nyhart

City of Orlando
Firefighter Pension Fund

Experience Study
October 1, 2014 – September 30, 2018

November 21, 2019

Table of Contents

I. Objectives and Process

The primary objectives of this study are to measure the recent experience of the City of Orlando Firefighter Pension Fund, to recommend, as appropriate, a new set of actuarial assumptions to be used starting with the 10/1/2019 valuation, and to measure the impact on the plan's liabilities of changing to this new set of assumptions. Experience studies help ensure that plan liabilities are accurately valued so that the plan and its sponsor can responsibly manage the fund and fulfill their obligations to participants.

We gathered data from valuations spanning 10/1/2014 through 9/30/2018. After gathering the five necessary census files, we measured the experience for each of the four years individually. For instance, we determined the withdrawal rates during the period 10/1/2014 – 9/30/2015 by checking to see which active members in the 10/1/2014 data were missing or reported as terminated in the 10/1/2015 active file.

Each of the demographic assumptions analyzed could potentially vary by age or service. We initially looked to see if the structure of the current tables made sense. Did termination rates really differ by age? Did pay increases follow a more predictable pattern when broken down by age or by service? We ultimately concluded that the structures of the current tables were appropriate.

Once satisfied with the structure of the tables, we charted both the current assumption and the recent actual experience. Our recommended assumption set was our attempt to blend the recent experience with both the current assumption and consideration for how things might change in the future, i.e. future expectations of pay increases. Then, we "smoothed" our rates in order to iron out data anomalies.

Finally, we measured the impact on the plan's liabilities of reflecting the recommended assumptions. We also calculated potential changes to the recommended contribution rate that might result from adopting updated assumptions.

There are a few key points to note:

- **Plan provisions remained unchanged.** None of the results of this study has any impact on the actual benefits that will be paid out to participants. This study deals only with the underlying actuarial assumptions and thus only affects the levels and timing of the contributions to the plan.

- **Only a small number of exposures were present in this study.** Since the plan did not experience large amounts of exposures or study-lives for many of the assumptions, recommendations were developed based on the combination of observable results, past studies, and expectations of the Fund, and not solely on the results of this study.

- **Past experience isn't necessarily indicative of future results.** Just because employees behaved a certain way in the past doesn't mean their behavior will continue unchanged. Outside factors, such as economic conditions, often have a significant impact on participant behavior.

The actual assumptions that were reviewed are in the following list:

- Economic

    - Investment return
    - Investment & non-investment expenses
    - Annual rate of inflation
    - Annual pay increases
    - Annual payroll growth

- Demographic

    - Rates of retirement
    - Rates of withdrawal
    - Rates of disability
    - Rates of mortality
    - Marital status
    - Age difference of spouses

- Methodology

    - Amortization of unfunded liability
    - Asset valuation methodology

Please note that not every assumption in this list was examined historically. There are a variety of reasons for not doing so, including materiality in the valuation, lack of historical data, and/or lack of exposures for analysis.

II. Certification

This report is prepared for the primary purposes of measuring the recent experience of the City of Orlando Firefighter Pension Fund and recommending reasonable actuarial assumptions to be used in determining the annual funding requirements.

The information presented in this report is based on the information furnished to us by the Plan Administrator and used in our annual valuations. In our opinion, the assumptions recommended are reasonable and represent a reasonable expectation of future experience under the Pension Fund. All calculations have been made in accordance with generally accepted actuarial principles and practice.

To our knowledge there have been no significant events prior to the current year's measurement date or as of the date of this report which could materially affect the results contained herein.

Neither Nyhart nor any of its employees have any relationship with the plan or its sponsor which could impair or appear to impair the objectivity of this report.

Prepared by:

_____
Tayt Odom FSA, MBA
November 21, 2019
Date

Lawrence Watts FSA, CFA, EA, MAAA

2000 RiverEdge Parkway
Suite 900
Atlanta, GA 30328
770-405-0755
www.nyhart.com

III. Cost Impact Recommendations

Actuarial assumptions are intended to be reasonable in the aggregate and to provide for reasonable estimates of the future annual costs of the Pension Fund. Periodic experience studies and annual gain/loss analyses are necessary to ensure such reasonableness, and refinements are suggested when the experience of the plan diverges from those assumptions. Upon review of the experience for the City of Orlando Firefighter Pension Fund, we have provided the following recommended refinements to the current actuarial assumptions being used for the Board's consideration. Details regarding each recommendation can be found later in this report. The table below reflects estimated impacts to the required contribution if the assumptions had been adopted for the October 1, 2018 valuation. Please note that the impacts are not necessarily additive as the aggregate impact of adopting many assumption changes may be greater or lesser than the individual impacts: the whole can be greater than the sum of its parts!

Actuarial Assumption	Refinement	Estimated Increase/(Decrease) in Contribution as a Percentage of Total Payroll	Estimated Increase/(Decrease) in Contribution as a Dollar Amount
Interest Rate	Lower from 7.60% to 7.50%	1.03%	$421,100
Expenses	No change recommended	n/a	n/a
Inflation Rate	Lower from 3.75% to 2.50%	0.00%	$0
Salary Scale	Lower rates to reflect lower baseline expected inflation	(5.35)%	$(2,193,000)
Retirement Rates	No change recommended	n/a	n/a
Withdrawal Rates	Lower rates to reflect experience	(1.39)%	$(570,400)
Disability Rates	Lower rates by factor of 25%	(1.44)%	$(587,900)
Amortization Method	Partially statutory; no change recommended	n/a	n/a
Asset Method	Change to 5-year smoothing with corridor	2.45%	$1,003,490
Salary Projection	Change to project salaries into valuation year	3.30%*	$1,353,095
Total	**All recommended changes**	**1.40%***	**$571,693**

* These contributions as a percentage of payroll are based on the original total salary. If these were calculated using proposed projected salary, they would have been 0.06% for the projection alone and (1.15)% for the total.

We have also presented the estimated impact to the plan's accrued liability and funding percentage had the proposed assumptions been in place for the October 1, 2018 valuation. Please note that, due to the way the Entry Age Normal cost method works, an adjustment to an assumption can result in increased accrued liability even when coupled with a decrease to ongoing costs.

Actuarial Assumption	Refinement	Estimated Increase/(Decrease) in Accrued Liability (millions)	Estimated Increase/(Decrease) in Funding Percentage
Interest Rate	Lower from 7.60% to 7.50%	$ 6.0	(1.0%)
Expenses	No change recommended	n/a	n/a
Inflation Rate	Lower from 3.75% to 2.50%	$ 0.0	0.0%
Salary Scale	Lower rates to reflect lower baseline expected inflation	$ (2.6)	0.4%
Retirement Rates	No change recommended	n/a	n/a
Withdrawal Rates	Lower rates to reflect experience	$ 0.1	(0.0%)
Disability Rates	Lower rates by factor of 25%	$ 0.5	(0.1%)
Amortization Method	Partially statutory; no change recommended	n/a	n/a
Asset Method	Change to 5-year smoothing with corridor	$ 0.0*	(2.3%)**
Salary Projection	Change to project salaries into valuation year	$ 10.4	(1.7%)
Total	**All recommended changes**	**$ 11.8**	**(4.1%)**

* The proposed change in asset method would not impact calculated accrued liability. However, it would impact the calculated <u>unfunded</u> accrued liability, as the asset total would decrease. This is why the funding percentage is impacted.

**These numbers are calculated assuming the proposed change in asset method were to have been adopted; the figures without double asterisks are calculated using the current actuarial value of assets.

IV. Economic Assumptions

A. Investment Return

The assumption that typically has the largest impact on pension liabilities is the interest rate used to discount benefit liabilities. Actuarial Standards direct the actuary to use a multitude of sources to determine the appropriateness and level of the assumed discount rate; many actuaries review the assumption historically, on a forward-looking basis, and in relation to a plan's peer groups. The Board has lowered the discount rate in recent years, with the stated goal of moving to a 7.5% rate in the near future. Nyhart's review of the discount assumption consists of the following:

Historical Review

The table below shows historical rates of return of the Pension Fund trust fund since 1996. The 23-year average market return is 7.5%. Additionally, the 10-year average for all 10-year periods ending on or after September 30, 2008 have been below the expected return used for the valuation, which supports the Board's move to lower rates. The market value rate of return is based on annual market values with adjustments for cash inflows and outflows. The actuarial value rate of return is based on the annual smoothed actuarial values of assets adjusted for cash inflows and outflows.

Fiscal Year Ending September 30	Actuarial Value Basis	Market Value Basis	Fiscal Year Ending September 30	Actuarial Value Basis	Market Value Basis
1996	9.9%	12.0%	2008	4.2%	(16.7%)
1997	13.7%	24.3%	2009	2.6%	0.0%
1998	14.6%	7.7%	2010	4.9%	10.8%
1999	15.0%	16.8%	2011	4.4%	2.4%
2000	15.9%	16.0%	2012	6.5%	16.0%
2001	8.0%	(8.2%)	2013	7.4%	11.0%
2002	4.4%	(6.3%)	2014	7.8%	9.0%
2003	4.2%	17.6%	2015	6.3%	0.1%
2004	2.5%	9.5%	2016	6.6%	8.2%
2005	8.8%	11.5%	2017	7.3%	10.5%
2006	8.8%	8.6%	2018	6.8%	6.6%
2007	10.0%	13.9%			

Multi-Year Average Returns	Actuarial Value Basis	Market Value Basis
5 Years	6.9%	6.8%
10 Years	6.0%	7.3%
23 Years	7.8%	7.5%

10-Year Average Market Return

9
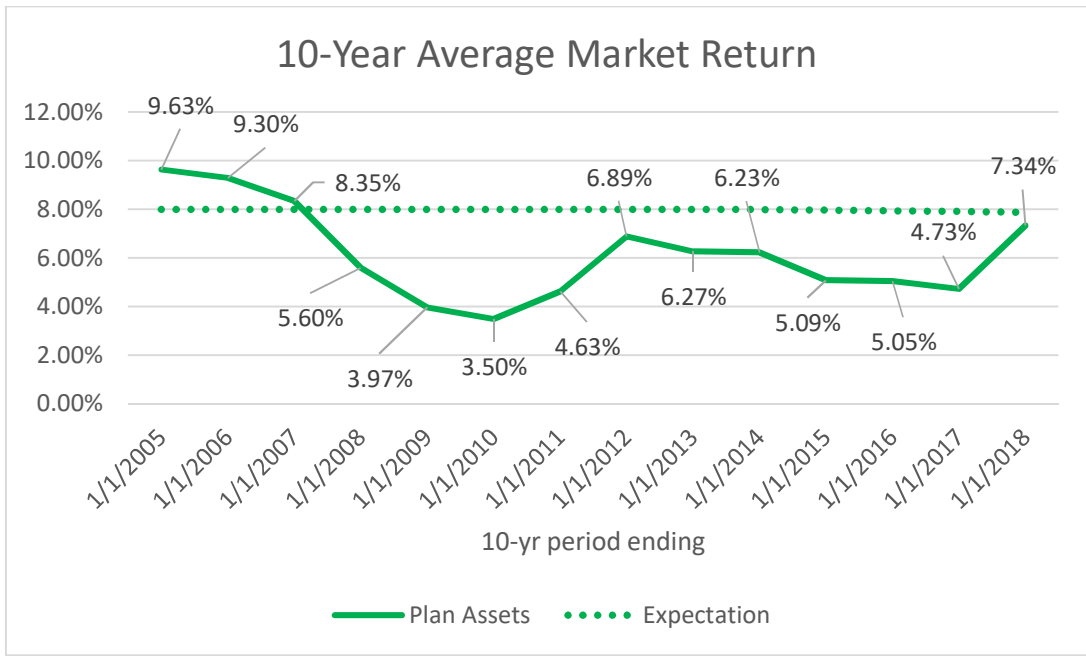
Peer Comparison

The National Association of State Retirement Administrators (NASRA) periodically publishes results of a survey of large public plans, which it conducts. It recently published a revealing brief that discusses assumed rates of return used by large public pension funds: "Issue Brief: Public Pension Fund Plan Investment Return Assumptions." Based on its survey of 129 plans, the average return assumption as of December 31, 2018 was 7.28%. More than 90% have reduced their return assumption since 2010. There has been a clear trend towards lowering assumed rates of return in recent years, as evidenced by the exhibit reproduced below.

Figure 4: Change in Distribution of Public Pension Investment Return Assumptions. FY 01 to FY 19
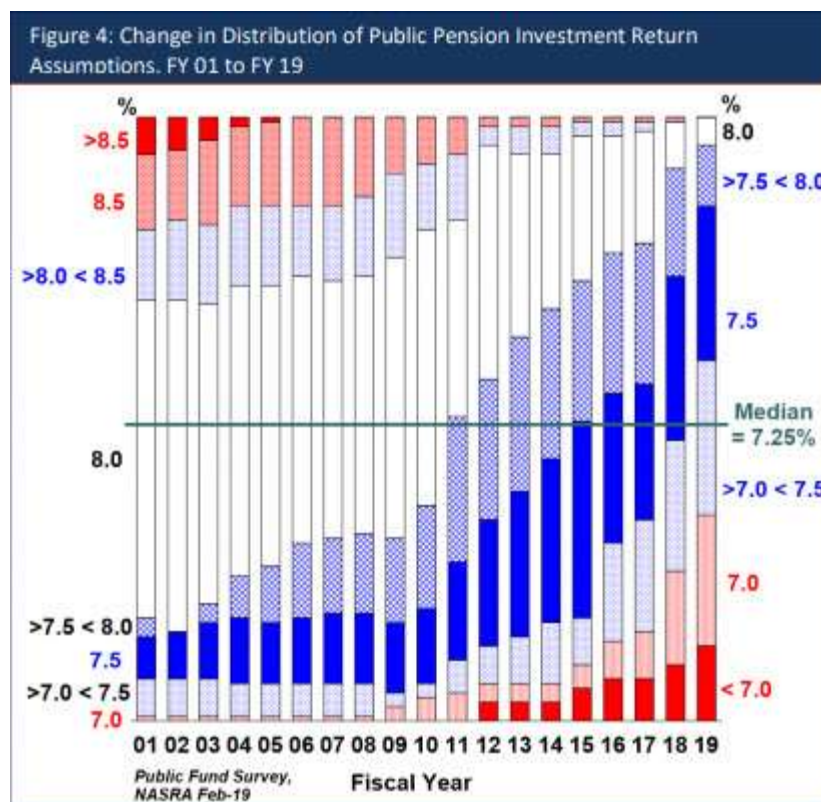
The State of Florida also publishes assumed rates of returns reported by public plans in their annual filings to the Department of Management Services. This landscape is slightly different from the universe surveyed by NASRA, as the plans are typically smaller, but the general distribution of assumptions is similar. In general, plans in Florida have also been lowering assumed rates of return in recent years. We have compiled the data reported in the 2018 filing year on the following page.
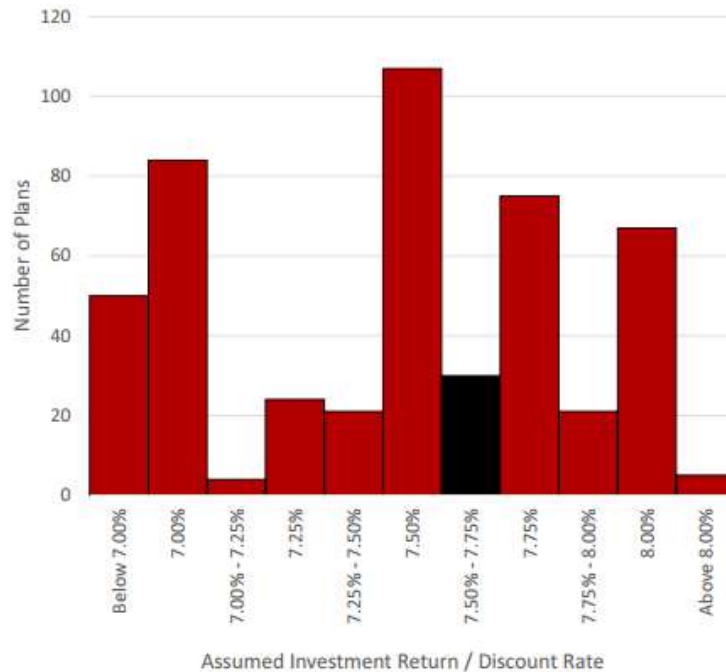
All Florida Public Plans

Summary 2018

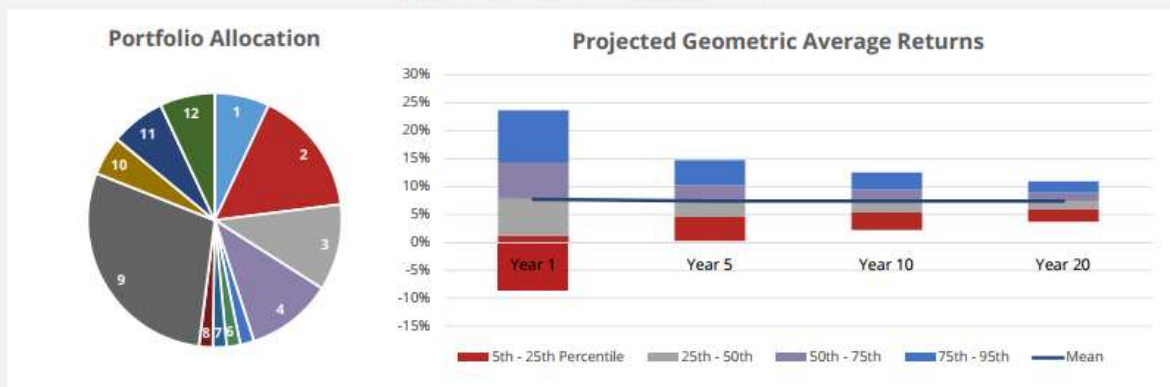| Discount Rate Assumption	Plan Count
Below 7.00%	50
7.00%	84
7.00% - 7.25%	4
7.25%	24
7.25% - 7.50%	21
7.50%	107
7.50% - 7.75%	30
7.75%	75
7.75% - 8.00%	21
8.00%	67
Above 8.00%	5
Total	488

Although neither the NASRA study nor the State filings provide any indication of projected changes to investment returns in the future, the results of both suggest that while the current rate used for the Pension Fund sits above the median assumed rate for similarly situated plans, it still falls within a reasonable range, especially given the Board's anticipated movement towards 7.5% in the near future.

Future Expectations

Nyhart also attempted to model forward-looking returns by consulting capital market expectations of the plan's investment consultant and other published market opinions. We consulted the plan's newly adopted investment policy and ran stochastic projections, assuming the plan remained invested as in the target allocation of the investment policy statement. We utilized long-term reference capital market expectations, as published by Morgan Stanley, to reflect the long-term nature of the pension benefit obligation.

Expected Return Analysis

Portfolio Allocation

Projected Geometric Average Returns

Legend: ■ 5th - 25th Percentile ■ 25th - 50th ■ 50th - 75th ■ 75th - 95th — Mean

Plan Asset Allocation As of 6/24/2019

Investment	Allocation	Long-Term Return (20+ Yr)	Long-Term Volatility		Portfolio Arithmetic Return	Long-Term Geometric Return
1 Emerging Markets Equities	7.0%	11.4%	22.7%		0.80%	
2 International Equities	16.0%	8.8%	18.1%		1.41%	
3 Large Cap - Growth	11.0%	9.2%	16.8%		1.01%	
4 Large Cap - Value	11.0%	9.2%	14.4%		1.01%	
5 Mid Cap - Growth	1.8%	9.8%	19.9%		0.17%	
6 Mid Cap - Value	1.8%	9.8%	15.5%		0.17%	
7 Small Cap - Growth	1.8%	10.3%	22.3%		0.18%	
8 Small Cap - Value	1.8%	10.3%	17.2%		0.18%	
9 US Fixed Income	29.0%	4.8%	5.3%		1.39%	
10 Equity Hedge Assets	5.0%	5.8%	8.2%		0.29%	
11 Opportunistic Assets	7.0%	9.1%	14.3%		0.64%	
12 REITs	7.0%	8.0%	16.7%		0.56%	
				Total	7.81%	7.38%

The model suggests a probability of attaining at least the plan's expected return on assets of 7.60% is 51% in the next year and 47% over the longer term (20+ years).

Notes:
Underlying asset performance assumptions (return, risk & correlations) are based on Morgan Stanley's 2018 Capital Market Assumptions as emulated by Winklevoss' stochastic projection modeling. Projected long-term inflation is approximately 2.3%.
The bar charts represent modeled geometric returns over the referenced number of years. For example, the "Year 10" entry displays the distribution of the estimated geometric average return over a 10-year period of time.

The return analysis suggests that, given the current investment policy, the plan should expect to achieve a 20-year return of 7.38%, on average. The model projects that the plan would meet a 7.6% return assumption 47% of the time, and a 7.5% return 49% of the time.

Recommendation

The current interest rate assumption as of the October 1, 2018 valuation is 7.6%. The Board has followed a step-rate reduction policy, with the ultimate goal of lowering the assumption to 7.5%. Data supports the reasonableness of a 7.5% assumption, but we would recommend careful monitoring in the current interest rate environment.

B. Investment & Non-Investment Expenses

The current assumptions use an expected rate of return that is net of all expenses, both administrative and investment. Consequently, there is no assumption for investment expenses. Based on this current policy, there is no need for a historical analysis of the investment expenses. The plan will continue to operate using a net of expenses investment return assumption.

The current assumption for administration expenses is a one-year term cost method which is based on the expenses for the previous year. The 14-year history is provided below with an average of $180,500. We do not recommend any changes to this assumption.

FYE 9/30	Administrative Expenses	FYE 9/30	Administrative Expenses	FYE 9/30	Administrative Expenses
2005	$120,639	2010	$251,810	2015	$163,243
2006	$135,225	2011	$266,896	2016	$149,760
2007	$215,611	2012	$182,315	2017	$157,904
2008	$379,014	2013	$140,830	2018	$118,991
2009	$144,242	2014	$100,521		

C. Annual Rate of Inflation (CPI)

The annual rate of inflation assumption is not used directly in any of the actuarial valuation procedures. There is, however, an implicit rate of inflation in the assumed wage growth and expected return on assets. It is important to ensure that these assumptions all fit together and achieve the same implicit inflation rate.

Inflation, as measured by the CPI, has increased by an average of 1.48% during the four-year period of the experience study. The Federal Reserve of Cleveland prepared a news release on May 10, 2019 estimating an average inflation rate of 1.80% over the next 10 years. The 30-year market-consistent breakeven inflation rate, as published by the Federal Reserve Bank of St. Louis, was 1.97% as of April 2019. The current baseline wage inflation assumption, before seniority and merit increases are taken into account, is 3.75%. We believe that the indicators discussed point towards lowering the assumed inflation rate. We are recommending the inflation assumption be lowered to a 2.50% annual rate. This revised assumption for inflation is more consistent with the recently lowered assumed rate of return, and the change would implicitly impact the salary scale.

Inflation
(year ending 6/30)

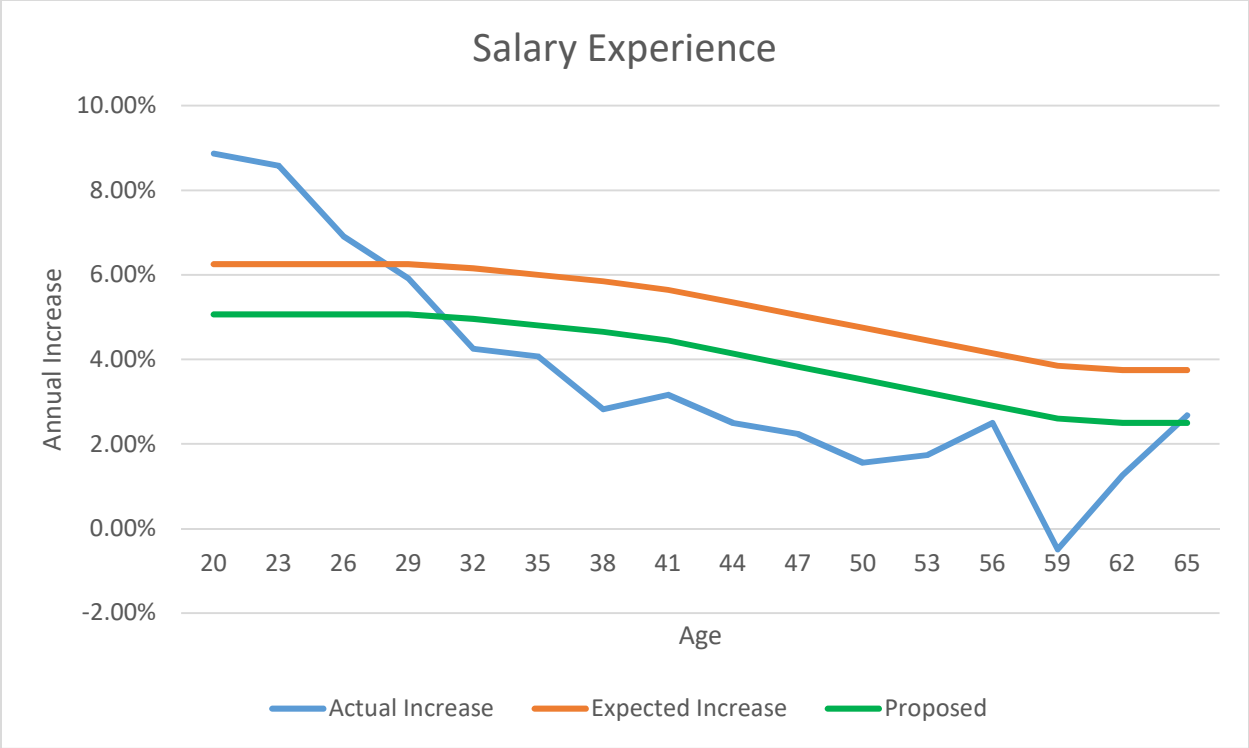Legend: CPI · Current · Proposed
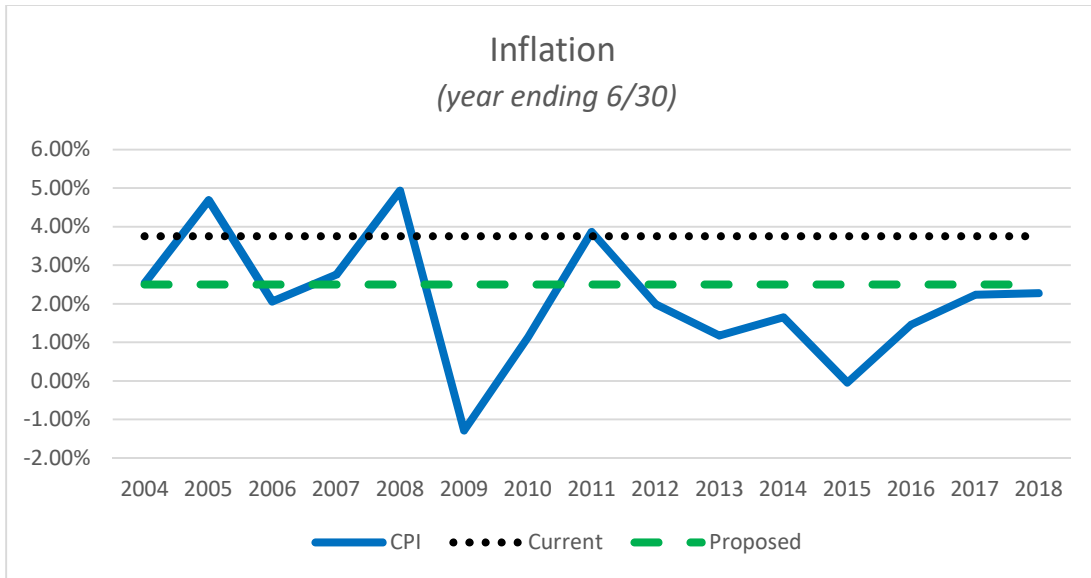
D. Annual Pay Increases

To examine the historical experience of pay increases, data from 2014 to 2018 was studied. Salaries during this time varied by year. For the fiscal year ending 9/30/2016, salary increases were noticeably higher than the current assumption, however, for the fiscal year ending 9/30/2017, salary increases were significantly lower than the current assumption. For the most part, those two years offset each other to demonstrate a general trend over the study period. Overall, once the decrease in the inflation rate is reflected, the current assumption is fairly consistent with the salary experience.

Actual Annual Salary Increases				
Fiscal Year Ending 9/30	**Expected**	**Actual**	**Average Expected**	**Average Actual**
2010	6.1%	5.4%		
2011	6.1%	3.7%		
2012	6.2%	3.0%	6.3%	3.9%
2013	6.2%	4.9%		
2014	6.9%	2.7%		
2015	5.7%	6.5%		
2016	5.7%	8.2%		
2017	5.6%	(1.8%)	5.6%	3.4%
2018	5.6%	3.8%		

The current salary assumption consists of increases due to the baseline 3.75% inflation assumption and additional increases due to seniority/merit, reflected in a table based on age. The seniority/merit table was recommended to be reduced after the 2009 through 2014 experience study for ages 40-50.

We are seeing similar experience during this study. Because we are proposing a decrease in the inflation rate assumption, we do not believe that a change to the seniority/merit scale is necessary unless the Board expects markedly higher or lower pay increases than observed during the study period. The following table and graph display the experienced salary increases, as well as the current and updated assumption incorporating the proposed change in the inflation assumption from 3.75% to 2.50%.

Age	2014-2018 Actual Experience	Current Assumption Including 3.75% Inflation	Updated Assumption Reflecting 2.50% Inflation
20-23	8.87%	6.25%	5.06%
23-26	8.58%	6.25%	5.06%
26-29	6.91%	6.25%	5.06%
29-32	5.92%	6.25%	5.06%
32-35	4.26%	6.15%	4.96%
35-38	4.07%	6.00%	4.81%
38-41	2.83%	5.85%	4.65%
41-44	3.17%	5.65%	4.45%
44-47	2.50%	5.35%	4.14%
47-50	2.24%	5.05%	3.83%
50-53	1.56%	4.75%	3.53%
53-56	1.74%	4.45%	3.22%
56-59	2.50%	4.15%	2.91%
59-62	-0.49%	3.85%	2.60%
62-65	1.26%	3.75%	2.50%
65+	2.68%	3.75%	2.50%
Total	3.42%	5.62%	4.35%

Salary Experience

Absent other information, we believe the experience data supports the lower proposed salary scale. However, before adopting the new assumption, we would recommend discussion with the Board and other stakeholders on future salary growth expectations for the members.

This change in the salary scale resulting from the recommended decrease in the baseline inflation rate would have resulted in an estimated $2,192,984 decrease to the required contribution, or 5.35% of payroll, based on the 2018 valuation.

E. Annual Payroll Growth

Historical payroll growth was also studied in order to comply with Florida Statute §112.64, which prescribes how the unfunded liability under the plan may be amortized. The table below shows the result of our analysis:

| Fiscal Year Ending September 30	Payroll Growth	10-Year Average
2006	6.50%	-
2007	10.60%	-
2008	9.30%	-
2009	4.30%	-
2010	2.80%	-
2011	(0.40%)	-
2012	(0.60%)	-
2013	6.80%	-
2014	0.70%	-
2015	3.46%	-
2016	3.94%	4.09%
2017	(1.37%)	2.89%
2018	(1.07%)	1.86%

Since the current assumption of 4.00% is significantly higher than the latest 10-year average of 1.86%, we believe that the Board should review this assumption to determine if it is consistent with expected future payroll growth. For purposes of amortizing the unfunded plan liability, the 10-year average was used in 2017 and 2018 in compliance with Florida Statute §112.64. This assumption does not directly impact the calculated liabilities, but it does impact the required contribution rate. We are not currently recommending any change, but we do advise that the Board discusses the appropriateness of the 4% assumption going forward.

V. Demographic Assumptions

A. Rates of Retirement

Retirements over the study period were examined based on retirement eligibility. The currently assumed retirement rates vary by participants' years of service. Experience during the study period was fairly consistent with the current assumption, with 47 actual retirements occurring compared to the 49 expected. The distribution of rates is also fairly consistent. Therefore, we do not recommend any changes to the current assumption.

Retirement		
Service	Experience	Current
<20	3%	0%
20	15%	10%
21	10%	10%
22	2%	10%
23	0%	10%
24	13%	20%
25	21%	40%
26	28%	30%
27	15%	30%
28	40%	30%
29	60%	70%
30+	100%	100%
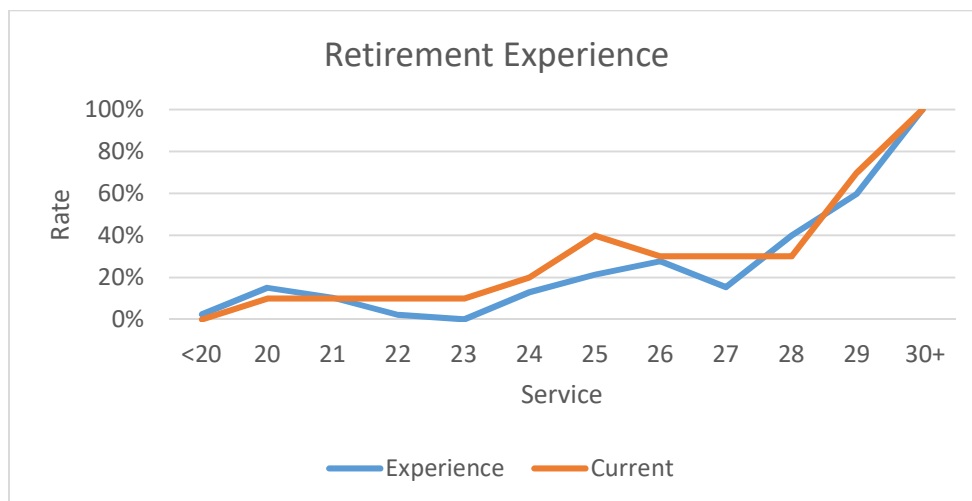
B. Rates of Withdrawal

Withdrawal, or termination, rates were also studied. This assumption is applicable to people who are not yet eligible to retire. The assumption forecasts the rates at which people will leave prior to becoming eligible for normal retirement.

Actual withdrawals from 2014 to 2018 were higher than suggested by the current assumption, with 13 terminations occurring compared to an expected 7.8 terminations. We recommend changing the rates slightly, as shown in the chart below, to reflect an increase in assumed terminations between ages 35 and 39. The proposed assumption would have produced an expected 10.5 withdrawals over the study period, moving closer to the actual experience.
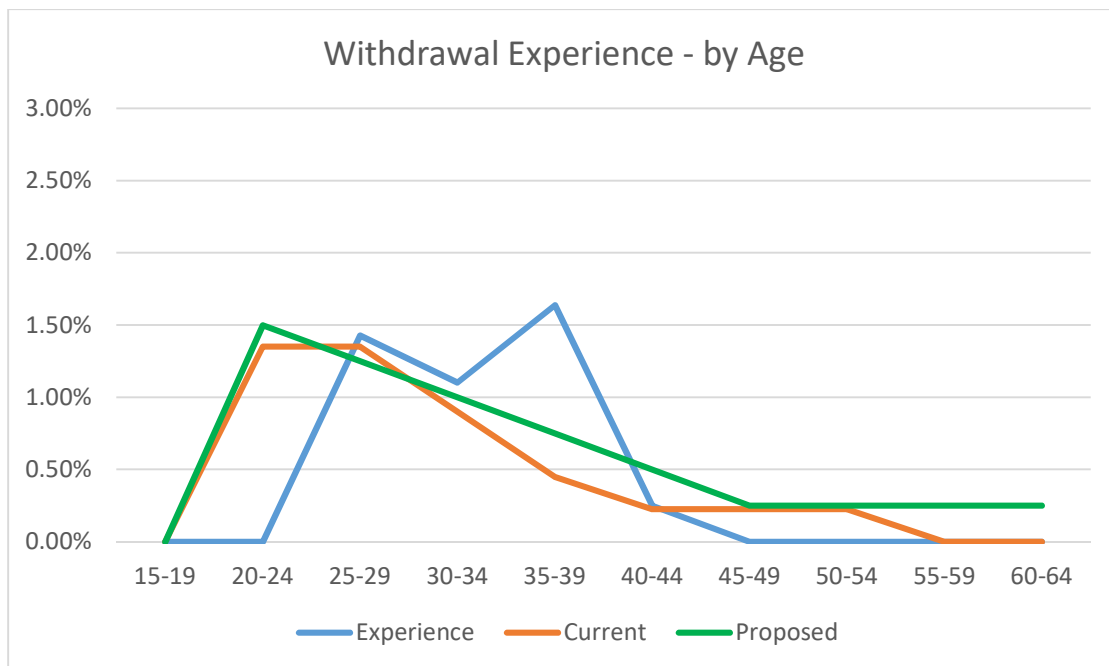

The impact on annual cost of the proposed refinements to the withdrawal rates would have been an estimated decrease of approximately $570,440, or 1.39% of payroll, based on the 2018 valuation.

C. Rates of Disability

Based on 2014-2018 experience, 9 individuals were designated as becoming disabled versus the expectation of 22.4. Due to the large variance in the expected and actual retirements we recommend that the disability rates decrease by 25%. This updated assumption would reduce the number of expected disabilities to 18. Although this is still higher than the actual 9 disabilities that occurred, we believe the proposed assumption is reasonable, in part due to the low number of exposures, and in part due to legislative changes regarding presumptive disability for firefighters that could result in more disability applications (§112.1816, created by Senate Bill 426 and signed into law on May 3rd of this year).

Disabilities (October 1, 2014 through September 30, 2018)		
Actual	Expected (Current Assumptions)	Expected (Recommended Assumptions)
9	22.4	18.0
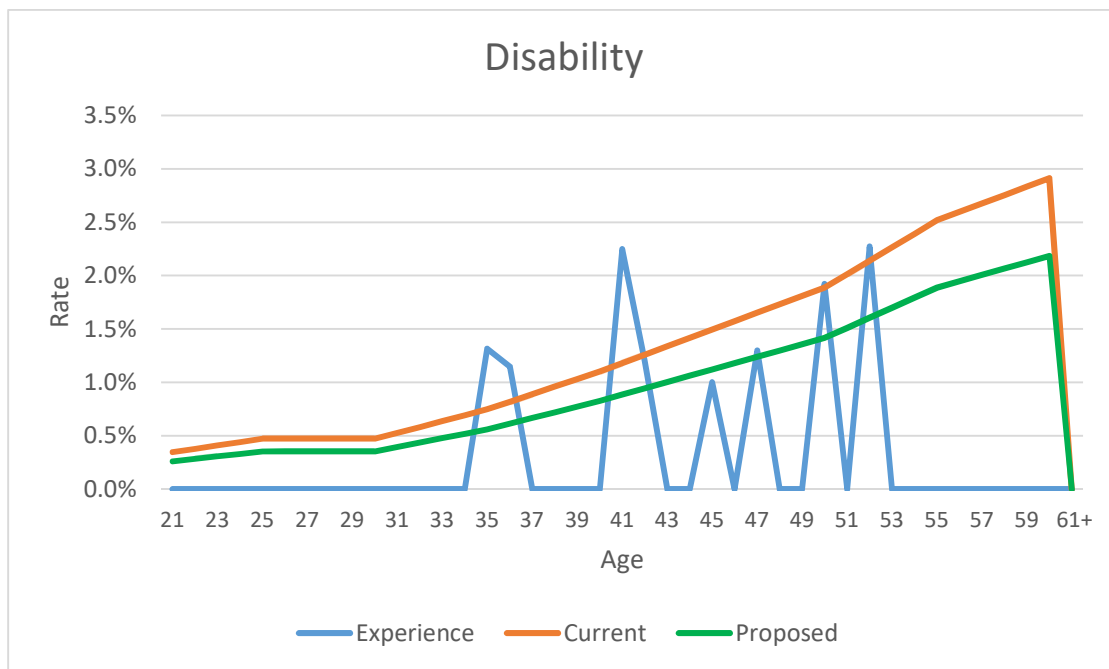
The recommended changes to the assumed disability rates would have resulted in a decrease to the calculated required contribution of $587,878, or 1.44% of payroll, based on the October 1, 2018 valuation.

D. Rates of Mortality

In order to perform an actual experience study on mortality, an extremely large number of exposures is required. Since the amount of data is not available for the Retirement System, it is standard actuarial practice to rely on national tables created by organizations like the Society of Actuaries. The key to the mortality assumption is to continually update this assumption as new studies are released. We believe reflecting future mortality improvements is prudent and should help avoid large impacts to plan costs as new studies are released.

Florida Statute §112.63 mandates the use of the mortality tables utilized in either of the two most recently published valuation reports of the Florida Retirement System (FRS). Fortunately, the mortality tables currently used by FRS are reasonable and meet the goals suggested above. Since the plan is currently using the tables prescribed by law and utilized by FRS, we recommend making no change to the mortality assumptions.

E. Marital Status and Assumed Ages of Spouses

Currently, 80% of active members are assumed to be married, and female spouses are assumed to be three years younger. We do not recommend any changes to these assumptions.

VI. Amortization Method

The current amortization method is a level payroll 20-year closed amortization with a 4.0% payroll growth assumption. There was a fresh start of the UAAL amortization over 20 years as of September 30, 2005.

In recent years, the trend has been to lower amortization periods. The Conference of Consulting Actuaries (CCA) released a White Paper in October 2014[1] indicating the "best practice" approach is to use a shorter amortization period (e.g. no more than 25 years) as a level percent of pay. Below is a table of what the CCA consider to be "Model Practice". The Fund's current practice aligns nicely with the CCA practices, so we recommend no change.

Source	Period
Plan Amendments	Lesser of expected future service or 15 years
Experience Gain/Loss	15 to 20 years
Assumption or Method Changes	15 to 25 years

As mentioned in the payroll growth section, under Florida Statute 112.64(5)(b), the payroll growth assumption used for the amortization of the unfunded accrued liability cannot exceed the annual average growth rate for the 10-year period preceding the valuation date. Due to this language, the payroll growth assumption was reduced to the 10-year average for the 2017 and 2018 actuarial valuations. For a plan with unfunded liabilities, such as Orlando, the impact of a lower payroll growth assumption is typically higher required contributions: if payroll growth is projected to be lower, then more money has to be set aside to pay off the liabilities over the same period of time. The payroll growth assumption is one where input from the City and Board is particularly valuable, if there are known plans to expand (or contract) the Fire workforce. We are not recommending changes at this time.

---

[1] *"Actuarial Funding Policies and Practices for Public Pension Fund Plans"*, Conference of Consulting Actuaries Public Plans Community, October 2014.

VII. Asset Valuation Method

The current asset valuation method uses a smoothing technique which is a modified 20% Write-Up Method whereby, each year, 20% of the difference between the expected actuarial value of assets (based upon assumed return) and the actual market value of assets is recognized as an adjustment to the actuarial value of assets. The actuarial value of assets is required to be at least 80%, but no more than 120%, of the market value; actuaries refer to this as an asset corridor.

Under the Actuarial Standards of Practice (ASOP) No. 44, an asset method other than actual fair market value should have the following qualities:

- Likely to produce actuarial value of assets sometimes greater and sometimes less than market value

- Fall within a reasonable range around the market value

- Differences recognized within a reasonable period of time

- No significant bias

The method used for the fund generally meets all of these objectives. However, as we have discussed with the Board, there is a slight bias involved: barring volatility, actuarial values tend to remain either higher or lower than the market values. We believe that this method's inherent bias is not necessary. The method is relatively uncommon, and we believe that using something more standard would be appropriate.

Another popular method is a smoothing technique called the 20% Phase-In Method, where annual asset gains and losses are fully recognized over five years. In this manner, gains and losses naturally tend to offset each other over short periods of volatility, producing the desired smoothing. This method is far more common, and five years is the same period of time prescribed under the GASB standards for pension accounting. If the Phase-In method is adopted, we would recommend maintaining a similar 80%-120% market value corridor, to ensure contribution levels remain appropriate during periods of extreme volatility. A comparison of methods is reflected in the graphic on the following page.
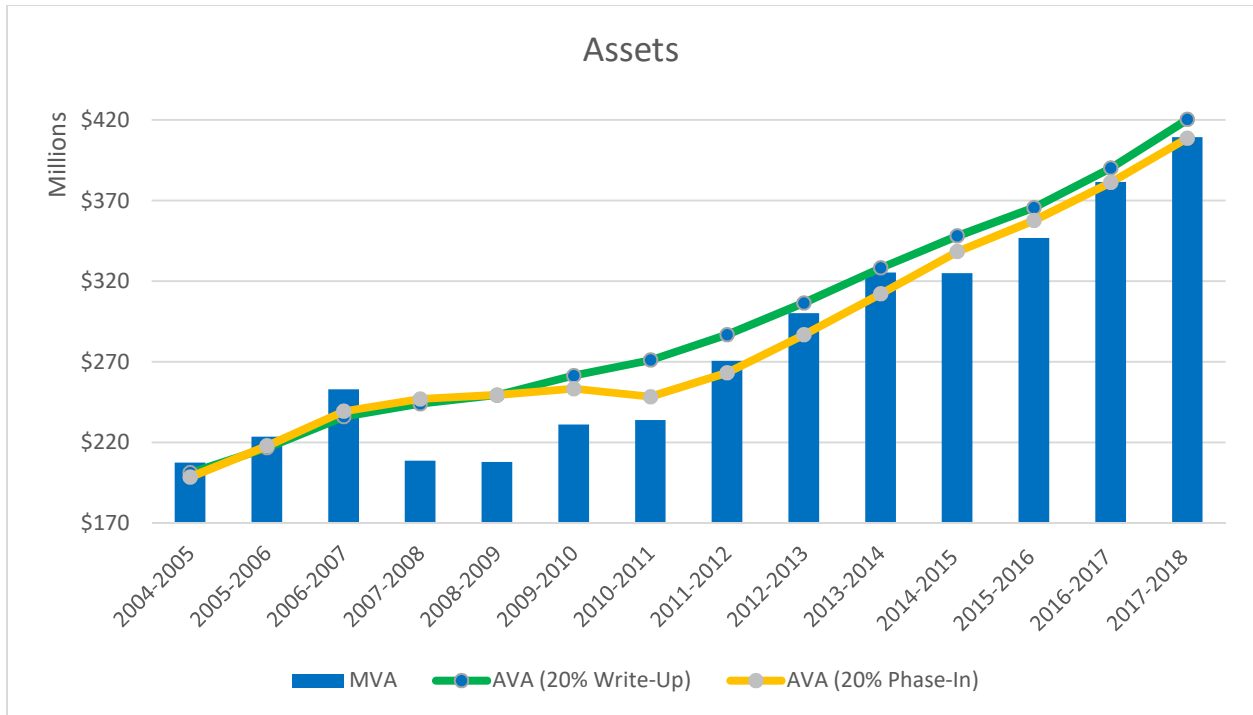
Assets

As suggested by the graph, the Phase-in Method more closely tracks the market value of assets, and the bias where the actuarial value of assets is consistently higher or lower than the market value for extended periods of time is not present.

We would recommend the adoption of the 20% (5-year) Phase-in Method with a 20% asset corridor to be used in valuations going forward.

As of the 2018 valuation, the Phase-in Method would have produce an estimated actuarial value of assets of $408.8 million (relative to the actual market value of $409.5 million and Write-Up value of $420.4 million). Had the lower asset number been utilized in the last valuation, the required contribution would have increased by $1,003,490.

VIII. Salary Projection

A technical detail involved in actuarial valuation work regards the timing of salary increases and whether or not to project compensation data forward when calculating plan costs. It is our understanding, based on data and correspondence with staff, that the City currently provides actual prior-year pensionable compensation data as of the end of each plan year, as opposed to a rate-of-pay or anticipated salary figure for plan participants. Currently, the valuation assumes that the (annualized) prior-year compensation is the rate of pay in place for the succeeding plan year. For valuation purposes, it is better practice to project pay increases into the next year to reflect the impact of salary changes and to help ensure liabilities and normal costs are evaluated most accurately. This is particularly relevant given the 1-year contribution lag seen by Orlando and most public plans in Florida: the contribution rate is set a year in advance of when the contributions are set to be contributed.

We would recommend that the Board approve the adoption of this method of salary projection to be consistent with best practices and to continue to produce accurate estimates of plan liability. The adjustment would cause a one-time increase in accrued liabilities, as well as an accompanying increase in the normal cost and required contribution rates. As of the 2018 valuation, the approximate impact would have been an increase in reported liabilities of $10.4 million, with a contribution impact of $1,353,095. This would be roughly 3.3% of current payroll, or 0.1% of the "new" estimated payroll reflecting the value of the projected salaries.

IX. Appendix

Data Sources

Membership data files for the fiscal years ending 2014 through 2018 were provided by the administrator for the purposes of performing annual valuations for the City of Orlando Firefighter Pension Fund. These files were thoroughly analyzed for each valuation and reconciles with prior year data to track changes and unexpected differences.

Decrements

FYE 9/30	Active Retirement	Active Withdrawal	Active Disability
2015	11	2	2
2016	17	1	3
2017	5	3	0
2018	14	7	4
Total	47	13	9

Asset Valuation Method

The following chart compares the presumptive asset values under the 20% Write Up and 20% Phase-In methods for the last five years.

FYE 9/30	Market Value of Assets	AVA using 20% Write Up Method	AVA using 20% Phase-In Method
2014	325,439,669	328,357,893	312,275,357
2015	325,083,312	348,252,298	338,445,106
2016	346,924,612	365,768,348	357,864,093
2017	381,634,531	390,325,255	381,356,392
2018	409,469,833	420,441,352	408,799,430

Given a current difference between actuarial and market values, and assuming return assumptions are met for all future years, the actuarial value under the current Write Up method will converge to the market value approximately as described below:

Initial Difference between Actuarial Value and Market Value	Number of Years for Actuarial Value to be within 1% of Market Value
20%	14 years
15%	13 years
10%	11 years
5%	8 years
3%	5 years