FIRE AND POLICE PENSION ASSOCIATION
GOLDEN GATE FIRE PROTECTION DISTRICT VOLUNTEER PENSION FUND

ACTUARIAL VALUATION REPORT AS OF JANUARY 1, 2019

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To:	Administrative Heads and Finance Officers of Golden Gate Fire Protection District; administered by FPPA
Date:	July 2019
Subject:	**Actuarial Valuation Results as of January 1, 2019**

This report contains the actuarial valuation results as of January 1, 2019 for your department as determined by Gabriel, Roeder, Smith & Company (GRS), actuary for the Fire and Police Pension Association (FPPA). Questions about this report should be directed to FPPA, rather than to Gabriel, Roeder, Smith & Company.

Financing Objectives

This valuation was prepared to determine if the current annual assumed contributions of $0 are adequate for funding the current benefits provided by the department. Contributions into the pension fund can come from two sources: contributions directly from the department and contributions from the State based on assessed property values and other formulas. The "Assumed Contribution" referred to throughout this report is the sum of the contributions from the aforementioned two sources. The plan is currently overfunded. Additional contributions above the normal cost will continue to add to the surplus.

The calculated annual contribution shown in Table 3 is the sum of the normal cost, an amount available to amortize the Unfunded Actuarial Accrued Liability (UAAL), and any ongoing administrative and miscellaneous expenses that are paid out of the pension fund. The minimum contribution the department must pay is the calculated annual contribution, but not less than $0.

Benefit Provisions

This actuarial valuation reflects the provisions that were applicable to the Golden Gate Fire Protection District Volunteer Pension Fund as of the valuation date. The details of the actuarial calculations, based on the current benefit provisions, are described in this report. Departments are allowed to model three alternative benefit packages, if desired. If alternatives were requested, a summary of the actuarial results based on those packages is shown in Table 16. A summary of the alternatives requested is shown in Table 15. If an alternative is adopted that increases the calculated annual contribution, the new calculated annual contribution will become effective beginning January 1, 2020.

This actuarial valuation is based upon coverage data given in the required checklist, which was completed by the department, returned to FPPA, and supplied to GRS. Any changes in coverage adopted but not included in the required checklist are not reflected in the current results. Once the adopted coverage data is provided, subsequent valuation results will be reflective of the change in coverage.

Actuarial Assumptions and Methods

This actuarial valuation uses the assumptions and methods that were adopted by the Board of Directors of FPPA based upon the actuary's analysis and recommendations resulting from the 2018 Experience Study and effective in the January 1, 2019 valuations. A summary of those assumptions and methods can be found in Table 14, and for a complete list of assumption changes as well as the rationale for the change, please see the experience study report dated September 21, 2018. The primary assumption changes were:

- Reducing the current nominal investment assumption from 7.50% to 7.00%;
- Removing the blue collar adjustment from the mortality tables being used and update the mortality projection scale from Scale BB to the ultimate rates of the MP-2017 projection scale; and
- Increasing the withdrawal rates by 10%.

Liabilities were determined under the Entry Age Normal actuarial cost method. This is the same funding method that has been used in prior years.

The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated annual contribution and funding periods. The actuarial calculations are intended to provide information for rational decision making.

This report does not include a detailed assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

The calculated employer contribution consists of the sum of three pieces: the normal cost, the amortization of the Unfunded Actuarial Accrued Liability (UAAL), and any administrative and other ongoing expenses to be paid out of the pension fund (e.g. insurance contracts). The calculated annual contribution is shown in Table 3, Item 9. The normal cost (shown in detail in Table 3, Item 1) can be viewed as the regular, ongoing cost of the plan. The UAAL is the amount by which the actuarial value of assets falls short of, or exceeds, the actuarial accrued liability for this plan. Under the current statutes, the UAAL must be amortized under a level dollar method in no less than 20 years. The required payment to amortize the UAAL in 20 years is shown in Table 3, Item 7.

Assets

Table 10, Item 2 shows the market and actuarial values of assets for this department. The actuarial value is an adjusted market value. It reflects only a portion of the excess (or shortfall) between recent investment returns and the corresponding expected returns based on the annual investment return assumption. The actuarial value recognizes 20% of the difference between the projected actuarial value and the market value at the valuation date. This smoothed average approach dampens the year-to-year fluctuations in the calculated annual contribution.

Member Data

Member data as of January 1, 2019 was supplied by FPPA, as verified by the department. GRS did not subject the data to any auditing procedures but reviewed it and tested it for reasonableness and consistency. The member count is shown in Table 10, Item 1. This count includes members who have worked for this employer at one time, but who are now active at another employer. Your share of the benefits for such former employees is reflected in the liabilities and in the contribution calculation. The number of retirees shown includes those who retired from this employer, as well as those who retired from another employer but has service attributed to this employer. The liabilities take into account your share of the benefits for these former, active members.

Experience

Many employers experienced an increase in their calculated annual contribution between the 2017 actuarial valuation and this valuation. This was mainly due to actuarial losses from investment experience on smoothed assets and the reduction to the investment return rate. Table 5 details the changes in the UAAL and the calculated annual contribution since the prior valuation.

Actuarial experience is measured by comparing the expected valuation results with the actual valuation results at the valuation date. The expected valuation results are calculated as if all of the actuarial assumptions had been met.

- A Gain/(Loss) attributable to Investment Experience is realized when the pension fund assets earn over/(under) the actuarial assumed earnings rate.

- A Gain/(Loss) attributable to Membership Changes is realized when the pension fund liabilities are less/(greater) than the actuarial assumptions predicted (e.g. higher terminations, members remaining after eligible for normal retirement benefits, members not living as long as expected). See Table 14 for a description of the actuarial assumptions.

- A Gain/(Loss) attributable to Benefit Improvements is realized when benefit level improvements have been adopted since the prior valuation.

GASB Accounting

The Governmental Accounting Standards Board (GASB) Statement No. 67, *Financial Reporting for Pension Plans* (Issued 6/2012), replaced the requirements under GASB Statement No. 25, *Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans* (Issued 11/1994), effective for financial statements for fiscal years beginning after June 15, 2013. GASB Statement No. 68, *Accounting and Financial Reporting for Pensions* (Issued 6/2012), replaced GASB Statement No. 27, *Accounting for Pensions by State and Local Governmental Employers* (Issued 11/1994), effective for fiscal years beginning after June 15, 2014. GASB Statement No. 67 was implemented in FPPA's Comprehensive Annual Financial Report beginning in fiscal year 2014. Employer reporting information for GASB Statement No. 68 is provided in a separate report.

Tables

This report includes one executive summary and up to sixteen tables.

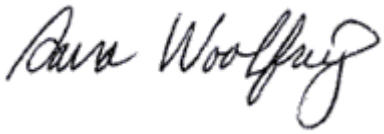
- The executive summary includes a condensed summary of the demographic, financial, and actuarial data.
- Table 1 is a comparison of the actuarial results of the report based on the current benefit provisions and the state match calculation if requested.
- Table 2 is a summary of the current benefit provisions and the state match calculation if requested.
- Table 3 provides the details of the development of the required contribution.
- Table 4 shows the actuarial present value of future benefits, broken down by membership category and type of benefit.
- Table 5 shows the sources of change in the calculated annual contribution since the prior valuation.
- Table 6 provides information that used to be required under the Governmental Accounting Standards Board Statement No. 25 (GASB 25) and No. 27 (GASB 27). These statements have been replaced by GASB 67 and GASB 68 and results under those standards will be provided in a separate report.
- Tables 7 thru 9 show the development of the financial information.
- Tables 10 and 11 show historical actuarial and demographic data for the department.
- Table 12 shows the current distribution of the membership by age and service.
- Table 13 shows the risks associated with measuring the accrued liability and actuarially determined contribution.
- Table 14 shows the actuarial assumptions and methods used to calculate the liabilities.
- Table 15 is a summary of the alternative benefit provisions requested, if any.
- Table 16 is a comparison of the actuarial results of the report based on the alternative benefit provisions requested, if any.
- Appendix provides definitions of several terms used throughout the report.

Certification

We certify that the information included herein and contained in the 2019 Actuarial Valuation Report is accurate and fairly presents the actuarial position of the Golden Gate Fire Protection District Volunteer Pension Fund as of January 1, 2019.

All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, the results presented comply with the requirements of the State of Colorado statutes and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board. The undersigned are independent actuaries. Mr. Newton and Mrs. Woolfrey are members of the American Academy of Actuaries, and are also Enrolled Actuaries. Both are experienced in performing valuations for public retirement systems.

Respectfully submitted,
Gabriel Roeder Smith & Company



Dana Woolfrey, FSA, EA, MAAA
Consultant and Actuary

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Senior Consultant

Executive Summary

Item	Valuation as of January 1, 2019	Valuation as of January 1, 2017
Membership		
• Number of:		
- Active members	1	1
- Retired Members	9	10
- Disabled members	0	0
- Beneficiaries	0	0
- Terminated vested members	0	0
- Terminated members active in another fund	0	0
- Total	10	11
Assets		
• Market value	$ 320,016	$ 304,267
• Actuarial value	335,335	318,386
• Employer contribution for prior year	0	17,750
• Employer contribution for prior year minus 1	8,352	0
• Ratio of actuarial value to market value	105%	105%
Actuarial Information		
• Employer normal cost	$ 414	$ 337
• Normal cost per active member	414	337
• Unfunded actuarial accrued liability / (Surplus)	(73,137)	(49,035)
• Calculated annual contribution	(3,763)	(4,917)
• Assumed contribution from department	0	7,000
• Assumed contribution from state	0	7,508
• Funding period based on assumed contributions	0 years	0 years
• Funded ratio	128%	118%
• Funded ratio based on market value	122%	113%
• Is current level of contributions adequate	Yes	Yes

Table 1 - Comparison of Actuarial Results Based on Alternate Benefit Levels

		Current Plan (1)	State Match Calc (2)
1.	Normal Retirement Benefit	$ 300.00	$ 300.00
2.	Normal Cost	414	431
3.	Present Value of Future Benefits	264,966	265,324
4.	Actuarial Accrued Liability	262,198	262,446
5.	Unfunded Accrued Liability / (Surplus)	(73,137)	(72,889)
6.	Total Annual Calculated Contribution	(3,763)	(3,720)
7.	Assumed Contribution	0	0
8.	Funding Period Based on Assumed Contribution	0 years	0 years
9.	Funded Ratio	128%	128%

Table 2 - Actuarial Valuation Information Checklist

	Current Plan	State Match Calc	Maximum Per State Statute
1. Normal Retirement Benefit (monthly):			
a. Regular	$300.00	$300.00	None
b. Extended Service Amount Per Year of Service	$0.00	$0.00	5% of Regular, for 10 Additional years
2. Vested Retirement Benefit (monthly):			
a. With 10 to 20 Years of Service Amount Per Year of Service per Minimum Vesting Years	$15.00	$15.00	Pro rata Share of Regular
b. Minimum Vesting Years	10	10	20 Years
3. Disability Retirement Benefit (monthly):			
a. Short Term Disability for line of duty injury Amount payable for not more than 1 year	$0.00	$150.00	½ of Regular or $225, whichever is greater
b. Long Term Disability for line of duty injury Lifetime Benefit	$100.00	$300.00	Regular or $450 whichever is greater
4. Survivor Benefits (monthly):			
a. Following Death before Retirement Eligible; Due to death in the line of duty as a volunteer firefighter	$87.50	$150.00	½ of Regular or $225, whichever is greater
b. Following Death after Normal Retirement	$150.00	$150.00	50% of Regular
c. Following Death after Normal Retirement with Extended Service Amount Per Year of Service	$0.00	$0.00	50% of Extended
d. Following Death after Vested Retirement with 10 to 20 Years of Service Amount Per Year of Service per Minimum Vesting Years	$7.50	$7.50	50% of Vested
e. Following Death after Disability Retirement	$50.00	$150.00	50% of Long Term
f. Optional Survivor Benefits in lieu of 4a-e Following Death before or after Retirement Eligible due to death on or off duty as a volunteer firefighter (Purchase of Life Insurance Required)	$0.00	$0.00	100% of Regular
5. Funeral Benefit (Required Benefit):			
a. Funeral Benefit Lump Sum, one time only	$100.00	$100.00	2 times Regular

Table 3 - Development of Annual Required Contribution

		Valuation as of 01/01/2019	Valuation as of 01/01/2017
		(1)	(2)
1.	Total normal cost	$ 414	$ 337
2.	Actuarial accrued liability for active members		
	a. Present value of future benefits for active members	$ 15,710	$ 12,319
	b. Less: present value of future normal costs	(2,768)	(2,387)
	c. Actuarial accrued liability	$ 12,942	$ 9,932
3.	Total actuarial accrued liability for:		
	a. Retirees and beneficiaries members	$ 249,256	$ 259,419
	b. Inactive members	0	0
	c. Active members (Item 2c)	12,942	9,932
	d. Total	$ 262,198	$ 269,351
4.	Actuarial value of assets	$ 335,335	$ 318,386
5.	Unfunded actuarial accrued liability / (Surplus) (Item 3 - Item 4)	$ (73,137)	$ (49,035)
6.	Funded Ratio*	128%	118%
7.	Required Payment to amortize the UAAL over the next 20 years	$ (7,009)	$ (6,416)
8.	Administrative and other ongoing expenses	$ 2,832	$ 1,162
9.	Calculated annual contribution (Item 1 + Item 7 + Item 8)	$ (3,763)	$ (4,917)
10.	Assumed contribution		
	a. Budgeted department contribution	$ 0	$ 7,000
	b. Expected state funding	0	7,508
	c. Total assumed contribution	$ 0	$ 14,508
11.	Funding period based on assumed contribution	0 years	0 years

* The funded status measure may be appropriate for assessing the need for future contributions. The funded status is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

Table 4 - Actuarial Present Value of Future Benefits

	Valuation as of 01/01/2019	Valuation as of 01/01/2017
	(1)	(2)
1. Active members		
a. Retirement benefits	$ 9,665	$ 7,870
b. Vested retirement benefits	5,851	4,270
c. Death benefits	40	47
d. Disability benefits	154	132
e. Total	$ 15,710	$ 12,319
2. Retired members		
a. Service retirements	$ 249,256	$ 259,419
b. Disability retirements	0	0
c. Beneficiaries	0	0
d. Total	$ 249,256	$ 259,419
3. Terminated vested members*	$ 0	$ 0
4. Total actuarial present value of future benefits	$ 264,966	$ 271,738

* Includes members active in another fund that have 'portable benefits' per the Colorado statutory requirements, if applicable.

Table 5 - Actuarial Experience

Change in UAAL

1.	Unfunded actuarial accrued liability (UAAL) as of January 1 of prior valuation year	$	(49,035)
2.	Total normal cost and administrative expenses for FY2017 & FY2018		6,338
3.	Contributions during FY2017		(15,744)
4.	Contributions during FY2018		(7,550)
5.	Interest at 7.50%*		(9,226)
6.	Expected UAAL as of this valuation (1. + 2. + 3. + 4. + 5.)	$	(75,217)
7.	Actual UAAL at end of period	$	(73,137)
8.	Actuarial gain/(loss) for the period (6. - 7.)	$	(2,080)
	SOURCE OF GAINS/(LOSSES)		
9.	Asset gain/(loss)	$	(2,537)
10.	Benefit changes		0
11.	Assumption changes		(10,701)
12.	Net liability gain/(loss) for the period (8. - 9. - 10. – 11.)	$	11,158

Change in Calculated Annual Contribution

1.	Calculated annual contribution 2017			$	(4,917)
2.	Expected changes (Contributions, Interest, etc)	$	569		
3.	Benefit changes		0		
4.	Assumption/method changes		1,072		
5.	Investment experience		254		
6.	Change in normal cost		77		
7.	Other experience		(818)		
8.	Total change	$	1,154		
9.	Calculated annual contribution 2019			$	(3,763)

* Updated to be 7.00% effective January 1, 2019.

Table 6 - History of Employer Contributions

The "Annual Required Contribution" (ARC) is the sum of the normal cost and the amortization of the UAAL. This is a historical standardized measure that was previously calculated in accordance with Statements No. 25 and No. 27 of the Governmental Accounting Standards Board (GASB).

The following exhibit shows a history of the ARC and the actual contributions made to the Plan.

Fiscal Year Ending	Annual Required Contribution*	Actual Contribution	Percent
(1)	(2)	(3)	(4)
December 31, 2015	$ 7,432	$ 7,432	100%
December 31, 2016	$ 17,750	$ 17,750	100%
December 31, 2017	$ 15,744	$ 15,744	100%
December 31, 2018	$ 7,550	$ 7,550	100%
December 31, 2019	$ 0	N/A	

* Based on the greater of the actual/assumed contribution and the calculated contribution. If the actual contributions are different, this exhibit will need to be adjusted.

Table 7 - Reconciliation of Net Plan Assets

		Year Ending 12/31/2018 (1)	Year Ending 12/31/2017 (2)
1.	Market value of assets at beginning of year	$ 337,060	$ 304,267
2.	Revenue for the year		
a.	Plan direct inflows		
i.	Employer contributions	$ 0	$ 8,352
ii.	State funding	7,550	7,392
iii.	Affiliations	0	0
iv.	Plan directed expenses	0	0
v.	Total	$ 7,550	$ 15,744
b.	Allocated income		
i.	Interest	$ 1,385	$ 858
ii.	Dividends	2,549	2,277
iii.	Other income	1,870	2,694
iv.	Net change accrued income	166	189
v.	Unrealized gain/(loss)	(18,830)	26,338
vi.	Realized gain/(loss)	16,094	14,274
vii.	Total	$ 3,234	$ 46,630
c.	Total Revenue (Item 2a + Item 2b)	$ 10,784	$ 62,374
3.	Expenditures for the year		
a.	Net benefits	$ 22,320	$ 23,475
b.	Allocated expense		
i.	Investment expenses	$ 2,926	$ 3,024
ii.	Direct expense allocation	431	1,015
iii.	Allocated fees and expenses	2,151	2,067
iv.	Total allocated expenditures	$ 5,508	$ 6,106
4.	Increase/(Decrease) in net assets (Item 2c - Item 3a - Item 3b)	$ (17,044)	$ 32,793
5.	Market value of assets at end of year (Item 1 + Item 4)	$ 320,016	$ 337,060

Note: 2018 employer contributions of $0 or state funding of $7,508 received after 12/31/2018 are not included in this report.

Table 8 - Development of Actuarial Value of Assets

	Year Ending 12/31/2018 (1)	12/31/2017 (2)
1. Actuarial value of assets at beginning of year	$ 332,249	$ 318,386
2. Cash flow for the year		
a. Contributions	$ 0	$ 8,352
b. State funding	7,550	7,392
c. Affiliation contributions	0	0
d. Net benefits	(22,320)	(23,475)
e. Administrative and other ongoing expenses	(2,582)	(3,082)
f. Net cash flow	$ (17,352)	$ (10,813)
3. Expected investment earnings	$ 24,268	$ 23,473
4. Expected actuarial value of assets at end of year	$ 339,165	$ 331,046
5. Actual market value of assets at end of year	$ 320,016	$ 337,060
6. Excess earnings/(shortfall)	$ (19,149)	$ 6,014
7. Excess earnings/(shortfall) recognized (Table 9, Item 6)	$ (3,830)	$ 1,203
8. Final actuarial value of assets (Item 4 + Item 7)	$ 335,335	$ 332,249

Table 9 - Development of Amounts to be Recognized in the Actuarial Value of Assets

	Year Ending 12/31/2018 (1)	Year Ending 12/31/2017 (2)
1. Remaining deferrals of excess (shortfall) of investment income from prior years		
a. Current year - 4	$ 0	$ 0
b. Current year - 3	0	0
c. Current year - 2	0	(8,433)
d. Current year - 1	4,811	(5,686)
e. Total	$ 4,811	$ (14,119)
2. Current year (Table 8, Item 6 - Table 9, Item 1)	$ (23,960)	$ 20,133
3. Amounts to be immediately recognized due to an offsetting experience		
a. Current year - 4	$ 0	$ 0
b. Current year - 3	0	0
c. Current year - 2	0	8,433
d. Current year - 1	(4,811)	5,686
e. Current year	4,811	(14,119)
f. Total	$ 0	$ 0
4. Remaining prior year deferrals		
a. Current year - 4	$ 0	$ 0
b. Current year - 3	0	0
c. Current year - 2	0	0
d. Current year - 1	0	0
e. Current year	(19,149)	6,014
f. Total	$ (19,149)	$ 6,014
5. Deferral of excess (shortfall) of investment income for:		
a. Current year - 4	$ 0	$ 0
b. Current year - 3	0	0
c. Current year - 2	0	0
d. Current year - 1	0	0
e. Current year	(15,319)	4,811
f. Total	$ (15,319)	$ 4,811
6. Total amount recognized in actuarial value of assets (Item 3.f + Item 4.f. - Item 5.f.)	$ (3,830)	$ 1,203

Table 10 - Historical Summary

	Valuation as of 01/01/2019	Valuation as of 01/01/2017	Valuation as of 01/01/2015
	(1)	(2)	(3)
1. Member Data			
a. Active Members	1	1	2
b. Retired Members	9	10	10
c. Disabled Members	0	0	0
d. Beneficiaries	0	0	0
e. Terminated Vested Members	0	0	0
f. Terminated Members Active in Another Fund	0	0	0
g. Total Members	10	11	12
h. Average Age – Actives Only	37.0	35.0	27.5
i. Average Service – Actives Only	10.0	10.0	6.0
2. Financial Data			
a. Market Value of Assets	$ 320,016	$ 304,267	$ 308,793
b. Actuarial Value of Assets	$ 335,335	$ 318,386	$ 304,615
3. Actuarial Data			
a. Accrued Liability	$ 262,198	$ 269,351	$ 267,932
b. Unfunded Accrued Liability / (Surplus)	$ (73,137)	$ (49,035)	$ (36,683)
c. Normal Cost			
i. Total Amount	$ 414	$ 337	$ 550
ii. Amount per Active Member	414	337	275
d. Amortization Contribution			
i. Total Amount	$ (7,009)	$ (6,416)	$ (5,223)
ii. Amount per Active Member	(7,009)	(6,416)	(2,612)
e. Administrative and Ongoing Expenses*			
i. Total Amount	$ 2,832	$ 1,162	$ 0
ii. Amount per Active Member	2,832	1,162	0
f. Calculated Annual Contribution			
i. Total Amount	$ (3,763)	$ (4,917)	$ (4,673)
ii. Amount per Active Member	(3,763)	(4,917)	(2,337)

* As of January 1, 2016, this is a method change to explicitly include administrative expenses in the calculated annual contribution. Prior years may have included an ongoing expense assumption in the calculated annual contribution that was separate from the administrative expenses.

Table 11 - Membership Data

	01/01/2019	01/01/2017	01/01/2015
	(1)	(2)	(3)
1. Active members			
a. Number	1	1	2
b. Average age	37.0	35.0	27.5
c. Average service	10.0	10.0	6.0
2. Service retirees			
a. Number	9	10	10
b. Total annual benefits	$ 22,320	$ 24,300	$ 24,300
c. Average annual benefit	$ 2,480	$ 2,430	$ 2,430
d. Average age	65.7	65.3	63.3
3. Disabled retirees			
a. Number	0	0	0
b. Total annual benefits	$ 0	$ 0	$ 0
c. Average annual benefit	$ 0	$ 0	$ 0
d. Average age			
4. Beneficiaries and spouses			
a. Number	0	0	0
b. Total annual benefits	$ 0	$ 0	$ 0
c. Average annual benefit	$ 0	$ 0	$ 0
d. Average age			
5. Terminated vested members			
a. Number	0	0	0
b. Average age			
6. Terminated members active in another fund	0	0	0
7. Total number of members	10	11	12

Table 12 - Distribution of Membership by Age and Service

Attained Age	Years of Service to Valuation Date							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	
Under 20								0
20-29								0
30-39			1					1
40-49								0
50-59								0
Over 60								0
Totals	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**

	Retirees		Disabled Members		Beneficiaries		All	
Age	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension	Number	Average Monthly Pension
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Less than 50	0	$ 0	0	$ 0	0	$ 0	0	$ 0
50-59	1	270	0	0	0	0	1	270
60-69	6	200	0	0	0	0	6	200
70-79	2	195	0	0	0	0	2	195
Greater than 80	0	0	0	0	0	0	0	0
All	9	$ 207	0	$ 0	0	$ 0	9	$ 207

Table 13 - Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability that results from the differences between actual experience and the actuarial assumptions.

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 economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;

2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;

3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees or other relevant contribution base;

4. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;

5. Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

Table 13 - Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution (Continued)

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of retirees and beneficiaries and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	12/31/2018	12/31/2016
Ratio of actives to retirees and beneficiaries	0.1	0.1
Ratio of net cash flows to market value of assets	-5%	-2%
Duration of the actuarial accrued liability	10.1	9.8

Ratio of Actives to Retirees and Beneficiaries

A ratio of actives to retirees and beneficiaries less than 1 typically indicates an older plan.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions (see Table 8).

Duration of Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

Table 14 - Summary for Actuarial Assumptions, Methods, and Changes

The calculations set forth in this report are based on the following assumptions:

1. Investment Return Rate — 7.0% per annum (net of investment expenses), compounded annually

2. Rates of Decrement due to:

a) Retirement — Age 50 and 20 years of service.

Age	Annual Rate Per 100
50	50
55	50
60	50
65	100

b) Disability

Age	Annual Rate Per 1,000
20	0.10
25	0.16
30	0.26
35	0.45
40	0.97
45	3.50
50	6.50
55	8.10

c) Pre-Retirement Mortality — 2006 central rates from the RP-2014 Employee Mortality Tables for males and females projected to 2018 using the MP-2017 projection scales, and then projected prospectively using the ultimate rates of the scale for all years, 50% multiplier for off-duty mortality. RP-2014 Mortality Table for Blue Collar Employees, 55% multiplier for off-duty mortality.

	Annual Rate Per 1,000 (for 2019)	
Age	Males	Females
20	0.193	0.084
25	0.249	0.094
30	0.254	0.117
35	0.302	0.164
40	0.348	0.226
45	0.497	0.336
50	0.842	0.545
55	1.416	0.889

Table 14 - Summary for Actuarial Assumptions, Methods, and Changes (Continued)

d) Withdrawal (any reason other than retirement, death, or disability)

Annual Rate Per 1,000 Withdrawals			
Service	Rates	Service	Rates
1	182.37	11	83.96
2	169.99	12	77.23
3	158.17	13	71.06
4	146.92	14	65.45
5	136.21	15	60.41
6	126.12	16	55.94
7	116.56	17	52.02
8	107.56	18	48.68
9	99.13	19	45.89
10	91.27		

Twenty percent (20%) of members age 50 and eligible for a terminated vested benefit which would commence immediately are assumed to withdraw each year.

3. Post-Retirement Mortality

a) Healthy Retirees and Beneficiaries

2006 central rates from the RP-2014 Annuitant Mortality Tables for males and females projected to 2018 using the MP-2017 projection scales, and then projected prospectively using the ultimate rates of the scale for all years.

	Annual Rate Per 1,000 (for 2019)	
Age	Males	Females
50	4.059	2.735
55	5.822	3.847
60	8.168	5.752
65	11.699	8.492
70	17.348	13.131
75	27.701	21.566
80	46.781	36.910

Table 14 - Summary for Actuarial Assumptions, Methods, and Changes (Continued)

b) Disabled Retirees

2006 central rates from the RP-2014 Disabled Mortality Tables for males and females projected to 2018 using the MP-2017 projection scales, and then projected prospectively using the ultimate rates of the scale for all years.

	Annual Rate Per 1,000 (for 2019)	
Age	Males	Females
50	30.000	20.000
55	30.000	20.000
60	30.000	20.000
65	33.660	22.012
70	41.739	28.780
75	56.059	42.277
80	80.143	64.656

4. Administrative Expenses

An explicit administrative expense equal to the average of the actual expenses for the two prior years.

5. Marital Status

a) Percent married

90% male and female

b) Age difference

Males are assumed to be two years older than females

6. Changes in Actuarial Assumptions

The global assumption set for plans administered by FPPA was changed in the 2018 Experience Study and effective as of January 1, 2019. This is the first valuation for this plan with the new assumptions. Significant changes affecting this valuation include:

- Reduce investment return from 7.5% to 7.0%
- Update base mortality tables and projection scales.
- Increase withdrawal rates by 10%.

Table 14 - Summary for Actuarial Assumptions, Methods, and Changes (Continued)

7. Actuarial Cost Method

Under the entry age actuarial cost method, the Normal Cost is computed as the level dollar amount which, if paid from the earliest time each member would have been eligible to join the plan if it then existed (thus, entry age) until his retirement or termination, would accumulate with interest at the rate assumed in the valuation to a fund sufficient to pay all benefits under the plan. The normal cost for the plan is determined by summing the normal cost of all members.

The Actuarial Accrued Liability under this method at any point in time is the theoretical amount of the fund that should have been accumulated had annual contributions been made in prior years equaling to the normal cost. The Unfunded Actuarial Accrued Liability/(Surplus) is the excess of the actuarial accrued liability over the actuarial value of the plan assets as of the valuation date.

The contribution requirements determined by this valuation will not be effective until one year later, and the determination of the calculated annual contribution reflects this deferral by amortizing the expected Unfunded Actuarial Accrued Liability/(Surplus) one year after the valuation date. It is assumed that there will be no change in the normal cost due to the deferral, and it is assumed that payments are made in the middle of the year.

Under this method, experience gains and losses (i.e. decreases or increases in accrued liabilities), attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

8. Asset Valuation Method

The asset valuation method is based on a comparison of expected and actual asset values. The actuarial value of assets is equal to the market value of assets less a five-year phase in of the Excess (Shortfall) between expected investment return and actual income determined as follows:

- At the beginning of each plan year, an expected actuarial asset value is calculated as the sum of the previous year's actuarial value increased with a year's interest at the Plan valuation rate plus net cash flow (excluding expenses) adjusted for interest (at the same rate) to the end of the previous plan year.
- The difference between the expected actuarial value and the actual market value is the investment gain or loss for the previous plan year.
- If the current year's difference is the opposite sign of any of the prior years' deferred Excesses/(Shortfalls), then the prior years' bases (starting with the oldest) are reduced dollar for dollar along with the current year's base. Any remaining bases are then recognized over five years (20% per year) from their initial creation.

Appendix - Definition of Terms

1. Actuarial Cost Method

   A method for determining the actuarial present value of future benefits and allocating such value to time periods in the form of a normal cost and an actuarial accrued liability.

2. Present Value of Future Benefits

   This is computed by projecting the total future benefit cash flow from the Plan, using actuarial assumptions, and then discounting the cash flow to the valuation date.

3. Normal Cost

   Computed differently under different actuarial cost methods, the normal cost generally represents the value of the portion of the participant's anticipated retirement, termination, and/or death and disability benefits accrued during a year.

4. Actuarial Accrued Liability

   Computed differently under different actuarial cost methods. Generally actuarial accrued liability represents the value of the portion of the participant's anticipated retirement, termination, and/or death and disability benefits accrued as of the valuation date.

5. Entry Age Actuarial Cost Method

   A method under which a participant's actuarial present value of future benefits is allocated on a level basis over the earnings of the participant between his/her entry into the Plan and his/her assumed exit.

6. Unfunded Actuarial Accrued Liability

   The difference between total actuarial present value of future benefits over the sum of the tangible assets of the Plan and the actuarial present value of the members' future normal costs. The Plan is underfunded if the difference is positive and overfunded if the difference is negative.

7. Actuarial Value of Assets

   The value of cash, investments, and other property belonging to the Plan, as valued by the actuary for purposes of the actuarial valuation.

8. Actuarial Gain or Loss

   From one valuation to the next, if the experience of the plan differs from that anticipated by the actuarial assumptions, an actuarial gain or loss occurs. For example, an actuarial gain would occur if the assets in the trust had a yield of 12% based on actuarial value, while the assumed yield on the actuarial value of assets was 7.00%.