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# **Killeen Firefighter's Relief and Retirement Fund**

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## **Actuarial Valuation as of September 30, 2014**

**May 11, 2015**



**Rudd and Wisdom, Inc.**  
CONSULTING ACTUARIES

# Rudd and Wisdom, Inc.

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May 11, 2015

Board of Trustees  
Killeen Firefighter's Relief and  
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c/o Ms. Jennifer Hanna, Administrator  
Post Office Box 497  
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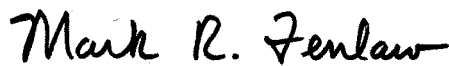
### Members of the Board of Trustees:

At the request of the Board of Trustees of the Killeen Firefighter's Relief and Retirement Fund, we have prepared this report of the results of the actuarial valuation of the fund as of September 30, 2014. This valuation was prepared to determine whether the fund has an adequate contribution arrangement.

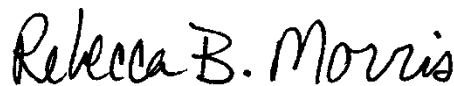
In a separate report in March, we provided the necessary disclosures for the fund's initial compliance with the new Governmental Accounting Standards Board (GASB) Statement No. 67 for the plan year ending September 30, 2014. Similarly, we will provide a separate report in the fall of 2015 containing the pension expense, net pension liability, and disclosure information for the city's initial compliance with the new GASB 68 for the fiscal year ending September 30, 2015. GASB 68 prescribes the city's accounting for your fund, while this actuarial valuation report reflects the assumed continuation of the current funding policy.

We certify that we are members of the American Academy of Actuaries who meet Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report.

Sincerely,



Mark R. Fenlaw, F.S.A.



Rebecca B. Morris, A.S.A.

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## Section I

### Valuation Summary

An actuarial valuation of the assets and liabilities of the Killeen Firefighter's Relief and Retirement Fund as of September 30, 2014 has been completed. The valuation was based on the Present Plan (plan effective July 1, 2007) and the provisions of the Texas Local Fire Fighters' Retirement Act (TLFFRA) which were in effect on September 30, 2014. Section II shows the summary of key results of the actuarial valuation as of September 30, 2014 and discusses the significant changes since the prior valuation that we prepared as of September 30, 2012.

This valuation reflects an actuarially assumed total contribution rate of 24.00%, comprised of 11.00% by the firefighters and 13.00% by the city. The total contribution rate of 24.00% exceeds the normal cost rate of 16.24%, leaving 7.76% available to amortize the unfunded actuarial accrued liability (UAAL) of \$16,451,960. Assuming that the total payroll increases at the rate of 3.50% per year in the future, the contributions in excess of the normal cost **will amortize the UAAL in 29.5 years.**

In order for a retirement plan to have an adequate contribution arrangement, contributions must be made that are sufficient to pay the plan's normal cost and to amortize the plan's UAAL over a reasonable period of time. Based on the Texas Pension Review Board guidelines, our professional judgment, and the actuarial assumptions and methods used in making this valuation, we consider periods of 15 years to 25 years to be preferable and 40 years to be the maximum acceptable period. Since the total contributions are sufficient to pay the fund's normal cost and to amortize the fund's UAAL within the maximum acceptable period, we are of the opinion that the fund, based on present levels of benefits and contributions, **has an adequate contribution arrangement. Section III presents considerations for future benefit improvements.**

### Projected Actuarial Valuation Results

In addition to completing this actuarial valuation, we estimated the amortization periods as of September 30, 2016 and as of September 30, 2018 by making projections from the September 30, 2014 actuarial valuation. These projections examine the effect on the amortization period in the next two actuarial valuations of the actuarial investment gains and losses that the fund experienced in the four years prior to the valuation date (losses in 2011, 2013, and 2014 and a gain in 2012) that have been only partially recognized as of September 30, 2014. As shown in Exhibit 6, a smoothing method is used to determine the actuarial value of assets (AVA) for this valuation. This method phases in over a five-year period any investment gains or losses (net actual investment return greater or less than the actuarially assumed investment return) that the fund has had. The AVA used in this current valuation is deferring recognition of various portions of the gains and losses in 2011-2014 that the fund experienced. The AVA used in this valuation is \$32,604,554.

The market value of assets (MVA) is \$31,844,201. The \$760,353 difference between the MVA and the AVA is the net of the deferred gain and losses that will be recognized in the next two actuarial valuations.

The theory behind the AVA method is to allow time for investment gains and losses to partially offset each other and thereby dampen the volatility associated with the progression of the MVA over time. In practice, the timing and amounts of investment gains and losses can result in irregular effects on the AVA in a given year. However, as intended, the pattern of the AVA is smoother over time than the pattern of the market value of assets, as seen in Exhibit 7.

For the purpose of projecting the amortization period through 2018 we used several scenarios of various assumed annual rates of investment return, net of investment-related expenses, over the 2015-2018 projection period. The projected amortization periods will not be the same as the actual amortization periods from completed future actuarial valuations but are projected future actuarial valuation results based on the completed September 30, 2014 actuarial valuation. These projections show the expected effects over the next four years after the valuation date (1) of the recognition of the portions of the past investment gains and losses over the past four years that are deferred as of September 30, 2014, and (2) of investment returns over the next four years different from the 7.75% assumption used in this valuation.

|                                                     | Scenario |       |       |        |        |        |
|-----------------------------------------------------|----------|-------|-------|--------|--------|--------|
|                                                     | 1        | 2     | 3     | 4      | 5      | 6      |
| Assumed Investment Return<br>for Fiscal Year        |          |       |       |        |        |        |
| 2014-2015                                           | 7.75%    | 0.00% | 4.00% | 10.00% | 10.00% | 15.00% |
| 2015-2016                                           | 7.75     | 6.00  | 4.00  | 0.00   | 10.00  | 15.00  |
| 2016-2017                                           | 7.75     | 6.00  | 4.00  | 2.00   | 7.75   | 7.75   |
| 2017-2018                                           | 7.75     | 7.75  | 7.75  | 7.75   | 7.75   | 7.75   |
| 2018-2019 and later                                 | 7.75     | 7.75  | 7.75  | 7.75   | 7.75   | 7.75   |
| Amortization Period in Years<br>as of September 30: |          |       |       |        |        |        |
| 2014 (actual)                                       | 29.5     | 29.5  | 29.5  | 29.5   | 29.5   | 29.5   |
| 2016 (projected)                                    | 29.2     | 33.8  | 32.0  | 29.9   | 27.6   | 24.4   |
| 2018 (projected)                                    | 28.2     | 40.4  | 38.3  | 36.2   | 24.6   | 17.8   |

The projected future September 30, 2016 valuation in Scenario 1 reveals that instead of decreasing by the expected two years from 29.5 years to 27.5 years, the amortization period is projected to decrease to only 29.2 years, primarily due to the deferred effect of the losses in three out of the last four years. The primary conclusion from Scenario 1 is that the remaining deferred losses as of September 30, 2014 will cause the September 30, 2016 amortization period to decrease very little from the 29.5 years in this valuation.

Is it realistic to expect that the market value rate of return could be high enough in 2015 and 2016 to lower the amortization period below 25 years? Scenario 6 in the table helps answer this question by showing the projected amortization periods in the next two valuations based on an annual assumed net investment return of 15% over the next two plan years, with the assumed 7.75% each year thereafter. Those are the minimum equal rates of return in the next two years required to get the amortization period under 25 years as of September 30, 2016.

On the pessimistic side, Scenarios 2, 3 and 4 show three different combinations of annual returns summing to only 12% over the next three plan years. In each scenario, the September 30, 2018 amortization period is projected to increase to be in the range of 36 to 40 years. These scenarios show the sensitivity of the amortization period to adverse investment experience, even with the smoothing method used.

We do not know what the investment experience will be for each of the next four plan years. All of the scenarios shown above, except for Scenario 6, present a range of plausible investment experience scenarios for the next valuations assuming no changes in benefits or contribution rates. Variations in experience from the underlying assumptions, other than investment return, will cause the actual amortization periods to be different from the periods shown above. In addition, the future investment experience in each of the next four years could be better or worse than the assumed rates shown. The key items that could have a positive effect, in addition to the investment experience, would be an increase in the number of firefighters and an increase in the total contribution rate.

The primary conclusion from the scenarios is that it is unlikely the amortization period in the next two actuarial valuations will be significantly below 25 years without an increase in the number of firefighters or in the contribution rate or both. The members should remember the long-term nature of the plan and should be patient in their expectations about future benefit improvements.

### **Participant and Asset Data**

We have relied on and based our valuation on the active firefighter data, pensioner data, and asset data provided on behalf of the board of trustees by Ms. Jennifer Hanna, plan administrator for the board. We have not audited the data provided but have reviewed it for reasonableness and consistency relative to the data provided for the September 30, 2012 actuarial valuation. Exhibit 1 is a distribution of the active paid firefighters by age and service. The salaries used for projecting future contributions and benefits in the valuation were based on the actual pay for the 2014 plan year increased to reflect the general pay increase in October 2014. The total of these salaries is our assumed annual covered payroll for the plan year beginning October 1, 2014 and is used in the valuation to determine the UAAL amortization period. The averages of the assumed salaries for the 2015 plan year are shown in Exhibit 1.

Exhibit 2 contains summary information on the pensioners. The monthly benefit payments are generally based on the amounts paid October 31, 2014. Exhibit 2A is a reconciliation of firefighters and pensioners from September 30, 2012 to September 30, 2014. Exhibit 3 shows a breakdown of the dollar level of the monthly benefits for retirees and surviving spouses. Exhibit 4 shows a historical comparison of the actuarial accrued liability and the actuarial value of assets.

The summary of assets contained in Exhibit 5 is based on the September 30, 2014 audited market value of assets shown in the fund's financial statements. This exhibit also shows a comparison of the market values and actuarial values of assets as of September 30, 2012 and September 30, 2014. Exhibit 5A contains the statement of changes in assets for fiscal years ending September 30, 2013 and September 30, 2014. Exhibit 6 shows the development of the actuarial value of assets. Exhibit 7 shows a historical comparison between the market value and actuarial value of assets. A comparison of the market value asset allocation by asset class as of September 30, 2012 and September 30, 2014 is shown in Exhibit 8.

### **Assumptions**

As a part of each actuarial valuation, we review the actuarial assumptions used in the prior actuarial valuation. As a result of our review, we have selected actuarial assumptions we consider to be reasonable and appropriate estimates of future experience for the fund for the long-term future. Their selection complies with the applicable actuarial standards of practice. Significant actuarial assumptions used in the valuation are:

1. 7.75% annual investment return net of investment-related expenses;
2. 3.50% annual general compensation increase plus an average of 1.73% per year for pay increases due to promotions and longevity over a 30-year career;
3. Retirement rates which result in an average expected age at retirement of 55.2; and
4. RP-2000 Combined Healthy Mortality Tables projected to 2024.

The following actuarial assumption changes have been made, and the new assumptions are compared to those used in the September 30, 2012 valuation:

1. We modified the components of the 7.75% investment return assumption, increasing the assumed net real rate of return from 3.75% to 4.25% and lowering the assumed inflation rate from 4.00% to 3.50%. The increase in the assumed net real rate of return is due to the combined effect of (a) the changes in the target allocation to more in equities and less in fixed income, (b) somewhat higher gross real rate of return assumptions for some of the asset classes, and (c) somewhat lower investment-related expenses due to changes in some of the managers to those with lower expenses.
2. The assumed mortality rates used in this valuation are somewhat lower and were changed to adjust for expected mortality improvement after the valuation date to 2024. The prior valuation used the same published mortality table but with rates adjusted for expected mortality improvement to 2014. This change is explained in more detail in a separate letter to the board dated April 13, 2015.



3. We changed the general compensation increase from 4% per year to 3.50%, making it the same as the underlying price inflation assumption. As a result, we also changed the aggregate payroll increase assumption from 4% per year to 3.50%. Because of the somewhat slower growth anticipated in our economy for the long-term future, we think that the 0.50% reduction in the long-term rate of inflation is appropriate.
4. The assumed pay increases due to promotion, step, and longevity increases were reviewed and revised to better fit the current pay structure for Killeen firefighters. The 30-year career average of 1.73% per year is slightly lower than in the prior valuation (1.80% per year), with the new assumed annual increases 1.0% lower with one to five years of service and 0.5% higher with 11 to 15 years of service compared to the prior valuation.
5. The general administrative expenses assumption was reviewed, and the average percent of payroll for the last four years was considered an appropriate expectation for the future. As a result, the assumption was increased from the prior assumption of 0.88% of payroll to 1.00% of payroll for this actuarial valuation.
6. The experience of the fund in the election of RETRO DROP has been very different since 2010. Before 2011, no one who was eligible for the RETRO DROP elected it; so we had been assuming that no one would. However, in the last four and a half years, six retirees have been eligible for RETRO DROP, and five of them elected it. As a result, for the retiring firefighters eligible for RETRO DROP, we have changed the assumed percent electing RETRO DROP from 0% to 75%.

The effects of these changes in assumptions on the UAAL amortization period are identified in Section II. A summary of all the assumptions and methods used in the valuation is shown in Exhibits 9 and 10. In our opinion, the assumptions used, both in the aggregate and individually, are reasonably related to the experience of the fund and to reasonable expectations. The assumptions represent a reasonable estimate of anticipated experience of the fund over the long-term future.

### **Supporting Exhibits**

Exhibit 11 contains definitions of terms used in this actuarial valuation report. Exhibit 12 summarizes the plan provisions of the Present Plan.

### **Actuarially Determined Contributions by the City**

The new GASB 68 is all about accounting for pensions and does away with the concept of annually required contributions, referred to as the ARC. The GASB made a point of separating their new accounting standard for public employee defined benefit plans from the actual funding of those plans. In other words, the city's GASB 68 pension expense will be very different from its actual contributions. That is why separate reports will be needed each year beginning in 2015 to provide the required GASB 68 actuarial information.



As a result of GASB getting out of the business of providing a funding standard, the Texas Pension Review Board (PRB) recommended in their report to the Texas Legislature at the end of 2014 that actuarial valuation reports for fixed contribution rate plans should disclose contribution levels required for a variety of appropriate amortization periods. Since the preferred range for the UAAL amortization period is 15 to 25 years in the PRB's guidelines for an actuarially adequate contribution arrangement, we have shown the city contribution rate that would have been required beginning October 1, 2014 for amortization periods of 15, 20, and 25 years based on this September 30, 2014 actuarial valuation.

| UAAL<br>Amortization<br>Period | Actuarially<br>Determined<br>Contribution Rate<br>by the City | Firefighter<br>Contribution<br>Rate | Total<br>Contribution<br>Rate |
|--------------------------------|---------------------------------------------------------------|-------------------------------------|-------------------------------|
| 15 Years                       | 17.13%                                                        | 11.00%                              | 28.13%                        |
| 20 Years                       | 14.99%                                                        | 11.00%                              | 25.99%                        |
| 25 Years                       | 13.74%                                                        | 11.00%                              | 24.74%                        |

### **Variability in Future Actuarial Measurement**

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following:

- Plan experience differing from that anticipated by the current economic or demographic assumptions;
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements;
- Changes in economic or demographic assumptions; and
- Changes in plan provisions.

Analysis of the potential range of such future measurements resulting from the possible sources of measurement variability is typically outside the scope of an actuarial valuation. However, we provided projected amortization periods for the next two biennial actuarial valuations under six scenarios. Additional or other sensitivity analysis could be performed in a subsequent report if desired by the board of trustees.

Respectfully submitted,  
RUDD AND WISDOM, INC.

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Fellow, Society of Actuaries  
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**Section II  
Key Results of the Actuarial Valuation**

|                                                                                        | <u>September 30,<br/>2012<sup>1</sup></u> | <u>September 30,<br/>2014</u> |
|----------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------|
| 1. Actuarial present value of future benefits                                          |                                           |                               |
| a. Those now receiving benefits or former firefighters<br>entitled to receive benefits |                                           |                               |
| i. Paid                                                                                | \$ 16,462,441                             | \$ 19,441,277                 |
| ii. Volunteer                                                                          | 79,529                                    | 73,024                        |
| b. Active firefighters                                                                 |                                           |                               |
| i. Paid                                                                                | 46,102,087                                | 51,700,501                    |
| ii. Volunteer                                                                          | <u>46,572</u>                             | <u>52,280</u>                 |
| c. Total                                                                               | \$ 62,690,629                             | \$ 71,267,082                 |
| 2. Actuarial present value of future normal cost<br>contributions                      | \$ 21,548,127                             | \$ 22,210,568                 |
| 3. Actuarial accrued liability (Item 1c – Item 2)                                      | \$ 41,142,502                             | \$ 49,056,514                 |
| 4. Actuarial value of assets                                                           | \$ 27,528,834                             | \$ 32,604,554                 |
| 5. Unfunded actuarial accrued liability<br>(UAAL) (Item 3 - Item 4)                    | \$ 13,613,668                             | \$ 16,451,960                 |
| 6. Contributions (percent of payroll)                                                  |                                           |                               |
| a. Firefighters                                                                        | 10.00%                                    | 11.00%                        |
| b. City of Killeen                                                                     | <u>13.00%</u>                             | <u>13.00%</u>                 |
| c. Total                                                                               | 23.00%                                    | 24.00%                        |
| 7. Normal cost (percent of payroll) <sup>2</sup>                                       | 16.85%                                    | 16.24%                        |
| 8. Percent of payroll available to amortize the UAAL<br>(Item 6c - Item 7)             | 6.15%                                     | 7.76%                         |
| 9. Annualized covered payroll                                                          | \$ 11,025,643                             | \$ 12,457,025                 |
| 10. Present annual amount available to amortize the<br>UAAL (Item 8 x Item 9)          | \$ 678,077                                | \$ 966,665                    |
| 11. Years to amortize the UAAL <sup>3</sup>                                            | 36.1                                      | 29.5                          |
| 12. Funded ratio (Item 4 ÷ Item 3)                                                     | 66.9%                                     | 66.4%                         |

<sup>1</sup> All items are from the September 30, 2012 actuarial valuation and reflect the Present Plan.

<sup>2</sup> In both valuations, the 7.75% investment return assumption is net of investment-related expenses. General administrative expenses are reflected as a percent of aggregate payroll, with the normal cost percent increased by 0.88% in the September 30, 2012 valuation and by 1.00% in the September 30, 2014 valuation.

<sup>3</sup> Calculated reflecting the city's commitment to contribute \$16,010 annually for volunteer firefighters and pensioners plus \$102 per active volunteer annually. These contributions are assumed to pay the annual normal cost for active volunteers and to pay for the benefits for the current volunteer pensioners.

## Change in Amortization Period

The amortization period, based on the Present Plan provisions, was determined in the actuarial valuation as of September 30, 2012 to be 36.1 years. Since two years have passed since that valuation date, a 34.1-year amortization period would be expected if all actuarial assumptions had been exactly met, no changes had occurred (other than those expected) in the firefighter and pensioner data, and no changes in assumptions or contribution rates had been made. The amortization period is now 29.5 years based on the same plan provisions. The actual experience occurring between September 30, 2012 and September 30, 2014 differed from the expected experience, and in combination with the changes in assumptions, the resulting amortization period was 29.5 years, which is 4.6 years less than the expected 34.1-year period for the following reasons:

1. The increase in the firefighter contribution rate from 10% to 11% of compensation **decreased** the amortization period by 8.5 years.
2. The average annual rate of investment return, net of investment-related expenses, on the market value of assets during the two fiscal years 2013 and 2014 was 6.21%. However, the actuarial value of assets (AVA) used in the valuation and the determination of the amortization period is based on an adjusted market value. The average annual rate of return on the AVA, net of investment-related expenses, for fiscal years 2013 and 2014 was 6.44%, below the assumed rate of return for those years of 7.75%. This resulted in an **increase** in the amortization period of 4.0 years.
3. The aggregate payroll increased at an average rate of 6.3% per year instead of the assumed 4.0% per year rate, which caused the amortization period to **decrease** by 3.2 years.
4. The net result of all experience other than the investment experience and the aggregate payroll experience had the combined effect of **increasing** the amortization period by 1.4 years. This was primarily the result of higher than assumed compensation increases and election of RETRO DROP in the last two years.
5. The result of the change in the mortality assumption had the effect of **increasing** the amortization period by 2.2 years.
6. The change in the general compensation increase and aggregate payroll increase assumptions from 4% to 3.50% and the revisions in the compensation for promotion, step, and longevity increases had the combined effect of **decreasing** the amortization period by 4.2 years.
7. The change in the actuarial assumption for the recognition of the general administrative expenses had the effect of **increasing** the amortization period by 0.5 of a year.
8. The change in the percent of eligible retiring firefighters assumed to elect RETRO DROP had the effect of **increasing** the amortization period by 3.3 years.

### **Section III**

#### **Benefit Improvements**

The results of this actuarial valuation as of September 30, 2014 reveal that the fund, based on the Present Plan of benefits, has an adequate contribution arrangement. As disclosed in both Sections I and II, the amortization period of the UAAL is 29.5 years. In order for benefit improvements to be made to the plan, they must be made in accordance with Section 7 of TLFFRA, as amended in May 2013. Sections 7(a), 7(b) and 7(c) are shown below.

- “(a) The board of trustees of a retirement system may change the benefits or eligibility requirements for benefits payable from the retirement system, may provide for reinstatement by a member of service credit previously forfeited, and may adopt or change other requirements for the payment of benefits, except as otherwise prohibited by this Act.
- (b) Before a board of trustees chooses to adopt or change a benefit or requirement for payment of benefits under this section, the proposed addition or change must be approved by:
  - (1) an eligible actuary selected by the board; and
  - (2) a majority of the participating members of the retirement system voting on the addition or change by secret ballot at an election held for that purpose at which at least 50 percent of all participating members of the retirement system vote.
- (c) To be eligible to approve an addition or change under this section, an actuary must be either a fellow of the Society of Actuaries or a member of the American Academy of Actuaries.”

The board should be cautious in considering benefit improvements in the future due to the sensitivity of the UAAL amortization period to investment losses as shown in the four-year projections in Section I. We have a strategy for injecting caution in future benefit improvements. The idea is to coordinate periodic benefit improvements with a gradual lowering of the benefit improvement cap on the UAAL amortization period to a long-term goal such as 15 years, even though we have been using 25 years as the cap for the last 10 years. We recommend this approach primarily for the following reasons:

1. The Texas Pension Review Board (PRB) guidelines for an actuarially adequate contribution arrangement, and
2. The increasing scrutiny of public employee pension plans.

One approach for implementing this strategy for injecting caution in future benefit improvements would be to wait until the amortization period is below 23 years and then to approve benefit improvements that would increase the amortization period up to as much as 23 years. In subsequent years, we would progressively lower the benefit

improvement cap to 21 years, then 19 years, etc., coordinating periodic benefit improvements with the gradual lowering, until getting to a long-term goal such as 15 years. With this approach we would approve benefit improvements based on the September 30, 2016 actuarial valuation only if the amortization period is below 23 years.

This approach would both strengthen the actuarial condition of the fund and better prepare for the possibility of adverse experience to the fund in the future. The stronger actuarial condition of the fund would be demonstrated by the progressively lower UAAL amortization period until getting to the lower end of the preferred range in the PRB guidelines (15 to 25 years). The kinds of future adverse experience that the fund would be better prepared to withstand would be primarily adverse investment experience.

One of the challenges the board faces is balancing the goals of providing periodic benefit improvements and of managing all your responsibilities in a way that considers the long-term sustainability of the fund. There are a number of stakeholders with different points of view. Firefighters approaching retirement would like to see increases in the benefit formula before they retire. Younger firefighters who hear about the very good benefits that new retirees are receiving may wonder if the fund will be able to pay benefits like that when they retire. Pensioners may wonder if they will get any kind of ad hoc increase in their monthly benefit. The city has a vested interest in providing benefits that are well funded, at a level that is attractive for hiring and retaining good firefighters, and also affordable for the long term. The Legislature has a higher interest in public employee defined benefit plans than ever before. That's the reason for the PRB report to the Legislature at the end of 2014. There are more critics of public employee defined benefit plans than ever before.

Many of the TLFFRA funds in the PRB report to the Legislature had amortization periods above 40 years (17, over 41% of the 41 TLFFRA funds) because they didn't have much of a cushion for adverse investment experience in 2000-2002 and 2008. The TLFFRA funds that are currently in good shape actuarially are often there because of the good fortune of an increase in the city contribution rate that has largely offset the adverse investment experience of 2000-2002 and 2008. The board should not rely only on increases in contribution rates in the future. Part of our responsibility as your fund's actuarial firm is to be forward looking and to help the fund with the challenges of balancing the desire for more benefits with the goal of long-term sustainability. We strongly believe that strengthening the actuarial condition of your fund by gradually reducing the maximum amortization period for benefit improvements will facilitate both benefit improvements over the next few years and long-term sustainability. In addition, it will enhance the board's reputation as good fiduciaries and the fund's reputation as thoughtful and balanced. An enhanced reputation could help make the city more receptive to increasing their contribution rate.

**Exhibit 1**

**Distribution of Paid Firefighters by Age and Service on September 30, 2014  
with Average Annual Salary**

| Years<br>of<br>Service | Age         |          |          |          |          |          |          |          |               | Total    | Average<br>Salary |
|------------------------|-------------|----------|----------|----------|----------|----------|----------|----------|---------------|----------|-------------------|
|                        | Under<br>25 | 25-29    | 30-34    | 35-39    | 40-44    | 45-49    | 50-54    | 55-59    | 60 or<br>Over |          |                   |
| 0                      | 3           | 1        | 4        | 1        | 0        | 0        | 0        | 0        | 0             | 9        | \$42,000          |
| 1                      | 3           | 1        | 3        | 1        | 0        | 0        | 0        | 0        | 0             | 8        | 45,546            |
| 2                      | 3           | 4        | 2        | 1        | 0        | 0        | 0        | 0        | 0             | 10       | 50,330            |
| 3                      | 2           | 4        | 4        | 2        | 0        | 0        | 0        | 0        | 0             | 12       | 53,661            |
| 4                      | 1           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 1        | 56,000            |
| 5                      | 0           | 6        | 4        | 2        | 0        | 0        | 0        | 0        | 0             | 12       | 56,478            |
| 6                      | 0           | 2        | 3        | 1        | 0        | 0        | 0        | 0        | 0             | 6        | 60,162            |
| 7                      | 0           | 5        | 7        | 5        | 2        | 0        | 0        | 0        | 0             | 19       | 63,455            |
| 8                      | 0           | 6        | 6        | 6        | 4        | 0        | 0        | 0        | 0             | 22       | 63,298            |
| 9                      | 0           | 3        | 7        | 5        | 1        | 0        | 0        | 0        | 0             | 16       | 67,152            |
| 10                     | 0           | 0        | 7        | 2        | 0        | 0        | 0        | 0        | 0             | 9        | 68,684            |
| 11                     | 0           | 0        | 1        | 3        | 1        | 0        | 0        | 0        | 0             | 5        | 68,393            |
| 12                     | 0           | 0        | 2        | 3        | 1        | 0        | 0        | 0        | 0             | 6        | 71,133            |
| 13                     | 0           | 0        | 1        | 2        | 1        | 2        | 0        | 0        | 0             | 6        | 76,375            |
| 14                     | 0           | 0        | 0        | 0        | 3        | 1        | 0        | 0        | 0             | 4        | 84,539            |
| 15                     | 0           | 0        | 1        | 4        | 2        | 1        | 0        | 0        | 0             | 8        | 80,617            |
| 16                     | 0           | 0        | 0        | 1        | 3        | 0        | 0        | 0        | 0             | 4        | 86,496            |
| 17                     | 0           | 0        | 0        | 1        | 2        | 0        | 1        | 0        | 0             | 4        | 77,398            |
| 18                     | 0           | 0        | 0        | 0        | 1        | 0        | 1        | 0        | 0             | 2        | 79,169            |
| 19                     | 0           | 0        | 0        | 1        | 1        | 1        | 2        | 0        | 0             | 5        | 84,742            |
| 20-24                  | 0           | 0        | 0        | 0        | 3        | 2        | 1        | 1        | 0             | 7        | 84,808            |
| 25-29                  | 0           | 0        | 0        | 0        | 0        | 1        | 1        | 2        | 0             | 4        | 79,618            |
| 30-34                  | 0           | 0        | 0        | 0        | 0        | 0        | 1        | 3        | 1             | 5        | 78,311            |
| 35+                    | <u>0</u>    | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>1</u> | <u>2</u> | <u>2</u>      | <u>5</u> | <u>86,104</u>     |
| Totals                 | 12          | 32       | 52       | 41       | 25       | 8        | 8        | 8        | 3             | 189      | \$65,910          |

Average \$48,901      \$60,973      \$77,658      \$76,625      \$81,459  
Salary      \$60,053      \$65,862      \$81,405      \$78,438      \$65,910

Average age      35.9  
Average years of service      10.3  
Average age at hire      25.6

**Exhibit 1A**

**Killeen Firefighter's Relief and Retirement Fund  
Distribution of Volunteer Firefighters by Age and Service on September 30, 2014**

| Years<br>of<br>Service | Age         |          |          |          |          |          |          |          |               | Total    |
|------------------------|-------------|----------|----------|----------|----------|----------|----------|----------|---------------|----------|
|                        | Under<br>25 | 25-29    | 30-34    | 35-39    | 40-44    | 45-49    | 50-54    | 55-59    | 60 or<br>Over |          |
| 0                      | 2           | 3        | 2        | 1        | 0        | 0        | 0        | 0        | 0             | 8        |
| 1                      | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 2                      | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 3                      | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 4                      | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 5                      | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 6                      | 0           | 0        | 0        | 0        | 0        | 1        | 0        | 0        | 0             | 1        |
| 7                      | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 8                      | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 1        | 0             | 1        |
| 9                      | 0           | 0        | 0        | 0        | 1        | 0        | 0        | 0        | 0             | 1        |
| 10                     | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 11                     | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 12                     | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 13                     | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 14                     | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 15                     | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 1        | 0             | 1        |
| 16                     | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 17                     | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 18                     | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 19                     | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 20-24                  | 0           | 0        | 0        | 0        | 0        | 0        | 1        | 0        | 0             | 1        |
| 25-29                  | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 30-34                  | 0           | 0        | 0        | 0        | 0        | 0        | 0        | 0        | 0             | 0        |
| 35+                    | <u>0</u>    | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u>      | <u>0</u> |
| Totals                 | 2           | 3        | 2        | 1        | 1        | 1        | 1        | 2        | 0             | 13       |



**Exhibit 1B**

**Killeen Firefighter's Relief and Retirement Fund  
Firefighters with Both Paid and Volunteer Service  
(Estimated Service as of September 30, 2014)**

| Name            | Estimated Service |                   |                |
|-----------------|-------------------|-------------------|----------------|
|                 | Paid Service      | Volunteer Service | Total          |
| Charles Brown   | 38 yrs, 0 mos     | 1 yrs, 8 mos      | 39 yrs, 8 mos  |
| Doug Emberton   | 16 yrs, 0 mos*    | 1 yrs, 0 mos      | 17 yrs, 0 mos* |
| Ethan Gingerich | 18 yrs, 4 mos     | 0 yrs, 7 mos      | 18 yrs, 11mos  |

\* Service shown does not include a break in service.

**Exhibit 2  
Summary of Pensioner Data**

| Type of Benefit                  | Pensioner Data Used in<br>September 30, 2014 Valuation |                                   |
|----------------------------------|--------------------------------------------------------|-----------------------------------|
|                                  | Number of<br>Recipients                                | Total Monthly<br>Benefit Payments |
| Paid Firefighter Pensioners      |                                                        |                                   |
| Service Retirement               | 42                                                     | \$ 125,780                        |
| Disability Retirement            | 0                                                      | 0                                 |
| Vested Terminated (Deferred)     | 9                                                      | 16,761                            |
| Surviving Spouse                 | 8                                                      | 14,622                            |
| Surviving Child                  | 0                                                      | 0                                 |
| Total                            | 59                                                     | \$157,163                         |
| Volunteer Firefighter Pensioners |                                                        |                                   |
| Service Retirement               | 2                                                      | \$ 310                            |
| Disability Retirement            | 0                                                      | 0                                 |
| Vested Terminated (Deferred)     | 0                                                      | 0                                 |
| Surviving Spouse                 | 5                                                      | 533                               |
| Surviving Child                  | 0                                                      | 0                                 |
| Total                            | 7                                                      | \$ 843                            |
| Total Pensioners                 | 66                                                     | \$ 158,006                        |

| Type of Benefit                  | Comparison of Pensioner Count by Type as of<br>The Prior and Current Actuarial Valuations |                 |        |                       |
|----------------------------------|-------------------------------------------------------------------------------------------|-----------------|--------|-----------------------|
|                                  | September 30,<br>2012                                                                     | New             | Ceased | September 30,<br>2014 |
| Paid Firefighter Pensioners      |                                                                                           |                 |        |                       |
| Service Retirement               | 38 <sup>1</sup>                                                                           | +5 <sup>1</sup> | -1     | 42 <sup>2</sup>       |
| Disability Retirement            | 0                                                                                         | 0               | 0      | 0                     |
| Vested Terminated (Deferred)     | 4                                                                                         | +5              | 0      | 9                     |
| Surviving Spouse                 | 9                                                                                         | 0               | -1     | 8                     |
| Surviving Child                  | 0                                                                                         | 0               | 0      | 0                     |
| Total                            | 51                                                                                        | +10             | -2     | 59                    |
| Volunteer Firefighter Pensioners |                                                                                           |                 |        |                       |
| Service Retirement               | 3                                                                                         | 0               | -1     | 2                     |
| Disability Retirement            | 0                                                                                         | 0               | 0      | 0                     |
| Vested Terminated (Deferred)     | 0                                                                                         | 0               | 0      | 0                     |
| Surviving Spouse                 | 4                                                                                         | +1              | 0      | 5                     |
| Surviving Child                  | 0                                                                                         | 0               | 0      | 0                     |
| Total                            | 7                                                                                         | +1              | -1     | 7                     |
| Total Pensioners                 | 58                                                                                        | +11             | -3     | 66                    |

<sup>1</sup> Includes an alternate payee according to the terms of a QDRO for a retired member.

<sup>2</sup> Includes two alternate payees according to the terms of a QDRO for a retired member.

**Exhibit 2A  
Firefighter and Pensioner Reconciliation**

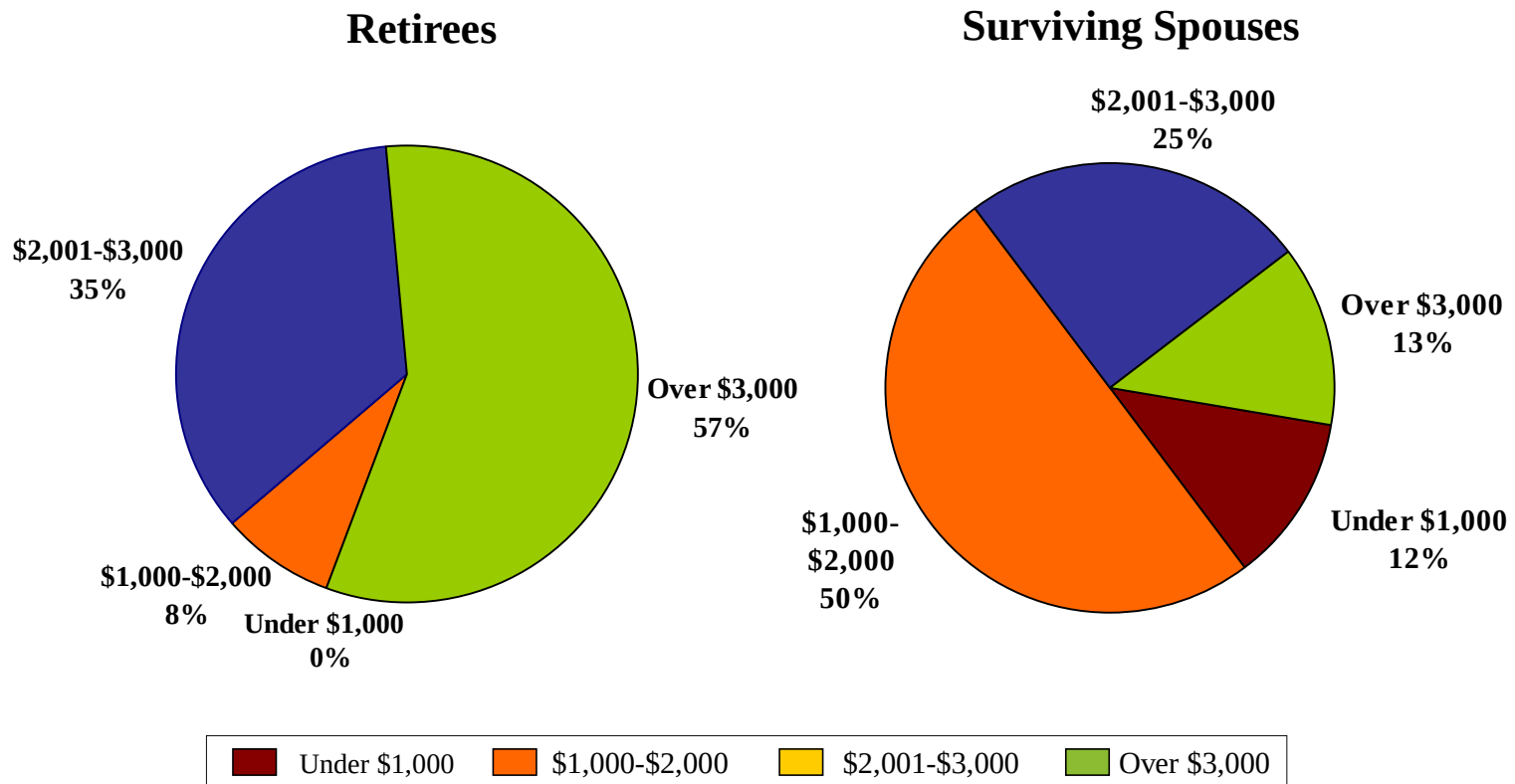
|                             | Firefighters | Volunteer<br>Firefighters | Current<br>Payment<br>Status | Vested<br>Terminated<br>Firefighters | Total     |
|-----------------------------|--------------|---------------------------|------------------------------|--------------------------------------|-----------|
| 1. As of September 30, 2012 | 193          | 11                        | 54 <sup>1</sup>              | 4                                    | 262       |
| 2. Change of status         |              |                           |                              |                                      |           |
| a. retirement               | (4)          | 0                         | 5 <sup>1</sup>               | 0                                    | 1         |
| b. disability               | 0            | 0                         | 0                            | 0                                    | 0         |
| c. death                    | 0            | 0                         | (3)                          | 0                                    | (3)       |
| d. survivor payment begins  | 0            | 0                         | 1                            | 0                                    | 1         |
| e. withdrawal               | (15)         | (5)                       | 0                            | 0                                    | (20)      |
| f. vested termination       | (5)          | 0                         | 0                            | 5                                    | 0         |
| g. volunteer to paid        | 0            | 0                         | 0                            | 0                                    | 0         |
| h. new QDRO                 | <u>0</u>     | <u>0</u>                  | <u>0</u>                     | <u>0</u>                             | <u>0</u>  |
| i. net changes              | (24)         | (5)                       | 3                            | 5                                    | (21)      |
| 3. New firefighters         | <u>20</u>    | <u>7</u>                  | <u>0</u>                     | <u>0</u>                             | <u>27</u> |
| 4. As of September 30, 2014 | 189          | 13                        | 57 <sup>2</sup>              | 9                                    | 268       |

<sup>1</sup> Includes an alternate payee according to the terms of a QDRO for a retired member.

<sup>2</sup> Includes two alternate payees according to the terms of a QDRO for a retired member.

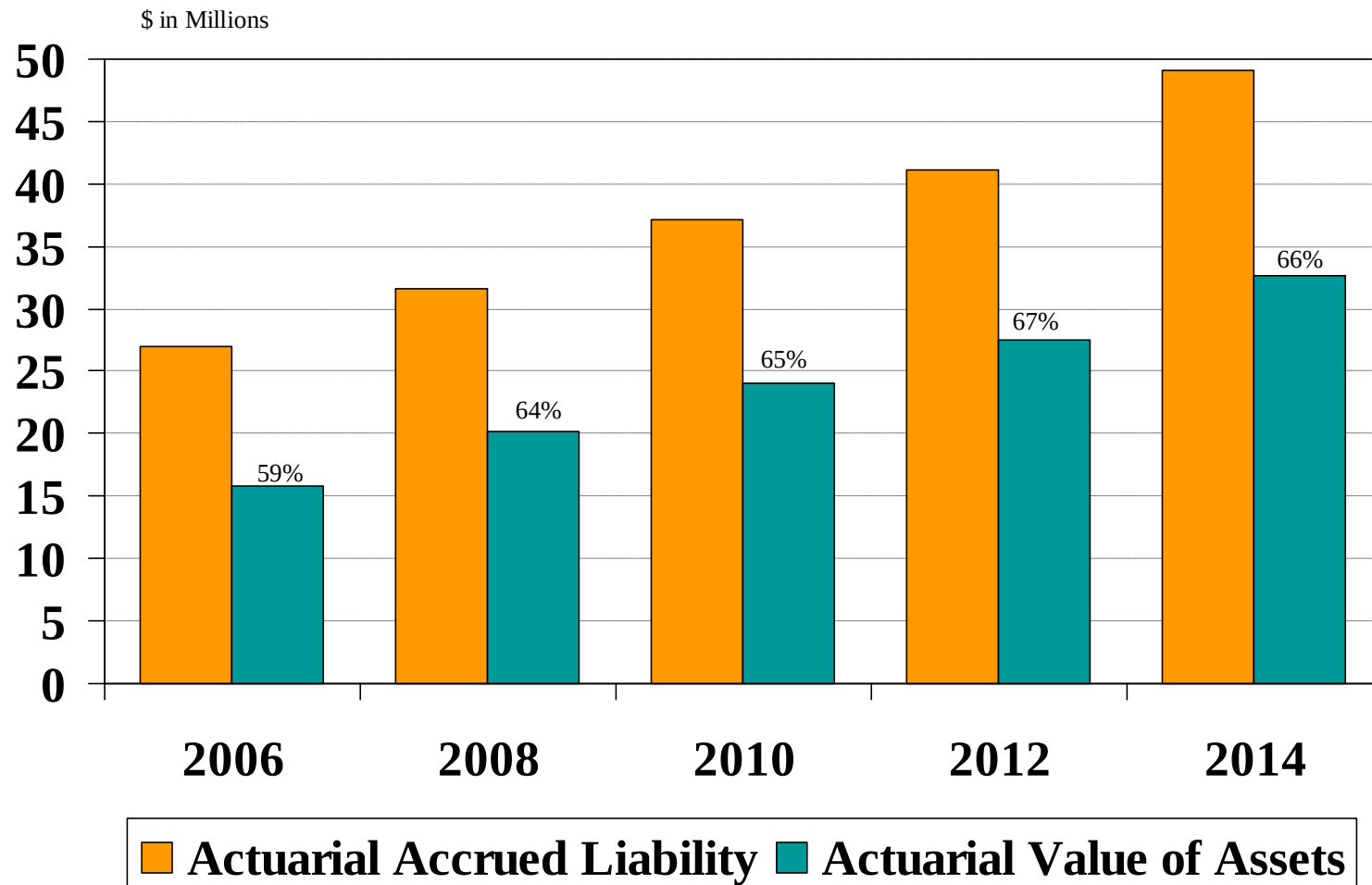
Exhibit 3

Breakdown of Paid Firefighters Pensioners by Monthly Benefit Amounts  
as of September 30, 2014



**Exhibit 4**

**Historical Comparison of Actuarial Accrued Liability for Active Firefighters and Pensioners  
(Present Plan Valuations as of September 30)**



**Exhibit 5**  
**Summary of Asset Data**

| Asset Type             | Market Value of<br>Assets as of<br>September 30, 2014 | Allocation<br>as a Percent<br>of Grand Total <sup>1</sup> |
|------------------------|-------------------------------------------------------|-----------------------------------------------------------|
| Domestic Equities      |                                                       |                                                           |
| Large Cap              | \$6,907,089                                           | 21.69%                                                    |
| Natural Resources      | 2,052,491                                             | 6.45                                                      |
| Mid Cap                | 855,597                                               | 2.69                                                      |
| Small Cap              | 828,977                                               | 2.60                                                      |
| Total                  | 10,644,154                                            | 33.43                                                     |
| International Equities |                                                       |                                                           |
| Developed              | 2,634,156                                             | 8.27                                                      |
| Emerging Markets       | 2,341,887                                             | 7.35                                                      |
| Total                  | 4,976,043                                             | 15.62                                                     |
| Fixed Income           |                                                       |                                                           |
| Core                   | 5,538,420                                             | 17.39                                                     |
| Multi Sector           | 2,702,514                                             | 8.49                                                      |
| Emerging Markets       | 2,124,855                                             | 6.67                                                      |
| Total                  | 10,365,789                                            | 32.55                                                     |
| Alternatives           | 3,067,182                                             | 9.63                                                      |
| Cash Net of Payables   | 2,791,033                                             | 8.77                                                      |
| Grand Total            | \$31,844,201                                          | 100.00%                                                   |

| Comparison of Asset Values as of the Prior and Current Actuarial Valuation Dates |                           |                           |
|----------------------------------------------------------------------------------|---------------------------|---------------------------|
|                                                                                  | <u>September 30, 2012</u> | <u>September 30, 2014</u> |
| Market Value                                                                     | \$26,974,697              | \$31,844,201              |
| Actuarial Value                                                                  | \$27,528,834              | \$32,604,554              |
| Actuarial Value as a Percent<br>of Market Value                                  | 102.1%                    | 102.4%                    |

<sup>1</sup> The board changed its asset allocation target in June 2014 and was still in the process of implementing significant changes in both allocations and investment managers as of September 30, 2014.

**Exhibit 5A**

**Statement of Changes in Audited Assets  
for the Years Ended September 30, 2014 and 2013**

|                                            | <u>9/30/2014</u>    | <u>9/30/2013</u>    |
|--------------------------------------------|---------------------|---------------------|
| <b>Additions</b>                           |                     |                     |
| 1. Contributions                           |                     |                     |
| a. Employer                                | \$ 1,541,096        | \$ 1,483,016        |
| b. Employees                               | <u>1,284,686</u>    | <u>1,127,336</u>    |
| c. Total                                   | \$ 2,825,782        | \$ 2,610,352        |
| 2. Investment Income                       |                     |                     |
| a. Interest and dividends                  | \$ 549,075          | \$ 698,036          |
| b. Net appreciation in fair value          | <u>1,543,046</u>    | <u>970,463</u>      |
| c. Total                                   | \$ 2,092,121        | \$ 1,668,499        |
| 3. Other Additions                         | <u>0</u>            | <u>0</u>            |
| <b>Total Additions</b>                     | <b>\$ 4,917,903</b> | <b>\$ 4,278,851</b> |
| <b>Deductions</b>                          |                     |                     |
| 4. Benefit Payments                        |                     |                     |
| a. Monthly benefits                        | \$ 1,646,898        | \$ 1,539,706        |
| b. Contribution refunds                    | 311,704             | 186,264             |
| c. RETRO DROP lump sums                    | <u>146,851</u>      | <u>26,419</u>       |
| d. Total                                   | \$ 2,105,453        | \$ 1,752,389        |
| 5. Expenses                                |                     |                     |
| a. Direct investment-related               | \$ 119,529          | \$ 101,031          |
| b. General administrative                  | <u>130,049</u>      | <u>118,799</u>      |
| c. Total                                   | \$ 249,578          | \$ 219,830          |
| <b>Total Deductions</b>                    | <b>\$ 2,355,031</b> | <b>\$ 1,972,219</b> |
| <b>Net Increase in Assets</b>              | <b>\$ 2,562,872</b> | <b>\$ 2,306,632</b> |
| Market Value of Assets (Plan Net Position) |                     |                     |
| Beginning of Year                          | \$ 29,281,329       | \$ 26,974,697       |
| End of Year                                | \$ 31,844,201       | \$ 29,281,329       |
| Rate of Return                             |                     |                     |
| Net of All Expenses                        | 6.22%               | 5.29%               |
| Net of Investment-Related Expenses         | 6.67%               | 5.73%               |
| Gross                                      | 7.09%               | 6.11%               |
| Direct Investment-Related Expenses         | 0.42%               | 0.38%               |



**Exhibit 6**

**Development of Actuarial Value of Assets**

| Calculation of Actuarial Investment Gain/(Loss) Based on Market Value for Plan Years Ending September 30 |                   |                   |                   |                   |
|----------------------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|-------------------|
|                                                                                                          | 2014              | 2013              | 2012              | 2011              |
| 1. Market Value of Assets as of Beginning of Year                                                        | \$ 29,281,329     | \$ 26,974,697     | \$ 23,831,864     | \$ 22,679,695     |
| 2. Firefighter Contributions                                                                             | 1,284,686         | 1,127,336         | 1,094,959         | 1,084,620         |
| 3. City Contributions                                                                                    | 1,541,096         | 1,483,016         | 1,439,762         | 1,425,767         |
| 4. Benefit Payments and Administrative Expenses <sup>1</sup>                                             | (2,235,502)       | (1,871,188)       | (1,708,809)       | (1,412,277)       |
| 5. Expected Investment Return <sup>2</sup>                                                               | <u>2,292,176</u>  | <u>2,119,182</u>  | <u>1,878,376</u>  | <u>1,799,434</u>  |
| 6. Expected Market Value of Assets as of End of Year                                                     | \$ 32,163,785     | 29,833,043        | \$ 26,536,152     | \$ 25,577,239     |
| 7. Actual Market Value of Assets as of End of Year                                                       | <u>31,844,201</u> | <u>29,281,329</u> | <u>26,974,697</u> | <u>23,831,864</u> |
| 8. Actuarial Investment Gain/(Loss)                                                                      | \$ (319,584)      | \$ (551,714)      | \$ 438,545        | \$ (1,745,375)    |
| 9. Market Value Rate of Return Net of Expenses                                                           | 6.67%             | 5.73%             | 9.56%             | 0.23%             |
| 10. Rate of Actuarial Investment Gain/(Loss)                                                             | (1.08)%           | (2.02)%           | 1.81%             | (7.52)%           |

<sup>1</sup> Administrative expenses are included for 2013 and 2014 because the investment return assumption was net of investment-related expenses for those years. In 2011 and 2012, the investment return assumption was net of all expenses.

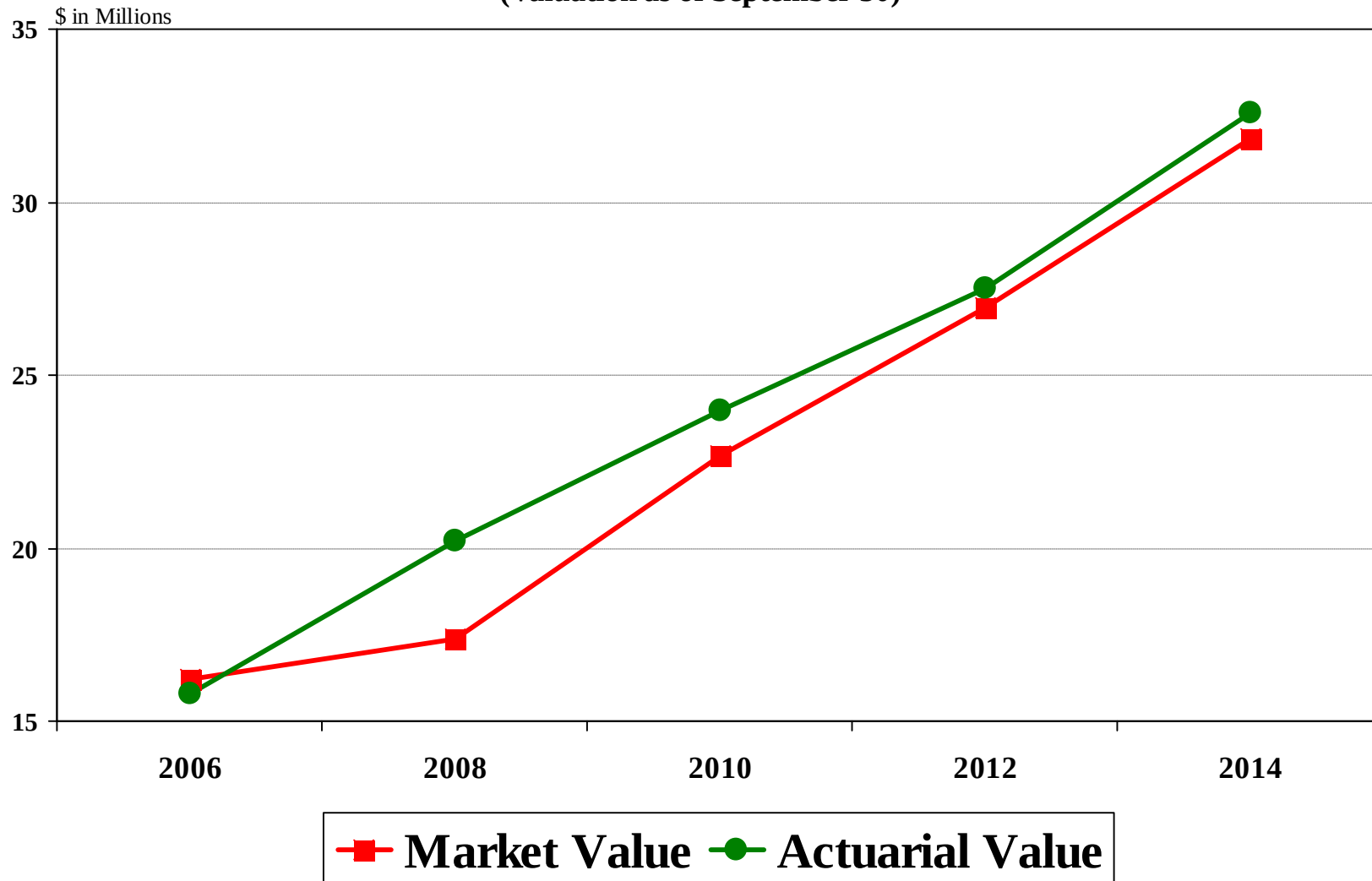
<sup>2</sup> Assuming uniform distribution of contributions and payments during the plan years; actuarially assumed investment return of 7.75%.

| Plan Year | Investment Gain/(Loss) | Deferral Percentage | Deferred Gain/(Loss) as of 9/30/2014 |
|-----------|------------------------|---------------------|--------------------------------------|
| 2014      | \$ (319,584)           | 80%                 | \$ (255,667)                         |
| 2013      | (551,714)              | 60%                 | (331,029)                            |
| 2012      | 438,545                | 40%                 | 175,418                              |
| 2011      | (1,745,375)            | 20%                 | <u>(349,075)</u>                     |
| Total     |                        |                     | \$ (760,353)                         |

| Actuarial Value of Assets as of September 30, 2014         |                  |
|------------------------------------------------------------|------------------|
| 11. Market Value of Assets as of September 30, 2014        | \$ 31,844,201    |
| 12. Deferred Gain/(Loss) to be Recognized in Future        | <u>(760,353)</u> |
| 13. Preliminary Value (Item 11 – Item 12)                  | \$ 32,604,554    |
| 14. Corridor for Actuarial Value of Assets                 |                  |
| a. 80% of Market Value as of September 30, 2014 (minimum)  | \$ 25,475,361    |
| b. 120% of Market Value as of September 30, 2014 (maximum) | \$ 38,213,041    |
| 15. Actuarial Value as of September 30, 2014               | \$ 32,604,554    |
| 16. Write Up/(Down) of Assets (Item 15 – Item 11)          | \$ 760,353       |

Exhibit 7

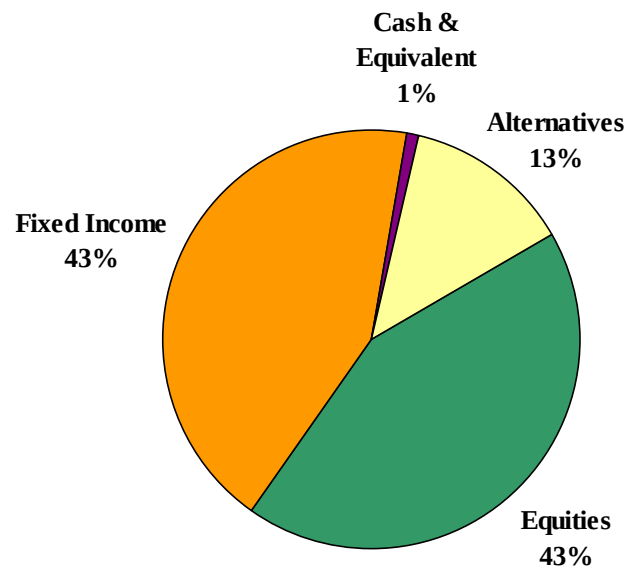
Historical Comparison of Market and Actuarial Value of Assets  
(Valuation as of September 30)



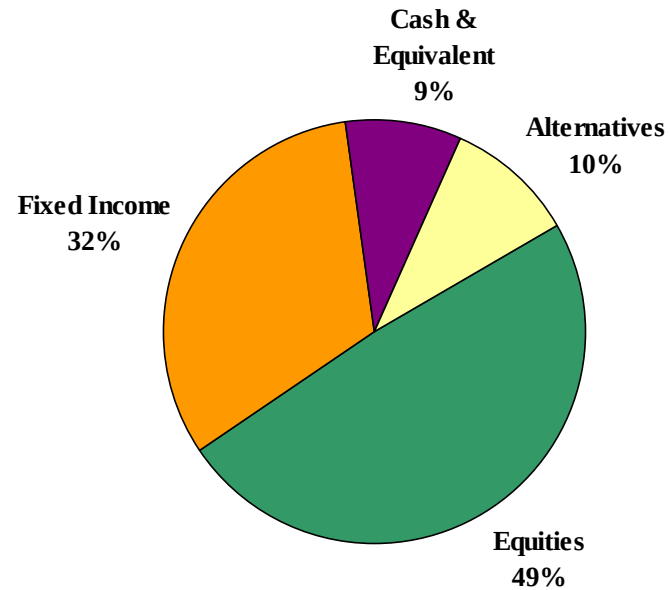
**Exhibit 8**

**Comparison of Market Value Asset Investment Allocation as of the Prior and Current  
Actuarial Valuation Dates**

**September 30, 2012**



**September 30, 2014**



## Exhibit 9

### Actuarial Methods and Assumptions

#### A. Actuarial Methods

##### 1. Actuarial Cost Method

The Entry Age Actuarial Cost Method is an actuarial cost method in which the actuarial present value of projected benefits of each active firefighter included in the valuation is allocated as a level percentage of compensation between age at hire and assumed termination. Each active firefighter's normal cost is the current annual contribution in a series of annual contributions which, if made throughout the firefighter's total period of employment, would fund his expected benefits. Each firefighter's normal cost is calculated to be a constant percentage of his expected compensation in each year of employment. The normal cost for the fund is the sum of the normal costs for each active firefighter for the year following the valuation date. The normal cost as a percent of payroll reflects that contributions are made biweekly.

The fund's actuarial accrued liability is the excess of the actuarial present value of projected benefits over the actuarial present value of all future remaining normal cost contributions. The unfunded actuarial accrued liability (UAAL) is the amount by which the actuarial accrued liability exceeds the actuarial value of assets. The UAAL is recalculated each time a valuation is performed. Experience gains and losses, which represent deviations of the UAAL from its expected value based on the prior valuation, are determined at each valuation and are amortized as part of the newly calculated UAAL.

##### 2. Amortization Method

The UAAL is assumed to be amortized with level percentage of payroll contributions (total assumed contribution rate less normal cost contribution rate) based on assumed payroll growth of 3.50% per year. The actuarial determination of the amortization period reflects that contributions are made biweekly.

##### 3. Actuarial Value of Assets Method

All assets are valued at market value with an adjustment made to uniformly spread actuarial gains or losses (as measured by actual market value investment return vs. expected market value investment return) over a five-year period. The total adjustment amount shall be limited as necessary such that the actuarial value of assets shall not be less than 80% of market value nor greater than 120% of market value. See Exhibit 6.

## B. Actuarial Assumptions

As a part of each actuarial valuation, we review the actuarial assumptions used in the prior actuarial valuation. The investment return assumption is reviewed using the building block approach that includes several asset allocations, assumed real rates of return for each asset class, an assumed rate of investment-related expenses, and an assumed rate of inflation, with all assumptions for the long-term future. Our economic assumptions are influenced both by long-term historical experience and by future expectations of investment consultants and economists, but we select the economic assumptions and discuss them with the board before completing the actuarial valuation.

We review the termination and retirement experience since the prior valuation and periodically look back more than two years. We also periodically review the average salaries by years of service to get insights into the promotion, step, and longevity compensation patterns for the purpose of reviewing our compensation increase assumption. For the mortality assumptions, we use an appropriate published mortality table with projections for improvement beyond the valuation date. We are guided in our review and selection of assumptions by the relevant actuarial standards of practice. As a result of our review, we have selected actuarial assumptions we consider to be reasonable and appropriate estimates of future experience for the system for the long-term future.

### 1. Investment Return

7.75% per year net of investment-related expenses.

### 2. Inflation

3.50% per year included in compensation increases and investment return assumptions.

### 3. Mortality Rates

RP-2000 Combined Healthy Mortality Table projected to 2024 by scale AA for males and for females (sex distinct) for all three types of mortality: pre-retirement, post-retirement, and post-disability.

### 4. Compensation Increases

General increases of 3.50% per year in addition promotion, step, and longevity increases that average 1.73% per year over a 30-year career. See Exhibit 10.

5. Retirement Rates

| Age   | Rate per Year for Paid<br>Firefighters Eligible to Retire |
|-------|-----------------------------------------------------------|
| 50-51 | 30%                                                       |
| 52-55 | 15                                                        |
| 56-69 | 25                                                        |
| 70    | 100                                                       |

The average expected retirement age for paid firefighters not yet eligible to retire based on these rates is 55.2. All volunteer firefighters are assumed to retire when first eligible, resulting in an average retirement age of age 57.

6. RETRO DROP Election

- a. Percent of firefighters eligible electing RETRO DROP: 75% of service retirements eligible to elect at least a 12-month lump sum.
- b. Months assumed for lump sum: Maximum they are eligible for, up to 24 months.

7. Withdrawal Rates

See Exhibit 10.

8. Disability Rates

See Exhibit 10. The on-duty and off-duty rates are each 50% of the total rate at each age.

9. Reduction in Benefit after 2½ Years of Disability Retirement

15% weighted average reduction in benefit.

10. Percent Married

80% of the firefighters are assumed to be married at retirement, disability, or death while employed, with male firefighters having a spouse two years younger and female firefighters having a spouse two years older.

11. Payment Form for Retirement Benefits Due to Service Retirement, Disability Retirement, or Vested Termination

- Joint and 2/3 to surviving spouse for the 80% assumed to be married
- Life annuity for the 20% assumed to be single

To the extent optional forms of payment are elected and the amounts are determined under an actuarial basis which differs from the basis used in the valuation, actuarial gains or losses will occur. These gains or losses are expected to be very small and will be recognized through the valuation process for those retiring since the prior valuation who made an optional election.

12. Surviving Child's Death Benefit

None are assumed as a result of future deaths.

13. Paid Firefighters' Contribution Rate

11.00% of covered pay.

14. City's Assumed Contributions

- 13% of covered payroll for paid firefighters.
- \$16,010 per year plus \$102 per year per active volunteer, which together are assumed to pay the annual normal cost for active volunteers and to pay the benefits for the current volunteer pensioners.

15. Covered Payroll for First Year Following Valuation Date

Actual (or annualized) pay for 2014 with adjustment for each firefighter to reflect the 8% pay increase effective in October 2014.

16. General Administrative Expenses

The expenses paid by fund assets for other than investment-related expenses are assumed to be 1.00% of payroll. The normal cost rate as a percent of payroll is assumed to be 1.00% of payroll higher to reflect these expenses.

17. Increase in Future Pay-Related Benefits Due to Definition of Average Salary

- 0.50%

**Exhibit 10  
Disability, Mortality, and Withdrawal Rates per 1,000 Active Members  
Compensation Increases by Years of Service**

| Attained Age | Disability and Mortality Rates |           |        | Withdrawal Rates |           |           | Compensation Increases |                  |
|--------------|--------------------------------|-----------|--------|------------------|-----------|-----------|------------------------|------------------|
|              | Disability <sup>1</sup>        | Mortality |        | Years of Service | Paid Rate | Vol. Rate | Years of Service       | Increase Percent |
|              |                                | Male      | Female |                  |           |           |                        |                  |
| 20           | 0.14                           | 0.218     | 0.130  | 0                | 89        | 163       | 1                      | 9.71%            |
| 21           | 0.15                           | 0.231     | 0.126  | 1                | 80        | 146       | 2                      | 9.71             |
| 22           | 0.16                           | 0.243     | 0.129  | 2                | 71        | 130       | 3                      | 9.71             |
| 23           | 0.17                           | 0.260     | 0.134  | 3                | 63        | 115       | 4                      | 9.71             |
| 24           | 0.18                           | 0.275     | 0.140  | 4                | 55        | 100       | 5                      | 9.71             |
| 25           | 0.19                           | 0.295     | 0.148  | 5                | 47        | 86        | 6                      | 6.61             |
| 26           | 0.21                           | 0.327     | 0.160  | 6                | 41        | 74        | 7                      | 6.61             |
| 27           | 0.23                           | 0.339     | 0.167  | 7                | 36        | 65        | 8                      | 6.61             |
| 28           | 0.25                           | 0.348     | 0.176  | 8                | 32        | 58        | 9                      | 6.61             |
| 29           | 0.28                           | 0.365     | 0.186  | 9                | 29        | 52        | 10                     | 6.61             |
| 30           | 0.31                           | 0.394     | 0.207  | 10               | 25        | 45        | 11                     | 5.05             |
| 31           | 0.35                           | 0.442     | 0.253  | 11               | 21        | 38        | 12                     | 5.05             |
| 32           | 0.40                           | 0.498     | 0.289  | 12               | 18        | 32        | 13                     | 5.05             |
| 33           | 0.45                           | 0.559     | 0.317  | 13               | 16        | 29        | 14                     | 5.05             |
| 34           | 0.49                           | 0.622     | 0.342  | 14               | 14        | 26        | 15                     | 5.05             |
| 35           | 0.52                           | 0.685     | 0.364  | 15               | 14        | 25        | 16                     | 3.50             |
| 36           | 0.54                           | 0.746     | 0.385  | 16               | 14        | 24        | 17                     | 3.50             |
| 37           | 0.57                           | 0.802     | 0.405  | 17               | 12        | 22        | 18                     | 3.50             |
| 38           | 0.62                           | 0.834     | 0.426  | 18               | 11        | 21        | 19                     | 3.50             |
| 39           | 0.73                           | 0.863     | 0.451  | 19               | 11        | 20        | 20                     | 3.50             |
| 40           | 0.92                           | 0.890     | 0.491  | 20 & Over        | 0         | 0         | 21                     | 3.50             |
| 41           | 1.14                           | 0.919     | 0.539  |                  |           |           | 22                     | 3.50             |
| 42           | 1.32                           | 0.955     | 0.593  |                  |           |           | 23                     | 3.50             |
| 43           | 1.48                           | 0.996     | 0.652  |                  |           |           | 24                     | 3.50             |
| 44           | 1.73                           | 1.046     | 0.716  |                  |           |           | 25                     | 3.50             |
| 45           | 2.09                           | 1.102     | 0.763  |                  |           |           | 26                     | 3.50             |
| 46           | 2.55                           | 1.152     | 0.810  |                  |           |           | 27                     | 3.50             |
| 47           | 2.98                           | 1.206     | 0.857  |                  |           |           | 28                     | 3.50             |
| 48           | 3.34                           | 1.263     | 0.927  |                  |           |           | 29                     | 3.50             |
| 49           | 3.62                           | 1.322     | 1.002  |                  |           |           | 30                     | 3.50             |
| 50           | 3.79                           | 1.383     | 1.111  |                  |           |           | 31                     | 3.50             |
| 51           | 3.92                           | 1.545     | 1.258  |                  |           |           | 32                     | 3.50             |
| 52           | 4.04                           | 1.642     | 1.439  |                  |           |           | 33                     | 3.50             |
| 53           | 4.24                           | 1.796     | 1.652  |                  |           |           | 34                     | 3.50             |
| 54           | 4.56                           | 1.968     | 1.904  |                  |           |           | 35                     | 3.50             |
| 55           | 0.00                           | 2.287     | 2.241  |                  |           |           | 36                     | 3.50             |
| 56           | 0.00                           | 2.716     | 2.674  |                  |           |           | 37                     | 3.50             |
| 57           | 0.00                           | 3.110     | 3.084  |                  |           |           | 38                     | 3.50             |
| 58           | 0.00                           | 3.580     | 3.478  |                  |           |           | 39                     | 3.50             |
| 59           | 0.00                           | 4.037     | 3.938  |                  |           |           | 40                     | 3.50             |
| 60           |                                | 4.581     | 4.482  |                  |           |           |                        |                  |
| 61           |                                | 5.341     | 5.155  |                  |           |           |                        |                  |
| 62           |                                | 6.093     | 5.902  |                  |           |           |                        |                  |
| 63           |                                | 7.138     | 6.781  |                  |           |           |                        |                  |
| 64           |                                | 8.042     | 7.642  |                  |           |           |                        |                  |

<sup>1</sup> Applicable when not eligible for service retirement. The on-duty and off-duty rates are each 50% of the total rate at each age.



## **Exhibit 11**

### **Definitions**

- |                                |                                                                                                                                                                                                                                                   |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Actuarial Accrued Liability | That portion, as determined by the particular actuarial cost method used, of the Actuarial Present Value of future pension plan benefits as of the Valuation Date that is not provided for by the Actuarial Present Value of future Normal Costs. |
| 2. Actuarial Assumptions       | Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, termination, disablement and retirement; changes in compensation; rates of investment earnings and asset appreciation; and other relevant items.   |
| 3. Actuarially Equivalent      | Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.                                                                                                                   |
| 4. Actuarial Gain (Loss)       | A measure of the difference between actual experience and that expected based on the Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with the particular actuarial cost method used.   |
| 5. Actuarial Present Value     | The value of an amount or series of amounts payable or receivable at various times, determined as of a given date (the Valuation Date) by the application of the Actuarial Assumptions.                                                           |
| 6. Actuarial Valuation         | The determination, as of a Valuation Date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets and related Actuarial Present Values for a pension plan.                                                                    |
| 7. Actuarial Value of Assets   | The value of cash, investments and other property belonging to a pension plan, as determined by a method and used by the actuary for the purpose of an Actuarial Valuation.                                                                       |

- |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8. Entry Age Actuarial Cost Method                             | An actuarial cost method under which the Actuarial Present Value of the Projected Benefits of each individual included in the Actuarial Valuation is allocated as a level percentage of earnings between entry age and assumed termination. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a Valuation Date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability. Under this method, Actuarial Gains (Losses), as they occur, reduce (increase) the Unfunded Actuarial Accrued Liability. |
| 9. Plan Year                                                   | A 12-month period beginning October 1 and ending September 30.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 10. Normal Cost                                                | That portion of the Actuarial Present Value of pension plan benefits that is allocated to a valuation year by the actuarial cost method.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 11. Projected Benefits                                         | Those pension plan benefit amounts that are expected to be paid at various future times according to the Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future qualified service.                                                                                                                                                                                                                                                                                                                                                                                                      |
| 12. Overfunded Actuarial Accrued Liability                     | The excess, if any, of the Actuarial Value of Assets over the Actuarial Accrued Liability.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 13. Unfunded Actuarial Accrued Liability                       | The excess, if any, of the Actuarial Accrued Liability over the Actuarial Value of Assets.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 14. Valuation Date                                             | The date upon which the Normal Cost, Actuarial Accrued Liability and Actuarial Value of Assets are determined. Generally, the Valuation Date will coincide with the end of a Plan Year, but it does not have to coincide.                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 15. Years to Amortize the Unfunded Actuarial Accrued Liability | The period is determined in each Actuarial Valuation as the number of years, beginning with the Valuation Date, to amortize the Unfunded Actuarial Accrued Liability with a level percent of payroll that is the difference between the expected total contribution rate and the Normal Cost contribution rate.                                                                                                                                                                                                                                                                                                                                            |

**Exhibit 12**  
**Summary of Present Plan**

1. Monthly Retirement Benefit for Paid Firefighters as a Percentage of Highest 60-Month Average Salary
  - (a) For service and duty-related disability retirement benefit 58.40%
  - (b) For duty-related death benefit to surviving spouse 38.93%
2. Additional Monthly Retirement Benefit for Paid Firefighters as a Percentage of Highest 60-Month Average Salary for Each Year of Service in Excess of 20 Years of Service
  - (a) For service and duty-related disability retirement benefit 2.275%
  - (b) For duty-related death benefit to surviving spouse 1.517%
3. Service Retirement Eligibility for Paid Firefighters Age 50 and 25 Years or  
Age 55 and 20 Years
4. Retroactive Deferred Retirement Option Plan (RETRO DROP) provides a reduced monthly benefit and a lump sum
  - (a) Earliest RETRO DROP benefit calculation date 3.5 Years after Service Retirement Eligibility
  - (b) Maximum RETRO DROP benefit accumulation period 24 Months
  - (c) Earliest employment termination date with maximum RETRO DROP benefit accumulation period Age 55.5 and 30.5 Years or  
Age 60.5 and 25.5 Years
  - (d) RETRO DROP lump sum includes
    - (i) monthly benefits that would have been received between RETRO DROP benefit calculation date and termination of employment,
    - (ii) accumulated contributions made by the firefighter after the RETRO DROP benefit calculation date, and
    - (iii) no interest
5. Vested Termination Benefit
  - (a) Eligibility for paid firefighters 10 years
  - (b) Percent vested with 10 years 50%
  - (c) Additional percent vested for each year above 10 years 5%
  - (d) Percent vested with 20 or more years 100%
  - (e) Benefit is deferred to date person would have satisfied service retirement eligibility date
  - (f) Benefit is percent vested times service retirement benefit
6. Monthly Duty-Related Death Benefit for Children of Paid Firefighters as a Percentage of Highest 60-Month Average Salary
  - (a) Where the spouse is receiving a benefit 7.79%
  - (b) Where the spouse is not receiving a benefit or there is no spouse 38.93%

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