to the benefits paid plus the expenses related to operating the retirement system. This cost is funded through contributions to the retirement system plus the investment return on accumulated contributions which are not immediately needed to pay benefits or expenses. The projected level and timing of the contributions needed to fund the ultimate cost are determined by the actuarial assumptions, plan provisions, participant characteristics, investment experience, and the actuarial cost method.

An actuarial cost method is a mathematical process for allocating the dollar amount of the total present value of plan benefits (TPV) between future normal costs and actuarial accrued liability (AAL). The retained actuary uses the Entry Age Normal actuarial cost method (EAN Method), characterized by:

- (1) Normal Cost – the level percent of payroll contribution, paid from each participant’s date of hire to date of retirement, which will accumulate enough assets at retirement to fund the participant’s projected benefits from retirement to death.
- (2) Actuarial Accrued Liability – the assets which would have accumulated to date had contributions been made at the level of the normal cost since the date of the first benefit accrual, if all actuarial assumptions had been exactly realized, and there had been no benefit changes.

The EAN Method is the most prevalent funding method in the public sector. It is appropriate for the public sector because it produces costs that remain stable as a percentage of payroll over time, resulting in intergenerational equity for taxpayers. The Public Fund Survey published in 2011, sponsored by the National Association of State Retirement Administrators and the National Council on Teacher Retirement, surveyed 126 retirement systems (mostly statewide). Over 75% of the plans reported using the EAN Method. Therefore, the retained actuary’s stated methods for allocating the liabilities of APRS are certainly in line with national trends.

Allocation of Normal Cost

The most common application of the EAN Method will produce a normal cost that is expected to remain constant, as a percentage of pay, throughout each member’s working lifetime. That is, the cost of all plan benefits is evenly allocated across each member’s expected career. The December 31, 2012 actuarial valuation report includes a very detailed description of the Entry Age Normal Cost Method (in the Valuation Notes section) and we believe that this description is consistent with this most common application. In particular, the description in the valuation report states:

- (a) *The normal cost accrual rate equals:*
- i. *the present value of future benefits for the participant, determined as of the participant's entry age, divided by*
 - ii. *the present value of the compensation expected to be paid to the participant for each year of the participant's anticipated future service, determined as of the participant's entry age.*

The retained actuary applies the EAN Method in a slightly different manner. Specifically, the normal cost is calculated independently for each benefit such that the normal cost for each benefit will only span through the last age at which that benefit is payable.

For example, APRS members are only eligible for a refund of contributions if they terminate within the first 10 years of employment. Under the most common application of the EAN Method, the anticipated cost associated with providing refund benefits is evenly allocated across each member's expected career. Alternatively, the retained actuary's application will produce a normal cost for the refund of contributions for the first 10 years of the member's career and then the normal cost associated with the refund of contributions will go to zero for the remainder of their expected career.

In general, the retained actuary's application of the EAN Method is reasonable; however, it is not the method described in the valuation report and it may not be the most appropriate method for APRS because the normal cost rate will certainly decrease over the course of each member's career.

Based on our understanding of the new accounting standards, we do not believe that the retained actuary's application of the EAN Method will comply with the new accounting requirements under GASB Statement Nos. 67 and 68. These new GASB statements are very specific about how the EAN Method should be applied for accounting purposes. Paragraph 46(b) of GASB 67 states, in part: "each plan member's service costs should be level as a percentage of that member's projected pay." Additionally, paragraph 46(d) states, in part: "the service costs of all pensions should be attributed through all assumed exit ages, through retirement." As previously noted, this requirement does not directly affect the methods and assumptions adopted by the Board to develop the funding requirements. However, the use of different actuarial cost method will result in the disclosure of multiple actuarial liabilities (one for funding and one for accounting).

We believe that the retained actuary's application of the EAN Method is reasonable. However, we believe that the application of the EAN Method that produces constant normal cost rate over the member's entire career would be more appropriate for APRS based on the fixed contribution rate that APRS receives from the City. Additionally, we believe that this more common method complies with the method described in the valuation report and is more appropriate for purposes of complying with the new GASB requirements.

Calculation of Present Value of Future Salaries

In order to determine the normal cost as a level percentage of pay, the valuation must determine the Present Value of Future Salaries (PVFS) over which the plan will receive contributions. The calculation of PVFS should be determined in the same manner as the TPV. Specifically, the calculation of the PVFS should be based on the salary that the participant is expected to receive over the course of their career according to the expected departures from active service (or, decrements).

For the December 31, 2012 actuarial valuation, the TPV was developed assuming that participants left active service (retirement, disability, withdrawal or death) at the beginning of the year. However, the PVFS was developed assuming that participants left active service at the end of the year. This difference in decrement timing results in a disconnect between the TPV and PVFS that overstates the PVFS and understates the normal cost as a percentage of pay that is needed to fund the benefits promised by APRS. In other words, the cost of plan benefits (i.e., TPV) was allocated across more

projected payroll than the member is expected to receive. It would be more consistent to exclude the projected pay in the year of decrement when calculating the present value of future salary.

Impact

It should be noted that the TPV (i.e., the present value of benefits) remains unchanged, so the present value of all plan benefits is appropriately accounted for in the actuarial valuation. The recommended modifications to the EAN Method will only impact the allocation of the TPV between future normal costs and actuarial accrued liability. We believe that the recommended modifications will result in the most appropriate application of the EAN Method. The modifications for APRS should not have a material impact on the most of the valuation results since the TPV remains unchanged, with the possible exception of the funding period.

Since APRS receives a fixed contribution rate from members and the City, the normal cost rate is an important component of the calculation of the funding period (or, “Funding Period to Amortize UAAL”). Specifically, the fixed contribution rate in excess of the normal cost rate is used to amortize (or “pay down”) the unfunded actuarial accrued liability (UAAL). Therefore, if the normal cost is understated, the contributions available to pay down the UAAL are overstated and the funding period should be longer. Based on this fixed contribution arrangement, APRS should seek a method that is expected to maintain a level and appropriately calculated normal cost percentage (especially when benefit improvements are considered based on the funding period). A complete analysis of the impact of these method enhancements is beyond the scope of this actuarial audit.

Asset Valuation Method

The market value of assets can experience significant short-term swings, which can cause large fluctuations in the development of the actuarially determined contributions required to fund a retirement system. Thus, many systems use an asset valuation method which dampens these short-term volatilities to achieve more stability in the required contributions. A good asset valuation method places values on a retirement plan’s assets which are related to the current market value, but which will also produce a smoother pattern of costs.

ASOP No. 44, Selection and Use of Asset Valuation Methods for Pension Valuations, provides a framework for the determination of the actuarial value of assets (AVA), emphasizing that the method should: (1) bear a reasonable relationship to the market value of assets (MVA), (2) recognize investment gains and losses over an appropriate time period, and (3) avoid systematic bias that would overstate or understate the AVA in comparison to MVA.

The actuarial valuation of APRS currently utilizes a smoothed asset valuation method that immediately recognizes income equal to the expected return on valuation assets, based on the assumed valuation interest rate (8.00%). The method also recognizes 20% of the difference between the expected AVA and the actual MVA each year. Further, the AVA cannot exceed 120% or be less than 80% of the market value of assets.

The smoothing method used for the actuarial valuation of APRS is common among public employee retirement systems. We feel that this method complies with ASOP No. 44. Additionally, this method is reasonable and appropriately applied for the valuation.

Funding Policy

Current Contribution Rates

For purposes of determining the TPV and the funding period in the December 31, 2012 actuarial valuation report, the members are assumed to contribute 13.00% of pay. Similarly, the City is assumed to contribute 20.63% of pay, increasing to 21.63% of pay after October 1, 2012. According to the results of the December 31, 2012 actuarial valuation, these total contributions are sufficient to amortize the unfunded actuarial accrued liability over 29.4 years.

The Texas PRB Guidelines for Actuarial Soundness indicate that funding should be adequate to amortize the unfunded actuarial accrued liability over a period not to exceed 40 years, with 15 to 25 years a more preferable target. As a result, the contribution policy as of December 31, 2012 complies with the PRB's Guidelines.

Benefit Increases

Section 6.01(c) of the Statutes applicable to APRS, and the Board's COLA adjustment policy, allow for certain increases in plan benefits. According to the COLA adjustment policy:

Actuarial soundness and financial stability for purposes of adoption of a cost-of-living adjustment will be demonstrated by satisfying the following two parameters for all years in the projection period.

- 1.) The funding period to amortize the unfunded accrued actuarial liability after the cost-of-living adjustment may not exceed 30 years for any year during the ten-year projection period;*
- 2.) The GASB25 funding ratio after the cost-of-living adjustment would not be less than 80% for any year in the ten-year projection period.*

This approach can increase benefits when there are positive developments in the long-term financing of the plan; however, this approach provides no way for the plan to reduce benefits when there are negative developments. In this situation, it will be difficult for the long-term financing of the plan to improve (the plan would need to outperform its assumptions over an extended period of time to generate gains greater than the benefit improvements), but it can get worse (requiring further contribution increases).

We understand that a COLA has not been granted to APRS retirees for at least the past five years. However, we believe that it is important that the City and the Board understand that without a significant outperformance of the actuarial assumptions the benefit increase provisions of APRS will likely require maintaining the current contribution rates (for the members and the City) once the Board's COLA adjustment policy allows for COLAs to be granted under these provisions.

It should also be noted that the Texas PRB Guidelines for Actuarial Soundness indicate that benefit increases should not be adopted if all plan changes being considered cause a material increase in the amortization period and if the resulting amortization period exceeds 25 years. If a benefit increase is granted through the Board's COLA adjustment policy, which can generally be granted if the funding

period is less than 30 years, the benefit increase could violate the PRB's Guidelines if the funding period is greater than 25 years following the increase.

Expected Payroll

The retained actuary presents one measure of payroll for the upcoming year. The "Total Annual Payroll" and "Payroll Under Assumed Retirement Age" were \$141,561,047 which represent the total expected payroll for the entire plan for the upcoming year. We believe that these measures of payroll are the most appropriate when calculating the 30-year Funding Cost and the contribution available to amortize the unfunded actuarial accrued liability.

In conjunction with our previous comments regarding the calculation of present value of future salaries, we believe that the normal cost rate should be calculated by dividing the total normal cost for active members on the valuation date by the expected payroll for these active members. Specifically, the expected payroll should reflect the assumption that a portion of the active members will leave active service during the upcoming year and only receive a portion of their annual salary. We believe that this is the most appropriate way to calculate the normal cost rate since the normal cost and the salary are based on the active members on the valuation date and reflect the expected decrement in the first year.

We believe that the retained actuary uses the most appropriate payroll to calculate the contributions available to finance the unfunded actuarial accrued liability. However, we recommend that the retained actuary use a payroll to calculate the normal cost rate that reflects the expected decrement in the first year.

Summary

We have the following recommendations regarding the application of the actuarial methods and assessment of the funding policy:

- We believe that the application of the EAN Method that produces constant normal cost rate over the member's entire career would be more appropriate for APRS based on the fixed contribution rate that AFRRF receives from the City. We recommend that the retained actuary review their application of the EAN Method and consider the most appropriate application for APRS.
- We recommend a modification to the application of the actuarial cost method to eliminate the disconnect between the calculation of TPV and the member's expected future pay. We believe that the proposed method of determining the member's expected future pay is the most appropriate application of the Entry Age Normal actuarial cost method. Since the TPV is appropriately accounted for in the actuarial valuation, the implementation of this method for APRS should not have a significant impact on the majority of the valuation results, with the possible exception of the funding period.
- We recommend that the retained actuary calculate the normal cost rate using a payroll measure that reflects the expected decrement in the first year.

SECTION V

ACTUARIAL VALUATION RESULTS

Actuarial Valuation Results

Benefits

Every employer is different and every employer's retirement plan is different. Each employer has a set of workforce and financial needs that dictate the type of retirement benefit that is most appropriate for their employees. Additionally, the amount of resources available to allocate to the retirement plan will dictate the level of benefits provided by the retirement plan. Regardless of the reasons for the benefit design, the employer must understand the liability and contribution requirements associated with the benefits promised. As a result, the actuarial valuation and the resulting funding policy contribution must properly reflect the benefit structure of the retirement plan.

Actuarial Valuation Results

Gain/Loss Analysis

All actuarial valuations of retirement plans should include an analysis of actuarial gains and losses. Actuarial gains and losses assess how well the actuarial assumptions explain the difference between the expected funded status of the plan and the actual funded status. The December 31, 2012 actuarial valuation report includes such an analysis.

The "Total Gain/(Loss)" in the Gain/Loss Analysis section of the December 31, 2012 actuarial valuation report calculates the actuarial loss for the pension benefits (excluding the Death Benefit Plan) in a reasonable manner. However, the associated "Gain/(Loss) on Assets" incorrectly includes the benefit payments associated with the Death Benefit Plan to calculate the actuarial loss on the assets associated with the pension benefits. The remainder of the calculations to determine the "Gain/(Loss) on Assets" correctly incorporate only the amounts associated with pension benefits.

The benefit payments associated with the Death Benefit Plan were only \$30,000 during 2012 so this issue did not have a significant impact on the analysis of actuarial gains and losses for the December 31, 2012 actuarial valuation. We recommend that future analyses of actuarial gains and losses on the pension benefits be corrected to exclude the benefits payments associated with the Death Benefit Plan.

Review of Sample Liability Calculations

As part of its review, GRS requested sample participant calculations from the retained actuary to ensure that the retained actuary valued the correct benefit levels, used the correct assumptions, and calculated the liabilities correctly on an individual basis.

Generally accepted actuarial standards and practices provide actuaries with the basic mathematics and framework for calculating the actuarial results. When it comes to applying those actuarial standards to complex calculations, differences may exist due to individual opinion on the best way to make those complex calculations or other differences may occur due to nuances in the valuation software programming. This may lead to differences in the calculated results, but these differences should not be material.

Active Participants. At the onset of the review, we requested that the retained actuary provide sample liability calculations that show probabilities of decrement by age, estimated pay and benefits by age, and values of benefits or pay by age for each decrement in sufficient detail to verify the calculation of the present value of benefits, present value of pay, accrued liability and normal cost for 10 active participants. The retained actuary provided all of the requested detail for all 10 members.

We have previously noted our comments on the application of the actuarial cost method (Section IV) and the assumptions (Section III). We identified one additional element of the actuarial valuation of active participants that should be corrected for the next valuation. This issue should not have a material impact on the actuarial valuation of APRS.

Application of IRC Section 415 Limit – Benefits payable from the APRS qualified trust are limited by the IRC Section 415 limit. This limit is updated each year by the IRS to reflect increases in cost-of-living.

In the December 31, 2012 actuarial valuation, the retained actuary applied the IRC Section 415 Limit for the year 2013 to projected benefits at all future retirement dates. As a result, two of the sample liability calculations that we received had the projected retirement benefits limited at future retirement dates (beginning in the year 2017 for one active member and 2037 for the other). Since this limit is updated by the IRS each year to reflect increases in cost-of-living, we do not believe that it is appropriate to limit projected retirement benefits in future years to the limit applicable to the year 2013.

In future actuarial valuations, we recommend that the retained actuary incorporate assumed increases in the IRC Section 415 Limit that are consistent with the valuation assumption for core inflation.

Based on our review of the other aspects of the actuarial valuation, the liability determination of active participants was reasonable and appropriately determined.

Annuitants. At the onset of the review, we requested that the retained actuary provide liability amount, benefit amount, form of benefit, age of participant, and age of beneficiary (where applicable) for 12 annuitants. The retained actuary provided all of the information we requested regarding the annuitants.

Based on our review, the liability determination of annuitants was reasonable and consistent with the stated assumptions and methods.

Summary

We believe that the valuation results were developed in a reasonable manner. In the next actuarial valuation, we recommend that the retained actuary incorporate the following enhancements into their actuarial valuation:

- We recommend that future analyses of actuarial gains and losses on the pension benefits be corrected to exclude the benefits payments associated with the Death Benefit Plan.
- We recommend that the retained actuary incorporate assumed increases in the IRC Section 415 Limit that are consistent with the assumption for core inflation.

SECTION VI

CONTENT OF THE VALUATION REPORT

Content of the Valuation Report

ASOP No. 4, Measuring Pension Obligations and Determining Pension Plan Costs, and ASOP No. 41, Actuarial Communications, provide guidance for measuring pension obligations and communicating the results. These Standards of Practice list specific elements to be included, either directly or by references to prior communication, in pension actuarial communications. The pertinent items that should be included in an actuarial valuation report on a pension plan should include:

- The name of the person or firm retaining the actuary and the purposes that the communication is intended to serve.
- A statement as to the effective date of the calculations, the date as of which the participant and financial information were compiled, and the sources and adequacy of such information.
- An outline of the benefits being discussed or valued and of any significant benefits not included in the actuarial determinations.
- A summary of the participant information, separated into significant categories such as active, retired, and terminated with future benefits payable. Actuaries are encouraged to include a detailed display of the characteristics of each category and reconciliation with prior reported data.
- A description of the actuarial assumptions, the cost method and the asset valuation method used. Changes in assumptions and methods from those used in previous communications should be stated and their effects noted. If the actuary expects that the long-term trend of costs resulting from the continued use of present assumptions and methods would result in a significantly increased or decreased cost basis, this should also be communicated.
- A summary of asset information and derivation of the actuarial value of assets. Actuaries are encouraged to include an asset summary by category of investment and reconciliation with prior reported assets showing total contributions, benefits, investment return, and any other reconciliation items.
- A statement of the findings, conclusions, or recommendations necessary to satisfy the purpose of the communication and a summary of the actuarial determinations upon which these are based. The communication should include applicable actuarial information regarding financial reporting. Actuaries are encouraged to include derivation of the items underlying these actuarial determinations.
- A disclosure of any facts which, if not disclosed, might reasonably be expected to lead to an incomplete understanding of the communication.

We have reviewed the actuarial valuation report prepared by the retained actuary and we have noted a few modifications to the report that would allow the report to adhere more closely with ASOP Nos. 4 and 41.

Cover Letter

ASOP No. 41 requires that actuarial communications should disclose “any information on which the actuary relied that has a material impact on the actuarial findings and for which the actuary does not assume responsibility.”

In the cover letter of the valuation report, the retained actuary indicated that they relied on personnel, plan design, financial reports, and asset information supplied by the City of Austin. This information was actually provided by the staff of APRS.

We recommend that the retained actuary properly disclose the source of the information relied upon as part of the actuarial valuation.

Presentation of Results

The December 31, 2012 actuarial valuation report presents the actuarial valuation results of the pension benefits as well as the Death Benefit Plan administered by APRS. There are portions of the valuation report where it is not clear whether the results presented are for the pension benefits, the Death Benefit Plan, or both combined.

In particular, Items B through F in the section titled Comparative Summary of Principal Valuation Results should be clearly identified as results associated with the pension benefits. Additionally, descriptions should be added to the section titled Gain/Loss Analysis to make it clear that the actuarial gains and losses are only associated with the pension benefits.

We recommend that the retained actuary enhance future valuation reports by providing additional descriptions of the results presented throughout the report.

Actuarial Assumptions and Funding Methods

The presentation of actuarial methods and assumptions is generally complete and understandable. The methods described in this section are reasonable and appropriate for public retirement plans. We do have the following suggestions to improve the overall communication of the valuation assumptions.

Mortality Rates – The stated mortality assumption does not explicitly include an assumption for expected mortality improvement after the measurement date. ASOP No. 35, Selection of Demographic and Other Noneconomic Assumptions for Measuring Pension Obligations, requires the actuary to disclose the assumption for mortality improvement included both before and after the measurement date (even if the assumption is “none”). The Actuarial Assumptions and Funding Method section of the valuation report describes the mortality assumed as of the measurement date, but does not provide a description of the mortality improvement assumed after the measurement date. However, a discussion earlier in the valuation report indicates that assumption includes a 10% margin for future mortality improvements. We recommend that the Actuarial Assumptions and Funding Method section of the actuarial valuation report be enhanced to explicitly state the assumption for expected mortality improvement after the measurement date.

Inflation – The valuation report clearly states the wage inflation and payroll growth assumptions incorporated into the actuarial valuation. We recommend that the valuation report be enhanced to explicitly state the assumption for core inflation.

Administrative Expenses – The description of the administrative expense assumption should be expanded to indicate that the assumed 0.025% of payroll is only attributable to the additional administrative expenses for participation in the Proportionate Retirement Program.

Termination Rates – The probability of termination is incorrectly stated in the valuation report from 12 to 14 years of service. The report currently indicates the probability at these ages is 0.05, but the correct rate should be 0.005. This assumption is being appropriately applied in the valuation, but the description just needs to be updated.

DROP Utilization – The actuarial valuation of active members incorporates assumptions about the percentage of retiring members that will elect DROP and the duration of their DROP. The assumptions are not currently summarized in the valuation report. The summary of the actuarial assumptions should be expanded to describe all of the valuation assumptions associated with DROP.

Summary

In general, the actuarial valuation report complied with the applicable Actuarial Standards of Practice. In order to improve the ability of the report to communicate the assumptions, methods and plan provisions incorporated into the December 31, 2012 actuarial valuation, we recommend that the retained actuary incorporate the noted enhancements into future actuarial valuation reports.

SECTION VII

FINAL REMARKS

Final Remarks

The auditing actuarial firm, Gabriel, Roeder, Smith & Company (GRS), is independent of the retained actuarial firm and the City of Austin. The auditing actuaries are not aware of any conflict of interest that would impair the objectivity of this work.

We have presented many suggestions for areas where we believe the product can be improved. The retained actuary has access to information and experience with retirement plans similar to APRS. We understand that the retained actuary may agree with some of our recommendations, while rejecting others. We ask that the retained actuary and APRS consider our recommendations carefully. We hope that the retained actuary and APRS find these suggestions useful.