



REPORT OF
THE
STATE AUDITOR

**Fire and Police Pension Association
Investment Program and State Assisted Plans**

**Performance Audit
November 2003**

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This report contains the results of a performance audit of the Fire and Police Pension Association (FPPA). The audit was conducted pursuant to Section 2-3-103, C.R.S., which authorizes the State Auditor to conduct audits of all departments, institutions, and agencies of state government, including political subdivisions, as required by law. The report presents our findings, conclusions, and recommendations, and the responses of the Fire and Police Pension Association.

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Fire and Police Pension Association (FPPA) Performance Audit, November 2003

Authority, Purpose, and Scope

This performance audit was conducted pursuant to Section 2-3-103, C.R.S., which authorizes the Office of the State Auditor to conduct performance audits of all departments, institutions, and agencies of the state government, including political subdivisions, as required by law. The audit work was performed from July through October 2003 and focused on the Fire and Police Pension Association's (FPPA's) investment program and administration of state funds.

The Office of the State Auditor retained Stratford Advisory Group, Inc., to conduct a review of FPPA's investment program including an evaluation of the performance of the investment portfolio; an examination of the costs of managing the portfolio; and an assessment of FPPA's processes for managing, selecting, and overseeing investments and investment managers. Stratford also assessed the status of funding for the Old Hire plans for firefighters and police officers and analyzed both the current level of state funding assistance for the plans and a number of alternative funding scenarios. In addition, Office of the State Auditor staff reviewed FPPA's administration of state funding assistance provided to the Old Hire and volunteer pension plans, the Statewide Death and Disability plan, and the volunteer death and disability insurance policy.

We gratefully acknowledge the assistance and cooperation extended by management and staff at the Fire and Police Pension Association.

Overview

FPPA is a public instrumentality and a political subdivision of the State, governed by a nine-member board of trustees. The primary investment responsibilities of the Board relate to the Statewide Defined Benefit plan and the Old Hire plans, which, combined, represent over 80 percent of the total assets managed by FPPA. In addition, the FPPA Board administers a variety of other pension and insurance plans for police officers and firefighters, as described below. As of June 30, 2003, FPPA had about \$2.2 billion in assets invested for the various plans.

For more information on this report, contact the Office of the State Auditor at 303.869.2800.

- **Statewide Defined Benefit Plan:** Provides uniform benefits for all Colorado police officers and firefighters hired on or after April 8, 1978 (except those covered under Social Security or local exempt or withdrawn plans) and is funded solely by employer and employee contributions. FPPA administers the plan, invests plan assets, oversees the actuarial soundness, and determines benefit eligibility and payments. According to FPPA records, as of July 31, 2003, the Statewide Defined Benefit plan covered 157 employers, with 3,397 active employees and 898 inactive, retired, and vested members. At June 30, 2003, the plan had total investments of about \$420 million.
- **Old Hire Pension Plans:** Provide benefits to police officers and firefighters hired prior to April 8, 1978, and are administered by local boards of trustees. Currently 8 of the 55 Old Hire plans affiliated with FPPA receive financial assistance from the State due to ongoing unfunded liabilities. According to FPPA, the eight state-assisted plans have 152 active members, 395 DROP members (individuals participating in a Deferred Retirement Option Plan that allows them to retire and then continue working for up to five years), and 2,466 retirees. FPPA distributes state assistance to the plans (totaling \$25.3 million in 2002) and invests plan assets. As of June 30, 2003, FPPA managed almost \$1.4 billion in investments for all the affiliated Old Hire plans.
- **Other pension plans:** Include locally administered plans for volunteer firefighters for which FPPA manages investments; a Statewide Money Purchase plan, which is a variation on a traditional defined benefit plan where contributions are made into individual participant accounts that are distributed to the participant on retirement; affiliated local exempt and withdrawn pension plans, whose investments are managed by FPPA; and a Deferred Compensation (457) plan. At June 30, 2003, FPPA managed over \$260 million for these plans.
- **Death and Disability Insurance plans:** Includes a Statewide Death and Disability plan, which covers nearly all paid police officers and firefighters, except those covered by Social Security, and a Death and Disability Insurance Policy for volunteer firefighters. As of June 30, 2003, the Statewide Death and Disability Fund had about \$196 million in assets.

The Old Hire plans, the volunteer pension plans, and the volunteer death and disability insurance plan are the only plans that receive state assistance.

FPPA's Investment Program

The FPPA Board uses the Fire and Police Members' Benefit Fund (the fund) to pool the assets of the pension plans whose investments are managed by FPPA. The Board's Master Statement of Investment Policies and Objectives states that the overall goal of the fund is to balance and prudently manage the risks and return of all participating plans. The Master Statement also cites as long-term

objectives that the fund should earn an average annual real rate of return of at least 4 percent over the rate of inflation; that the total fund should produce an investment return greater than the sum of the index returns of each asset class multiplied by the fund's target allocation; and that the total fund should produce an investment return which places it in the top half of its peer group universe (public pension plans having more than \$1 billion in assets). Stratford identified the following concerns related to FPPA's investment program:

- **FPPA is not meeting its objective of producing an investment return which places the fund in the top half of its peer group universe.** Specifically, over the last 1-, 3-, 5-, and 10-year periods ending on June 30, 2003, FPPA's investment returns have lagged the average returns of other large public pension funds. For the 10 years ending June 30, 2003, the average annual difference in overall returns between FPPA and the Callan public fund sponsors with greater than \$1 billion is 0.87 percentage points. Achieving the best possible return on investments is important to meet benefit obligations and reduce the unfunded liabilities of the plans as well as the need for additional financial assistance. Increasing returns on a \$2 billion fund by one-half percent results in an additional \$10 million per year reduction in liabilities. Stratford evaluated FPPA's asset allocation policy and the investment risk associated with the policy and determined that the Association has taken on less risk than its peers over much of the last 10-year period. This appears to have contributed to some of FPPA's relatively lower investment returns. In addition, over the past five years, FPPA's asset allocation had substantially less domestic equity and fixed income exposure and substantially more real estate, global bonds, and international equities than the median public fund, as well as lower performance. These variances from the asset allocations of other public funds are the key to the difference in investment performance.
- **FPPA could improve its analysis of manager performance by using holdings-based style analysis.** Stratford found that all investment managers are managing to the benchmark index designated in their respective investment policy agreements and that FPPA has a comprehensive investment manager selection and monitoring process. However, FPPA currently relies solely on returns-based analyses of its managers, which can be misleading if managers do not correlate well with standard benchmarks. For example, analysis only of returns may not reveal that a manager is not holding investments consistent with the style stipulated in its agreement. Holdings-based analysis evaluates the actual holdings of the manager against stated benchmarks for specific investments.

Old Hire Plans

Through FPPA, the General Assembly has provided state assistance to help underfunded Old Hire plans meet minimum funding standards. Statutes clearly place the ongoing financial responsibility for each plan with its municipality and provide that state financial assistance is a temporary action to be terminated as soon as possible. As of 2002, the annual amount of state assistance provided to

Old Hire plans was about \$25 million. As individual Old Hire plans reach full funding, they no longer receive state assistance. Currently 8 of 55 Old Hire plans receive state funds. Between 1996 and 2001, the unfunded liabilities of the plans receiving state assistance dropped from about \$487 million to just under \$193 million, but by 2003 the unfunded liabilities of the plans had grown to over \$315 million, due primarily to salary increases significantly higher than expected and relatively poor investment experience.

In 2003, Senate Bill 263 suspended state assistance payments scheduled for September 2003, 2004, and 2005, and provided for payments to resume in April 2006 and continue through April 2012. The bill also specifies that the State will transfer, no later than April 30, 2012, any actuarially determined increase in the unfunded accrued liability attributable to this suspension of state contributions, in addition to the annual payments. Stratford estimated that using the actuarial interest rate of 8 percent, if this increase were spread across all seven years, the State would pay almost \$31 million annually, or a total of just over \$216 million. Alternatively, if the increase was paid through a single payment in one of the seven years, the payment would range from about \$31 million if paid in 2006 to over \$49 million if paid in 2012, in addition to the annual \$25 million payment required by statute. If the actuarial assumptions are met throughout the period, the remaining unfunded accrued liability at 2012 will be the \$65 million estimated by Buck Consultants in its pre-SB 03-263 calculations with an adjustment for benefits paid from 2009 to 2012.

Stratford identified several issues relating to the Old Hire plans:

- **Unfunded liabilities and cash flow problems are likely to continue for at least some Old Hire plans under various funding scenarios.** Stratford modeled several alternative state assistance scenarios based on input from FPPA, staff of the Joint Budget Committee, and the Governor's Office of State Planning and Budgeting. The scenarios considered delaying state assistance until 2007 or 2010 and making seven annual payments thereafter along with an amount to cover the unfunded liability that would accrue due to the delay; using different interest rates in place of the actuarially assumed rate of 8 percent to calculate any additional unfunded liability accrued; extending the length of the payment period to either 10 or 15 years; and reducing the length of the payment period to four years. For all the scenarios, an unfunded liability is expected to exist after state assistance is discontinued, at least for some plans. In addition, the cash flow problems currently experienced by some of the plans may not be alleviated by state assistance, particularly if the period over which the assistance is provided is extended. These scenarios present options for managing the State's assistance to the Old Hire plans. The analysis highlighted the importance of FPPA's working with local employers to plan for any possible changes in the state funding scheme to help address issues related to cash flow and continuing unfunded liabilities.
- **FPPA has delayed actuarial and experience studies to control expenses in the last few years.** FPPA typically completes a study of actuarial assumptions and plan experience every four to five years and an asset and liability analysis every three to four years. The last

experience study considered experience through 1998. The last asset and liability analysis was completed as of January 1, 2000. An asset and liability analysis completed in the near future would provide a more current picture of the member groups and the liabilities of each plan. An annual detailed analysis of experience, showing impact of salary changes, investment experience, and demographic experience, on each plan, can help FPPA to monitor and prepare for changes in the plans.

Administration of State Funds

Since its inception in 1980, FPPA has been statutorily responsible for distributing state funding to the Old Hire plans, the Statewide Death and Disability plan, and the Volunteer Firefighter Pension plans. FPPA uses an internal pass-through account to track all state funds received and distributed. We found that, for Fiscal Years 1998 to 2002, FPPA accurately distributed nearly all funds received for the Old Hire plans. However, we identified a number of problems with FPPA's handling of state funds, as follows:

- **FPPA has not reconciled state funds received to funds distributed.** All state monies received by FPPA should be promptly distributed to either Volunteer Pension plans, Old Hire Pension plans, or the Statewide Death and Disability plan. When we reviewed FPPA's accounting records we found that not all funds were distributed. Specifically, there were residual balances in the pass-through account from 1995 through 2001 ranging from a low of \$214,000 to a high of \$402,000. In December 2002, FPPA transferred nearly \$223,000 from the pass-through account to the Statewide Death and Disability plan. The \$223,000 amount was held pending negotiations regarding one police officer's eligibility for plan benefits between 1983 and 1992. These funds should have been held in the Statewide Death and Disability Fund. Although the \$223,000 was invested with the rest of the pooled funds managed by FPPA, the estimated \$771,000 in earnings on these monies between 1983 and 2002 was erroneously allocated among all funds managed by FPPA, rather than only to the Statewide Death and Disability Fund. This oversight likely resulted in the State's overpaying to fully fund the Statewide Death and Disability Fund in 1997 by about \$565,000.
- **FPPA has requested state funds for volunteer pension plans based on incomplete applications.** To receive state funds, volunteer departments must submit applications to FPPA by the end of August each year. In April 2002, FPPA staff determined that an \$82,000 residual balance in the pass-through account was the result of FPPA's overrequesting state monies. FPPA's requests for funds from the State were based on incomplete applications and unverified information. In October 2002, FPPA repaid the State the \$82,000 residual balance in the pass-through account by reducing the request for state funds. We estimate the State lost about \$4,850 in interest earnings from October of 2001 to October of 2002 while the \$82,000 balance was building.

- **Calculations of volunteer distributions have contained errors.** First, we found the distributions of state funds to volunteer departments in 2002 were based on the formula in effect prior to July 1, 2002, resulting in four departments that qualified for the minimum state funding receiving less than \$1,000 each, for a total underpayment \$1,341. We also found that, in 2002, FPPA incorrectly distributed a total of \$428 of state funding to two departments that did not contribute the statutorily required one-half mill. Although these amounts are immaterial, they indicate a lack of supervisory review prior to distribution. We also found errors in the formulas FPPA used for volunteer distributions between 1997 and 2001.
- **Cost allocations for services provided should be reevaluated.** FPPA currently recovers its costs for services it provides to volunteer fire departments by allocating them to all the pension funds it administers. Costs are not allocated to volunteer plans because FPPA does not administer them and does not have authority to charge them fees. FPPA estimates the annual costs to process volunteer department applications for state funding are about \$9,050, or an average of about \$40 per volunteer application. Changing the allocation of administrative costs, seeking statutory authority to charge an application fee, requesting an appropriation for processing the volunteer funds, or seeking legislative change to shift the duty of distributing these volunteer funds to another entity, such as a state agency, could address this concern.

The audit recommendations and the responses of the Fire and Police Pension Association can be found in the Recommendation Locator.

RECOMMENDATION LOCATOR
Agency Addressed: Fire and Police Pension Association

Rec. No.	Page No.	Recommendation Summary	Agency Response	Implementation Date
1	27	Expand efforts to produce fund returns that meet all investment objectives.	Agree	July 2004
2	30	Consider a more widely recognizable measure, in place of the GNP deflator, to evaluate investment performance against the benchmark of earning a return of 4 percent over inflation.	Agree	December 2003
3	34	Consider using holdings-based style analysis to ensure the accuracy of the returns-based analysis of investment managers.	Agree	October 2005
4	35	Evaluate the current analytical software to determine if there is redundancy, and eliminate any unnecessary software costs.	Agree	October 2005
5	50	Monitor the cash flow positions of the Old Hire plans, and work with the employers to develop plans for addressing current and future cash flow problems.	Agree	Ongoing
6	51	Have an annual, detailed, experience study completed, addressing the experience both of individual plans and of plans in the aggregate.	Agree	March 2004
7	52	Consider employing an actuarial asset valuation that averages assets over five years.	Agree	July 2004
8	57	Work with the State Treasurer and Joint Budget Committee to resolve errors in the 1997 accounting for Statewide Death and Disability costs.	Partially Agree	--
9	58	Improve accountability for state funds and return any unallocated balances to the State upon identification.	Agree	Implemented

RECOMMENDATION LOCATOR
Agency Addressed: Fire and Police Pension Association

Rec. No.	Page No.	Recommendation Summary	Agency Response	Implementation Date
10	61	Improve accountability over state funding for volunteer pension funds.	Agree	Pending Potential Legislation
11	64	Ensure state funds are distributed in accordance with statute. Work with the Joint Budget Committee to determine whether recalculation of prior year volunteer distributions is reasonable and whether additional funding for underallocations would be available.	Agree	Pending Potential Legislation
12	64	Consider moving the volunteer application deadline one month earlier, or seek statutory changes to allow state funds to be transferred at a time that is more appropriate.	Agree	Pending Potential Legislation
13	66	Consider obtaining bids for the volunteer death and disability insurance policy.	Agree	Pending Potential Legislation
14	66	Provide informational material on the volunteer death and disability insurance policy to nonaffiliated volunteer departments and the Colorado State Firefighter's Association.	Agree	Pending Potential Legislation
15	67	Consider options to improve the equity of cost allocation for services provided only to volunteer departments.	Agree	Pending Potential Legislation

Overview of the Fire and Police Pension Association

Prior to 1978, Colorado municipalities and fire protection districts with paid police and fire services administered local pension plans for police officers and firefighters. The following two bills, passed by the General Assembly in 1978 and 1979, significantly changed the pension plans for these employees:

- Senate Bill 78-046 (the Policemen's and Firemen's Pension Reform Act) required municipalities and districts to begin funding their fire and police pension plans at specified levels and provided for state funding assistance to those plans that increased employer contributions and established minimum member contributions to fund their plans on an actuarially sound basis. The Act also limited membership in the plans to police officers and firefighters who were hired prior to April 8, 1978. These plans are referred to as "Old Hire" pension plans.
- Senate Bill 79-079 established the Fire and Police Pension Association (FPPA) and created a new statewide pension plan as well as a statewide death and disability plan. The statewide pension plan is a defined benefit plan for police officers and firefighters hired on or after April 8, 1978 (new hires). The Statewide Death and Disability plan provides coverage for all paid police officers and firefighters.

FPPA Responsibilities

According to Section 31-31-201, C.R.S., the Fire and Police Pension Association (FPPA) is a public instrumentality and a political subdivision of the State. FPPA is governed by a nine-member board of trustees appointed by the Governor and confirmed by the Senate. Two board members represent Colorado municipal employers; one member represents full-time paid firefighters; one member represents full-time paid police officers; one member represents retired members, alternating every four-year term between firefighters and police officers; one member represents special districts with volunteer firefighters; and three members are from the State's financial or business community with one having investment experience, one having experience with insurance disability claims, and one having experience in personnel or administration of corporations with over 200 employees.

One of the primary functions of the FPPA Board is to manage the investments of the various plans described below. As of June 30, 2003, FPPA had about \$2.2 billion in assets invested for the various plans. The primary investment responsibilities of the Board relate to the Statewide Defined Benefit plan and the Old Hire plans, which represent over 80 percent of the total assets managed by FPPA.

Statewide Defined Benefit Plan

Section 31-31-401, et seq., C.R.S., establishes the Statewide Defined Benefit plan providing uniform benefits and covering all police officers and firefighters hired on or after April 8, 1978 (except those who are covered only under Social Security or are in exempt or withdrawn plans, described below). The Statewide Defined Benefit plan must be maintained on an actuarially sound basis and is funded solely by employer and employee contributions. FPPA administers the plan, including investing the assets, overseeing the actuarial soundness, determining benefit eligibility and payments, and accounting for the plan.

According to FPPA, as of July 31, 2003, the Statewide Defined Benefit plan covered 157 employers, with 3,397 active employees and 898 inactive, retired, and vested members. In addition, there are eight small employers who cover all of their police and fire employees under the Social Security system. These employers have affiliated with FPPA to include their employees in the Statewide Defined Benefit plan, providing the employees the opportunity to retire at age 55 (rather than at the Social Security retirement age) and receive the statewide plan benefit in addition to their Social Security benefit. At June 30, 2003, the Statewide Defined Benefit plan had total investments of about \$420 million.

Old Hire Pension Plans

Article 30.5 of Title 31, C.R.S., defines and sets guidelines for the Old Hire pension plans. These plans, which provide benefits to police officers and firefighters who were hired prior to April 8, 1978, are administered by local boards of trustees. Currently 8 of the 55 Old Hire plans affiliated with FPPA are receiving financial assistance from the State because they have ongoing unfunded liabilities. Membership information for these eight plans is shown in the following table.

Membership in State-Assisted Old Hire Plans as of July 31, 2003				
Employer/Plan	Number of Members			Total
	Actives	DROPs¹	Retirees²	
Denver Fire	86	126	923	1,135
Denver Police	48	238	1,263	1,549
Grand Junction Police	0	0	23	23
Greeley Fire (Union Colony)	2	0	29	31
Lakewood Fire	10	0	42	52
LaSalle Police	1	0	1	2
Pueblo Fire	5	30	171	206
North Washington Fire	0	1	14	15
TOTAL	152	395	2,466	3,013

Source: Information provided by FPPA.

¹ DROP members participate in a Deferred Retirement Option Plan that allows them to retire and then continue working for up to five years. Their employee retirement contributions during this extended employment period are invested in funds of their choice within the Statewide Money Purchase plan, described below.

² Retiree numbers include vested retirees.

For each of the Old Hire plans that have an ongoing unfunded accrued liability and therefore receive state financial assistance, FPPA is responsible for setting the assumptions for and overseeing actuarial valuations which update the unfunded liability of each plan based on the demographic, economic, and investment experience to date. FPPA also distributes state monies to those Old Hire plans that have an unfunded accrued liability and is responsible for the investment of the assets of the plans. As of January 2002, the annual state contribution to the Old Hire plans was \$25.3 million, and as of June 30, 2003, FPPA managed almost \$1.4 billion in investments for all the Old Hire plans affiliated with the Association.

In addition to its responsibilities for the Statewide Defined Benefit plan and the Old Hire plans, FPPA carries out certain administrative functions for the following:

Volunteer Firefighter Pension Plans and Death & Disability Insurance Plan.

Section 31-30-1101, et seq., C.R.S., governs pension plans for volunteer firefighters, and Section 31-31-705, C.R.S., authorizes the FPPA Board to enter into agreements with the governing bodies of volunteer firefighter pension plans to manage their funds for investment. These plans are funded by state and employer contributions. In accordance with Section 31-30-1112, C.R.S., the State makes an annual contribution for volunteer pension plans that is equal to 90 percent of the amount levied or appropriated, up to one-half mill, on the current valuation for the assessment of the municipality or district. FPPA allocates these state monies to the volunteer pension plans. For Fiscal Year 2003, the amount of state funding provided to the plans was nearly \$3.8 million. According to information from FPPA, the

Association managed almost \$77 million in investments for the 164 volunteer pension plans covering about 4,100 active firefighters and about 2,200 retirees, as of June 30, 2003.

For the insurance policy providing accidental death and disability coverage to volunteer firefighters, the State pays the annual premium, currently \$30,000. Statutes require that FPPA competitively bid and negotiate the insurance contract.

The unfunded Old Hire plans, the volunteer pension plan, and the volunteer death & disability insurance plan are the only plans that receive state assistance.

Local Exempt Plans. In 1978 and 1979, when the General Assembly established funding requirements for the Old Hire plans and created the Statewide Defined Benefit plan, it also permitted employers to establish local plans exempt from many of the statutory requirements. These plans are locally administered but two have affiliated with FPPA to have their investments managed by the Association. As of June 30, 2003, FPPA managed about \$150 million for these two plans.

Local Withdrawn Plans. These plans were initially included in the Statewide Defined Benefit plan but opted to withdraw and create local Money Purchase plans. A money purchase plan is a variation on the traditional defined benefit plan in which contributions are made into individual accounts for individual participants. At retirement, the participants receive the account value, including contributions and investment returns. Four of these local plans, with 129 members, have affiliated with FPPA, and as of June 30, 2003, had about \$12 million in investments managed by FPPA.

Statewide Money Purchase Plan. Section 31-31-501, et seq., C.R.S., establishes the fire and police members' money purchase benefit plan and authorizes the FPPA Board to administer the plan. The Board must offer members a minimum of three investment options and maintain an accurate accounting for each member. Currently there are 55 employers covering 93 active employees. As of June 30, 2003, the Statewide Money Purchase Plan had about \$4 million in investments.

Deferred Compensation (457) Plan. Section 31-31-901, C.R.S., authorizes the FPPA Board to establish a deferred compensation plan that is to be in compliance with section 457 of the "Internal Revenue Code of 1986." This plan is a master plan that guides employers in the establishment of a compliant plan under which their police officers and firefighters may voluntarily defer compensation until some future time. FPPA keeps an accounting of member accounts, receives and distributes monies, and offers at least three options to members for the investment of their deferred wages. Currently 79 employers offer the deferred compensation plan to their

firefighters and police officers, who number 1,123. As of June 30, 2003, there was about \$18 million in investments in the 457 plan.

Statewide Death and Disability Plan. Section 31-31-801, et seq., C.R.S., establishes the Statewide Death and Disability Plan, which covers nearly all paid firefighters and police officers, except those who are covered by Social Security. Until 1997 the State contributed to these plans for eligible members hired prior to January 1, 1997. Since 1997, employers fund the benefits. Members include employees covered by the affiliated Old Hire plans, the Statewide Defined Benefit plan, the Statewide Money Purchase plan, the withdrawn plans, and the exempt affiliated plans. As of June 30, 2003, there were 356 participating plans with 9,692 employees and about \$196 million in investments in the Statewide Death and Disability plan.

Finally, FPPA will manage the investments of any other Old Hire plans, exempt pension plans, withdrawn money purchase plans, and volunteer plans that elect to affiliate with the Association.

The following table summarizes the plans described above.

Summary of Pension and Death & Disability Plans for Police Officers and Firefighters					
Plan	Administration²		Funding		
	FPPA	Local	State	Employer	Member
Statewide Defined Benefit	%			%	%
Old Hire					
Affiliated ¹ with FPPA		%	%	%	%
Nonaffiliated with FPPA		%		%	%
Volunteer Firefighter					
Affiliated ¹ with FPPA		%	%	%	%
Nonaffiliated with FPPA		%	%	%	%
Local Exempt		%		%	%
Local Withdrawn Money Purchase		%		%	%
Statewide Money Purchase	%			%	%
457 Deferred Compensation	%				%
Statewide Death & Disability	%			%	%
Source: Stratford Advisory Group analysis of data provided by FPPA.					
Notes:					
¹ Affiliated plans are those that make contributions to FPPA, which invests the assets and pays benefits to eligible members, under the direction of a local pension board.					
² Administration refers to the entity that manages and makes policy decisions regarding the plan or plans.					

FPPA's Investment Program

Chapter 1

Section 31-31-301, C.R.S., creates the Fire and Police Members' Benefit Fund (the fund), which is used to pool the assets of the pension plans whose investments are managed by FPPA. Section 31-31-302, C.R.S., establishes the FPPA Board as trustee of the fund and gives full and unrestricted discretionary authority to invest and reinvest portions of the fund not immediately required for benefits. This statute also requires that the Board be governed by the "Uniform Prudent Investor Act" (Article 1.1 of Title 15, C.R.S.). As of June 30, 2003, FPPA had about \$2.2 billion in investments.

Investment Objectives

The FPPA Board initially developed a Master Statement of Investment Policies and Objectives in 1980 to formalize and guide investment oversight of the fund. This document has been regularly updated to address each aspect of the fund's investment management and developments in the capital market environments, with the most recent update occurring in April 2003. According to the Master Statement, the overall goal of the fund is to balance and prudently manage the investment needs (risks and return) of all plans participating in the fund, including the need to eliminate current unfunded liabilities and/or to protect surpluses, if possible. This goal is expected to be achieved over time and within any applicable statutory limits. The Master Statement also cites a number of more specific objectives for the fund, as follows:

- In conjunction with the overall goal, the fund should earn, over time, an average annual real rate of return of at least 4 percent over the rate of inflation as measured by the GNP Deflator published by the Federal Reserve System.
- The total fund should produce an investment return greater than the sum of the index returns of each asset class multiplied by the fund's target allocation to the asset class over an investment cycle of three to five years.
- Over time, the total fund should produce an investment return that places it in the top half of its peer group universe while avoiding extended periods of performance that place it in the bottom quartile of the universe. FPPA's peer

group includes public pension plans having more than \$1 billion in assets. FPPA will utilize the Russell/Mellon and Callan universes (or other appropriate fund universes) to monitor this performance objective.

Asset Allocation

The FPPA Board has established an asset allocation policy that is intended to be diversified to minimize the risks of large losses from individual investments and to have a higher probability of achieving the return and risk objectives of the fund. The following table shows the current asset allocation policy and FPPA's actual allocation of assets as of June 30, 2003:

FPPA's Asset Allocation Policy and Actual Asset Allocation Of the Fire and Police Members' Benefit Fund As of June 30, 2003				
Asset Class	Target	Range	Actual Allocation	
			Amount (millions)	Percent
Domestic Equities	38%	33.0% - 43.0%	\$843.8	39.0%
International Equities	18%	14.0% - 22.0%	\$400.8	18.5%
Bonds	29%	25.0% - 33.0%	\$638.6	29.5%
Real Estate	6%	4.5% - 7.5%	\$119.6	5.5%
Alternative Investments	8%	5.5% - 10.5%	\$138.7	6.4%
Cash	1%	N/A	\$21.9	1.0%
Total	100%	100.0%	\$2,163.4	100.0%
<p>Source: FPPA Master Statement of Investment Policies and Objectives and data provided by FPPA.</p> <p>Note: The Fire and Police Members' Benefit Fund includes the assets of the Statewide Defined Benefit plan, the Statewide Death & Disability plan, the affiliated local volunteer pension plans, the affiliated Old Hire plans, and the affiliated local exempt plans. The assets of the local money purchase plans, the Statewide money purchase plan, the 457 plan, and certain deferred retirement option plans (DROPs), are all maintained in separate funds whose assets are primarily self-directed by participants.</p>				

The asset allocation policy is typically reviewed every two years, and asset allocation studies (which are used to determine how to invest a pool of funds among selected asset classes based on various assumptions) were completed in both 2001 and 2002. Asset and liability analyses (which are multiple-year studies that project liability and asset experience of a plan over future years) are conducted periodically, with the last being completed in 2000. In conjunction with the asset allocation, a policy for

rebalancing the fund is in place. This allows the FPPA Board to stay close to its target allocation and adjust for movement in the valuation of the investments.

Review of Investment Performance

Under its contract with the Office of the State Auditor, Stratford evaluated FPPA’s investment performance relative to the stated objectives described above. Stratford found that FPPA has met its objectives of earning investment returns that exceed inflation and are sufficient to cover the growth of plan liabilities over the long term. FPPA has also met its objective of achieving returns that are consistent with representative indices using a similar asset allocation over the past five years. However, FPPA is not meeting its objective of producing an investment return that places the fund in the top half of its peer group universe while avoiding extended periods of performance that place it in the bottom quartile of the universe. Specifically, over the last 1-, 3-, 5-, and 10-year periods ending on June 30, 2003, FPPA’s investment returns have lagged the average returns of other public pension funds. Our conclusions are discussed in detail throughout this chapter.

FPPA Performance Relative to Benchmark of Exceeding Inflation by 4 Percent Over the Long Term

The first objective cited in FPPA’s Master Statement of Investment Policies and Objectives, to exceed inflation by 4 percent over the long term, is intended to ensure that the assets of the fund retain their purchasing power and that the fund grows. To evaluate performance relative to the long-term benchmark of exceeding inflation by 4 percent, Stratford considered the actual growth experienced by FPPA over three periods ending December 31, 2002—the 23 years since the fund was established on January 1, 1980; the past 10 years; and the past 5 years—compared with this benchmark over the same periods. The comparisons are shown in the following table:

FPPA Fund Performance Compared With a Benchmark of 4 Percent Over Inflation			
Period of Comparison Ending December 31, 2002	Average Performance		
	FPPA	Benchmark	Difference
23 Years	10.52%	7.81%	2.71%
10 Years	7.23%	6.46%	0.77%
5 Years	1.98%	6.33%	-4.35%

Source: Stratford Advisory Group analysis of data provided by FPPA.

As the table shows, since the inception of the fund and over the past 10 years, FPPA's investment performance has exceeded the benchmark. However, over the shorter, five-year term, FPPA's returns fell significantly below the benchmark. Performing below the benchmark for an extended period of time affects the actuarial soundness of the fund.

A related objective of the fund is to meet or exceed the actuarially assumed rate of return on investments to maintain the funded status of the plans. FPPA's actuary establishes an actuarial return assumption that considers the returns earned by the fund in prior years as well as expected future returns. This investment return assumption is used in calculating the value of the plans' liabilities. FPPA develops its asset allocation to produce a long-term return, with controlled risk, that will at least meet the actuary's long term-investment return assumption. Currently both the actuarial investment return assumption and the expected return under the fund's asset allocation are 8.0 percent. Stratford found that since the inception of the fund on January 1, 1980, the actuarially assumed rate of return has been 7.57 percent (the rate was 7.5 percent until 2000, at which time the actuary increased the rate to 8.0 percent). FPPA's fund has earned an average return over the period of 10.52 percent, as noted above, exceeding the return assumed by the actuary. Over the 10 years ending December 31, 2002, FPPA's annual return has dropped below the actuarial rate, with an actual return for the 10 years of 7.23 percent.

FPPA Performance Relative to Benchmark of Representative Asset Class Indices

FPPA's second investment objective is to produce an investment return greater than the sum of the index returns of each asset class multiplied by the fund's target allocation to the asset class over an investment cycle of three to five years. This benchmark changes as the asset class exposures and asset allocation of the fund change and is used for both short-term and longer-period comparisons. Its intent is twofold: (a) to measure how well the fund's investments in each asset class compare with investments in representative asset class indices and (b) to measure how the overall fund is performing relative to total index exposure. Stratford evaluated FPPA's fund performance relative to a benchmark composed of representative asset class indices in proportion to the target asset allocation set by FPPA. The current benchmarks for each asset class are described below.

Benchmarks for FPPA's Current Target Asset Allocation		
Asset Class	Benchmark	
	Index	Target Allocation
Domestic Equities	Russell 3000 - Includes the 3,000 largest U.S. companies, based on market capitalization, which represent about 98 percent of the investable U.S. equity market.	38%
Internat'l. Equities	MSCI All Country ex. U.S. - A free float-adjusted market capitalization index designed to measure equity market performance in global developed and emerging markets. Consists of 49 developed and emerging market country indices.	18%
Fixed Income	Lehman Brothers Universal - Contains over 10,700 securities including the U.S. Aggregate Index (87.0%), U.S. High-Yield Corporate Index (5.7%), 144A Index (1.9%), Eurodollar Index (3.0%), Emerging Markets Index (2.1%), and non-ERISA portion of the CMBS Index (0.3%). Excludes municipal debt, private placements, and non-dollar-denominated issues.	30%
Real Estate	NCREIF - Contains only properties acquired for tax-exempt institutions and held in a fiduciary environment, including existing (no development projects) investment-grade, non-agricultural, income-producing properties. Market value is determined by real estate appraisal.	6%
Alternatives	Russell 3000 + 4% - See Russell 3000 index above.	8%
Source: Information provided by FPPA.		

Stratford believes the benchmarks used by FPPA, which are consistent with industry accepted standards for the major asset classes in which the fund is invested, are appropriate.

Below is a table that compares FPPA's fund performance with these benchmarks for recent years.

FPPA Fund Performance Compared With a Benchmark Composed of Representative Asset Class Indices			
As of December 31	Annual Performance		
	FPPA	Benchmark	Difference
2002	-8.61%	-9.08%	0.47%
2001	-6.31%	-5.43%	-0.88%
2000	-3.44%	-3.83%	0.39%
1999	18.00%	16.73%	1.27%
1998	13.07%	16.88%	-3.81%
Source: Stratford Advisory Group analysis of data provided by FPPA.			

As the table shows, in two of the last five years, FPPA's fund has performed below the benchmark. In response to experience and market conditions, FPPA has taken action by terminating and/or replacing investment managers and by revising the asset allocation. For example, substantive underperformance of the fund's global bond managers in 1999 and 2000 led FPPA to terminate these managers and provide for opportunistic exposure to this asset class through core fixed income managers.

FPPA Performance Relative to Other Public Funds

FPPA's third objective is to produce an investment return that places the fund in the top half of its peer group universe while avoiding extended periods of performance in the bottom quartile of the universe. Stratford obtained information regarding the investment performance of FPPA compared with the following peer groups:

- The Russell/Mellon Trust Universe of Total Funds—Public
- The Russell/Mellon Trust Universe of Total Funds Greater Than \$1 Billion—Public
- The Callan Public Fund Sponsor Universe
- The Callan Public Fund Sponsor Greater Than \$1 Billion Universe

FPPA obtains comparisons of its fund to these universes on a quarterly basis.

The following table shows how FPPA's returns compare with the Russell/Mellon public funds, with FPPA trailing the median returns for the past 1-, 3-, and 5-year periods.

Comparison of FPPA’s Average Annual Investment Returns With Median Returns of Russell/Mellon Funds* As of June 30, 2003					
	Current Quarter	Year to Date	One Year	Three Years	Five Years
FPPA Fund	10.56%	8.57%	2.86%	-3.90%	1.73%
R/M Total Funds-Public	11.51%	9.29%	3.53%	-2.65%	2.80%
R/M Total Funds >\$1B-Public	11.65%	9.38%	3.44%	-3.09%	2.73%
Source: Data provided by FPPA. * Returns are shown net of investment fees.					

The table below compares FPPA’s returns with the Callan public funds and shows that FPPA’s returns have fallen below the median for these funds for the past 1-, 3-, 5-, and 10-year periods.

Comparison of FPPA’s Average Annual Investment Returns With Median Returns of Callan Funds* As of June 30, 2003					
	Current Quarter	Last Year	Last 3 Years	Last 5 Years	Last 10 Years
FPPA Fund	10.60%	3.10%	-3.68%	2.07%	7.57%
Callan Funds-Public	10.55%	3.74%	-1.66%	2.93%	8.28%
Callan Tot. Funds >\$1B-Public	10.93%	3.35%	-2.53%	2.78%	8.44%
Source: Data provided by FPPA. * Returns reflect gross returns, before fees are deducted.					

For the 10 years ending June 30, 2003, the difference in overall returns between FPPA and the Callan public fund sponsors with greater than \$1 billion universe is 0.87 percentage points.

The fund’s poor performance relative to other public funds led FPPA to complete a study in March 2002 to determine what caused the underperformance and what actions should be taken. The study showed the fund’s ranking relative to other public funds as follows:

Total Performance Comparison of FPPA With Other Public Funds (Periods Ending 12/31/01)			
	1 Year	3 Years	5 Years
Percent of Public Funds Performing Better Than FPPA	83%	78%	91%
Source: 2002 Asset Allocation Sensitivity Study conducted by Pension Consulting Alliance.			

The rankings shown above mean FPPA performed in the lowest quartile for the 1-, 3-, and 5-year periods ending December 31, 2001.

The study determined that over the last five years the causes of the underperformance are the fund's asset allocation, deviation from the asset allocation policy, structure within asset classes, and active management. The significance of each of these areas varied from year to year. The study also identified actions FPPA could take to minimize the continuing substantial underperformance relative to its peers. For example, the study determined that if the allowable asset class ranges of the fund were set closer to the median public fund ranges, the fund's performance would be substantially less likely to be below the 75th percentile (or above the 25th percentile) of the other public funds. FPPA has since tightened the ranges around most of its target asset exposures (excluding alternative investments) as recommended.

For 2002, FPPA's performance relative to its peers rose above the average, with 47 percent of other public funds performing better than FPPA. This improvement may be due, in some part, to the tightening of the ranges, but improved performance of the equity markets is more likely to have had a significant impact on the fund's overall performance.

Evaluation of Investment Performance by Asset Class/Manager

Stratford also reviewed the individual performance results of some of FPPA's investment managers with their benchmarks for one- and three-year periods ending December 31, 2002, as shown below.

FPPA Active Investment Managers Performance as of December 31, 2002		
Manager¹	Performance	
	One Year	Three Year
Domestic Small Cap Managers		
Thomson, Horstmann & Bryant	-11.27%	1.42%
Benchmark – Russell 2500	-17.79%	-4.62%
Peer Quartile Ranking ²	2 nd	2 nd
Brandywine Asset Management	-2.72%	10.28%
Benchmark – Russell 2000	-11.42%	7.45%
Peer Ranking	1 st	2 nd
International Equity Managers		
Morgan Stanley Active Country	-12.61%	-13.81%
Benchmark – EAFE	-15.81%	-17.47%
Peer Quartile Ranking ²	2 nd	2 nd
Putnam International	-19.21%	-15.53%
Benchmark – EAFE	-15.81%	-17.47%
Peer Quartile Ranking ²	4 th	2 nd
Fixed Income Managers		
Bradford & Marzec	8.21%	9.44%
Benchmark - LB Aggregate	10.25%	10.10%
Peer Quartile Ranking ²	4 th	3 rd -4 th
PIMCO	10.44%	10.95%
Benchmark - LB Aggregate	10.25%	10.10%
Peer Quartile Ranking ²	2 nd	1 st
Western Asset Management	10.50%	10.87%
Benchmark – LB Aggregate	10.25%	10.10%
Peer Quartile Ranking ²	2 nd	1 st
Trust Company of the West	3.11%	2.19%
Benchmark – SB High Yield Cash Pay	-0.58%	0.53%
Peer Quartile Ranking ²	2 nd	2 nd
<p>Source: Stratford Advisory Group analysis.</p> <p>¹ Managers hired in 2002 or later are not included in the table, nor are index managers. The investment mandate of index managers is to replicate the performance of an index, such as the S&P 500 or the Russell 3000. Technology now allows these managers to match their index automatically on an ongoing basis.</p> <p>² For peer quartile rankings, 1st (Quartile 1) is best, 4th (Quartile 4) is worst, in comparison with peers.</p>		

As the table shows, most of the managers performed in the top two quartiles, compared with peers, except for Bradford & Marzec. FPPA terminated this manager in the first quarter of 2003.

As the fund management and the capital markets have evolved, FPPA has implemented additional measures to assist in producing the targeted returns and controlling risk. Examples of these measures include:

- Expanding comparisons of the total fund's performance to other public funds. In 1998, FPPA began comparing the total fund to two peer groups on a quarterly basis. In 2002 the FPPA Board added a specific peer universe performance objective to the policies in the Master Statement, and a new quarterly report format was implemented. In 2003, FPPA began receiving reports from its custodian on a quarterly basis to more closely track manager and total fund performance.
- Increasing the frequency of both routine and special studies. Specifically, beginning in about 2000, FPPA has asset allocation analyses conducted at least every two years and analyses of asset class structure (such as active versus passive management) conducted about every two years for each asset class. In April 2003, FPPA established a policy in the Master Statement to have an asset/liability study conducted every three to five years. Additionally, FPPA had a sensitivity analysis done in March 2002 for the specific purpose of examining the causes of the fund's underperformance relative to other public funds.
- Expanding evaluations of investment managers and reporting to the Board regarding such evaluations. FPPA established a manager audit program including regular manager site visits beginning in 1998. The manager audits take a comprehensive look at performance (absolute, relative, risk adjusted, attribution, etc.) and review a manager's risk management, trading, strategy, process, organizational changes, personnel changes, and fees. The site visits involve meeting with all investment team members, attending investment committee meetings, and reviewing any new software and systems used by a manager. Reporting to the Board includes reports on the manager audits and site visits, as well as various performance, style, allocation, and account information. Previously, reporting focused on performance data, information supplied by the manager, and input from the consultant. This monitoring and reporting can lead to actions such as changing a manager or placing them on "watch."
- Using improved analytical software for internal performance evaluation. Specifically, FPPA added the MPI Stylus software in March 2001 to monitor

the investment style of each manager and subscribed to Russell/Mellon Analytics when Mellon was retained as the new custodian bank in 2003.

- Considering newer asset classes as they become viable for public fund investment. Examples of newer “sub-asset” classes in which FPPA has invested recently include buyout funds (private equity) beginning in 1995 and opportunistic real estate beginning in 1998. FPPA also expanded the authority of its fixed income managers to allow investment in emerging market debt in 2001. FPPA is currently studying hedge funds but has not made a decision to invest at this point.
- Handling manager terminations and replacements through the use of an external transition manager to increase the cost-effectiveness of the transition. Transition managers are firms that specialize in handling a transition when one manager is fired and another hired. They handle the sale of the old portfolio and the purchase of a new, seeking to minimize trading costs and benchmark risks. This is a relatively new business, and while FPPA has used transition managers in the past, the Association only recently adopted a formal transition manager policy that specifies how such managers will be selected and how their performance will be measured.

These processes help FPPA monitor the performance of both the total fund and individual investment managers, and take appropriate action when performance is below expectations. FPPA should continue and expand these efforts to prevent future underperformance of the fund over extended periods in the future.

Asset Allocation

Asset allocation is the primary driver of portfolio performance. As such, Stratford evaluated the appropriateness of the current asset allocation policy relative to FPPA’s stated return objectives and compared the policy with the allocations of other public funds. Stratford modeled projected returns under varying market conditions and found that using the current return, risk, and correlation assumptions, 8.33 percent is the median expected return under FPPA’s current asset allocation. Based on this analysis, Stratford believes the current target asset allocation is reasonable and does not employ excessive risk in the pursuit of targeted return levels. Stratford also found that the range of returns under varying market conditions did not expose FPPA to excessive downside risk. See Appendix A for Stratford’s detailed analyses.

Stratford further reviewed the amount of risk taken by FPPA relative to its peers in the universe of all public funds and public funds greater than \$1 billion. Risk is measured in terms of standard deviation from the median return. Standard deviation

depicts how widely returns varied from the median over a certain period of time. When a fund has a high standard deviation, the predicted range of performance around the median is wide, implying greater volatility in the fund.

Stratford found that FPPA's standard deviation is generally on the low end of the standard deviations of its peers over the 10-year period ended June 30, 2003, indicating that FPPA has taken on less risk than its peers. This may account for some of FPPA's relatively lower investment returns over the period. However, over the five years ending December 31, 2001, FPPA's asset allocation differed from other public funds yet produced similar risk levels. As the following table shows, the fund's asset allocation had substantially less domestic equity and fixed income exposure and substantially more real estate, global bonds, and international equities than the median public fund.

FPPA's Average Asset Allocation Compared With the Median Public Fund 1997-2001		
Asset Class	FPPA	Median Public Fund
Cash	1%	3%
Domestic Fixed Income	20%	32%
Global Fixed Income	6%	2%
Real Estate	8%	3%
Domestic Equity	35%	46%
International Equity	24%	12%
Alternatives	6%	2%

Source: 2002 Asset Allocation Sensitivity Study, Pension Consulting Alliance.

This variance from the asset allocations of other public funds is the key to the difference in investment performance.

Although FPPA has achieved most of its benchmarks, the comparison with other public funds shows that the fund could have done better over the last 10 years. Achieving the best possible returns on investments is important for FPPA, its plans, and individual plan participants. For example, better returns increase the overall assets available to meet benefit obligations and may reduce any unfunded liabilities of the plans. Furthermore, higher returns may reduce the need for additional financial assistance and could eventually allow members and employers to provide lower contributions while still adequately funding their plans. To illustrate, having returns that are 0.50 percent below the median on a fund of \$2 billion equates to lower returns of \$10 million a year (\$2 billion x 0.50%). Therefore, it is important for FPPA to actively monitor and manage its portfolio to achieve all its objectives.

FPPA could take steps to increase its potential for higher returns. Specifically, FPPA should continue and expand the efforts noted above to produce targeted returns while controlling risk and should consider the use of absolute return managers. Absolute return managers, or hedge fund managers, employ various strategies that generally seek a steady return under all market conditions. This segment of the market is normally considered a subclass of alternative investments or equities. FPPA's current slate of alternative investments includes only various forms of private equity. Absolute return strategies are a recent consideration for pension plans, and on the margin, the use of a more recently recognized and utilized asset class/investment management style might slightly increase the fund's return or reduce its volatility.

Recommendation No. 1:

The Fire and Police Pension Association should continue and expand efforts to produce fund returns that meet all investment objectives, including being in the top half of its peer group universe over time. These efforts should include:

- a. Continuing to closely monitor the fund's investment performance and make changes as appropriate to respond to underperformance of the fund.
- b. Focusing on establishing an asset allocation structure with return and risk objectives that are consistent with the underlying plans' liabilities and, given the fund's underperformance relative to other public funds, assessing whether the recent reduction of asset class ranges is sufficient.
- c. Considering expanding its asset classes to increase diversification and return potential by using absolute return managers.

Fire and Police Pension Association Response:

Agree. We have continually sought to enhance and improve FPPA's investment policies, programs and processes in order to ensure that we meet or exceed the investment objectives established for the Fire and Police Members' Benefit Fund ("the Fund"). As the report states, FPPA has met or exceeded the Fund's actuarial and real rate of return objectives, over time. This is critical to the success of the investment program since the Fund's ability to pay promised benefits, without increasing contributions, depends on meeting these investment objectives.

The very challenging investment environment during the 2000-2002 period, was difficult for investors. Like nearly all large public pension plans, FPPA

did not meet the return objectives for the Fund during this period. Fortunately, the economy is improving and equity markets have rallied in 2003. Updating the chart on page 17 of the report to include returns through September 30, 2003, shows the favorable impact of this improved environment on FPPA's absolute and relative returns:

FPPA Fund Performance Compared to a Benchmark of 4 Percent Over Inflation			
Period of Comparison ending 9/ 30/03	Average Performance		
	FPPA	Benchmark	Difference
22 Years	10.70%	7.84%	2.87%
10 Years	7.45%	6.61%	0.84%
5 Years	4.05%	6.65%	-2.60%
1 Year	18.00%	6.52%	11.48%

With respect to FPPA's peer performance objective referenced in the auditor's report, it is important to understand that FPPA does not actively manage the Fund to this objective. Rather, FPPA designs its investment program around the plans' funded status, their liability streams and the actuarial and real rate of return objectives for the Fund. We added the peer performance objective to FPPA's policies in March 2002. We did so because we understand that others will, to some extent, assess our performance relative to peers. However, each pension fund's investment program is different, depending upon its unique liability stream and funded status. One fund's investment structure may not be appropriate for another.

In any event, updating the charts on pages 21 and 22 of the report to reflect Callan Universe information through the 3rd quarter of 2003, shows improvement in FPPA's relative peer performance as follows:

Comparison of FPPA's Average Investment Returns to Median Returns of Callan Funds* As of September 30, 2003						
	Current Quarter	Last Year	Since April 2002**	Last 3 Years	Last 5 Years	Last 10 Years
FPPA Fund	3.51%	18.24%	1.17%	-1.96%	4.23%	7.60%
Callan Funds-Public	2.90%	16.95%	N/A	- .79%	4.92%	8.16%
Callan Total. Funds>\$1B-Public	3.05%	17.90%	1.07%	-1.51%	5.12%	8.41%

* Returns reflect gross returns, before fees are deducted.
**Peer Objectives Adopted.

Total Performance of FPPA to Other Public Funds (Periods Ending 9/30/03)				
	1 Year	Since 4/02	3 Years	5 Years
Percentage of Public Funds Performing Better Than FPPA	43%	44%	59%	86%
Source: Callan Large Plan (>\$1 Billion) Universe				

Finally, with respect to the specific recommendations labeled a, b, and c, we make the following observations:

- a. Agree. Implementation date: Ongoing. The FPPA Board and staff will continue to closely monitor the Fund’s investment performance and will make changes as appropriate, to ensure that the Fund meets its investment objectives, over time.
- b. Agree. Implementation date: July 2004. We believe the current asset allocation structure is appropriate and consistent with the underlying plans’ liabilities and funded status. Although not a primary objective, the above charts reflect an improvement in performance relative to peers. We will, of course, continue to assess asset allocation and asset class ranges and, if appropriate, will implement changes necessary to ensure that the Fund meets its objectives. The Board will review asset allocation and asset class ranges in the context of the asset/liability and asset allocation studies scheduled for late 2nd Quarter, early 3rd Quarter, 2004.
- c. Agree. Implementation date: July 2004. We have considered, and will continue to consider, other appropriate strategies which have the potential to increase the Fund’s diversification and return potential. In particular, the Board of Directors and staff have been studying hedge funds, including absolute return strategies. At its October 2003 meeting, as the result of presentations at the Board’s annual planning session, the Board directed staff and FPPA’s investment consultant to prepare recommendations and options for including absolute return strategies in FPPA’s portfolio. We anticipate a report from the consultant and staff in this regard at the December 2003 meeting.

The Board will make a decision on whether and how to invest in absolute return strategies at the December 10, 2003 meeting; if a decision is made to invest in these strategies, a search will likely occur in 2004. (It could be in the 1st Quarter, or the Board may defer a search until the asset/liability and asset allocation studies are completed later in the year.)

Analysis of Assumptions

As part of reviewing the performance of FPPA's portfolio, Stratford also evaluated the 10-year return, risk, and correlation assumptions used by FPPA's consultant, Pension Consulting Alliance (PCA), in its February 2001 Asset Allocation Review to establish the asset allocation policy. Overall, Stratford found that the investment return, risk, and correlation assumptions employed by FPPA in setting its asset allocation policy are reasonable, are generally comparable to both historical experience and the practice of a broad group of investment professionals, and follow standard investment consulting industry practices. Details of Stratford's analyses in these areas are included in Appendix B. However, Stratford also found that FPPA's actual level of risk, as reflected in its asset allocation policy, did not always lead to desired returns, as discussed above.

FPPA's Measure of Inflation

FPPA's Master Statement of Investment Policies and Objectives states that the measure of rate of inflation is the GNP Deflator published by the Federal Reserve System. This is the rate to be used to determine if FPPA's objective of a real return of 4.0 percent over inflation is achieved. FPPA staff did not have a precise rationale for the use of the GNP Deflator.

The Consumer Price Index (CPI) is a much more common measure of inflation and is more generally understood. Using the CPI in place of the GNP Deflator to measure investment returns relative to inflation would raise the benchmark because the CPI typically exceeds the GNP Deflator somewhat. For example, the annualized five-year (1997 - 2001) GNP deflator was 1.71 percent, so FPPA's objective would be to earn investment returns of 5.71 percent (1.71% + 4.00%). For the same period, the annualized five-year CPI was 2.43 percent. If FPPA used the CPI as its measure of inflation, the objective would be to achieve investment returns of 6.43 percent (2.43% + 4.00%), or 0.72 percentage points higher than the objective of 5.71 percent set using the GNP deflator.

For clarity and ease of understanding of FPPA's goals, use of the CPI is recommended.

Recommendation No. 2:

The Fire and Police Pension Association should consider other, more widely recognizable measures of inflation, in place of the GNP deflator, in measuring

whether investment performance is delivering the long-term target return of 4 percent over inflation.

Fire and Police Pension Association Response:

Agree. Implementation date: December 2003. At its December 2003 meeting, the Board will adopt an amendment to its policies, substituting the CPI-U for the GNP deflator, as the measure of inflation.

**Review of Investment Manager
Monitoring and Selection Processes**

Stratford evaluated FPPA's policies and procedures in a number of additional areas that relate to overall investment performance, including the Association's monitoring of investment managers. FPPA's current investment managers, their investment styles, and their benchmarks are shown in the following table.

FPPA Investment Managers, Investment Style, and Index		
Investment Manager	Investment Style	Index
Domestic Equities		
State St. S&P 500 Index	S&P 500 Index	S&P 500 Index
State St. S&P/BARRA Growth Index	S&P/BARRA Growth Index	S&P/BARRA Growth Index
State St. S&P/BARRA Value Index	S&P/BARRA Value Index	S&P/BARRA Value Index
Legg Mason	Large Core	S&P 500 Index
Fiduciary Asset Management	Large Core	S&P 500 Index
Thomson, Horstmann & Bryant	Small Core	Russell 2500
Brandywine	Small Value	Russell 2000 Value
US Bancorp	Small Growth	Russell 2000 Growth
International Equities		
Morgan Stanley	Developed International	MSCI EAFE+Canada
Putnam International	Developed International	MSCI EAFE+Canada
Jarislowsky Fraser	Developed International	MSCI EAFE+Canada
Rexiter-EM	Emerging Markets	MSCI EM Free
Baillie Gifford-EM	Emerging Markets	MSCI EM Free
Fixed Income		
TCW	High Yield	SB Hi Yld Cash Pay (ex. sov. debt)
PIMCO	Core Plus	LB Aggregate
Western Asset Mgmt	Core Plus	LB Aggregate
SSGA Bond Index	LB Aggregate Index	LB Aggregate
Source: Information provided by FPPA.		

Stratford reviewed both the processes used by FPPA to select and monitor investment managers and the manager agreements to evaluate whether the managers are investing according to their mandate and are evaluated relative to the proper benchmark. Stratford found that all investment managers are managing to the benchmark index designated in the respective investment policy agreements. Each agreement outlines the opportunity set or securities in which the manager is required to invest, as shown in the table above. Stratford found these opportunity sets to be consistent with each investment manager's benchmark index.

Stratford also found that FPPA has a comprehensive selection and monitoring process. FPPA currently conducts investment manager searches through its investment consultant, Pension Consulting Alliance (PCA). PCA uses the InvestorForce search platform to conduct investment searches. InvestorForce is an Internet-based provider of investment manager databases and traditional asset class investment manager searches to institutional investors. Over \$18 billion in investment manager searches have been conducted through the InvestorForce platform since the product inception.

The manager search process begins with a posting of a request for proposal (RFP) on the InvestorForce Web site to which any investment manager may submit a response.

Quantitative screens are run on all respondents. Screens include, but are not limited to, the following: length of time the firm has been in business and has managed assets in the strategy being sought; dollar amount of assets under management both firm-wide and strategy specific; assets gained and lost both firm-wide and strategy specific; investment personnel and client turnover; investment performance and compliance with Association of Investment Management Research (AIMR) performance standards; and proposed fee schedule. Excluded managers are listed under the criteria for which they did not qualify and the remaining candidates are scored on a range of qualitative factors by PCA and FPPA staff. The process narrows the field of candidates to three or four firms for which further due diligence (which may include on-site visits, reference and background checks, and a review of all contracts and/or agreements) is conducted. An on-site visit is required before any manager is funded by FPPA.

Once an investment manager is retained, FPPA monitors the manager's investment performance, consistency of investment style, portfolio characteristics, compliance with investment agreement, and organizational stability. FPPA monitors investment manager performance relative to both nominal and real return objectives that are stated in each investment manager agreement. Each manager is also compared with the stated benchmark, and its performance is compared with a peer group of similar managers. FPPA also monitors risk-adjusted returns for each manager by employing industry-accepted methods. Performance is monitored at least monthly for each manager. The ongoing manager monitoring process evaluates performance over both short-term, defined as the trailing one-, two-, or three-year, periods and long-term, defined as the trailing five-year period or longer. Minimum return targets are set for each asset class.

FPPA also selects one manager per month for an in-depth review. This review requires the selected manager to answer a more extensive data request than is required on a quarterly basis. The findings of the review are presented to the FPPA Board. All investment managers must also present to the Board at least once every 12 to 18 months. In addition, FPPA has a detailed due diligence process including on-site manager visits every other year. Finally, managers are required to reconcile their account values on a monthly basis, and FPPA verifies this reconciliation.

If FPPA finds that a manager is not complying with the terms of the contract, the investment manager and the Board are notified in writing of the issue. The notice of noncompliance is sent within five business days of the finding and includes the facts of the noncompliance finding. FPPA next contacts the manager to ensure that the facts of the finding are correct. If the finding is determined to be correct, the manager is placed on Stage One Notice. The Board is informed at its next meeting what actions the manager has taken in response to the notice, and FPPA recommends what further action, if any, should be taken. The Board may approve, reject, or

amend the recommendation. A manager is placed on Stage Two Notice if, after 12 months from the date of the Stage One Notice, performance is below the established return targets over either the short-term or long-term periods defined above. A manager on Stage Two Notice will be formally reviewed by the Board and is subject to termination.

Stratford believes that the current processes for selecting investment managers and monitoring their performance are thorough and within generally accepted industry practices. The selection process allows for a large number of candidates to be evaluated in an efficient and unbiased manner, and FPPA's monitoring provides a high level of oversight of the fund's investment managers.

Although FPPA currently conducts regular evaluations, using the returns generated, of whether each investment manager is true to the investment style for which it was retained, FPPA could improve its analysis of manager performance by using holdings-based style analysis. As described above, FPPA currently conducts returns-based analyses of its managers, which is a widely used method of analysis. However, this type of analysis can sometimes be misleading if managers do not correlate well with standard benchmarks. For example, analysis only of returns may not reveal that a manager is not holding investments consistent with the style stipulated in its agreement. Holdings-based analysis involves reviewing not just the returns but the actual holdings of the manager to evaluate them against their benchmarks. This type of analysis would provide an added level of review that could offset any shortcomings in the returns-based analyses.

Recommendation No. 3:

The Fire and Police Pension Association should consider using holdings-based style analysis to ensure the accuracy of its returns-based style analysis of investment managers.

Fire and Police Pension Association Response:

Agree. Implementation date: October 2005. Holdings-based style analysis may be more accurate than returns-based style analysis. However, the software necessary to implement holdings-based style analysis is expensive. FPPA will evaluate the potential cost and benefits of acquiring holdings-based style analysis software and will make an appropriate decision based on this analysis. Staff will research and assess holdings based software packages in 2004 and will make a recommendation to the Board in the context of the

budget process for 2005. (Budget review occurs in the 4th Quarter of each year.)

Controlling Software Costs

Currently FPPA's monitoring process employs several software systems to automate much of the manager selection and monitoring and may have some redundancy. For example, Standard & Poor's Micropal software is used to calculate performance of investment managers. Prior to the calculation, FPPA reconciles holdings and transactions reported by the investment manager to those reported by the custodian, Mellon Bank (Mellon). A similar reconciliation is performed by the custodian, in which the performance calculated by Mellon and FPPA is compared to ensure accuracy. Manager performance is compared with designated benchmarks and peer universes, supplied by Russell/Mellon, on a monthly basis.

In addition, FPPA uses Russell Analytics software to ensure manager compliance with investment guidelines contained in the agreements. The actual investment agreement is sent to Russell Analytics, which inputs the guidelines into the system. The system is then able to identify any managers who are not in compliance and what the violation may be. Finally, MPI Stylus software is used to monitor the investment style of each investment manager. The software performs an industry-accepted, returns-based regression analysis to various benchmarks to identify the investment style to which the manager is most highly correlated. However, through its new custodian (Russell/Mellon, retained in early 2003), FPPA has access to software that would nearly replace all of the capabilities of the MPI Stylus software and, with an upgrade in progress, may fully provide the capabilities of MPI. FPPA is in the process of evaluating the software included in the contract, with the expectation that one redundant software package, with an annual cost of \$10,000, will be eliminated. To avoid duplicate charges and software resources, FPPA should expand its analysis to ensure that all redundancies across software packages are eliminated.

Recommendation No. 4:

The Fire and Police Pension Association should evaluate its current analytical software to determine if there is redundancy between various packages and eliminate any unnecessary software expense.

Fire and Police Pension Association Response:

Agree. Implementation date: October 2005. We are currently in the process of evaluating our investment software in order to determine whether we can reduce or eliminate some of our costs in this regard. We note, however, that total investment software costs for FPPA are relatively modest. For the current year, the total cost of all such software is \$22,000. Staff will continue to evaluate its current investment software in 2004, as well as alternative software packages (see response to recommendation no. 3, above) and will make a recommendation to the Board in the context of the Budget process for 2005.

Evaluation of Investment Management Fees

Stratford reviewed the investment manager agreements of all managers to verify the individual fee schedules and compared the managers with peers in their respective investment styles. Stratford utilized the eVestment Alliance database to compile the peer separate account fee data. eVestment Alliance is a widely used database among investment managers and investment consultants. Stratford found all investment manager fees were within an acceptable range of their peers and in general at or below the peer fee average. Stratford also reviewed the contracts for each Real Estate and Alternative manager and made a general comparison of the fees with those of similar managers. Stratford found that the fees paid by FPPA are reasonable relative to industry standards.

FPPA also uses a commission recapture program through third-party providers, Lynch, Jones & Ryan, and the Frank Russell Company. The program asks investment managers to direct up to 25 percent of their trades through the program, to the extent that best trade execution is achieved. Investment manager participation in the program is voluntary. The program is at no cost to FPPA and results in approximately \$20,000 in annual commission savings. Russell/Mellon provides an analysis of trading costs for domestic investment managers, and Abel/Noser has been retained to provide an analysis of trading costs associated with international equities. The commission recapture program and trading cost analysis program are evaluated on an annual basis.

FPPA has entered into a securities lending agreement with its custodian, Mellon Bank. Under the agreement, securities held in custody for FPPA may be lent out to qualified parties for a set interest amount. FPPA receives a portion of the income generated from the program, totaling about \$580,000 each year.

Stratford believes that the use of a commission recapture program and securities lending are effective means to reduce costs and are in line with industry practices. In addition, the utilization of third-party monitoring of trading costs ensures that costs do not become excessive and out of line with industry norms.

Evaluation of Cash Requirements

In addition to analyses related directly to investment performance, Stratford evaluated FPPA's ability to meet projected liquidity needs to cover ongoing expenses such as fees payable to investment managers, overhead and administrative costs, and pension benefit payments, under the current target asset allocation. FPPA currently maintains a target cash allocation of 1 percent of assets to meet liquidity needs. Interest, dividends, and other investment cash flows are also used to meet cash requirements. If necessary, investment holdings may be sold to meet additional liquidity requirements.

Based on the three-year cash flow projections from FPPA staff, Stratford modeled the potential impact of projected spending under multiple market return scenarios. Stratford also evaluated the impact of different levels of spending beyond the three-year projections provided by FPPA (up to 10 years) with spending levels of 2, 3, and 4 percent. The modeling considered varying market conditions from very good (95th Percentile – returns would be expected to be below this level 95% of the time) to very poor (5th Percentile – returns would be expected to be below this level 5% of the time). An expected annual return of 8 percent and a beginning market value of approximately \$2.1 billion were used for the analysis. Details of the analysis are shown in Appendix C.

Overall, the analysis shows that FPPA should be able to meet annual spending levels of up to 4 percent over the next 10 years under all but the worst market conditions. Only if returns were very poor (5th Percentile) would FPPA have difficulty meeting its cash flow needs.

Old Hire Plans

Chapter 2

Background

Old Hire plans are local pension plans covering firefighters and police officers who were employed prior to April 8, 1978 (Section 31-30.5-103, C.R.S). There are currently 55 local Old Hire plans. Although the State has provided some financial assistance to these plans for many years, in 1978 the General Assembly established statutory requirements that these plans be funded on an actuarially sound basis and began providing annual financial assistance to the plans. An actuarial valuation mandated by statute was completed as of January 1, 1978, and calculated an unfunded past service liability for the Old Hire plans of just over \$431 million. The actuarial study also determined minimum funding requirements for each plan that ranged from 14 to 78 percent of payroll. The total contribution from all sources to meet minimum funding requirements was 50 percent of payroll (equal to \$48.2 million as of January 1, 1979).

Annual minimum funding for the plans is defined as the actuarially determined amount to fund both:

- The “current service cost,” which can generally be described as the cost of future benefits expected to be earned and allocated to the current year.
- The annual amount needed to fund the “unfunded accrued liability” over 37 years from January 1, 1982.

Note that neither the current service cost nor the unfunded accrued liability are fixed amounts, but rather change each year based on a number of factors. One significant factor is salary increases for covered members, which increase the cost of pension benefits for two reasons.

First, the retirement benefit provided to each Old Hire retiree is a percentage of that member’s salary during his or her last year in service before retirement. Most plans provide for a 50 percent benefit when a member reaches the minimum age and years of service required for retirement plus a 2 to 4 percent extra benefit for each additional year of service. Therefore, if a member works for five years after reaching the minimum age and years of service requirement, and participates in a plan where

the employer offers an extra 2 percent for each additional year of service, the member would receive a retirement benefit equal to 60 percent of his or her salary (50% + [2% x 5 years]). Therefore, when active members receive salary increases, the amount of the retirement benefits they will receive also increases.

Second, current retirees receive an increase in their monthly retirement benefit when a salary increase or other additional pay is granted to active employees of the same rank the retiree occupied at the time of retirement. For example, a member who retired as a police captain in 1990 with a retirement benefit equal to 60 percent of pay (as described above) will receive an increase in benefits in 2003 if active police captains in the same plan receive a pay increase. Thus, the retiree's benefit continues to be equal to 60 percent of a police captain's pay throughout retirement. Therefore, salary increases greater than those assumed in the actuarial calculations will increase both the unfunded accrued liability and the current service cost.

Another factor that influences the current service cost and the unfunded liability is investment experience. Investment returns greater than the actuarially assumed annual investment return rate of 8 percent will reduce both the unfunded accrued liability and the current service cost, while returns lower than this rate will have the reverse effect.

Although the General Assembly, in Senate Bill 78-046, provided state assistance to help the plans meet the minimum funding standards, it also clearly placed the ongoing financial responsibility for each plan with its municipality or district and deemed state financial assistance as a temporary action to be terminated as soon as possible.

In 1995, Senate Bill 228 increased the annual amount of state assistance provided to Old Hire plans from about \$18 million to about \$25 million. SB 95-228 also established a level dollar employer contribution projected to cover all remaining unfunded liabilities of the plans by 2009—the year when the last employee of an Old Hire Plan was expected to retire. In January 2002, FPPA's actuary, Buck Consultants, calculated the total liabilities of the eight Old Hire plans that were receiving state assistance (due to their unfunded liabilities). The following table shows the total liabilities and the unfunded portion of the liabilities for each of the eight plans as of January 1, 2002.

Liabilities of State-Assisted Old Hire Plans January 1, 2002			
Plan	Total Liabilities	Unfunded Liabilities	Funded Percentage
Denver Fire	\$469,215,504	\$48,107,310	89.7%
Denver Police	\$707,308,109	\$137,104,746	80.6%
Grand Junction Police	\$6,635,865	\$4,132,227	37.7%
Greeley Fire (Union Colony)	\$13,549,663	\$3,184,944	76.5%
Lakewood Fire	\$24,485,476	\$2,920,016	88.1%
LaSalle Police	\$586,231	\$204,425	65.1%
North Washington Fire	\$6,491,262	\$849,441	86.9%
Pueblo Fire	\$59,756,991	\$12,756,940	78.7%
Total	\$1,288,029,101	\$209,260,049	83.8%
Source: Analysis of data provided by FPPA.			

Buck Consultants also estimated, in January 2002 (prior to Senate Bill 03-263, described below), that the unfunded accrued liability that would remain at the end of 2009 would be about \$65 million. This means that after state contributions end, employers and plan members may have to increase their contributions to adequately fund the plans. In addition, the plans may experience cash flow problems due to the continuing unfunded liability after state assistance is discontinued.

In 2003, Senate Bill 263 suspended the scheduled payments that would have occurred in September 2003, 2004, and 2005, and provided for payment of any unfunded liability amount accrued as a result of the suspension as determined through a required actuarial study. Senate Bill 03-263 requires state assistance to the plans to resume in April 2006 and to continue through April 2012. If any of the plans have a remaining unfunded liability at that time, or have an unfunded liability after state assistance to the plan has ended, employers become solely responsible for the ongoing funding of the plans.

FPPA is responsible for allocating the state assistance funds to the plans. Generally, the allocation to each plan is based on the proportion of the total state funding the plan received in 1994, just before Senate Bill 95-228 (described above) was passed. Some adjustments are made to the allocations as plans become fully funded and no longer receive state assistance. Of the 55 Old Hire Plans affiliated with FPPA, only 8 plans continue to receive state funding assistance. Listed below are these plans along with the employer and state contributions for 2002.

Employer and State Contributions to State-Assisted Old Hire Plans 2002					
Plan/Department	Contributions				
	Employer		State		Total
	Amount	%	Amount	%	Amount
Denver Fire	\$11,631,977	54%	\$9,960,439	46%	\$21,592,416
Denver Police	\$16,261,604	56%	\$12,601,870	44%	\$28,863,474
Grand Junction Police	\$426,798	60%	\$288,733	40%	\$715,531
Greeley Fire (Union Colony)	\$288,931	31%	\$658,126	69%	\$947,057
Lakewood Fire	\$562,858	45%	\$679,382	55%	\$1,242,240
LaSalle Police	\$7,326	46%	\$8,641	54%	\$15,967
North Washington Fire	\$45,972	23%	\$156,844	77%	\$202,816
Pueblo Fire	\$1,028,768	52%	\$967,044	48%	\$1,995,812
Total Amount/Avg. Percent	\$30,254,234	54%	\$25,321,079	46%	\$55,575,313
Source: Office of the State Auditor analysis of data provided by FPPA.					

The total amount of the unfunded liabilities of the Old Hire plans has fluctuated over the past eight years, as shown below, with some plans reaching fully funded status, thus eliminating the state assistance provided to them.

Unfunded Liabilities of State-Assisted Old Hire Plans						
Department	1/1/1996	1/1/1998	1/1/2000	1/1/2001	1/1/2002	1/1/2003
Aurora Police	\$17,805,221	\$10,714,816	0	0	0	0
Colo. Springs Fire	\$6,589,942	0	0	0	0	0
Colo. Springs Police	\$12,727,742	\$2,938,143	0	0	0	0
Denver Fire	\$174,566,094	\$130,296,355	\$64,186,068	\$44,973,871	\$48,107,310	\$87,535,674
Denver Police	\$232,262,926	\$226,052,937	\$146,671,068	\$125,043,111	\$137,104,746	\$197,836,599
Grand Junction Fire	\$5,212,339	\$2,805,700	\$503,393	0	0	0
Grand Junction Police	\$6,206,956	\$5,721,916	\$4,930,931	\$4,498,603	\$4,132,227	\$4,089,219
Greeley Fire/Union Col.	\$9,759,091	\$5,565,329	\$3,591,778	\$3,093,216	\$3,184,944	\$3,727,157
Lakewood Fire	\$3,926,883	\$4,389,329	\$1,139,350	\$1,567,701	\$2,920,016	\$2,252,175
LaSalle Police	\$239,150	\$251,219	\$223,149	\$196,657	\$204,425	\$218,931
No. Washington Fire	\$1,408,283	\$790,945	\$355,564	\$509,345	\$849,441	\$1,483,440
Pueblo Fire	\$16,164,342	\$12,703,635	\$7,391,356	\$12,819,006	\$12,756,940	\$18,304,552
Rocky Ford Fire	\$10,210	\$49,961	0	0	0	0
Total	\$486,879,179	\$402,280,285	\$228,992,657	\$192,701,510	\$209,260,049	\$315,447,747
Source: Data provided by FPPA.						

As the table shows, there has been an overall decrease in the combined unfunded liabilities of the plans of over \$171 million, or about 35 percent, between 1996 and 2003. However, the reduction in the total unfunded liabilities that was achieved between 1996 and 2001 (about \$294 million, or 60 percent) has been offset in recent

years. As of January 1, 2003, the total unfunded liabilities had grown almost \$123 million, or nearly 64 percent, from the 2001 figures. The factors causing these increases are primarily salary increases significantly higher than expected and the poor investment experience discussed in Chapter 1. Although Stratford was unable to estimate the extent to which each of these factors affects the unfunded liabilities, it is clear that some plans have experienced considerably greater impacts than others. For example, from 2001 to 2003, the unfunded liabilities almost doubled for Denver Fire, grew almost 60 percent for Denver Police, and almost tripled for North Washington Fire.

Analysis of Funding Options

Stratford reviewed the January 2002 actuarial analyses of the Old Hire plans as well as the following reports:

- The Asset and Liability Study as of January 1, 2000.
- The Study of Actuarial Experience 1993-1997, completed in 1999.
- The Task Force Report in 1995.
- The Actuarial Valuation as of January 1, 1978.
- Recent projections of the unfunded liability completed by the actuary before Senate Bill 03-263.
- Several alternative payment patterns for state funding before Senate Bill 03-263 prepared by the actuary.
- Summary of the estimated unfunded liabilities as of January 1, 2003.

Using information from these documents, Stratford examined two variations on the current funding stipulated under SB 03-263 to estimate the additional amount the State will pay to account for any unfunded liability that accrues as a result of suspending assistance.

State Assistance Under Senate Bill 03-263

SB 03-263 specifies that the State will fund (transfer), no later than April 30, 2012, any actuarially determined increase in the unfunded accrued liability attributable to the suspension of state contributions in September of 2003, 2004, and 2005. The actuarially determined increase is caused by the plans' not having the state contribution to invest from the expected dates and would be calculated using the actuarial rate of return, currently 8 percent.

One approach to paying this additional amount would be to increase each of the seven annual contributions (for 2006 through 2012) to include a portion of the

interest. Using the actuarial interest rate of 8 percent, the revised annual payments would be \$30,890,640, or \$5,569,561 higher than the base annual assistance amount of \$25,321,079 currently specified in statutes. The total of these payments for the seven-year period is \$216,234,480 (\$30,890,640 x 7).

A second approach would be to pay the additional amount as a single separate payment in any of the seven years between 2006 and 2012. The following table shows the one-time payment amount that would be required in addition to the annual assistance amount of \$25,321,079. In other words, if the State paid the increase on April 30, 2006, the total amount paid for that year would be \$56,638,052 (\$31,316,973 + \$25,321,079), while in each of the following six years, the State would provide the annual amount of \$25,321,079. As the table shows, the amount of a one-time payment increases over time, due to lost earnings on the contributions.

Payment Date - April 30	Single Payment Amount to Fund the Increase in Unfunded Liability
2006	\$31,316,973
2007	\$33,822,330
2008	\$36,528,117
2009	\$39,450,366
2010	\$42,606,396
2011	\$46,014,907
2012	\$49,696,100
Source: Stratford Advisory Group analysis of data provided by FPPA.	

If the actuarial assumptions are met throughout the period, the remaining unfunded accrued liability at 2012 would be the \$65 million estimated by Buck Consultants in its pre-SB 03-263 calculations with an adjustment for benefits paid from 2009 to 2012.

Even with the State's assistance, many of the plans experienced cash flow problems in 2002. The total combined contributions of employers, employees, and the State were not sufficient to cover benefit payments for five of the Old Hire plans, including the largest of the remaining state-assisted plans. As a result, the five plans were required to liquidate investments to cover the costs of benefits and other expenses. Spreading the additional amount the State will pay to account for any unfunded liability that accrues as a result of suspending assistance across all seven years could help alleviate the cash flow problems of these plans. As noted above, this approach would provide for annual payments of almost \$31 million for seven years. However, once the State's commitment to provide assistance has ended, the plans may once again experience cash flow difficulties, and additional employer contributions may be needed. FPPA should work closely with the affected local plans to ensure contributions are adequate to meet benefit needs.

Additional Funding Options

In addition to analyzing different mechanisms by which the current mandates of SB 03-263 could be fulfilled, Stratford modeled a variety of alternative scenarios for future state assistance based on input from FPPA, staff of the Joint Budget Committee, and the Governor's Office of State Planning and Budgeting. These scenarios include options that provide for delaying further state assistance, changing the interest rate used to calculate the additional amount the State will pay to account for any unfunded liability that accrues as a result of suspending assistance, and changing the period over which state assistance is provided. Stratford's analysis addresses the impact of various changes on the State, on the unfunded liabilities of the Old Hire plans, and on employers.

I. Delaying State Assistance

Stratford analyzed two scenarios for delaying the resumption of state assistance until 2007 and 2010, but following the pattern of SB 03-263 of making seven annual payments thereafter, and paying an amount to cover the unfunded liability that would accrue due to the delay. As with the scenarios above, covering the additional unfunded liability that would accumulate as a result of delaying payments can be managed either through additional annual payments or through a one-time payment at some point during the seven-year funding stream, as shown below:

- Delay resumption of annual payments until April 2007:** If an additional amount is added to the currently mandated annual payment, the resulting payment is \$33,361,079 (\$8,040,000 over the currently mandated \$25,321,079) for total payments by the State between 2007 and 2013 of \$233,527,553 (\$33,361,079 x 7). If a single additional payment is made during one of the seven years, the additional amount would be as shown in the following table, depending on the year of the payment. Again, this one-time payment would be in addition to the level funding amount of \$25,321,079.

Payment Date - April 30	Single Payment Amount to Fund the Increase in Unfunded Liability
2007	\$45,212,521
2008	\$48,829,523
2009	\$52,735,885
2010	\$56,954,756
2011	\$61,511,136
2012	\$66,432,027
2013	\$71,746,589

Source: Stratford Advisory Group analysis of data provided by FPPA.

- **Delay resumption of annual payments until April 2010:** If an additional amount is added to the currently mandated annual payment, the resulting payment is \$42,026,375 (\$16,705,296 over the currently mandated \$25,321,079) for total payments by the State between 2010 and 2016 of \$294,184,625 (42,026,375 x 7). If a single additional payment is made during one of the seven years, the additional amount would be as shown in the following table, depending on the year of the payment.

Payment Date - April 30	Single Payment Amount to Fund the Increase in Unfunded Liability
2010	\$93,931,870
2011	\$101,446,419
2012	\$109,562,133
2013	\$118,327,103
2014	\$127,793,272
2015	\$138,016,733
2016	\$149,058,072
Source: Stratford Advisory Group analysis of data provided by FPPA.	

If the actuarial assumptions are met throughout the period, the remaining unfunded accrued liability at 2013 or 2016 would be the \$65 million estimated by Buck Consultants in its pre-SB 03-263 calculations with an adjustment for benefits paid from 2009 to 2013 for the first option or from 2009 to 2016 for the second option.

Under the current statutory commitment made by the General Assembly, any further increase in the unfunded liabilities would be borne by the employers. In addition, as noted above, any continuing unfunded liabilities of the plans could create cash flow problems that need to be examined.

II. Using Different Interest Rates

Stratford also estimated the additional amount the State will pay to account for any unfunded liability that accrues as a result of suspending assistance under SB 03-263 using a number of alternative interest rates in place of the current actuarially assumed rate of 8 percent. These alternatives assume that the State makes contributions as now specified under SB 03-263 (i.e., payments made for seven years beginning April 2006).

- **State payments at FPPA's actual annualized five-year rate of return.** Using FPPA's 1.98 percent actual rate of return for the 5-year period ending December 31, 2002, Stratford calculated the amount of a single payment to cover any additional unfunded liability, as shown in the following table. The one-time payment would be in addition to the stipulated annual payment of

\$25,321,079. The employers' liability under this scenario would be higher than under the SB 03-263 calculations due to the lower rate of interest.

Payment Date - April 30	Single Payment Amount to Fund the Increase in Unfunded Liability
2006	\$8,689,509
2007	\$8,861,561
2008	\$9,037,020
2009	\$9,215,953
2010	\$9,398,429
2011	\$9,584,518
2012	\$9,774,292
Source: Stratford Advisory Group analysis of data provided by FPPA.	

- State payments at FPPA's actual annualized ten-year rate of return.** Using FPPA's 7.23 percent actual rate of return for the 10-year period ending December 31, 2002, Stratford calculated the amount of a single payment to cover any additional unfunded liability, as shown in the following table. The one-time payment would be in addition to the stipulated annual payment of \$25,321,079. The employers' liability under this scenario would be higher than under the SB 03-263 calculations due to the lower rate of interest.

Payment Date - April 30	Single Payment Amount to Fund the Increase in Unfunded Liability
2006	\$28,686,302
2007	\$30,760,322
2008	\$32,984,293
2009	\$35,369,057
2010	\$37,262,240
2011	\$40,668,307
2012	\$43,608,626
Source: Stratford Advisory Group analysis of data provided by FPPA.	

- State payments at the State Treasurer's actual rate of return of 6.0 percent.** Using the State Treasurer's actual rate of return of 6.0 percent per annum, Stratford calculated the amount of a single payment to cover any additional unfunded liability, as shown in the following table. The one-time payment would be in addition to the stipulated annual payment of \$25,321,079. The employers' liability under this scenario would be higher than under the SB 03-263 calculations due to the lower rate of interest.

Payment Date - April 30	Single Payment Amount to Fund the Increase in Unfunded Liability
2006	\$24,340,058
2007	\$25,800,461
2008	\$27,348,488
2009	\$28,989,398
2010	\$30,728,762
2011	\$32,572,488
2012	\$34,526,837
Source: Stratford Advisory Group analysis of data provided by FPPA.	

Reducing the interest rate used to calculate the additional amount the State will pay due to suspending assistance for 2½ years will increase the unfunded liabilities of the plans beyond the \$65 million estimated by Buck Consultants in its pre-SB 03-263 calculations if all other actuarial assumptions are met throughout the period. For these three scenarios, some of the plans would most likely experience cash flow problems unless local employers increased their contributions. As noted previously, five of the state-assisted plans had to liquidate investments in 2002 to cover expenses. These scenarios would only increase the annual state assistance amount if the additional payment to account for suspended assistance were spread across all seven years.

III. Extending the Length of the Payment Period

Under this alternative, Stratford estimated the impact of increasing the period over which the State would provide assistance to the Old Hire plans, including any additional amount that would accrue as a result of suspending payments for 2½ years. Stratford considered both a 10-year and a 15-year funding stream, as follows:

- **10-Year Payment Schedule:** Spreading the total amount of state assistance across 10 years would result in an annual payment by the State of \$13,968,130 (or \$11,352,949 less than the currently mandated \$25,321,079) for total payments of \$139,681,300 (\$13,968,130 x 10).
- **15-Year Payment Schedule:** Spreading the total amount of state assistance across 15 years would result in an annual payment by the State of \$18,321,079 (or \$7,000,000 less than the currently mandated \$25,321,079) for total payments of \$274,816,185 (\$18,321,079 x 15).

Extending payments over a longer period will likely increase the unfunded liabilities of the plans because the smaller annual payments will reduce the amount of assets available to generate investment returns each year. In addition, given the maturity of the plans, and the smaller payments that would result from these options, these

schedules would increase the cash flow problems of these plans, where the remaining assets are not sufficient to pay benefits in a given year.

IV. Reducing the Length of the Payment Period

Under this alternative, Stratford estimated the impact of reducing the period over which the State would provide assistance to the Old Hire plans from seven years to four, including any additional amount that would accrue as a result of suspending payments for 2½ years. Spreading the total amount across all four years would increase the State's annual payment amounts from April 30, 2006, through April 30, 2009, to \$48,557,351 (or \$23,236,272 over the currently mandated \$25,321,079). This results in total payments by the State of \$194,229,404 (\$48,557,351 x 4). This amount is about \$22 million less than the \$216,234,480 total the State will pay by making annual payments that include an additional amount for the accrued unfunded liability over seven years, as currently planned (see page 44). The reduction in the total payments is the result of the State's paying a smaller amount of total interest over a four-year period compared with a seven-year period.

Providing a higher level of state assistance over a shorter period could help reduce the unfunded liabilities of the plans somewhat because more assets will be available sooner to begin generating investment returns. The higher payments could also improve the cash flow situations of the plans for the four-year period considered, but as with any of the funding scenarios, once state assistance is discontinued, cash flow difficulties could arise or recur.

These scenarios present options for managing the State's assistance to the Old Hire plans. Under all the scenarios, an unfunded liability is expected to exist after state assistance is discontinued, at least for some of the plans. In addition, the cash flow problems currently experienced by some of the plans may not be alleviated by assistance from the State. In particular, the scenarios that consider extending the period over which state assistance is provided (option III above) would be expected to increase cash flow difficulties because they would significantly lower the annual state assistance amount provided. If the State implements such approaches for providing assistance, FPPA should have a complete actuarial analysis conducted to calculate the increase in the employers' liability and the impact on their contributions for each of the plans receiving assistance. Alternatively, if the State chooses an approach that shortens the period over which assistance is offered, plans may be in a better cash flow situation.

In all cases, we believe FPPA should carefully monitor the cash flow situations of the Old Hire plans and consider working with the local employers over a period of time to plan and budget for ongoing cash flow problems and future unfunded liabilities.

Recommendation No. 5:

The Fire and Police Pension Association should monitor the cash flow positions of the Old Hire plans and consider working with employers to develop plans and budgets to address current and future cash flow problems and future unfunded liabilities. If the State modifies its approach to providing assistance by extending the period over which state assistance is provided, FPPA should have a complete actuarial analysis conducted to calculate the increase in the employers' liability and the impact on their contributions for each of the plans receiving assistance.

Fire and Police Pension Association Response:

Agree. Implementation date: Ongoing. We will monitor the cash flow situations of the old hire plans and continue to work with them on funding issues as we have done in the past. The cash flow needs of the old hire plans will be reviewed in the context of their actuarial valuations, which are completed on a regular basis.

If the State changes its funding approach, any additional actuarial work that may be required must be approved, in advance, by each local plan. The costs of the additional work will be directly borne by each local plan.

Conducting Frequent Plan Studies

Statutes currently require all employers that wish to receive state assistance for their Old Hire plans to file an annual actuarial study with FPPA. In addition, FPPA typically completes a study of actuarial assumptions and plan experience every four to five years and an asset and liability analysis every three to four years. The last experience study considered experience through 1998. The last asset and liability analysis was completed as of January 1, 2000. FPPA has delayed studies more recently to control expenses in the last few years. Given the time since the last studies were completed, the aging of the plans, the changes in membership status, and the salary increases and investment experience, FPPA should consider having both an experience study and an asset and liability analysis completed in the near future to provide a more current picture of the member groups and the liabilities of each plan. In addition, FPPA should consider conducting an annual detailed analysis of experience, showing individually, at a minimum, the impact of salary changes, the impact of investment experience, and the impact of demographic experience. Every five years, FPPA should have an experience study completed, showing both the experience of the plans in the aggregate relative to assumptions and the experience

of at least the largest individual plans relative to assumptions. Such studies can help FPPA to monitor and plan for changes in the plans.

As a part of these studies, updating the projections of the benefit payout streams for each plan would assist in managing cash flow. The asset and liability analysis should include a sensitivity analysis of liabilities as they relate to current investment rate levels. This type of analysis could include cash flow analyses for the Old Hire plans and would provide insights on the implications of poor plan experience and poor investment experience on the unfunded liabilities and necessary contribution levels for the plans.

Recommendation No. 6:

The Fire and Police Pension Association should have an annual, detailed, experience study completed including, at a minimum, the impact of salary changes, the impact of investment experience, and the impact of demographic experience on the individual plans. In addition, FPPA should have an experience study completed every five years that includes both the experience of the plans in the aggregate and the experience of at least the largest individual plans, relative to assumptions.

Fire and Police Pension Association Response:

Agree. Implementation date: March 2004. We will have our outside actuary expand the bi-annual gain/loss analysis currently done on each old hire plan to include a more detailed breakdown of the factors that lead to gains and losses for each plan. If this is to be done every year, there will be a cost impact to each local plan for the additional work, so we will seek approval from those plans prior to contracting for the work. We will expand the scope of the upcoming (early 2004) experience study to include both composite experience as well as individual plan experience for the largest plans administered by FPPA. We plan to conduct experience studies every 4-5 years. The 2003 study, now planned for 2004, was delayed in order to save on administrative expenses in 2003.

Asset Smoothing

Currently FPPA employs a three-year smoothing of asset values for actuarial calculations. This approach has the advantage of keeping the actuarial asset value closer to the market value of the assets and more closely reflects market changes than averaging over longer periods. However, it may not sufficiently smooth the “peaks

and valleys” of investment experience and may lead to unnecessary fluctuations in plan liabilities and costs. In Stratford’s experience, five-year smoothing is the most common averaging approach, creating a lengthier averaging pattern. It is recommended that FPPA study using a five-year averaging of assets, to increase the smoothing, when assets are performing both poorly and beneficially. Employing techniques to smooth experience on the asset side may be useful in helping to manage the fluctuations in the unfunded accrued liabilities and in the employer contributions for the annual service cost of the Old Hire plans.

Recommendation No. 7:

The Fire and Police Pension Association should consider employing an actuarial asset valuation that averages assets over five years.

Fire and Police Pension Association Response:

Agree. Implementation date: July 2004. FPPA will discuss this recommendation with our outside actuary, and evaluate the appropriateness of making such a change in the context of our asset / liability modeling study scheduled for mid-2004.

Administration of State Funds

Chapter 3

Introduction

Since its inception in 1980, FPPA has been statutorily responsible for distributing state funding for employee benefit packages for both paid and volunteer fire departments and police departments. As discussed in the Overview chapter, the State has fully or partially funded four programs since 1980, including the Old Hire Pension plans, the Statewide Death and Disability plan, the Volunteer Firefighter Pension plans, and Volunteer Firefighter Death and Disability insurance. In addition to work performed by Stratford Advisory Group in Chapters 1 and 2 on FPPA's investment program and the unfunded liabilities in the Old Hire Plans, the Office of the State Auditor (OSA) reviewed FPPA's administration of state funds. The OSA's review included reconciling state funds paid to FPPA for distribution to the Old Hire plans, the Volunteer Firefighter Pension plans, and the Volunteer Firefighter Death and Disability insurance. In 2002, FPPA received just over \$29 million in state funds to assist these plans. Findings and recommendations related to FPPA's administration of state funds are discussed in this chapter.

Reconciliation of State Funds

FPPA functions as a pass through agency for state funding, and as such, funds paid to FPPA should be distributed upon receipt to the appropriate fire and police departments or plans. FPPA uses an internal pass-through account (Account 202) to track all state funds received and distributed. While we found that FPPA has accurately distributed nearly all funds received, there have been residual balances in Account 202 for at least the seven years prior to Calendar Year 2002 (we did not review account balances prior to 1995 for this account). End-of-year balances for Account 202 were as follows:

End-of-Year Balances of Undistributed State Funding Provided to FPPA Calendar Years 1995 to 2002							
1995	1996	1997	1998	1999	2000	2001	2002
\$271,000	\$402,000	\$322,000	\$214,000	\$329,000	\$302,000	\$395,000	\$0
Source: Office of the State Auditor's analysis of financial information provided by FPPA.							
Note: Numbers rounded to nearest \$1,000.							

In April of 2002, FPPA had a balance of about \$305,000 in state funds that had not been distributed. According to FPPA, nearly \$223,000 of this balance was transferred to the Statewide Death and Disability plan in December 2002 and the remaining \$82,000 was a buildup of funds that had been requested for volunteer firefighter pension plans but never distributed. Balances of undistributed state funds are the result of inadequate controls. Basically, FPPA has not reconciled state funds received to funds distributed. Lack of reconciliation between receipts and distributions resulted in the buildup of state funds over time and increases the risk of misappropriation of state monies.

We reviewed FPPA's processing of volunteer applications for state funds, reviewed the formulas FPPA used to allocate state funds, and reconciled state funds requested to funds distributed for Fiscal Years 1998 to 2002. For this period, we found that FPPA accurately distributed all funds received for the Old Hire plans, with the exception of \$48,500 used by FPPA for legal expenses in 2000. Joint Budget Committee staff noted that, in Calendar Year 2000, FPPA withheld a total of \$48,500 in state monies meant for distribution to nine state-assisted Old Hire Plans. FPPA withheld the funds for legal expenses incurred in an analysis of the potential issuance of Pension Obligation Notes.

While, overall, FPPA's distribution of Old Hire funding appeared appropriate, our audit work revealed a number of problems with FPPA's handling of state funds provided for the Statewide Death and Disability plan and Volunteer Firefighter Pension plans, as well as general concerns with FPPA's internal controls for tracking state funds and distributing funds to volunteer fire departments.

Statewide Death and Disability Funding

In 1980 the State began providing funding to FPPA for deposit in the Statewide Death and Disability Fund. The Statewide Death and Disability plan provides death and disability pension benefits to all non-volunteer firefighters and police officers employed in Colorado. Senate Bill 83-133 gave fire and police departments until October 1, 1983, to exempt themselves from the Statewide Death and Disability plan

and departments elected to provide their own Death and Disability Pension benefits. Senate Bill 133 also allowed exempt departments to receive a portion of the state funding that would otherwise be paid to the Statewide Death and Disability Fund. Senate Bill 90-152 gave exempt departments another chance to become part of the Statewide Death and Disability plan. Between 1991 and 1997, three of the eight exempt departments chose to become part of the Statewide Death and Disability plan while the other five elected to remain exempt. The last payment made by the State to the Statewide Death and Disability Fund was for \$39 million in Fiscal Year 1997, after which statute requires that the Fund be supported entirely by contributions from members and employers.

As noted previously, there was a buildup of about \$223,000 in FPPA's accounts related to the Statewide Death and Disability plan. We reviewed documentation provided by FPPA showing that the \$223,000 portion of the balance of funds in Account 202 is from state funds for one exempt police department's death and disability plan. Documentation provided by FPPA shows that shortly after the FPPA Board granted a disability retirement to one of the city's police officers in 1982, the police department elected to be exempt from the Statewide Death and Disability plan, resulting in FPPA's questioning whether the police officer's disability pension benefits should be paid from the Statewide plan. In November 1984, FPPA's Board determined that because the officer's disability pension was granted prior to the city's electing exemption from the Statewide plan, the officer was eligible for pension benefits from the Statewide plan. According to FPPA management, from 1983 to 1993 the city police department and FPPA were discussing the city's taking over the police officer's pension payments in order to receive its portion of the State death and disability funding. During this negotiation period, FPPA withheld the city's share of state funding, including all state funding available to the city from 1983 to 1992. There was no state funding available to the city police department after 1992. The issue was never resolved, and the city chose to affiliate with FPPA in 1997, rendering the discussions moot. Payments withheld are as follows:

State Death and Disability Funding Withheld by FPPA From One Exempt City Police Department 1983 to 1992				
1983	\$40,513		1988	\$20,258
1984	\$36,462		1989	\$16,207
1985	\$32,411		1990	\$12,156
1986	\$28,360		1991	\$8,105
1987	\$24,309		1992	\$4,054
TOTAL				\$222,835
Source: Office of the State Auditor analysis of information provided by FPPA.				
Note: Does not include interest earned.				

FPPA held these funds in the pass-through account set up for receipt and disbursement of state funds (Account 202) from 1983 until December 2002 when the funds were transferred to the Statewide Death and Disability Fund (Account 910/920). FPPA staff should have held these funds in the Statewide Death and Disability Fund, earmarked for the police department until resolution of negotiations related to whether the city or FPPA should be paying the retirement benefits. In December 2002, FPPA staff decided that since there had been no resolution of the negotiations between the city and FPPA, and the city chose to affiliate with the Statewide Death and Disability plan in 1997, the funds should be transferred to the Statewide Death and Disability Fund. FPPA staff explained that a management oversight resulted in the accumulated funds sitting in the wrong account. Essentially, once the last of the state funds were escrowed (1992), FPPA erroneously left the money in the pass-through account (Account 202). The effect of FPPA's decision to hold these funds in the pass-through account, rather than the Statewide Death and Disability Fund is twofold:

- 1) **Interest accumulated on the funds between 1983 and 2002 was not allocated to the Statewide Death and Disability Fund.** Although the \$223,000 was invested with the rest of the pooled funds managed by FPPA, FPPA does not allocate interest earnings to Account 202, since the account is a pass-through account, designed for receipt and disbursement of state funds. Therefore, the approximately \$771,000 in interest earned on these monies between 1983 and 2002 was actually allocated among all funds managed by FPPA, rather than only to the Statewide Death and Disability Fund. Had FPPA held these monies in reserve in the Statewide Death and Disability Fund, rather than in Account 202, the Statewide Death and

Disability Fund would have been accumulating investment earnings over the 20-year period from 1983 to 2002. Total assets of the Statewide Death and Disability Fund at December 31, 2002, after the transfer of \$223,000, were about \$184 million.

- 2) **The State may have overpaid about \$565,000 to fully fund the Statewide Death and Disability plan in Fiscal Year 1997.** In 1997 the State ended funding for the Statewide Death and Disability plan. The State and FPPA jointly determined the amount of money needed from the State to fully fund the Statewide Death and Disability plan for all police officers and firefighters currently employed, with the understanding that employer and employee contributions would be required to fully fund the Statewide plan after January 1, 1997. However, because of the error discussed above, the assets in the Statewide Death and Disability Fund should have been \$565,000 higher, and thus, the need for State funds was overstated. In 1995, FPPA's actuary performed a study of the Statewide Death and Disability Fund and employee salary information from the affiliated departments. One of the main components of the study was the balance of assets in the Statewide Death and Disability Fund in 1995. FPPA's actuary determined that the State needed to make a single payment of \$39 million to fully fund the Statewide plan for all employees as of January 1, 1997. The \$39 million figure determined by the actuary was based on 1995 assets and liabilities projected to January 1, 1997. Projected assets were about \$130 million and liabilities were about \$169 million.

FPPA needs to develop internal controls over the accounts used to receive and distribute state funds, including reconciliation and review. In addition, FPPA should work with the Joint Budget Committee and the State Treasurer to resolve the issues related to the errors in the accounting for the Statewide Death and Disability funding.

Recommendation No. 8:

The Fire and Police Pension Association should work with the State Treasurer and the Joint Budget Committee to resolve errors in the 1997 accounting for Statewide Death and Disability costs.

Fire and Police Pension Association Response:

Partially agree. FPPA agrees to work with the State Treasurer and JBC, but does not agree that changes need to be made to the 1997 funding of the Statewide Death and Disability plan.

This is a very complicated issue, simplified as follows: The lump-sum payment made by the State in 1997 was determined by comparing hard (easily determined) asset values with estimated liabilities. That is why a flat amount of \$39 million was included in the statute rather than tying the state contribution to the amount required to pre-fund all future normal costs for members hired prior to January 1, 1997. The \$39 million was an estimate based on January 1, 1995 data. It was necessary to use pre-estimated amounts in order to propose and draft legislation in late 1995 for the 1996 legislative session. Between the date that the estimate was made and the 1997 payment by the State, the Death & Disability Fund incurred a \$3 million actuarial loss due to a 10% increase in membership, which was far more than expected. There were also some actuarial gains during that same time period due to higher than expected investment returns; however, these could arguably be set aside to pre-fund future cost-of-living adjustments (COLAs) for disabled members rather than reduce the State's contribution. The Task Force which developed the Death & Disability legislation requested funding from the State which included no COLAs, assuming that future investment earnings might result in actuarial gains that would allow this important benefit in the future. The funding that was estimated by FPPA's actuaries that would be needed to pre-fund the Death & Disability plan for members hired before January 1, 1997 was in excess of \$100 million if future COLAs had been included, rather than the \$39 million actually requested.

FPPA is willing to work with the State in a more detailed look at this issue, but there will be actuarial expenses involved in any future analysis. Also, legislation would be required to change the \$39 million figure, which is set in statute. Additionally, FPPA's Board of Directors is opposed to making any changes to the funding at this time. The Statewide Death and Disability plan is less than 100% funded due to the poor market returns for the three years ended December 2002. As a result, the Board could not grant a COLA this year to occupationally disabled members. A reduction of the original (1997) \$39 million contribution at this time would have a further negative impact on the funding of this plan, and further jeopardize future cost of living increases to the State's disabled police officers and firefighters, and their survivors.

Recommendation No. 9:

The Fire and Police Pension Association should improve accountability for state funds received and distributed by establishing appropriate timeframes for reconciling state funds received and distributed and returning any unallocated balances to the State upon identification.

Fire and Police Pension Association Response:

Agree. Implementation date: Implemented. The reconciliation process for state funding has been tightened up over the past year as a result of the change in supervisory personnel in FPPA’s Accounting Department. The issues mentioned in the audit report occurred prior to the assignment of the current supervisor.

Volunteer Pension Plans

Section 31-30-1112, C.R.S., requires the State to contribute funds to volunteer fire department pension funds. The State matches 90 percent of the contributions made to the pension fund by the department, up to one-half mill of the current assessed value of the municipality or district. For the last six years, state funding provided to FPPA for distribution to volunteer fire departments was as follows:

State Funds Provided to FPPA for Volunteer Pension Plans And Number of Recipient Plans Calendar Years 1998 to 2003 (In Millions)						
	1998	1999	2000	2001	2002	2003
Funds Paid to FPPA	\$3.1	\$3.4	\$3.4	\$3.6	\$3.8	\$3.6
Recipient Plans	210	206	203	202	200	203
Source: Office of the State Auditor analysis of data provided by FPPA.						

While the total number of volunteer departments receiving state matching funds for pension plans is generally decreasing, the total funding amount provided to FPPA is rising, likely due to increasing assessed valuations of municipalities and districts, and increases in department contributions. To receive state funds, volunteer departments are required to submit applications to FPPA by the end of August each year. Applications must include information on the amount of matching funds the department plans to contribute for the current year, the current assessed value of the municipality or district, the maximum pension amounts allowed by the department's plan, and the actual amount contributed in the previous year. FPPA bases the amount of funding distributed to each volunteer department upon a formula set forth in statute.

Volunteer Application Process Results in Undistributed State Funding

In April 2002, FPPA staff determined that an \$82,000 residual balance in the pass-through account used for state funds (Account 202) was not owed to any volunteer departments but rather was the result of FPPA's overrequesting state monies. FPPA repaid the State in October 2002 by reducing the amount of its 2002 request for state funds for the volunteer plans by the \$82,000. Our analysis of FPPA state funding requests and distributions indicate that the buildup of state funds occurred between October of 2001 and April of 2002. The overrequest of state funds by FPPA was likely the result of the following factors.

- **FPPA has made requests for state funds on the basis of incomplete volunteer applications.** Volunteer departments may provide incomplete applications, and clear up discrepancies before funds are distributed. In some cases, discrepancies are never resolved, leading to a buildup of state funds that were requested but never distributed. For example, in 2001, FPPA requested about \$12,000 from the State for one department on the basis of an application that lacked the department's prior year financial audit. The local department did not provide enough information, and therefore, FPPA did not distribute the funds.
- **FPPA has accepted late applications.** FPPA allows volunteer departments to apply after the application deadline, sometimes even in subsequent years. As an example, FPPA distributed \$60,000 in state funds received in 1999 to one volunteer department in November of 2000, or nearly 16 months after the application process for the 1999 funds was complete. Processing late applications and distributing funds in subsequent years makes reconciliation of state funds requested and distributed difficult. If the current deadlines are not practical, FPPA should work with the local volunteer departments and the State to establish deadlines that take into account the budgetary, accounting, and planning issues at all levels.
- **FPPA has distributed monies that were never requested from the State.** In April 2002, FPPA paid about \$22,000 to a department for which FPPA had not requested funding from the State. The effect of this was to reduce the balance of undistributed funds owed back to the State at that time. FPPA would not have been able to pay this department from the account it uses to track state funds if there had not been an excess balance in that account.
- **State funds have been distributed based on volunteer estimates of matching contributions.** While volunteer departments request state funds

in August, they have until December of that same year to actually make all required matching contributions to the pension fund. As a result, state funds are allocated based on estimated, rather than actual, matching contributions. Therefore, FPPA has already requested, received, and distributed the state funds before it determines whether volunteer departments actually made the required matching contribution. If the department does not contribute the full amount of matching funds for which it received state funding, FPPA will not identify the shortage until the following year's application process, thus over-allocating state monies. When shortfalls are identified, FPPA reclaims overpayments of state funds by reducing the department's request in the following year. We identified at least one instance where basing requests for state funds on budgeted contributions led to the buildup of state funds not distributed by FPPA or returned to the State. In Calendar Year 2001, FPPA made a request for state funds of \$184,500 for one department based on an incorrectly budgeted contribution. The error was identified by FPPA before payment was made to the department. Subsequently, the correct payment of \$94,500 was made to the department. However, the excess of \$90,000 that FPPA requested and received was not remitted back to the State until October 2002 when FPPA paid back the buildup of state funds.

We estimate that the State lost about \$4,850 in interest earnings from October of 2001 until October of 2002 due to the \$82,000 of state funds held in Account 202. Of this amount, about \$2,280 in lost interest earnings accrued between April 2002, when FPPA identified the buildup of state funds, and October 2002, when it repaid the State.

Recommendation No. 10:

The Fire and Police Pension Association should improve accountability for state funding for volunteer pension funds by reconciling state funds received and distributed each year, as discussed in Recommendation No. 9. Additionally, FPPA should improve the application process and accountability for state funding of volunteer pension plans by:

- a. Ensuring that its requests for state funds are based upon complete and verified volunteer applications.
- b. Working with local volunteer departments and the State to establish deadlines that take into account the budgetary, accounting, and planning issues at all levels that impact the departments' ability to submit complete applications by the deadlines.

- c. Changing volunteer applications to be based on actual volunteer matching contributions made in the prior year and verifying the contributions at the time of application using the prior year's financial statements. Statutory change may be necessary to accomplish this change.

Fire and Police Pension Association Response:

Agree. Implementation date: Pending potential legislation. We have tightened up our deadlines and processes for the distribution of state matching funds for volunteer departments. Please review our response to Recommendation No. 15 which details a more complete solution.

Calculation of Volunteer Distributions

Each year between August and October, FPPA staff collect and verify over 200 volunteer fire department applications for state pension funding. In 2002 state funding provided to volunteer departments ranged from \$500 to \$195,000, depending on the assessed property valuation of the volunteer district, the amount of matching contributions made by the department, and the level of pension benefits available. Section 31-30-1112, C.R.S., prescribes the formula to be used to determine the amount of funding that will be distributed to each qualifying department and requires that the State transfer the requested funds by September 30 of each year. We reviewed FPPA's calculation of distributions for Calendar Years 1998 to 2002 and found the following:

- **Calendar Year 2002 distributions were based on an outdated formula.** HB 02-1036 amended the statutory formula for determining state matching funds for volunteer firefighter pensions. This bill was signed by the Governor on May 24, 2002, and was effective July 1, 2002. Among other changes, HB 02-1036 raised the minimum state contribution from \$500 to \$1,000 for those volunteer departments that contribute at least one-half mill of the assessed valuation of their municipality or district. State matching funds are calculated by FPPA at the end of September and beginning of October. We found that the calculations FPPA made for 2002 were based on the wrong formula. Because HB 02-1036 became effective in July 2002, FPPA should have used the new formula to allocate funds to volunteers in October 2002. We calculated that for the four departments qualifying for the minimum state funding, all received less than \$1,000. This resulted in those four departments receiving \$1,341 less in state funds than they were eligible for. Because another statutory change affected volunteer departments that

offer pensions of more than \$300 to retirees, FPPA's use of the wrong formula most likely led to inaccurate distributions to these departments as well.

- **FPPA did not follow the statutory formula for distributions in Calendar Years 1997 through 2001.** One of the statutory tests in the volunteer funding formula in place from 1997 to 2001 related to whether departments offered post-retirement pension increases (cost-of-living adjustments). For departments offering cost-of-living adjustments, the State was to pay the amount required to fund a \$300 per month pension. FPPA was not using this test in its calculations for years 1997 to 2001. To determine the impact of this error, FPPA would have to recalculate all volunteer distributions from 1997 to 2001.
- **Local volunteer fire departments all received the minimum state funding, even when they did not qualify.** As discussed, Section 31-30-1112, C.R.S., states that volunteer fire departments contributing at least one-half mill of their current assessed valuation to their pension plans shall receive at least \$1,000. We reviewed FPPA's calculations for distribution of state funds for all departments receiving the minimum state match or less in 1998 through 2002. We found that, in 2002, FPPA incorrectly distributed the minimum level of state funding to two departments that did not qualify for the minimum because they did not contribute the statutorily required one-half mill. These agencies should have received a total of \$428 less in state matching funds. While the amounts are immaterial, these errors indicate a lack of supervisory review prior to distribution.
- **FPPA requests state funding after the statutory deadline.** FPPA does not typically request additional state funding for volunteer pension plans until the end of October. Statutes state that these funds should be transferred by the State Treasurer's office on September 30. FPPA reports that it cannot complete its review of applications and make the appropriate calculations to request funds by September 30. FPPA's current deadline for receiving applications for state matching funds is the end of August. The application deadline is not set in statute. Therefore, FPPA could set an earlier application deadline to meet the statutory requirement, or seek legislation to change the September 30 date to one that meets the needs of the volunteer departments, the State, and FPPA.

Recommendation No. 11:

The Fire and Police Pension Association should ensure that it distributes state funds in accordance with statute and incorporates secondary review of volunteer funding calculations. Additionally, FPPA should work with the Joint Budget Committee to determine whether recalculation of prior year volunteer distributions is reasonable and whether additional funding for any underallocations would be available.

Fire and Police Pension Association Response:

Agree. Implementation date: Pending potential legislation. To explain the issues regarding implementation of various pieces of volunteer legislation, the following history is provided regarding the state matching funds process: In 1993, language was added to the statutes to allow departments to increase pensions above \$300, but due to the specific wording we had to completely cut off the funding to some departments which were fully funded for benefits of \$300 or more. The legislature subsequently amended the wording in 1994. However, while it appears the legislative intent has always been to cap state assistance when benefits were improved, the specific wording in 1997 would have effectively eliminated the ½ mill cap in some cases, which is why it was never implemented by FPPA staff. That is why FPPA sought to “clean up” the language in 2002.

FPPA did not implement the 2002 legislation until 2003 due to the necessity for additional actuarial information that is only calculated in the odd years for volunteer pension funds. Doing an additional study in 2002 to implement the legislation likely would have cost the funds more than they would have realized from the statutory change. FPPA staff can recalculate the 2002 distributions using the 2003 valuations if the legislature would like to have it done. Since it will take a number of additional hours of staff time to complete this work, we would like assurance from the legislature that any additional funds requested due to this recalculation will be made available for FPPA to distribute to the affected volunteer plans.

Recommendation No. 12:

The Fire and Police Pension Association should either consider moving the volunteer application deadline one month earlier in order to meet the current statutory deadline for requesting and transferring state funds, or seek statutory changes that would allow

for state funds for volunteer departments to be transferred at a time that is more appropriate for the volunteer departments, FPPA, and the State.

Fire and Police Pension Association Response:

Agree. Implementation date: Pending potential legislation. Please see response to Recommendation No. 15 for additional information.

Volunteer Death and Disability Policy

In addition to processing volunteer applications for state pension funding, FPPA is statutorily responsible for procuring an accidental death and disability policy to cover all volunteer firefighters. The State transfers \$30,000 each year to FPPA for the purchase of this policy. Section 31-31-202(4), C.R.S., requires that the FPPA Board set the amount of coverage provided to each volunteer firefighter and take competitive bids for the policy from insurers. FPPA states that it has been procuring the volunteer death and disability policy from the same insurance company since 1981. It does not appear that FPPA ever sought competitive bids for the policy. FPPA staff report that they negotiate with the current provider of the insurance policy each year to determine whether increased benefits can be purchased for the same premium amount. According to FPPA staff there may not be many insurance companies that provide life insurance for emergency service organizations, and therefore sole source procurement may be reasonable. However, FPPA should investigate the possibility of obtaining quotes from other insurance providers to ensure that it is procuring the best policy possible, at the lowest price.

We also found that all volunteers may not be aware of the existence of the policy. Currently FPPA provides information about the volunteer death and disability insurance policy to affiliated volunteer departments along with information on the pension plans FPPA administers on their behalf. However, there is no formal communication with nonaffiliated volunteer departments about the existence of the policy or benefits available. While the total number of nonaffiliated volunteer departments is unknown, FPPA communicated with about 72 of the nonaffiliated volunteer departments in Calendar Year 2002 via the application process for state pension funding. Providing information to the nonaffiliated departments through this application process could be an efficient way to ensure that the majority of nonaffiliated volunteer firefighters are aware of the insurance policy.

Recommendation No. 13:

The Fire and Police Pension Association should consider obtaining bids for the volunteer death and disability insurance policy.

Fire and Police Pension Association Response:

Agree. Implementation date: Pending potential legislation. Please see response to Recommendation No. 15 for additional information.

Recommendation No. 14:

The Fire and Police Pension Association should include informational material on the volunteer firefighter death and disability insurance policy with the applications sent to the nonaffiliated volunteer departments each year and provide information to the Colorado State Firefighter's Association for communication to the volunteer firefighters.

Fire and Police Pension Association Response:

Agree. Implementation date: Pending potential legislation. Please see response to Recommendation No. 15 for additional information.

Cost of Services Provided to Volunteers

As discussed, FPPA currently provides a number of services for volunteer fire departments, including processing of volunteer department applications for state pension funding and procuring a death and disability insurance policy that covers all volunteer firefighters. FPPA currently recovers the costs associated with these services through the allocation of administrative costs among the approximately 230 pension funds it administers. FPPA believes that allocating these costs to the 72 non-volunteer pension plans is inequitable because the non-volunteer plans do not benefit from state funding for volunteer plans or the death and disability policy procured by FPPA each year. As such, non-volunteer plans should not be expected to pay for the costs of FPPA's services for those functions.

FPPA estimates the annual costs for staff to mail and process volunteer department applications for state funding to be about \$9,050. This breaks down to an average

cost of about \$40 per volunteer application. According to FPPA, affiliated volunteer applications are easier to process and cost less than applications from nonaffiliated volunteer departments because FPPA already has much of the needed information on-hand to verify information reported. In addition, FPPA does not incur the costs of mailing checks to each affiliated department. We believe there are a number of options that FPPA could consider for improving the equity of cost allocations for handling duties that benefit the volunteer fire departments, including changing the allocation methodology, seeking statutory authority to charge an application fee for state funding, seeking an appropriation for processing the volunteer funds, or seeking legislative change to revert the process of distributing funds to the volunteer pension plans to the State.

Recommendation No. 15:

The Fire and Police Pension Association should improve the equity of cost allocation for services provided only to volunteer departments by considering implementing one of the following options:

- a. Seeking statutory authority to charge an application fee for volunteer departments applying for state funds.
- b. In combination with part (a) above, changing the cost allocation methodology so that the costs of processing volunteer applications for state pension funding are allocated only to affiliated volunteer plans, and charging nonaffiliated volunteers an application fee for processing their application for state funds.
- c. Seeking statutory authority for an appropriation of funds from the State for processing volunteer applications and procuring the volunteer death and disability policy.
- d. Working with the General Assembly to seek legislative change that removes the duties of distributing state funding for volunteer pension plans and procurement of the volunteer death and disability policy from FPPA's duties and places those duties with an existing state agency.

Fire and Police Pension Association Response:

Agree. Implementation date: Pending potential legislation. As discussed with the OSA staff, FPPA was given the responsibilities relating to the distribution of state matching funds and procurement of the volunteer

insurance policy when it was established in 1980, and is simply a pass-through entity for both. FPPA's administrative expenses are passed through to all of its affiliated plans, but we question if it is really appropriate for those plans to be charged to perform work for the State and for unaffiliated volunteer plans.

While FPPA provides administrative services to a number of affiliated volunteer fire pension plans, the plans are still controlled by local boards, just like the Old Hire plans. Until 2002, when FPPA proposed legislation to try to simplify the state matching funds process somewhat, we had been in the reactive position of implementing legislation that was proposed and passed by the volunteer organizations. This occurred often without regard to conflicting wording or the increased complexity of the matching funds calculations. We have also had to adjust the application and distribution process to the timing of funding by the State and the preparation of bi-annual actuarial valuations for each individual plan. (In 2002, 156 affiliated plans and 70 non-affiliated plans applied for state matching funds.)

With this background information, FPPA feels that it would be most appropriate to pursue implementation of the State Auditor's suggested option "d". Since the volunteer statutes are separate from those governing the Old Hire and statewide plans administered by FPPA, and volunteer funding is provided by the State, FPPA would like legislative support to return the responsibility for the following to the State:

- a) procurement of the volunteer disability insurance policy, which may have the potential of reducing costs due to the State's greater purchasing power; and
- b) distribution of state matching funds, which will allow the State to control the exact timing of the issuance of matching funds to volunteer departments, and to oversee the implementation of new volunteer legislative changes.

FPPA is available to work with the Legislative Audit Committee on this piece of legislation, or could take the proposal to our oversight body, the Pension Reform Commission, if that is more appropriate.

Appendices

Appendix A

Asset Allocation Analysis

Stratford utilized mean/variance optimization software to model the current asset allocation under FPPA's current risk, return, and correlation assumptions (discussed in Appendix B). Mean/variance optimization software calculates projected returns and risk (standard deviation) levels for a portfolio of assets. The process considers both the expected risk and return characteristics, along with the effects of varying levels of correlations among individual asset classes. The software uses the given risk, return, and correlations to statistically forecast returns under varying market conditions.

Stratford modeled the projected returns under varying market conditions from very good (95th Percentile – returns would be expected to be below this level 95% of the time) to very poor (5th Percentile – returns would be expected to be below this level 5% of the time). The results of this modeling are as follows:

Return Percentiles

	1 Year	3 Years	5 Years	10 Years	20 Years
95 th Percentile	32.14	21.50	18.40	15.36	13.25
75 th Percentile	17.53	13.55	12.35	11.16	10.33
50 th Percentile	8.33	8.33	8.33	8.33	8.33
25 th Percentile	-0.14	3.36	4.46	5.58	6.38
5 th Percentile	-11.18	-3.40	-0.87	1.74	3.63

This analysis shows that the projected median return (50th percentile) is slightly in excess of 8.0 percent. In other words, using its current target asset allocation, if the return, risk, and correlation assumptions hold true, FPPA would earn a return of 8.33 percent or better, 50 percent of the time.

A similar analysis was conducted to determine the probabilities of achieving various other target returns, as shown below.

Probability of Achieving Nominal Returns of:

	1 Year	3 Years	5 Years	10 Years	20 Years
Target: 2 %	69.11	80.63	86.77	94.27	98.72
Target: 4 %	63.24	72.09	77.52	85.75	93.48
Target: 6 %	57.16	62.26	65.66	71.58	79.01
Target: 8 %	51.02	51.77	52.28	53.22	54.55

Stratford conducted further analyses using the average return from six external sources and 20-year average standard deviations and correlations. The results of these analyses are as follows:

Return Percentiles

	1 Year	3 Years	5 Years	10 Years	20 Years
95 th Percentile	31.67	21.02	17.92	14.88	12.78
75 th Percentile	17.05	13.07	11.87	10.68	9.85
50 th Percentile	7.86	7.86	7.86	7.86	7.86
25 th Percentile	-0.62	2.88	3.98	5.10	5.90
5 th Percentile	-11.65	-3.88	-1.35	1.26	3.15

Appendix A

Probability of Achieving Nominal Returns of:

	1 Year	3 Years	5 Years	10 Years	20 Years
Target: 2 %	67.73	78.74	84.83	92.73	98.02
Target: 4 %	61.80	69.84	74.90	82.88	91.03
Target: 6 %	55.69	59.79	62.55	67.46	73.89
Target: 8 %	49.56	49.24	49.02	48.61	48.04

Appendix B

Detailed Analyses of Investment Return, Risk, and Correlation Assumptions

Investment Return Assumption Analysis

FPPA's investment return assumptions were compared to actual returns over the last 20 years and since the inception of the index for representative asset class indexes. An index, such as the S&P 500, is an unmanaged group of securities that fit within established criteria and is used to compare performance relative to a similar group of securities managed by an investment manager. FPPA's return assumptions were also compared to return assumptions for a range of six external sources. The external sources include two nationally known investment consulting firms and four multi-strategy investment management firms with combined assets under management of over \$1 trillion. The analysis indicates that the investment return assumptions employed by FPPA in setting its asset allocation policy are generally comparable to both historical experience and the practice of a broad group of investment professionals.

FPPA Expected Return Assumptions 2001		Historical Returns of Representation Indices		Summary of External Sources		
<i>Asset Class</i>	<i>Return</i>	<i>Last 20 Years</i>	<i>Since Inception</i>	<i>Avg.</i>	<i>High</i>	<i>Low</i>
Cash	5.00%	5.60%	3.80%	N/A	N/A	N/A
Core Fixed Income	6.25%	9.50%	9.30%	4.20%	6.20%	2.10%
Global Fixed Income	6.20%	N/A	8.20%	3.90%	5.40%	1.80%
Domestic Equities	10.00%	11.20%	10.40%	8.00%	10.10%	4.00%
International Equities	10.10%	9.40%	9.00%	9.30%	13.70%	6.90%
Core Real Estate	8.00%	8.70%	12.20%	7.00%	7.50%	6.60%
Alternative Investments	14.00%	14.30%	14.40%	9.10%	11.00%	8.10%

Risk Assumption Analysis

Risk assumptions use standard deviation to reflect the expected volatility of each asset class by assuming a range of returns around the mean, or average, expected return. For example, FPPA assumes a rate of return of 6.25 percent on core fixed income investments and a standard deviation of 9.0 percent for this asset class. This means that FPPA expects the actual return on core fixed income to vary up to 9 percentage points above or below the assumed rate of 6.25 percent two-thirds of the time (because 1 standard deviation reflects two-thirds of a normal bell curve). In other words, FPPA would expect the returns for this asset class to range from -2.75 percent (6.25 - 9) to 15.25 percent (6.25 + 9). The higher the assumed standard deviations, the greater expected volatility and more conservative the asset allocation policy will be, to counteract the expected volatility.

The risk assumptions used by FPPA, as measured by standard deviation, were compared to the actual standard deviations over the last 20 years and actual standard deviations since the inception of the asset class index. The indices used as a representation of the respective asset classes are as follows:

Appendix B

1. Cash - 90-day T-Bills
2. Core Fixed Income - Lehman Brothers Aggregate Index
3. Global Fixed Income - JP Morgan Hedged Non-US Government Index
4. Domestic Equities - Wilshire 5000 Index
5. International Equities - MSCI All Country World Index, ex. US Index
6. Core Real Estate - NCREIF Property Index
7. Alternative Investments - Venture Economics Index

FPPA Expected Risk		Historical Risk Experience	
<i>Asset Class</i>	<i>Standard Deviation</i>	<i>Last 20 Years</i>	<i>Since Inception</i>
Cash	1.00%	1.00%	1.50%
Core Fixed Income	9.00%	5.20%	7.30%
Global Fixed Income	9.00%	N/A	4.20%
Domestic Equities	20.00%	18.39%	20.46%
International Equities	22.00%	19.30%	19.00%
Core Real Estate	13.00%	15.00%	17.60%
Alternative Investments	32.00%	N/A	N/A

The risk comparison indicates that FPPA’s assumptions for expected risk for each asset class are conservative and consistent with long term experience.

Correlation Assumption Analysis

FPPA uses correlation assumptions to help diversify its investments by selecting investment options that have a variety of correlations. Assets are correlated when they tend to react similarly to changes in the market. For example, a bond fund and an equity fund that have a high correlation (close to +1) would both be expected to increase or decrease in value similarly in response to the same market stimulus, such as a change in interest rates by the Federal Reserve. The lower the correlation between two assets, the greater the diversification benefits are of including those assets in a portfolio.

FPPA’s correlation assumptions are based on both historical correlations and trends among asset pairs over non-overlapping five year periods. FPPA’s current correlation assumption was arrived at by considering both long-term averages and trends. Stratford compared FPPA’s correlation assumptions to historical correlations over the longest common time periods available for representative indexes for the asset classes. Stratford compared the correlation assumptions used by FPPA for its most recent asset allocation study and the historical correlations over the past 20 years, as shown in the tables below. The comparison indicates that the assumptions used by FPPA in conjunction with its investment consultant, PCA, to set asset allocation policy are reasonable and follow standard investment consulting industry practices.

Appendix B

FFPA Correlation Assumptions							
	Cash	Core Fixed Income	Global Fixed Income	Domestic Equity	International Equity	Core Real Estate	Alternative Investments
Cash	1.00						
Core Fixed Income	0.50	1.00					
Global Fixed Income	0.30	0.90	1.00				
Domestic Equity	0.25	0.40	0.50	1.00			
International Equity	0.00	0.00	0.10	0.35	1.00		
Core Real Estate	0.35	0.20	0.10	0.25	0.10	1.00	
Alternative Investments	0.00	0.00	-0.20	0.50	0.50	0.25	1.00

Historical Correlations							
	Cash	Core Fixed Income	Global Fixed Income	Domestic Equity	International Equity	Core Real Estate	Alternative Investments
Cash	1.00						
Core Fixed Income	0.05	1.00					
Global Fixed Income	0.00	0.50	1.00				
Domestic Equity	0.00	0.20	-0.15	1.00			
International Equity	-0.05	-0.05	0.20	0.75	1.00		
Core Real Estate	0.35	0.00	-0.05	-0.05	0.00	1.00	
Alternative Investments ¹	N/A	N/A	N/A	N/A	N/A	N/A	1.00

¹ Performance record less than 20 years

Appendix C

FPPA CASH FLOW MODELS

**Projected Annual Returns
(All Spending Levels)**

Year	1	2	3	4	5	6	7	8	9	10
95th Percentile	32.4%	30.9%	30.9%	30.8%	31.4%	32.0%	32.3%	32.1%	32.1%	30.3%
75th Percentile	17.6%	17.1%	17.2%	16.2%	16.8%	17.1%	17.2%	17.5%	17.4%	17.4%
50th Percentile	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
25th Percentile	0.0%	-0.7%	-0.4%	-0.4%	-1.0%	-1.0%	-0.4%	-0.3%	0.2%	-0.8%
5th Percentile	-11.7%	-11.8%	-12.7%	-12.0%	-11.4%	-12.2%	-11.3%	-11.1%	-10.7%	-12.6%

Assumes Target Asset Allocation and \$2.1 Billion Market Value

2% Annual Spending

Projected Ending Market Value

Year	1	2	3	4	5	6	7	8	9	10
95th Percentile	2,802,133,674	3,133,549,813	3,530,908,037	4,021,547,287	4,405,771,421	4,945,542,834	5,425,649,481	5,990,983,520	6,614,435,972	7,083,191,325
75th Percentile	2,480,715,551	2,703,024,887	2,943,444,255	3,155,741,558	3,412,922,797	3,669,507,976	3,913,354,088	4,251,957,132	4,621,896,452	4,890,386,407
50th Percentile	2,273,062,418	2,388,050,635	2,524,512,140	2,676,758,557	2,828,094,294	2,982,245,422	3,191,783,254	3,357,285,079	3,546,294,613	3,771,250,159
25th Percentile	2,100,644,335	2,113,366,485	2,172,186,551	2,235,175,852	2,321,545,292	2,383,496,236	2,481,995,353	2,605,575,374	2,759,871,278	2,909,094,492
5th Percentile	1,847,487,633	1,782,377,245	1,735,372,725	1,788,760,230	1,786,099,458	1,829,937,057	1,867,287,677	1,906,138,945	1,965,230,684	2,057,071,470

Projected Annual Spending

Year	1	2	3	4	5	6	7	8	9	10
95th Percentile	65,212,779	71,812,744	53,529,083	61,691,163	69,658,638	78,720,073	86,889,426	95,778,168	107,819,679	119,845,597
75th Percentile	65,212,779	71,812,744	53,529,083	53,869,394	58,186,122	62,913,433	68,240,648	73,360,443	79,088,434	84,875,561
50th Percentile	65,212,779	71,812,744	53,529,083	48,121,618	50,650,837	53,781,841	56,755,311	60,116,999	63,862,529	67,389,123
25th Percentile	65,212,779	71,812,744	53,529,083	43,119,956	44,018,887	45,428,961	46,800,128	48,261,290	50,144,131	52,779,066
5th Percentile	65,212,779	71,812,744	53,529,083	37,048,639	36,562,264	36,360,306	37,006,681	37,172,781	38,289,027	39,223,353

FPPA CASH FLOW MODELS

Assumes Target Asset Allocation and \$2.1 Billion Market Value

3% Annual Spending										
Projected Ending Market Value										
Year	1	2	3	4	5	6	7	8	9	10
95 th Percentile	2,802,133,674	3,133,549,813	3,530,908,037	3,993,327,734	4,327,535,804	4,827,464,095	5,258,765,440	5,755,951,251	6,312,270,000	6,696,605,883
75 th Percentile	2,480,715,551	2,703,024,887	2,943,444,255	3,131,023,445	3,356,760,550	3,575,036,897	3,781,883,938	4,065,373,644	4,387,384,281	4,597,437,929
50 th Percentile	2,273,062,418	2,388,050,635	2,524,512,140	2,653,159,043	2,775,894,303	2,899,501,901	3,076,048,263	3,204,150,992	3,354,509,729	3,529,943,692
25 th Percentile	2,100,644,335	2,113,366,485	2,172,186,551	2,209,821,349	2,273,427,343	2,312,719,260	2,383,141,635	2,479,030,789	2,604,999,895	2,721,258,252
5th Percentile	1,847,487,633	1,782,377,245	1,735,372,725	1,769,602,826	1,749,874,361	1,771,961,043	1,784,806,677	1,818,120,621	1,841,696,706	1,911,289,067
Projected Annual Spending										
Year	1	2	3	4	5	6	7	8	9	10
95 th Percentile	65,212,779	71,812,744	53,529,083	92,536,744	104,189,436	117,096,566	128,286,579	140,052,493	155,992,503	172,784,536
75 th Percentile	65,212,779	71,812,744	53,529,083	80,804,091	87,020,183	93,511,467	100,534,730	107,266,673	114,433,074	121,842,381
50 th Percentile	65,212,779	71,812,744	53,529,083	72,182,426	75,726,492	79,935,641	83,554,313	87,628,208	92,182,314	96,402,471
25 th Percentile	65,212,779	71,812,744	53,529,083	64,679,934	65,810,536	67,449,037	68,898,773	70,287,270	72,265,493	75,156,106
5th Percentile	65,212,779	71,812,744	53,529,083	55,572,958	54,643,365	53,944,987	54,259,521	53,948,862	54,836,037	55,822,158

FPPA CASH FLOW MODELS

Assumes Target Asset Allocation and \$2.1 Billion Market Value

4% Annual Spending										
Projected Ending Market Value										
Year	1	2	3	4	5	6	7	8	9	10
95 th Percentile	2,802,133,674	3,133,549,813	3,530,908,037	3,966,366,123	4,252,795,994	4,710,050,217	5,093,715,935	5,534,190,048	6,018,393,573	6,324,501,571
75 th Percentile	2,480,715,551	2,703,024,887	2,943,444,255	3,104,378,366	3,298,762,904	3,487,374,621	3,654,986,010	3,890,260,950	4,152,092,076	4,305,461,181
50 th Percentile	2,273,062,418	2,388,050,635	2,524,512,140	2,629,074,589	2,724,300,025	2,818,633,205	2,962,794,360	3,052,588,333	3,168,274,194	3,303,842,080
25 th Percentile	2,100,644,335	2,113,366,485	2,172,186,551	2,186,105,256	2,227,542,336	2,244,769,274	2,287,042,406	2,355,627,316	2,451,243,088	2,535,470,727
5 th Percentile	1,847,487,633	1,782,377,245	1,735,372,725	1,750,577,004	1,711,891,329	1,711,952,093	1,708,262,182	1,718,411,404	1,724,313,057	1,774,409,149
Projected Annual Spending										
Year	1	2	3	4	5	6	7	8	9	10
95 th Percentile	65,212,779	71,812,744	53,529,083	123,382,325	138,479,964	154,827,196	168,141,734	182,239,481	201,698,552	221,371,591
75 th Percentile	65,212,779	71,812,744	53,529,083	107,738,788	115,675,676	123,545,348	131,719,218	139,247,454	147,152,758	155,222,757
50 th Percentile	65,212,779	71,812,744	53,529,083	96,243,235	100,635,639	105,586,810	109,374,159	113,581,471	118,297,380	122,721,894
25 th Percentile	65,212,779	71,812,744	53,529,083	86,239,912	87,459,788	89,048,438	90,065,549	90,922,003	92,547,487	95,199,517
5 th Percentile	65,212,779	71,812,744	53,529,083	74,097,277	72,600,388	71,159,887	70,696,179	69,526,872	69,708,164	70,691,109

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