# A Report on the State of the Pension Fund

Office of the Controller, City of Philadelphia

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As a member of the Board of Pensions and Retirement, the City Controller has a responsibility to pensioners and taxpayers to ensure the long-term viability and overall fiscal health of the Pension Fund (Pension). As such, the Office of the City Controller conducted an analysis of the Pension's stability and capacity to meet future obligations. The following research gauges the reasonableness of the Pension's current investment strategy, evaluates key areas of risk in its actuarial assumptions, and presents several recommendations. The goal of this report is to offer an independent and objective analysis of the current state of the Pension, highlighting both positive changes and areas where improvement can still be made.

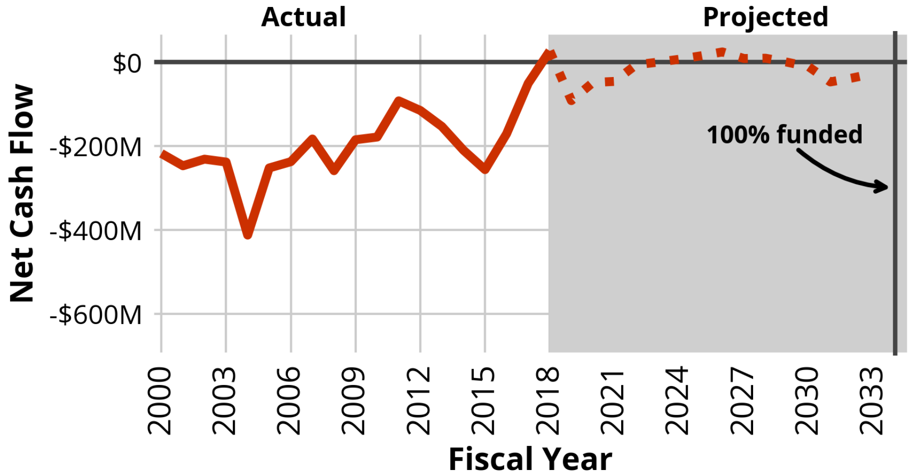
# 1 Cash Flow Analysis

In the past several years, the City and the Board of Pensions and Retirement (Board) have made adjustments to the Pension to improve its funded status and better meet annual obligations. By lowering the assumed rate of return for existing assets, negotiating higher contributions from union members, and implementing a stacked hybrid plan for new employees, the City has made strides to offset unfunded liabilities with increased funding in the immediate term and decreased obligations in the long run. The City has also adopted the Revenue Recognition Policy (RRP) to contribute an annual amount in excess of its minimum municipal obligation and to use sales tax revenue and increased employee contributions specifically to pay down the unfunded liability. These efforts have helped to improve the annual cash flow of the Pension, that is, the measurement of benefit and expense payments as compared to member and City contributions.

Looking at Figure 1 below, while net cash flows have fluctuated from year to year, benefit payouts and expenses have regularly exceeded annual contributions (excluding investment returns/losses). Between 2000 and 2017, net cash flows fell below negative $200M for 10 of 18 years. From a negative $412M net cash position in 2004, however, cash flows reached negative $51M in 2017 and positive $27M in 2018. As projected below, this trajectory, towards a sustained net-neutral cash flow, illustrates the Pension's reduced dependency on investment returns to fill the gap between contributions and disbursements. Meeting annual obligations without an overreliance on portfolio performance stabilizes the Pension's unfunded liability and helps to avoid asset liquidation.

**Fig. 1: Historical and Projected Pension Fund Cash Flows**

Cash flow equals total contributions minus benefit payments & expenses




**Sources**: Actuarial Valuation Reports, Cheiron projections; 2018 cash flow is preliminary.
**Note**: Net cash flow does not include investment earnings. Projections use a 7.6% assumed rate of return.

## 2 The Current Investment Strategy

In September 2016, the Board voted to implement a new allocation strategy that sought better returns, lower fees, and a shift towards passive management. The new strategy reduced the target allocation for opportunistic fixed income and hedge funds, two asset classes with poor historical performance and, in the case of hedge funds, disproportionately high management fees. It then increased target allocations in real estate, specifically core open-end real estate. Looking at 44 comparably-sized pensions across the country, the current allocation strategy places our equity targets in-line with nationwide medians, with underweighting toward fixed income and hedge funds and overweighting toward real assets and private equity.

| Asset Class | Pre-2016 Target | Current Target | Current Allocation | Median for Comparable Plans |
|---|---|---|---|---|
| Fixed Income | 23.50% | 14.00% | 18.90% | 23.90% |
| U.S. Equity | 19.00% | 30.00% | 27.80% | 25.53% |
| Non-U.S. Equity | 21.00% | 25.00% | 22.60% | 21.89% |
| Hedge Funds | 6.00% | 0.00% | 0.60% | 5.20% |
| Real Assets | 9.00% | 19.00% | 17.10% | 13.81% |
| Private Assets | 19.50% | 12.00% | 9.50% | 5.71% |
| Other | 2.00% | N/A | 3.50% | N/A |
| | 100.00% | 100.00% | 100.00% | |

*Comparable plans include 44 public pensions nationwide with current assets between $2B and $6B.*

Due to the allocation strategy's increased weighting to real estate, outlined in the table above, the Controller's Office researched the associated risks in raising the target allocation from 9 to 19 percent of the portfolio. While substantial, the majority of this shift occurred in U.S. core open-end real estate, whose target now comprises 11 percent of the entire portfolio. Investments in U.S. core open-end real estate provide income from leases for large commercial and residential buildings in urban settings. They offer steady cash flows through dividend payments, not unlike coupon payments for fixed-income sources. In comparison to other real estate investments, including private investments (with a current portfolio target of 2 percent), core open-end investments are a relatively liquid asset with funds that are not locked into multi-year contracts. However, the risks associated with a higher allocation to real estate are increased year-to-year volatility and a higher correlation with the stock market relative to the bond market's correlation. In addition, liquidity could be negatively impacted, making funds harder to access, during a market shock occurrence. As discussed later in this report, a detailed analysis of the Pension's real estate exposure and liquidity risks during a market shock should be performed.

Beyond additional investments in real estate, the Pension will also contribute significant funds toward private equity in the next few years to reach its target strategy. Taking into consideration current and historical capital market assumptions, private equity remains one of the riskiest financial asset classes. The Pension's private equity investments have failed to meet the public market equivalent (PME) benchmark, inclusive of a typical 300 basis-point risk premium, for the lifetime of the Pension. Since inception, the net internal rate of return for the

Pension's private equity investments has been 10.1 percent while the PME has been 11.1 percent. Investment returns have improved markedly since 2007, however. Over the last decade, the Pension's investments have closely mirrored the PME benchmark performance of 15.5 percent. Greater returns since 2007 reflect industry trends in addition to better selection of investment managers. The Board must continue to prioritize the manager selection process to sustain its recent performance and to ensure that future returns account for the additional risks of private equity. These risks will be discussed in greater detail in the Other Considerations section.

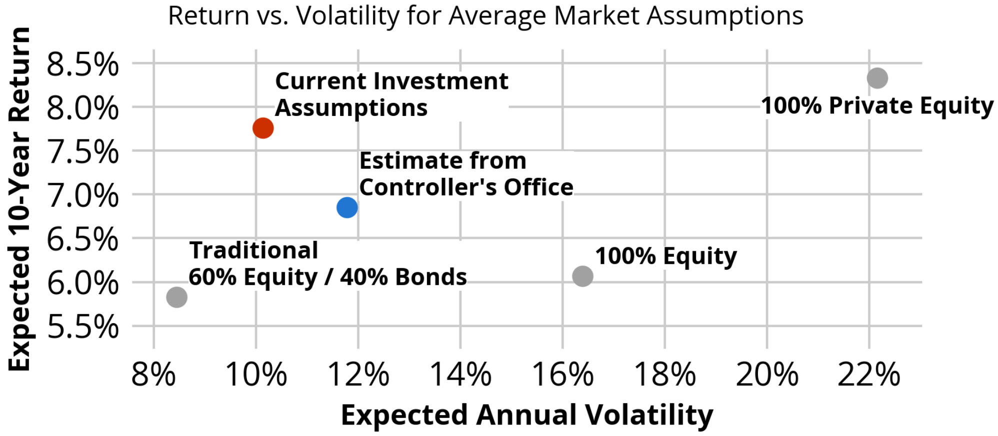
## 3 Evaluating Current Assumptions

The Board's current investment strategy is expected to produce a ten-year annualized return of 7.76 percent with an annual volatility of 10.13 percent. This assumption means that in most years Pension returns should typically fall between approximately negative two percent and positive 18 percent, with a smaller possibility of even larger gains or losses depending on market conditions.

To gauge the reasonableness of these assumptions, the Office of the Controller conducted an independent analysis of expected portfolio returns, running thousands of probability-based portfolio simulations using the September 2016 target allocations. We applied the specified allocations of the major asset classes and simulated thousands of possible cash flows to identify an expected average return and average volatility. For the purposes of these calculations, we relied on average ten-year capital market assumptions as defined in Horizon Actuarial Services' annual Survey of Capital Market Assumptions for 2018.[1] After inputting these averages, correlating asset classes to mirror market conditions, and simulating according to the target allocation strategy, we found an expected annual portfolio return of 6.8 percent and a volatility of 11.8 percent. Figure 2 below places the Controller's estimate in the context of the latest allocation strategy assumptions.

**Fig. 2: Evaluating the Pension's Investment Strategy**

Return vs. Volatility for Average Market Assumptions




Note: Analysis relies on average capital market assumptions from the 2018 Horizon Survey (10-year)

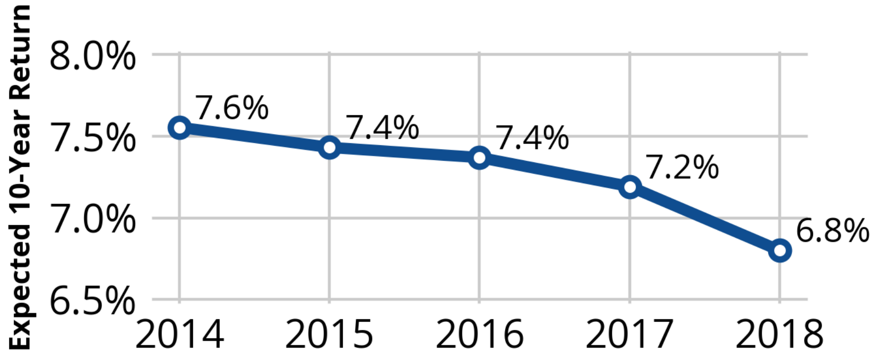
The differences in the expected portfolio performance seen above likely stem from discrepancies in capital market assumptions. With an expected annual return of 7.76 percent and a volatility of 10.13 percent, the current investment strategy assumes a more optimistic

[1] Capital market assumptions provide best-guess estimates for the expected returns and risks of each financial asset class based on historical data. To account for differences from firm-to-firm, Horizon's survey aggregates data from over 30 major financial firms and advisories to produce average return assumptions and volatilities by asset class.

outlook than the calculation conducted with Horizon averages. However, when inputting Horizon averages from 2016, the year the Board adopted the latest recommended strategy, the Controller's Office found an expected return of 7.4 percent and a volatility of 12.2 percent. This reduction in expected returns between 2016 and 2018 falls in-line with broader trends in capital market assumptions in the last decade. When simulating according to the Pension's current target strategy, but using Horizon averages from prior years, we found that expected returns have decreased materially over time, as seen in Figure 3 below.

**Fig. 3: The Impact of Changes in Market Assumptions on Returns**

Expected returns have diminished over the past five years




Note: Analysis uses average market assumptions from each year's Horizon survey and the Pension's target allocation strategy

As of July 1, 2018, the current return assumption for the Pension is 7.6 percent, down from 7.75 percent in 2016. The Office of the Controller recommends lowering the assumed rate of return further to better align with market trends. If lowered to 6.8 percent, reflective of Horizon's average capital market assumptions for 2018, the City would contribute an additional $1.6B until funded status is reached, relative to the current return assumption. The impact to the General Fund in the first year after such a change would be about $83M, increasing to $100M by 2033.[2]

As expectations in asset class returns have declined, public pensions have implemented parallel declines in their assumed rates of return. Simply put, pensions are not expected to perform as well in the future as they did in the 1990s and early 2000s. Looking across the country at state and local pensions, the nationwide median for assumed rate of return is 7.25 percent, a decline from 7.75 percent in 2014.[3] Current rates, however, still largely exceed past performance. According to a study by the Center for Retirement Research (CRR) at Boston College, from 2001-2016, the median public pension return was 5.5 percent. Despite the Pension having a median return assumption of 8.75, its annualized return for the same time period was 4.77 percent.[4]

[2]This calculation assumes that 83% of the RRP payment is charged to the General Fund, as was the case for Fiscal Year 2018.

[3]"2018 Public Pension Funding Study." Milliman. January 2019.

[4]Note that these dates include both the 2001 and 2008 recessions.

# 4 Other Considerations

***Fees***

Disclosure of fees and other manager-based costs are crucial to properly evaluating managers and the Pension's investment strategy. In recent years, the Board has prioritized fee reduction by negotiating better terms with fund managers. From 2015 to 2018, fees decreased from 0.62 percent of total assets under management to 0.35 percent.[5] This decrease is due in part to a shift toward passive funds. Since 2015, the percentage of assets under passive management has increased from 36.7 percent to 53.6 percent.

Beyond management fees, however, the Board should closely monitor performance-based fees as well, given its increased allocations to private equity and the often opaque nature of this asset class. The Office of the Controller recommends annual disclosure of such fees, as outlined in the following section.

***Private Equity***

Relative to its peers nationwide, the Pension is over-weighted to private equity, an asset class that offers high rewards at considerable risk. Notorious for a lack of transparency and non-standard reporting practices, private equity requires vigilant monitoring to ensure that stated earnings and cash flows best reflect actual investment performance. To assess whether this allocation strategy is worth its inherent risk, consistent benchmarking with a public market equivalent, inclusive of a risk premium, is essential. The Controller's Office recommends using this kind of benchmark as its primary benchmark.

Moreover, because private equity is a highly illiquid asset class, it is vital to ensure that management terms and fees are as fair as possible. For example, the Pension paid $17.6M in carried interest, a performance-based fee, to private equity managers from 2016 to Q1 2018 alone. Typical private equity fee structures follow a rule of Two-and-Twenty, in which investors pay annual two percent management fees on total assets and 20 percent carried interest fees on returns greater than a predetermined performance threshold. In recent years, the Board successfully negotiated terms more favorable than Two-and-Twenty, paying an average of 0.93 percent in management fees and 12.3 percent in carried interest. The Controller's Office supports the continuation of these efforts.

As investments are typically locked into 10-15 year fund lifecycles, the negotiation of better distribution terms can improve cash flows in the near term and lower the risk of overpayment. In a European waterfall distribution, carried interest is only paid at the end of the fund lifecycle, when the Pension has already recouped all committed capital and received its negotiated share of investment returns. This practice differs from the common American waterfall distribution, when carried interest is paid on a deal-by-deal basis and can result in clawback. Clawback occurs when future investment losses outweigh past performance and the Board must "claw back" the fees already paid to managers to make up the difference. The Controller's Office supports the Board's continued efforts to negotiate toward a European waterfall fee schedule and recommends that the Board formalize its policies and practices around clawback to ensure

[5] Excluding private equity carried interest. The 2018 figure has yet to be finalized.

timely analysis of overpayment that avoids unnecessary loss.

### *Liquidity*

Sustained levels of liquidity are necessary to maintain the Pension's long-term ability to meet capital calls, repay unfunded liabilities, and pay pensioners. With equities, fixed income, and cash considered liquid assets, the Pension's liquidity as of December 31, 2018 is 73 percent and falls in-line with the median for comparably sized plans nationwide. This figure provides only a snapshot of the City's liquidity position, however. When including assets liquid on a quarterly basis, such as core open-end real estate, the liquidity rate rises to a strong 86 percent. Only 14 percent of funds are allocated to highly illiquid assets like private equity with liquidity durations greater than one year.

However, liquidity becomes a larger concern during a market shock, when assets must be sold off, often at financial losses, in order to meet obligations and contract-based capital calls. As noted in the next section, such scenarios should be simulated in order to verify that present levels of liquidity are sufficient to weather prolonged economic decline in the future.

## 5 Evaluating Future Risk: Stress Tests

Because future investment returns are unpredictable, the best practice for assessing a pension plan's ability to meet obligations is through stress testing. The Society of Actuaries' Blue Ribbon Panel recommends simulating future cash flows using investment returns three percent higher and three percent lower than the current assumed rate of return. The Panel identifies two types of stress tests necessary for this analysis: *deterministic* tests, that assumed a fixed investment return every year, and *stochastic* tests which account for year-to-year volatility. The Controller's Office recommends formalizing annual tests in accordance with these guidelines in the Investment Policy Statement.

It is also in the City's best interest to conduct more intensive stress tests that provide insight into the Pension's ability to recover from market shocks. The Controller's Office requested an analysis from the City's actuary to estimate the impact of a single-year drop of 30 percent in the market value of the Pension's assets. For comparison, the Pension's market returns during the 2007-2008 market crash were negative 4.5 percent and negative 19.9 percent for Fiscal Years 2007 and 2008, respectively. A single year 30 percent drop is consistent with the stress testing regulations established as part of the Dodd-Frank Act following the Great Recession.[6]

According to the actuary's findings, a 30 percent asset shock would increase the City's General Fund contribution by about $99M in the year immediately following the market crash. This actuarial analysis, however, does not take into consideration capital calls and the disproportionate impact on certain asset classes like private equity and real estate. The Controller's Office recommends a more detailed look at a shock's impact on individual asset classes, the classes' respective recovery rates, and the portfolio's ability to rebalance toward the target strategy given market shock and capital calls.

Stress testing also gauges the risk that past unfunded liabilities could outpace current assets. In the event of multiple shocks or slow recovery, assets might have to be liquidated faster than they can recoup lost value. The Board should prepare for potential worst-case scenarios

[6] https://www.occ.gov/tools-forms/forms/bank-operations/stress-test-reporting.html

by assessing the probability of its occurrence with a reverse stress test. Reverse stress tests begin with worst-case scenario outcomes and chart the missteps and liquidity crises necessary to arrive there. They provide insight into a plan's vulnerabilities and guidance for how to avoid unfavorable outcomes by cushioning future shortfalls with additional funding.

# 6 Transparency

While the above recommendations aim to preserve the Pension's longevity, they do not take into consideration how best to present this information to pensioners and taxpayers. The Government Finance Officers Association (GFOA) recommends the publication of comprehensive annual financial reports (CAFRs) as a best practice for defined benefit plans. Cities that publish CAFRs of their pensions in accordance with GFOA standards include Chicago, Houston, and Baltimore. Pension Plan CAFRs are detailed summaries that highlight pension performances both historically, within five and ten-year windows, and as compared to actuarially-assumed rates of return for invested assets. CAFRs detail which asset classes have outperformed benchmarks, which have underperformed relative to expectations, and provide insight as to where pension managers have reallocated funds to best meet expected annual return. They also disclose transactional, management, and performance fees and present them as a percentage of assets under management. It is the recommendation of the Office of the Controller for the Board to publish annual CAFRs of the Pension's investments to offer greater perspective to the public on the health and sustainability of the Pension in the long run.

# 7 Final Recommendations

As outlined in this report, the City and the Board have made several positive steps to improve the health of the Pension over the last few years. We recommend additional measures to improve the fiscal health of the Pension and to account for future risk. The Controller's Office recommends the following:

- Establishing a goal of reducing the assumed rate of return to reflect current capital market assumptions and reevaluating on an annual basis;
- Continuing to negotiate lower management fees and consider passive management opportunities;
- Continuing to monitor private equity quarterly reports for fees and performance evaluation;
- Amending the Investment Policy Statement to:
  - Formalize procedures around clawback for private equity investments; and
  - Establish a public market equivalent, with a 300 basis-point risk premium, as the primary private equity benchmark;
- Formalizing annual stress testing in the Investment Policy Statement, to include:
  - Tests that project sustained, less-than-expected asset returns;
  - Tests that measure the impact of market shocks on future cash flows; and
  - Tests that measure liquidity risks and capital constraints for private assets and other illiquid investments;

- Using the data from the annual stress testing to inform decision-making; and
- Publicly releasing an annual CAFR in accordance with GFOA standards.

By adopting these policies and undertaking them regularly, the Board can mitigate future risks and meet the Pension's future obligations to City employees in a transparent and timely manner.