# **EVALUATION** REPORT

# Denver Employees Retirement Plan

## *Investment Program Evaluation*

November 2017


**Office of the Auditor**
**Audit Services Division**
**City and County of Denver**

**Timothy M. O'Brien, CPA**
**Denver Auditor**

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November 16, 2017

**AUDITOR'S REPORT**

Ellwood Associates has completed an evaluation of the Denver Employees Retirement Plan's Investment Policy. The purpose of the evaluation was to review the Investment Program under the stewardship of the Denver Employees Retirement Plan (DERP). The evaluation reviewed the Investment Policy, investment procedures, investment structure, and investment performance.

The evaluation provided recommendations to improve the Investment Policy and investment procedures as well as the investment performance of the Denver Employees Retirement Plan.

We extend appreciation to the Denver Employees Retirement Plan personnel who assisted and cooperated with us during the evaluation.

Denver Auditor's Office

Timothy M. O'Brien, CPA
Auditor

# Denver Employees Retirement Plan

## Investment Program Evaluation

October 2017

Dale A. Connors, CFA

Senior Consultant

Andrew C. Fiegel, CFA, CAIA

Consultant

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# Executive Summary

## Scope of Project

- Ellwood was hired to review the investment program under the stewardship of the Denver Employees Retirement Plan (DERP).
- The evaluation includes the following:
    1. Analysis of the appropriateness of Investment Policy based on industry standards and within the context of the City Charter and Revised Municipal Code requirements,
    2. Review of investment procedures within the context of the Investment Policy,
    3. Analysis of the current investment structure in relation to the assumed rate of return,
    4. Analysis of the portfolio performance results compared to appropriate benchmarks including indices and peer universes,
    5. Recommendations, as needed, for revisions to the Investment Policy and investment procedures.
- The evaluation covers the period from 1/1/2012 to 6/30/2017.


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# Executive Summary

## Ellwood's Assessment of the Denver Employees Retirement Plan

| Topic | Observations/Considerations | Pages |
|---|---|---|
| **1. Investment Policy Analysis** | • In general, the Investment Policy (IP) is comprehensive.<br>• Ellwood recommends staff complete a full review of the IP for the Retirement Plan Board, with a focus on elimination of outdated language, on verification of procedures being used to verify stated guidelines and on uniformity in the formats of the investment manager guidelines in the schedules.<br>• The IP is in need of improvement in the benchmarking of the portfolio and managers, with timeframes, benchmarks and valuation criteria, such as gross vs. net comparisons displaying inconsistency. | 3-6 |
| **2. Investment Procedures Analysis** | • The addition of the new documentation for duties and delegations will improve the overall procedures for the investment of the assets. The new documents address procedures that are not currently addressed in the Investment Policy.<br>• A portion of the fixed income assets are managed internally. Schedule IX-B provides the guidelines, procedures, and performance benchmarks for the Staff Managed Fixed Income account. The guidelines and procedures related to the Staff Managed Fixed Income portfolio are reasonable. | 7-8 |
| **3. Investment Structure and Assumed Rate of Return Analysis** | • Ellwood evaluated the Denver Employees Retirement Plan Investment Policy and the asset allocation review performed by Summit Strategies Group. Additionally, Ellwood performed an efficient frontier analysis on the DERP current allocation targets using our 10-Year asset class assumption inputs. We are in agreement that the proposed assumed rate of return of 7.5% is reasonable. | 9-11 |
| **4. Investment Performance Analysis** | • Overall, the DERP Total Fund investment portfolio has performed well relative to the assumed return objective and relative to the benchmark policy index as well as compared to peer public pension funds greater than $1 billion.<br>• Total Fund Policy Index composition appears accurate based on target allocations and underlying manager benchmarks. | 12-16 |
| **5. Recommendations** | • Investment Policy: Ellwood recommends staff complete a full review of the IP for the Retirement Plan Board, with a focus on elimination of outdated language, on confirmation of procedures being used to verify stated guidelines and on uniformity in the formats of the investment manager guidelines in the schedules, on integration of the Mosaic recommendations if approved, and on standardization of benchmark measurement criteria.<br>• Investment Procedures: The addition of the new documentation recommended by Mosaic for duties and delegations will improve the overall procedures for the investment of the assets. The new documents address procedures that are not currently addressed in the Investment Policy. If approved by the Board, it is recommended that the Mosaic language be integrated into the IP.<br>• Investment Structure: No recommendations or corrective actions needed. The proposed assumed rate of return of 7.5% is reasonable.<br>• Investment Performance Analysis: DERP measures their performance against peers on a gross of fee basis while the assumed return objective, per the IP, is measured net of fees. Ellwood recommends inclusion of a net of fee comparison relative to peers. | 17-18 |



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# I. Investment Policy Analysis

## Introduction

- Task – An evaluation of the appropriateness of Investment Policy (IP) based on industry standards and within the context of the City Charter and Denver Revised Municipal Code requirements.
- Documents Evaluated – This evaluation relied upon materials obtained through the Denver Employees Retirement Plan staff, along with others. These materials included:
  - Denver Employees Retirement Plan Investment Policy Revised December 2016
  - Revised Municipal Code of the City and County of Denver, Chapter 18, Article XII. Retirement,
- Evaluation Components – The following are considered key components of an effective investment policy statement:
  - A detailed description of investment objectives and constraints, target rate of return, and asset allocation,
  - Overall administration and governance structure, including responsibilities of the Board, staff, retained investment management firms, investment consultant, trustee/custody bank, among others,
  - Investment performance benchmarks, frequency and methodology of reviews and time horizon over which performance is measured, and
  - Investment guidelines for each investment manager.
- Evaluation of Investment Policy – Overall, the IP contains most of the components highlighted above that are included in an effective investment policy statement. The IP references the Code and highlights the specific statutory requirements regarding the investments of the assets.
  - The IP does not include language regarding the delineation of duties between the Board, staff, investment consultant and trustee/custodian.
  - Several sections of the IP contain language regarding investment guidelines or procedures that could be difficult to track, objectively measure, or may no longer be relevant. Staff stated that the IP is reviewed annually. It is recommended that a thorough review be completed with the goal of creating consistency and eliminating language and guidelines that may no longer be relevant in the investment of the assets. The analysis below highlights areas evaluated that may need attention.

## Investment Objectives, Constraints and Asset Allocation

- The IP details three investment objectives, including the target rate of return:
  1. To provide a net realized rate of return meeting or exceeding the actuarial assumption of seven point seven five percent (7.75%), annualized over a full market/economic cycle of three to seven years,
  2. Consistent with this minimum investment objective, an efficient portfolio determined by risk/return concepts of Modern Portfolio Theory must be maintained, and
  3. Relative investment objective, over a market/economic cycle of three to seven years, is to exceed the rate of return that would have been achieved by a statically allocated and


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passively managed portfolio, at the same risk, in accordance with the long term asset allocation policy.

4. Objective Observations:
   - A common return target for a governmental defined benefit plan is the actuarial assumed rate of return. The assumed return in the IP is 7.75%, though as of October 2, City Ordinance was amended to change the assumed return to 7.5%. The new return assumption will be reflected in the next revision to the IP. The appropriateness of the assumed return is addressed later in this evaluation. Typically the timeframe for achieving the assumed return goal is tied to the smoothing period utilized in the actuarial valuation. The Plan's actuary uses a five-year smoothing method, hence it is recommended that the measurement period for measuring the rate of return objective should be five years.
   - While an admirable goal, to require that the Plan "must" maintain an efficient portfolio determined by Modern Portfolio Theory is subjective and difficult to measure. A less absolute and more measurable investment objective may be preferable.
   - The third relative return objective is important. There have been, and will be, periods when the assumed return target is untenable given the capital market environment. In these environments, the relative return to the composite market index return provides perspective on available market return levels in contrast to the assumed return target.

- Investment Constraints contained in the IP:
  1. At the total fund level, the IP constraints include the statutory requirements such as the prudent investor requirement as well as allowable securities within each "portion" of the Trust investments. Individual investment manager constraints and overall asset allocation constraints are addressed below.
  2. Constraints Observation:
     - It is agreed by Ellwood, and is viewed as good practice, to outline the statutory constrains in the IP. The specific list of investments allowed per portion of the Trust needs to be monitored as the marketplace is continually evolving and may require changes or additions to allowable investments within the portions.

- Asset Allocation:
  1. Schedule I of the IP contains a table of the Plan's asset allocation targets and ranges. Schedule II displays the approved allocation by managed accounts in tabular form.
  2. Asset Allocation Observations:
     - The asset allocation table and manager allocation table are formatted well and are easy to follow.
     - Given the sub-component breakdown in some asset classes, it is recommended that sub-component allocations be added for all asset classes with sub-components, such as in real estate.
     - Similar to the asset allocation table sub-component recommendation, it is recommended that allocation targets be added in the real estate section.
     - The Private Equity and Energy managers should also be listed, though given the large number of funds, this may require a separate Schedule and would allow for the


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inclusion of the commitment amounts, vintage years and general investment approach for each fund.

## Administration and Governance Structure

- The Introduction of the Investment Policy states "…the Board assumes full and absolute responsibility for establishing, implementing, and monitoring adherence to pension fund policy."
- The IP also provides for "Authority of Investment Manager in the Managed Accounts."
- Administrative and Governance Structure Observations:
    1. The IP does not include language regarding the delegation of Board responsibilities to and the duties of DERP staff, the investment consultant, and the Trustee/Custodian. Best practices would recommend these delegations be formally stated either in the IP or under separate documentation.
        - The Board is currently working with an outside advisor, Mosaic Governance Advisors, LLC, on this particular issue. Initial work was presented at the June 2017 Board meeting with formal documentation presented at the September 2017 Board meeting for approval.
    2. The addition of formal responsibilities documentation would clarify roles. It was observed that during the August 18, 2017 Board meeting, a Board member requested clarification as to the roles of the CIO/investment staff and those of the investment consultant.

## Investment Performance Benchmarks

- The IP does not include the components of the benchmark index used to measure the Trust's third investment objective of relative index return outperformance. It is recommended that a schedule be added to the IP to specify the components within the Total Fund benchmark index.
- The measurement timeframe for the managed accounts, defined as "market/economic cycle," varies by schedule. It is recommended that a common timeframe be utilized for benchmark comparisons.
- The managed account schedules do not clarify whether managed account performance will be measured gross of investment management fees or net of fees. It is recommended that the measurement of performance be done net of investment management fees.
- It was also noted that the passive index accounts had stated benchmarks to "match or exceed" their comparative index. It is recommended that the benchmark be changed to "passive products are expected to produce returns that exhibit minimal tracking error to their target index returns."



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## Investment Guidelines for each Managed Account

- The Investment Policy contains a series of schedules that detail each managed account's objective, investment guidelines and benchmarks.
    1. Each schedule for the managed accounts is written as the managed account is added to the Trust investment line-up. Over time, the structure of the schedules has evolved so that there is not a standard format.
    2. Several of the schedules contain restrictions on investments that require tracking. Staff indicated that the restrictions are monitored. The performance reporting presented to the Board at the August 18, 2017 Board meeting did not include a reporting of compliance with the listed restrictions.
    3. At the August 18, 2017 Board meeting, it was noted by Board members that several managed accounts are behind their benchmark index returns over several time periods. Investment staff noted that most have styles that explain the relative performance and they were still comfortable utilizing those managers. It is recommended that any monitoring criteria used that is outside of benchmark return comparison should be added to Managed Account Schedules as appropriate.


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# II. Investment Procedures Analysis

## Introduction

- Task – Review the investment procedures within the context of the Investment Policy.
- Documents Evaluated – This evaluation relied upon materials obtained through the Denver Employees Retirement Plan staff, along with others. These materials included:
  - Denver Employees Retirement Plan Investment Policy Revised December 2016, and
  - Memo from Mosaic Governance Advisors, LLC to the Board dated September 13, 2017,

## Investment Procedures

- The Board responsibilities and delegation of certain investment duties are currently under review. The recommended Delegation of Additional Investment Authority to Staff was approved in September. If the proposed Retirement Board Charter and Statement of Delegation to the Executive Director are approved, the following would be the investment duties of various parties:
  - Board:
    - Adopt an Investment Policy, to be reviewed annually
    - Adopt an asset allocation and periodically review it for continued appropriateness
    - Conduct an Asset/Liability Study, every five years
    - Ensure that appropriate strategies, such as active and passive management and internal and external investment management, are in place to achieve investment goals and objectives, to be reviewed periodically
    - Monitor the performance of the total portfolio, asset classes and individual investment managers relative to policy benchmarks and peers, on a quarterly basis
    - Select Investment Consultant, as needed
    - Stay informed of current trends in investment management strategies, periodically
  - Executive Director/Investment Staff:
    - Approve the selection, reinvestment, and termination, when necessary, of external investment managers consistent with formal Board policy
    - Approve periodic rebalancing of the asset allocation across asset classes/strategies
    - Direct the voting by proxy, and otherwise act in accordance with Board policy, on all matters where the Plan holds title to investments, including, but not limited to corporate governance matters.
- The recently adopted Delegation of Additional Investment Authority to Staff transfers responsibility for investment manager new hires, terminations and private investment commitments to staff.
  - Staff presents the need for new hires and terminations to the Board. Staff, in conjunction with the investment consultant, then implements new hiring and terminations and reports back to the Board.
  - The pacing schedule for private investments is presented to the Board as part of the annual asset class review.


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  - Commitments to existing managers in amounts consistent with the pacing schedule would be fully delegated to Staff/Consultant.
  - Ellwood agrees that this approach would conform to prevailing practices among multi-billion dollar public pension funds.

- A portion of the fixed income assets are managed internally. Schedule IX-B provides the guidelines, procedures, and performance benchmarks for the Staff Managed Fixed Income account.
  - The portfolio is limited to obligations issued or guaranteed as to principal and interest by the United States government and any agency or instrumentality thereof.
  - The procedure in the schedule provides for separation of duties between the CIO/investment staff for management and the Executive Director for approval of transactions.
  - A separate document, "Internally Managed Fixed Income Account Procedures", provides further specific guidance including a list of the approved brokerage firms and specific trading system procedures.
  - The guidelines and procedures related to the Staff Managed Fixed Income portfolio are reasonable.
- Observations:
  - The addition of the new documentation for duties and delegations will improve the overall procedures for the investment of the assets. The new documents address procedures that are not currently addressed in the Investment Policy.


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# III. Investment Structure and Assumed Rate of Return Analysis

## Introduction

- Task – Analysis of the current investment structure in relation to the assumed rate of return.
- Documents Evaluated – This evaluation relied upon materials obtained from DERP staff, along with others. These materials included:
  - Denver Employees Retirement Plan Investment Policy Revised December 2016
  - Asset Allocation Review performed by Summit Strategies Group on March 24, 2017

## Assumed Rate of Return

- The assumed rate of return was revised to 7.5% with the change to City Ordinance on October 2. The Ordinance Change was required as both the assumed return and Actuarially Required Contribution (ARC) are part of Ordinance.
- Each year DERP staff and the investment consultant perform an asset allocation study. The study determines the asset mix that would optimally achieve the assumed rate of return, i.e., the mix that is expected to create the least volatility at the assumed return level. In this exercise, DERP staff focuses on risk and determines whether the expected risk level required to achieve the assumed return is reasonable. The last study led to the recommendation to lower the assumed return from 7.75% to 7.5%. The output from the DERP investment consultant's study is in the table on the following page.



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**Denver Employees Retirement Plan**
Asset Allocation Review

## ASSET ALLOCATIONS

| | | Target Allocation | Portfolio 1 | Portfolio 2 | Portfolio 3 | Portfolio 4 |
|---|---|---|---|---|---|---|
| US Equity | Large Cap Core | 12.0% | 12.0% | 7.0% | 12.0% | 12.0% |
| | Large Cap Value | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% |
| | Large Cap Growth | 3.5% | 3.5% | 3.5% | 3.5% | 3.5% |
| | Small Cap Value | 2.5% | 2.5% | 2.5% | 2.5% | 2.5% |
| | Small Cap Growth | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% |
| | Defensive Equity | 0.0% | 0.0% | 5.0% | 0.0% | 0.0% |
| Non-US Equity | Developed Large Cap Core | 2.0% | 3.0% | 2.0% | 2.0% | 2.0% |
| | Developed Large Cap Value | 4.0% | 4.0% | 4.0% | 4.0% | 4.0% |
| | Developed Large Cap Growth | 4.0% | 4.0% | 4.0% | 4.0% | 4.0% |
| | Developed Small Cap | 5.5% | 2.5% | 5.5% | 5.5% | 5.5% |
| | Emerging Markets | 8.0% | 10.0% | 8.0% | 8.0% | 8.0% |
| Fixed Income | Governments | 5.0% | 5.0% | 5.0% | 5.0% | 7.5% |
| | Core Fixed Income | 5.0% | 5.0% | 5.0% | 5.0% | 0.0% |
| | Core Plus Fixed Income | 1.5% | 1.5% | 1.5% | 1.5% | 1.5% |
| | Emerging Market Debt | 2.5% | 2.5% | 2.5% | 2.5% | 2.5% |
| | Senior Loans | 4.0% | 4.0% | 4.0% | 4.8% | 5.5% |
| Real Estate | Core Real Estate | 4.8% | 4.8% | 4.8% | 4.8% | 4.8% |
| | Non-Core Real Estate | 3.2% | 3.2% | 3.2% | 3.2% | 3.2% |
| Hedge Funds | Hedge Funds | 5.0% | 5.0% | 5.0% | 5.0% | 5.0% |
| MLP | MLP | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% |
| Alternatives | Private Equity | 7.0% | 7.0% | 7.0% | 7.0% | 7.0% |
| | Distressed Debt | 2.5% | 2.5% | 2.5% | 3.1% | 3.5% |
| | Private Energy | 5.5% | 5.5% | 5.5% | 4.1% | 5.5% |
| | Timber | 1.0% | 1.0% | 1.0% | 1.0% | 1.0% |
| | **10-yr Beta Expected Return** | **7.1%** | **7.1%** | **7.1%** | **7.1%** | **7.2%** |
| | **10-yr Alpha Expected Return** | **0.5%** | **0.5%** | **0.5%** | **0.5%** | **0.6%** |
| | **10-yr Total Expected Return** | **7.6%** | **7.7%** | **7.6%** | **7.6%** | **7.8%** |
| | **Standard Deviation** | **13.0%** | **13.0%** | **12.6%** | **12.8%** | **13.1%** |

- **Portfolio 1 features:**
  - 3.0% reduction of Non-US Developed Small Cap,
  - 2.0% increase in Emerging Markets, and
  - 1.0% increase in Non-US Developed Large Cap Core.
- **Portfolio 2 features:**
  - 5.0% reduction of US Large Cap and
  - 5.0% allocation to Defensive Equity is added.
- **Portfolio 3 features:**
  - 1.4% reduction of Private Energy and
  - 1.4% increase in Private Debt (60% to Senior Loans and 40% to Distressed Debt).
- **Portfolio 4 features:**
  - 5.0% allocation to Core Fixed Income is removed,
  - 2.5% increase in Governments, and
  - 2.5% increase in Private Debt (60% to Senior Loans and 40% to Distressed Debt).

23 Note: Numbers may not sum due to rounding.

*Summit Strategies Group*

- The target allocation is expected to achieve a 7.6% average return over a 10-year period with a risk, or standard deviation, level of 13%. It is worth noting, the 7.5% assumed return is achieved with an assumption of positive alpha coming from the actively managed accounts. Traditional asset allocation modeling, mean-variance efficient frontier modeling, assumes asset class beta returns and risks and does not include assumptions for an alpha component.



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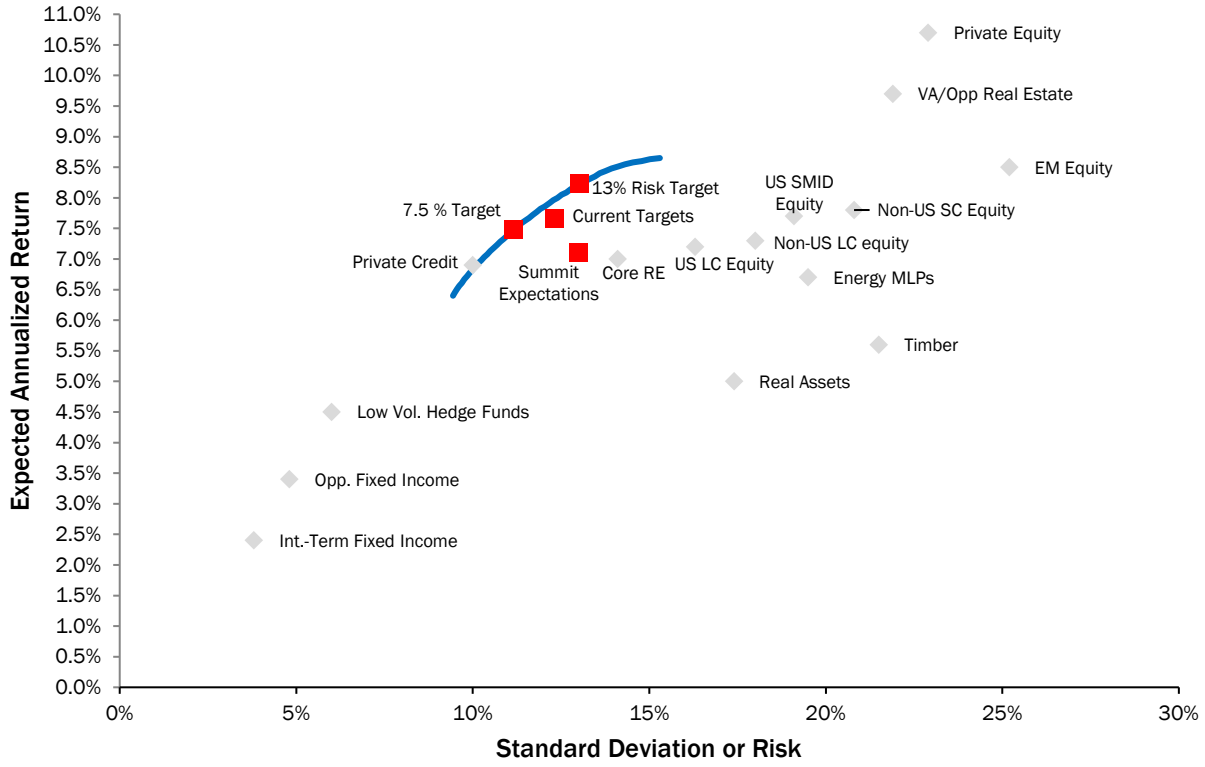
- Ellwood performed an efficient frontier analysis on the DERP current allocation target using our 10-Year asset class assumption inputs. The modeling utilized the allowable ranges in the IP for each asset class which reduced the range of optimized outcomes. The results are shown below:




- The current target allocation is expected to achieve a 7.7% return with an expected 12.3% standard deviation. This demonstrates an expectation to achieve the 7.5% return without a need for positive alpha generation from investment managers.
- We are in agreement that the rate of return of 7.5% is reasonable.



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# IV. Investment Performance Analysis

## Introduction

- Task – Analysis of the portfolio performance results compared to appropriate benchmarks including indices and peer universes.
- Documents Evaluated – This evaluation relied upon materials obtained from DERP staff, along with others. These materials included:
  - Summit Strategies Group Investment Review dated June 30, 2017
  - Staff Investment Report dated August 18, 2017
- The evaluation period focuses on the period 01/01/2012 to 06/30/2017. Periods back ten years are also part of the analysis. Ellwood utilized quarterly gross of fee returns, net of fee returns, and benchmark policy index results provided by staff. The investment consultant's second quarter 2017 investment review was also used for this analysis.
- Overall, the DERP Total Fund investment portfolio, $2.2 billion as of August 31, 2017, has performed well relative to the assumed return objective and relative to the benchmark policy index as well as compared to peer public pension funds greater than $1 billion. Results are shown in the tables below. DERP measures their performance against peers on a gross of fee basis while the assumed return objective, per the IP, is measured net of fees. Below is an independent look at DERP's returns relative to the InvestorForce Public Defined Benefit (greater than $1B) Universe, gross of fees and a second table based on net of fees.

| | 1 Yr (%) | Rank | 3 Yrs (%) | Rank | 5 Yrs (%) | Rank | 7 Yrs (%) | Rank | 10 Yrs (%) | Rank |
|---|---|---|---|---|---|---|---|---|---|---|
| **Denver Employees Retirement Plan - Gross** | **14.5** | **14** | **4.5** | **85** | **9.4** | **38** | **9.8** | **38** | **5.3** | **48** |
| *Total Fund Policy Index* | *13.1* | *45* | *4.3* | *88* | *8.7* | *64* | *9.4* | *58* | *4.9* | *70* |
| *InvestorForce Public DB > $1B Gross Median* | *12.9* | | *5.4* | | *9.1* | | *9.5* | | *5.2* | |

| | 1 Yr (%) | Rank | 3 Yrs (%) | Rank | 5 Yrs (%) | Rank | 7 Yrs (%) | Rank | 10 Yrs (%) | Rank |
|---|---|---|---|---|---|---|---|---|---|---|
| **Denver Employees Retirement Plan - Net** | **13.9** | **17** | **3.9** | **85** | **8.8** | **41** | **9.2** | **41** | **4.8** | **50** |
| *Total Fund Policy Index* | *13.1* | *36* | *4.3* | *74* | *8.7* | *49* | *9.4* | *39* | *4.9* | *46* |
| *InvestorForce Public DB > $1B Net Median* | *12.7* | | *4.9* | | *8.6* | | *9.1* | | *4.8* | |



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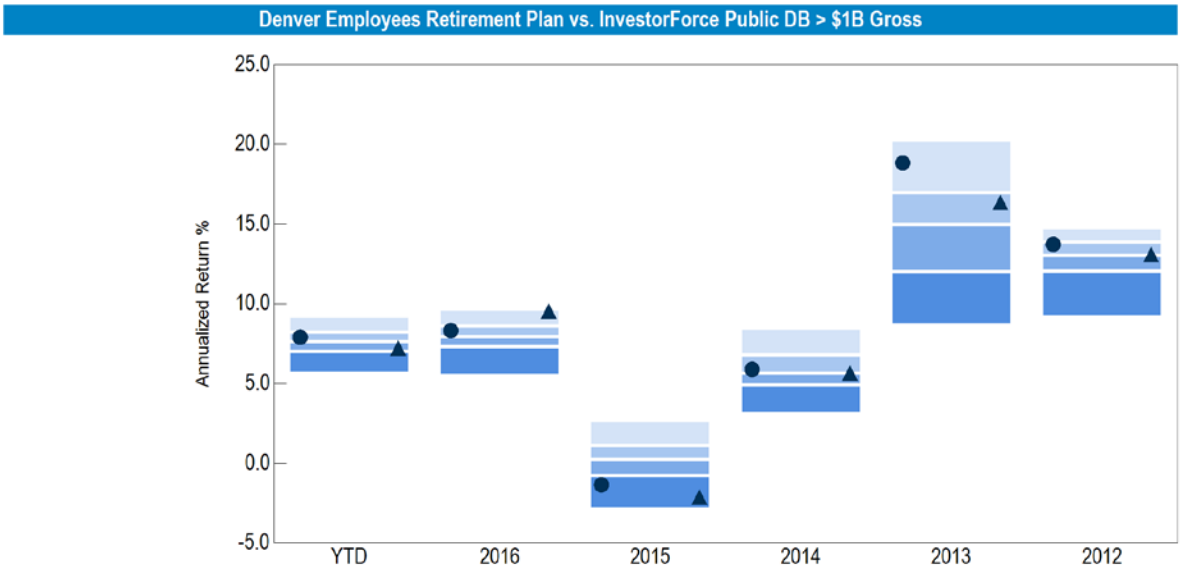
- As can be seen in the calendar year returns exhibit below, 2015 was a challenging year for the DERP investments, returning -1.3% gross of fees. While outperforming the policy index return result of -2.1%, the Fund trailed the median peer return of 0.3% and ranked in the 88th percentile of peer results for the year.




| | Return (Rank) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5th Percentile | 9.2 | | 9.7 | | 2.7 | | 8.5 | | 20.2 | | 14.7 | |
| 25th Percentile | 8.2 | | 8.6 | | 1.1 | | 6.8 | | 17.0 | | 13.9 | |
| Median | 7.6 | | 8.0 | | 0.3 | | 5.7 | | 15.0 | | 13.0 | |
| 75th Percentile | 7.0 | | 7.4 | | -0.7 | | 4.9 | | 12.0 | | 12.1 | |
| 95th Percentile | 5.7 | | 5.5 | | -2.8 | | 3.1 | | 8.7 | | 9.2 | |
| # of Portfolios | 110 | | 92 | | 98 | | 79 | | 67 | | 74 | |
| ● Denver Employees Retirement Plan | 7.9 | (39) | 8.3 | (35) | -1.3 | (88) | 5.9 | (46) | 18.8 | (14) | 13.7 | (36) |
| ▲ Total Fund Policy Index | 7.2 | (70) | 9.6 | (7) | -2.1 | (91) | 5.7 | (52) | 16.4 | (34) | 13.1 | (45) |



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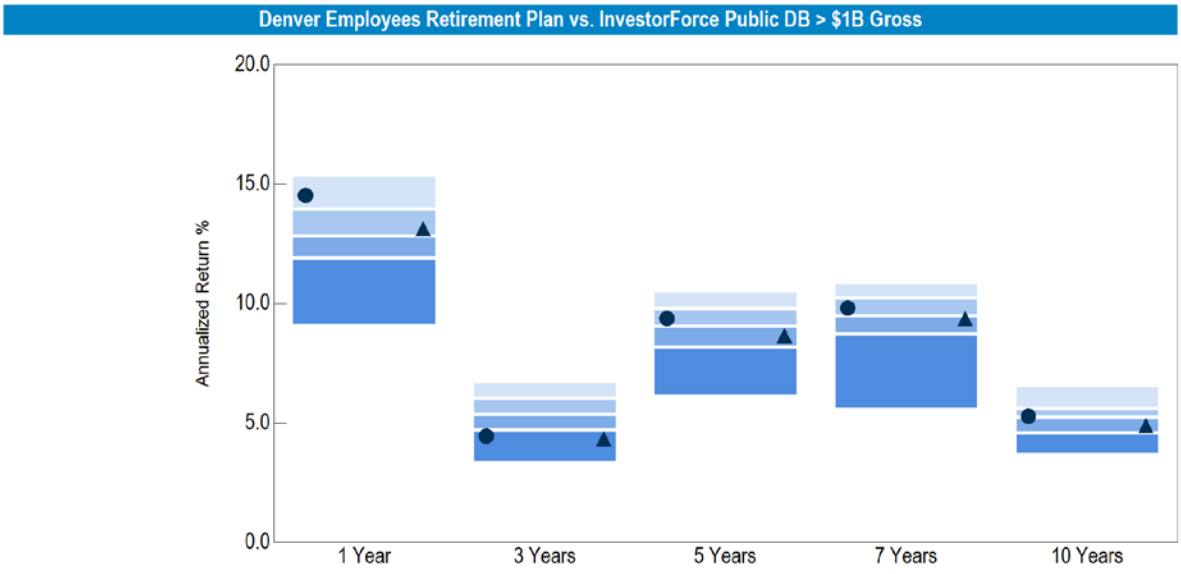
- The 2015 results detracted from the trailing three year returns ending June 30, 2017. Longer-term results have been above the median peer results, ahead of the policy index, and over the trailing 5- and 7-years has exceeded the assumed rate of return objective, see below:




| | Return (Rank) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 5th Percentile | 15.35 | | 6.71 | | 10.53 | | 10.87 | | 6.55 | |
| 25th Percentile | 13.96 | | 6.04 | | 9.80 | | 10.24 | | 5.63 | |
| Median | 12.85 | | 5.37 | | 9.06 | | 9.51 | | 5.25 | |
| 75th Percentile | 11.93 | | 4.73 | | 8.18 | | 8.75 | | 4.60 | |
| 95th Percentile | 9.09 | | 3.36 | | 6.14 | | 5.59 | | 3.71 | |
| # of Portfolios | 108 | | 91 | | 87 | | 78 | | 75 | |
| ● Denver Employees Retirement Plan | 14.52 | (14) | 4.45 | (85) | 9.37 | (38) | 9.81 | (38) | 5.28 | (48) |
| ▲ Total Fund Policy Index | 13.13 | (45) | 4.35 | (88) | 8.66 | (64) | 9.37 | (58) | 4.89 | (70) |



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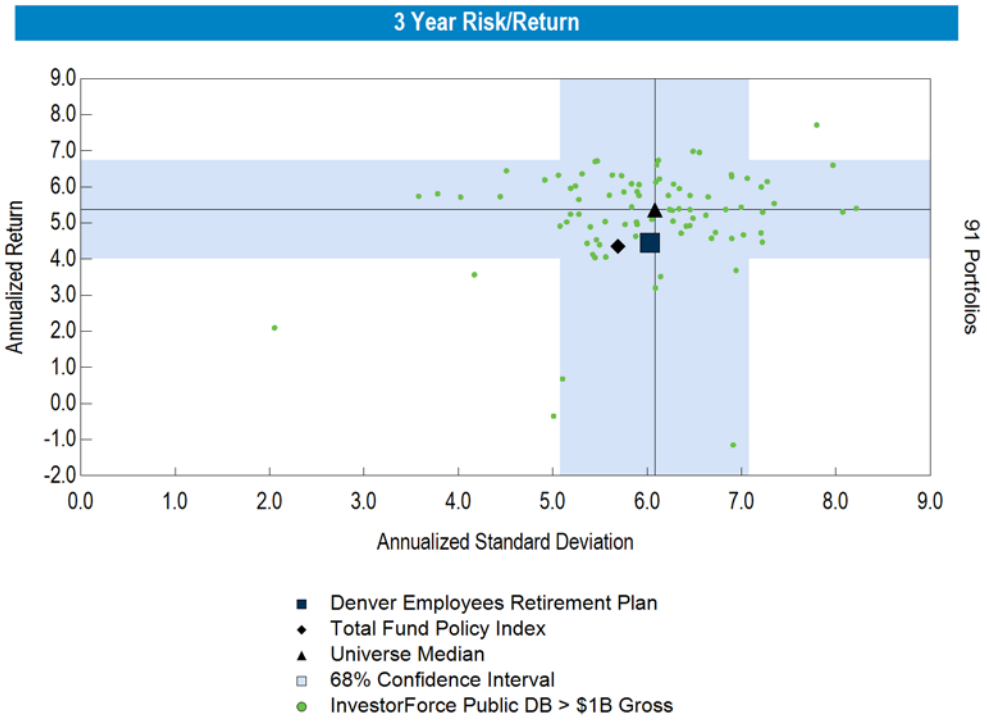
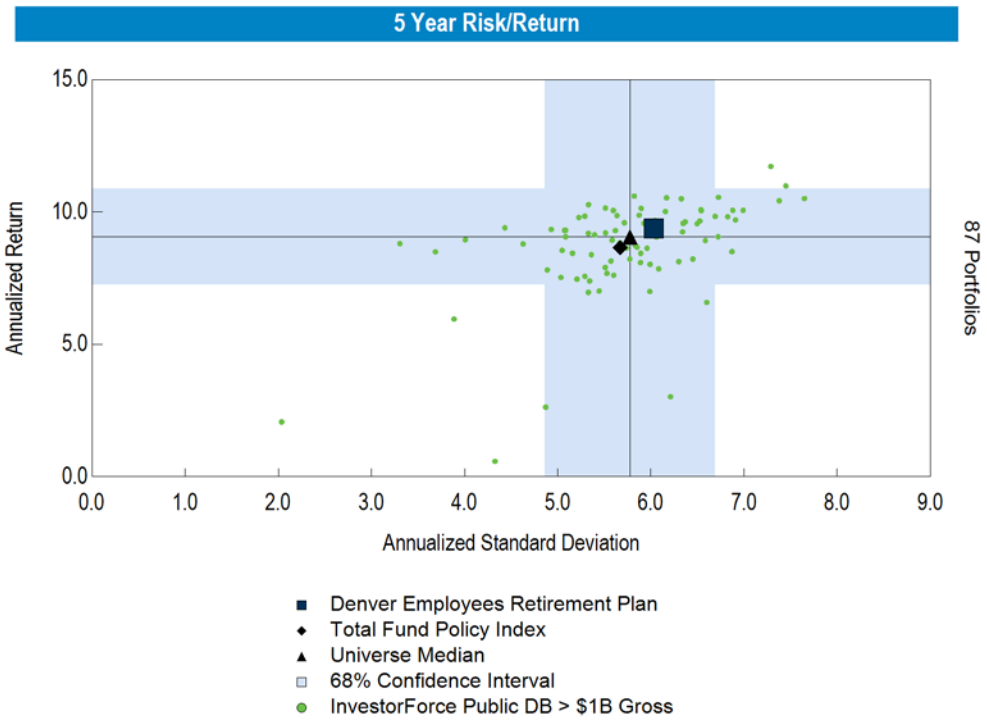
- From a risk/return standpoint, given the second investment objective of maintaining an efficient portfolio as determined by risk/return concepts of Modern Portfolio Theory, it appears the Plan's risk/return over the past 3 and 5 years is consistent with the median fund in the InvestorForce Public DB (greater than $1B) Universe. No recommendations or corrective actions needed.



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- Total Fund Policy Index composition appears accurate based on target allocations and underlying manager benchmarks. As mentioned in the IP section, benchmarking is vague. It is unclear how the Total Alternatives ex MLPs and Absolute asset classes are benchmarked. Underlying manager benchmarks and appropriateness is highlighted below:

| Manager | Benchmark | Appropriate? |
|---|---|---|
| Russell 1000 MCM | Russell 1000 Index | Yes |
| Eagle Capital Management | Russell 1000 Value Index | Yes, S&P 500 Index also appropriate |
| Brown Advisory | Russell 1000 Growth Index | Yes |
| Neuberger Berman | Russell 2000 Value Index | Yes, Russell 2000 Index also appropriate |
| Franklin | Russell 2000 Growth Index | Yes |
| EAFE MCM | MSCI EAFE Index | Yes |
| Franklin Templeton Investments | MSCI EAFE Index | Yes |
| Fidelity Inst'l Asset Management | MSCI EAFE Index | Yes |
| Dimensional Fund Advisors | MSCI World ex US Small Cap Index | Yes |
| LSV Asset Management | MSCI Emerging Markets Index | Yes |
| Barclays Aggregate MCM | Blmg. Barclays U.S. Agg Bond Index | Yes |
| Smith, Graham & Company | Blmg. Barclays U.S. G/C Index | Yes, manager was terminated post 6/30/17 |
| Internal Fixed Income | Blmg. Barclays U.S. Gov't Bond Index | Yes |
| Pictet Asset Management | JPM GBI-EM Global Diversified Index | Yes, clarify that Index is "unhedged" |
| Golub Pearls | CS Leveraged Loan Index | Yes, Golub is included in the High Yield Composite which uses Blmbg. Barc. U.S. High Yield BA/B 2% Issuer Cap |
| JP Morgan Strategic Prop Fund | NCREIF Fund Index - ODCE | Yes |
| PREI PRISA | NCREIF Fund Index - ODCE | Yes |
| PREA PRISA II | NCREIF Fund Index - ODCE | Yes |
| UBS Reality Investors | NCREIF Fund Index - ODCE | Yes |
| Prisma Spectrum Fund | HFRI FOF: Conservative Index | Yes, HFRI FOF Comp. Index also appropriate |
| Tortoise Capital Advisors | Alerian MLP Index | Yes |


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# V. Recommendations

## Investment Policy Recommendation Overview

| Recommendations | |
|---|---|
| Investment Policy Evaluation: | ▪ Ellwood recommends staff complete a full review of the IP for the Retirement Plan Board, with a focus on elimination of outdated language, on verification of procedures that are being used to verify stated guidelines and on uniformity in the formats of the investment manager guidelines in the schedules.<br>▪ The IP does not include the components of the benchmark index used to measure the Trust's third investment object of relative index return outperformance. It is recommended that a schedule be added to the IP to specify the components within the Total Fund benchmark index.<br>▪ The measurement timeframe for the managed accounts, defined as "market/economic cycle," varies by schedule. It is recommended that a common timeframe be utilized for benchmark comparisons.<br>▪ The managed account schedules do not make clear whether managed account performance will be measured gross of investment management fees or net of fees. It is recommended that the measurement of performance be done net of investment management fees.<br>▪ It was also noted that the passive index accounts had stated benchmarks to "match or exceed" their comparative index. It is recommended that the benchmark be changed to "passive products are expected to produce returns that exhibit minimal tracking error to their target index returns."<br>▪ At the August 18, 2017 Board meeting, it was noted by Board members that several managed accounts are behind their benchmark index returns over most periods. Investment staff noted that most have styles that explain the relative performance and they were still comfortable utilizing those managers. It is recommended that any monitoring criteria used that is outside of benchmark return comparisons should be added to Managed Account schedules as appropriate. |



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## Investment Procedures Recommendation Overview

| | Recommendations |
|---|---|
| Investment Procedures | ▪ The addition of the new documentation for duties and delegations currently being developed in conjunction with Mosaic Governance Advisors, LLC will improve the overall procedures for the investment of the assets. The new documents address procedures that are not currently addressed in the Investment Policy.<br><br>▪ The Mosaic recommendation of delegation of additional investment authority to staff that was approved in September transferred responsibility for investment manager new hires, terminations and private investment commitments to staff. Ellwood agrees that this approach conforms to prevailing practices among multi-billion dollar public pension funds. |
| Investment Structure | ▪ Based on Ellwood's ten-year assumptions, the current target allocation is expected to achieve a 7.66% return with an expected 12.3% standard deviation, hence an expectation to achieve the 7.5% return without a need for positive alpha generation from investment managers. Ellwood is in agreement that the proposed rate of return of 7.5% is reasonable and no corrective actions or recommendations needed. |
| Investment Performance | ▪ Overall, the DERP Total Fund investment portfolio has performed well relative to the assumed return objective and relative to the benchmark policy index as well as compared to peer public pension funds greater than $1 billion. DERP measures their performance against peers on a gross of fee basis while the assumed return objective, per the IP, is measured net of fees. Ellwood recommends inclusion of a net of fee comparison relative to peers.<br><br>▪ From a risk/return standpoint, given the second investment objective of maintaining an efficient portfolio as determined by risk/return concepts of Modern Portfolio Theory, it appears the Plan's risk and return over the past 3 and 5 years are consistent with the InvestorForce Public DB (greater than $1B) Universe median. No corrective actions or recommendations needed.<br><br>▪ Total Fund Policy Index composition appears accurate based on target allocations and underlying manager benchmarks. As mentioned in the IP section, benchmarking is vague. It is unclear how the Total Alternatives ex MLPs and Absolute are benchmarked. As mentioned in the IP section, Ellwood recommends that a schedule be added to the IP to specify the components within the Total Fund benchmark index. Benchmarks for individual managers appear appropriate and no corrective actions or recommendations needed. |



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## Endnotes

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- Universe Note: Beginning with first quarter 2008 reporting, Ellwood is using Morningstar universes.
- Manager and universe returns are shown net of investment management expenses. Index returns are shown gross of investment management expenses.
- Data Disclosure: Mutual fund holdings and performance provided by Morningstar (Copyright ©2016 Morningstar, via Morningstar Direct. All rights reserved)
- Separate Account Performance Attribution Note: Contribution to return measures the impact that each security has on the portfolio’s total return and is calculated using holdings information in FactSet. The security weights are multiplied by its total return on a daily basis and linked geometrically for any given period. Accordingly, the contribution to return shown could differ from actual returns when daily portfolio holdings are not available and/or there is a significant difference between the trade price and the closing price of any given security. Furthermore, the contribution to return does not directly take into account manager fees.

*Updated 4/3/17*



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# AGENCY RESPONSE

THE PLAN

DENVER EMPLOYEES RETIREMENT PLAN

Steven E. Hutt
*Executive Director*

October 27, 2017

Auditor Timothy O'Brien, CPA
Office of the Auditor
City and County of Denver
201 West Colfax Avenue, Dept. 705
Denver, Colorado 80202

Dear Mr. O'Brien,

The Office of the Auditor has conducted a performance audit of Denver Employees Retirement Plan (DERP) Investment Program Evaluation.

This memorandum provides a written response for each reportable condition noted in the Auditor's Report final draft that was sent to us on October 13, 2017. This response complies with Section 20-276 (c) of the Denver Revised Municipal Code (D.R.M.C.).

**AUDIT FINDING 1**
Investment Policy Analysis (detailed recommendations are on page 17 of the report)

**RECOMMENDATION 1**
Ellwood recommends staff complete a full review of the IP for the Retirement Plan Board, with a focus on elimination of outdated language, on confirmation of procedures being used to verify stated guidelines and on uniformity in the formats of the investment manager guidelines in the schedules, on integration of the Mosaic recommendations if approved, and on standardization of benchmark measurement criteria.

| Agree or Disagree with Recommendation | Target date to complete implementation activities (Generally expected within 60 to 90 days) | Name and phone number of specific point of contact for implementation |
|---|---|---|
| Agree | November 17, 2017; February 16, 2018 | Randall Baum 303-839-5419 |

**Narrative for Recommendation 1**
We agree some language exists in the IP that is in need of revision, generally due to imprecise meanings or unclear measurement standards. DERP Staff will complete a review of the IP by the November 17, 2017 Board meeting, to identify all sections needing revision. Revised language will be presented to the Board by its February 16, 2018 meeting.

Formal reporting to the DERP Board on policy compliance commenced with the October 20, 2017 meeting.

Page 1 of 3

Additionally, because the IP is a working document and continually evolving over time, there are differences in formats among sections. While immaterial to the functioning of the IP, a more standard appearance would be beneficial, and will be accomplished.

The Mosaic recommendations were approved by the Retirement Board on October 20, 2017, and relevant changes to the IP will be reflected in the updated version to be presented to the Board on November 17, 2017.

**AUDIT FINDING 2**
Investment Procedures (detailed recommendations are on page 18 of the report)

**RECOMMENDATION 2**
The addition of the new documentation recommended by Mosaic for duties and delegations will improve the overall procedures for the investment of the assets. The new documents address procedures that are not currently addressed in the Investment Policy. If approved by the Board, it is recommended that the Mosaic language be integrated into the IP.

| Agree or Disagree with Recommendation | Target date to complete implementation activities (Generally expected within 60 to 90 days) | Name and phone number of specific point of contact for implementation |
|---|---|---|
| Agree | November 17, 2017 | Randall Baum<br>303-839-5419 |

**Narrative for Recommendation 2**
The Retirement Board approved changes to the delegation of authority to Staff on October 20, 2017. New language reflecting the changes to Investment Department responsibilities will be included in the revised version of the IP to be presented to the Board on November 17, 2017.

**AUDIT FINDING 3**
Investment Performance Analysis (detailed recommendations are on page 18 of the report)

**RECOMMENDATION 3**
DERP measures their performance against peers on a gross of fee basis while the assumed return objective, per the IP, is measured net of fees. Ellwood recommends inclusion of a net of fee comparison relative to peers.

| Agree or Disagree with Recommendation | Target date to complete implementation activities (Generally expected within 60 to 90 days) | Name and phone number of specific point of contact for implementation |
|---|---|---|
| Disagree | N/A | Randall Baum<br>303-839-5419 |

**Narrative for Recommendation 3**

While we agree that net-of-fees measurement and comparison is generally to be preferred, there are problems in data availability and integrity that cause us to believe our current methodology is better.

1. To the best of our knowledge, InvestorForce is the only provider (vendor) of net-of-fees data.
2. DERP utilizes the BNY Mellon Public Fund Universe.
    a. There are a similar number of pension plans included in each database (approximately 100).
    b. InvestorForce data is sourced only from its own clients, and therefore has potential selection bias.
    c. BNY Mellon uses both client and custodial data, and is therefore randomized.
3. Treatment of fees for reporting purposes is not standardized or consistent for some asset classes such as hedge funds, private equity, real estate, and others. Comparability between funds is therefore compromised.
4. There is no material difference in DERP's relative ranking when using gross or net, as per the Audit Report Section IV Investment Performance Analysis, page 12.
5. While peer comparison is done gross of fees, DERP *does* currently evaluate and report on a net of fees basis:
    a. our overall fund performance relative to our Fund Policy Index;
    b. each asset class composite relative to the appropriate benchmark, if available, and;
    c. each individual manager relative to its benchmark.

For these reasons, we are opposed to incurring additional expense for a very limited benefit.

Please contact Randall Baum at 303-839-5419 with any questions.

Sincerely,

Steven E. Hutt
Executive Director

cc: Valerie Walling, CPA, CMC®, Deputy Auditor
Heidi O'Neil, CPA, Director of Financial Audits
Dawn Wiseman, CRMA, Audit Manager
Randall Baum, CFA
Retirement Board and Advisory Committee Members