MWRA EMPLOYEES' RETIREMENT BOARD MEETING

AGENDA

Thursday, February 29, 2024 10:00 a.m.
MWRA, 2 Griffin Way
Chelsea, MA 02150

Item 1 10:00 a.m. Meeting called to order

OLD BUSINESS

Item 2 Standing Committee Reports

i. By-Laws Committee: Member Kevin McKenna, Member Brian Peña
ii. Human Resources Committee: Member Frank Zecha, Member Matthew Horan
iii. Special Committee, Stipend: Member James M. Fleming, Member Kevin McKenna
iv. Job Review Committee: Member James M. Fleming, Member Frank Zecha

Item 3 Term of New Consulting Services Contract – VOTE

NEW BUSINESS

Item 4 Approval of Minutes – VOTE

a) January 25, 2024
b) January 25, 2024 Executive Session
c) February 7, 2024

Item 5 Approval of Warrants – VOTE

a) Warrant 2-2024
b) Warrant 2A-2024 – Payroll

Item 6 Approval of Monthly Transfers 2-2024 – VOTE

Item 7 Acknowledgement of retirement applications under G.L. c 32 §5 – VOTE

a) Kieran McGrath DOR 1/12/2024
b) Patricia Veiga-Phillips DOR 1/28/2024
c) Stephen Buczko DOR 1/20/2024
d) Vicki Mucci DOR 1/24/2024
e) William Kurtz DOR 2/3/2024
f) Richard Williams DOR 2/3/2024
g) Marianne Ouellette DOR 2/10/2024
h) Susan Viera DOR 2/10/2024

Item 8 Approval of January 2024 Bank Reconciliation – VOTE

Item 9 Approval of Renee Angelo's buyback of 9 months of MWRA contract employment – VOTE

Item 10 Acceptance of Section 7 Retirement Application re. Joseph Comeau – VOTE

Item 11 NEPC

a) Flash Report as of 1/31/2024
b) Asset Allocation Review & Outlook
c) Rebalancing Recommendation – VOTE
d) International Equity Structure Review

...FOR YOUR INFORMATION and REVIEW ....

Item 99-1 PERAC MEMO #7/2024
Item 99-2 PERAC MEMO #8/2024
Item 99-3 PERAC MEMO #9/2024
Item 99-4 PERAC Pension News Flash February 15, 2024

The Board reserves the right to consider items on the agenda out of order. The listing of items is those reasonably anticipated by the Chair to be discussed received at least forty-eight (48) hours prior to the meeting. Not all items listed may in fact be discussed and other items not listed may also be brought up for discussion to the extent permitted by law. Items identified for discussion in Executive Session may be conducted in open session, in addition to, or in lieu of discussion in Executive Session.

Date of next scheduled Retirement Board meeting is Thursday, March 28, 2024, 10:00 a.m., Chelsea

MWRA EMPLOYEES' RETIREMENT BOARD MEETING
JANUARY 25, 2024

A regular meeting of the MWRA Employees' Retirement Board was conducted in-person on Thursday, January 25, 2024. Remote access was provided to the public via Zoom, with call-in information provided on the official Meeting Notice posted to www.mwraretirement.com and the MA Secretary of State's website. Present at the in-person meeting were Board members Matthew Horan, Kevin McKenna, Frank Zecha, and James Fleming, staff members Carolyn Russo, Julie McManus and Danielle DiRuzza, and Sebastian Grzejka representing NEPC. Mr. Brian Peña joined via remote participation. Members of the public also attended via remote access. Mr. Fleming called the meeting to order at 10:00 a.m.

1) Call the meeting to order-roll call of members: Mr. Horan, Mr. McKenna, Mr. Peña, Mr. Zecha, and Mr. Fleming present.

   Mr. Fleming cautioned that Massachusetts is a two-party consent state for recordings, and stated that it is not permissible to record without the consent of the Chair.

2) Standing Committee Reports

   i. By-Laws Committee: No report
   ii. Human Resources Committee: No report
   iii. Special Committee, Stipend: No report
   iv. Job Review Committee: No report

3) Approval of Minutes – VOTE

   a) December 14, 2023
   b) January 11, 2024

      On a motion made by Mr. Zecha and seconded by Mr. Horan:
      VOTED
      to approve the Minutes of the December 14, 2023 meeting. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

      On a motion made by Mr. McKenna and seconded by Mr. Zecha:
      VOTED
      to approve the Minutes of the January 11, 2024 Special Meeting. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

4) Approval of Warrants – VOTE

a) Warrant 01-2024
b) Warrant 01-2024A – Payroll

On a motion made by Mr. Horan and seconded by Mr. Zecha:
VOTED
to approve Warrant 01-2024. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

On a motion made by Mr. Zecha and seconded by Mr. Horan:
VOTED
to approve Warrant 01-2024A. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

5) Approval of Monthly Transfers 01-2024 – VOTE

On a motion made by Mr. Zecha and seconded by Mr. McKenna:
VOTED
to approve the monthly transfers for January. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

6) Acknowledgement of retirement applications under G.L. c 32 §5 – VOTE

a) Emily Dallman DOR 12/9/2023
b) Brian George DOR 12/9/2023
c) Jean Whyte DOR 12/16/2023

On an omnibus motion by Mr. McKenna and seconded by Mr. Horan:
VOTED
to acknowledge the section 5 retirements as listed. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

7) Approval of October 2023 Bank Reconciliation – VOTE

a) November 2023
b) December 2023

On an omnibus motion made by Mr. McKenna and seconded by Mr. Zecha:
VOTED

to approve the Bank of America reconciliations for November and December 2023. 5-0, with Mr. Fleming voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Horan voting yes.

8) Approval of Curtis Fahey's buyback of 6 months of Salem State University employment – VOTE

9) Approval of Gina's Mician buyback of 5 months of the Town of Tewksbury employment – VOTE

10) Approval of Brian DeMeo, Jr's buyback of 5 months of the Town of Norwood employment – VOTE

11) Approval of Brian DeMeo, Jr's buyback of 3 months of the Department of Fish and Game employment – VOTE

On an omnibus motion made by Mr. Zecha and seconded by Mr. McKenna:
VOTED
to approve the four buyback requests labeled as items numbered eight through eleven. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes. Mr. McKenna asked how the interest rate is determined if the employees are purchasing service from when the rate was higher. The Executive Director responded that PERAC's Actuary has taken the position that we should use the rate as of the most recent actuarial valuation, although in some cases it would be half the actuarial rate that would apply.

12) Acceptance of Section 7 Retirement Application re. Gary Nee – VOTE

On a motion made by Mr. McKenna and seconded by Mr. Zecha:
VOTED
to accept the application of Gary Nee for accidental disability retirement, and to petition PERAC for the appointment of a medical panel. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

Because the Board was ahead of schedule, the Chair moved ahead to item 15.

13) NEPC

a) Flash Report as of 12/31/23
b) Large Cap Value Search Summary Results
   (i) 2022 Calendar Year Ranks
   (ii) 2023 12 Trailing Ranks
c) Rebalancing Recommendation – VOTE

Mr. Grzejka presented the Flash report. He reported that 2023 had a strong finish after a choppy year. The large cap portfolio came in at 21.5% for the year. All of the non-US managers have participated in the bounce-back, with non-us coming in at 11% for the year. A shift in rates has benefitted the fixed income managers. The portfolio was up overall 7% for the year, with Garcia Hamilton up 7.8% for the quarter, to end the year at 4.8%. Hedge Funds, Real Estate and non-PRIT private equity have not yet reported December numbers. The System is once again “knocking on the door” of $700m. Mr. Horan stated that after looking at Rhumbline’s fees and performance, he is wondering whether it is worth it to have active management in the large cap space as part of the asset allocation, and the question becomes how to reallocate the funds if the active managers are eliminated. Mr. Zecha asked about NEPC’s outlook for Garcia Hamilton. Rates have posed headwinds for Garcia. On a forward-looking basis core bonds and US Equity are likely to be at parity, and there is no longer a significant advantage to overweighting equities. Mr. McKenna asked about Baillie Gifford’s underperformance, particularly over the three-year period. Mr. Grzejka stated that Baillie Gifford is a growth-oriented manager. They pick names that are likely to grow, and are expected to have good results over the long term. They are clawing back some losses from the 2022 growth pullback, but remain behind the benchmark since-inception. Mr. McKenna stated that it appears that Baillie Gifford held onto names through the downturn, and Mr. Grzejka concurred, because there was long-term conviction in the businesses.

Attorney Gibson signed onto the call at 10:18 a.m.

> On a motion by Mr. Zecha and seconded by Mr. McKenna:
> **<u>VOTED</u>**
> to return to agenda item 13, the hearing on the accidental disability retirement application of Joseph Farino. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

14) Joseph Farino Section 7 Retirement Review

> On a motion by Mr. McKenna and seconded by Mr. Horan:
> **<u>VOTED</u>**
> to convene in Executive Session under Purpose 7 to conduct the hearing on the accidental disability retirement application of Joseph Farino. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

The Board convened in Executive Session at 10:21 a.m. A breakout room was established, and all non-parties were removed from the virtual proceedings. Discussion began at 10:25 a.m.

On a motion by Mr. McKenna and seconded by Mr. Horan:
VOTED
to return to open session. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes. The Board returned to open session at 10:36 a.m.

Upon the Board's return to open session, the Chair announced that in Executive Session the following vote was taken.

On a motion by Mr. McKenna and seconded by Mr. Horan:
VOTED
to approve the application of Joseph Farino for accidental disability retirement based upon the affirmative findings of the medical panel, and to submit the application to PERAC for final approval. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

Attorney Gibson reported that the pre-hearing memorandum is due soon in the matter of Dennis Vargus. The case will proceed based upon written submissions only, so the decision should be issued more quickly than in those cases requiring a hearing.

Mr. Gibson announced that PTG is pursuing litigation vs. Baystate in regard to intellectual property.

The Office of the Inspector General issued an advisory on controls in regard to the Quincy Retirement System's loss of $3.5m. Mr. Zecha responded that MWRAERS' cash is consistently balanced through prior month-end and that the controls established by the Executive Director well in advance of the Quincy incident serve as a model for retirement systems' controls.

PERAC has determined in regard to rehired annuitants that for members re-hired to a governmental unit applicable to the retirement same system, no OBRA withholding is required. However, if the retiree is hired to work for a governmental entity different from the one from which he or she retired, then OBRA withholding would be mandated.

The Magistrate reviewing whether use of sick pay constitutes regular compensation has requested additional information from the Board and from PERAC. It would appear that some distinction may be drawn between employees who use sick time while active, as opposed to those who use it while on leave either due to illness or injury. Mr. Zecha commented that *Vernava* was a bad decision, and has led to the instant cases seeking to change the treatment of earned time used by public employees.

Mr. McKenna asked about the status of Capozzi. Attorney Gibson stated that DALA has begun to “triage” single-issue cases, and that he is hopeful the Board will see a decision in the spring.

Attorney Gibson signed off the call at 10:45 a.m.

14) Large Cap Value Manager Search Presentations

a) Newton Investment Management/Brian Ferguson & Jon Ritz
b) Dodge & Cox/Deirdre Curry
c) Aristotle Capital Management/Aylon Ben-Shlomo & Keri Hepburn
d) Seizert Capital Partners/Tom Kenny, Andy Jones, & Chris Heatley

Mr. Brian Ferguson and Mr. Jon Ritz joined the call representing Newton. Mr. Grzejka stated that there are members of the public on the call and cautioned the presenters against disclosing any materials which may be considered proprietary. Mr. Ritz thanked the Board for the opportunity and stated Newton is experienced with PERAC clients, and is currently serving four MA public fund systems, one in the large cap value strategy. Mr. Ferguson referred the Board to page 3 for four reasons to hire Newton: the long-term tenure of the team, the depth and breadth of research, the repetitive process of seeking alpha through valuation, strong fundamentals, and catalyst-driven momentum, and three layers of risk management infrastructure consisting of the large cap value team, the independent risk team, and the quant team. There is just over $8bn in the large cap value strategy, but the fund remains nimble. The team is local. Page 10 shows strong returns over all periods. The goal is positive performance over a cycle, with outperformance over time. Page 11 shows the growth of the large cap value strategy as compared to the Russell 1000 value over time. Page 12 reiterates Newton’s differentiators. In regard to catalysts, the team looks at all causes of potential disruption, good and bad. Newton takes some unusual approaches, including hiring a former investigative journalist, because the skills have proved valuable to the team. They start with the value universe, then build on it while maintaining “style purity.” They screen for catalysts in order to capture alpha through active management. Mr. McKenna noted that the returns provided in the deck were as of December 31, and asked what the exposure was to the “magnificent 7” (i.e. Amazon, Apple, Alphabet, Meta, Microsoft, Nvidia, and Tesla) over time, and how the returns were generated. Mr. Ferguson stated that over all periods the strategy has adhered to large cap value only. He noted the only FANG stock (Facebook(Meta), Amazon, Netflix, Google (Alphabet)) currently held is Alphabet. Meta came into the index in 2022, and a very small position was held. Mr. Ferguson and Mr. Ritz thanked the Board and signed off at 11:02 a.m.

Representative Ms. Deidre Curry from Dodge & Cox joined the call at 11:03 a.m. Mr. Grzejka stated that there are members of the public on the call and cautioned Ms. Curry against disclosing any materials which may be considered proprietary.

Ms. Curry thanked the Board and directed the members to page 4 of the presentation. Dodge & Cox has an over 90-year history. The firm was founded in 1930, its leadership is in its sixth generation, and the firm remains independent and employee-owned. Sometimes value is out of favor. It is important to have a firm that works for its clients, not for shareholders. The firm's independence helps attract top-tier talent. The team takes a long-term view, seeking names that are temporarily out of favor. At the end of 2023, AUM stood at $363bn. The Stock fund held $101bn in assets. Dodge & Cox has no Real Estate or Hedge Funds; they focus on long-term appreciation. The firm consistently evolves its investment capabilities globally, as demonstrated on page 6. Favorable valuation matters. The depth of the research team is shown on page 7. The team has an average of 21 years of experience, and engages in collective, consensus-driven decision making. The team seeks value-oriented names with a 3-5 year horizon low valuation, and good fundamentals. Page 8 describes the selection process, and the principles underlying the building of the portfolio. Page 12 provides performance history over the last 20 years, and demonstrates outperformance over all periods over the Russell 1000 Value Index. The fund holds four of the "Magnificent 7" but has been underweight defensive sectors, which is also a function of the pricing/valuation discipline. Dodge & Cox is optimistic about new attractive opportunities. The stock fund has 75 holdings, and the top ten are shown on page 13. Mr. Horan noted that it seems Dodge & Cox moves in and out of sectors, and asked how quickly these moves take place. Ms. Curry responded that they can happen daily if the consensus is there. However, portfolio turnover is relatively low, around 20%, because of the high 3-5 year conviction required to buy a position. Analysts do research over time, so moves can happen quickly. Meta was purchased in 2020 at a low price point. Once the decision is made, the purchase happens quickly. The fund managers "eat what we cook," meaning they have a vested interest in the fund's results. Page 15 shows a comparison of Dodge & Cox to peer funds. Mr. Grzejka asked Ms. Curry about fees. She responded 51bps, or a 48bps fee on a separately managed account which requires a $60m minimum investment. Ms. Curry thanked the Board and signed off the call at 11:22 a.m.

Mr. Horan stepped out of the meeting at 11:22 a.m.

At 11:23, Ms. Keri Hepburn and Mr. Aylon Ben-Shlomo joined the call representing Aristotle. Mr. Grzejka stated that there are members of the public on the call and cautioned the presenters against disclosing any materials which may be considered proprietary.

Mr. Horan returned to the meeting at 11:24 a.m.

Ms. Hepburn stated that Aristotle currently has $52.8bn AUM and an over 20-year track record with the focused value, low turnover, highly active, research-driven portfolio. She directed the Board to page 4 of the presentation for a representative listing of clients, including 15 MA Systems which provided written permission to be included. Mr. Ben Shlomo directed the Board to page 5, which shows the global research team. The firm culture is rooted in private ownership mentality. The research team seeks to understand the businesses, rather than to pick stocks well. If they do this well over the long term, the stock prices will follow. The team is stable; Aristotle has lost only two analysts since 2010. The four pillars of the firm philosophy are described on page 6: high quality, global perspective, long-term view, and focused but diversified portfolios. The long-term view lowers turnover, which is about 10-15%. The process to analyze a business consists of identifying high quality names with attractive valuations and compelling catalysts. It's not enough to be right, because that will generate market-like returns; they have to be different. Analysts use the "so what" or "who cares" test, i.e. if the business went under, who would notice or care, and are there ready, equivalent options available requiring minimal transition. Aristotle seeks good businesses about to become great, based on catalysts over which management has control. They are looking for business-specific changes expected to move the business forward. US Bank, as an example, is a top-five bank with large amounts of fee income from credit card payments. Some managers use quantitative screens, which will herd everyone in the same direction. Aristotle spends more time on the qualitative side of the data, to screen names in, rather than out. Aristotle is, therefore, not as concentrated in sectors as its peers. Page 16 shows performance since inception (2001). Page 19 shows that Aristotle provides greater downside protection over the three- and five-year periods time as compared with the Russell 1000 Value Index, which has a meaningful impact on performance. The fee is 39bps all-in for risk-qualified plans. Ms. Hepburn directed the Board to page 17 to demonstrate what happened in 2022, and what changed in 2023. Mr. Ben-Shlomo described a perfect storm of Russia's invasion of Ukraine and a shift in commodity prices, so lower quality performed well. High quality/low turnover as a strategy performs poorly in a sudden reversal. Aristotle's focus is on the long term. There is some materials and commodity exposure. Mr. McKenna asked if Aristotle maintained its positions in the downturn due to conviction, and Mr. Ben-Shlomo responded affirmatively. Ms. Hepburn and Mr. Ben-Shlomo thanked the Board and signed off the call at 11:43 a.m.

Mr. Zecha stepped out at 11:43 a.m.

At 11:44 a.m. Mr. Tom Kenny, Mr. Andy Jones, and Mr. Chris Heatly joined the meeting representing Seizert. Mr. Grzejka stated that there are members of the public on the call and cautioned the presenters against disclosing any materials which may be considered proprietary.

Mr. Zecha returned to the meeting at 11:44 a.m.

Mr. Kenny began that Seizert's goal is to protect plan assets over the long term. They have 14 years of experience with MA pension plans. Page three describes firm philosophy to preserve and compound clients' capital over the long-term by focusing on undervalued businesses. As shown on page 4, the firm's investment process is intended to identify good long-term businesses that have fallen out of favor with the market. Analysis is based on valuation, financial strength, and management behaviors. The portfolio is built around price targets and fundamental data. Seizert's seeking inexpensive companies with good management teams. Mr. Jones directed the Board to page 5. The Valuation, Quality, and Market Reaction data comes in daily. Mr. Kenny and Mr. Jones evaluate the data independently. They want to know how the business executes, whether they are consistent, and what the driving force is. They read all management reports looking for proof of concept. Both must be in agreement before a name will be in the portfolio. The portfolio construction model is shown on page 7. What will the value of the business be in 3-5 years from now? On the left side, the model uses probability-weighted targets to guide entry point and position size. The right side shows the sell discipline, if fundamentals change, if the price target is met, if a better opportunity arises, if red flags appear, or if the purchase is later deemed a misjudgment. Most sales are trading resulting from attainment of price targets. Page 8 shows performance vs. the Russell 1000 Value Index, and page 10 shows that purchases are made at lower price points relative to the market. The fund has 92% downside capture with 107% upside capture. Mr. McKenna asked whether the fund contains "Magnificent 7" exposure, and what the remaining names not shown on page 10 are. Mr. Kenny stated that there are small positions in Meta and Apple. He will share the holdings, there are 37 positions currently. Mr. Grzejka asked Mr. Kenny to describe how Seizert's being a boutique firm benefits clients. Mr. Kenny responded that public funds are a big part of the concentration, and MWRAERS would be a meaningful client. The firm doesn't market much and relies on client referrals. The portfolio management team will remain accessible to the client. Mr. Horan asked about the fees. Mr. Kenny responded that $25m or less would be 50 bps, over $25m would be 40bps. Seizert thanked the board and signed off at 12:02 p.m.

The Board moved to discussion of Item 15(b), NEPC's Large Cap Value Search Summary results. Mr. Horan asked Mr. Grzejka what are the Boards top three considerations in making a selection. Mr. Zecha responded product performance, price and service would be his. Mr. Horan asked if size/concentration should be a concern. Mr. Grzejka acknowledged it should be a consideration. He noted that the Board should look for a zig and a zag within the US large cap portfolio, as it had with Coho and Polen. The selected fund should behave differently from the index. The risk/return analysis for the 3, 5, 7, and 10 year periods are on pages 19-22. Value's returns should be different from growth's. Convergence may indicate overlap. Dodge & Cox and Newton may not be able to continue performing at the recent level. The Board has seen this sort of outgrowth before, and wants to avoid buying into a fund at a high, then riding it down. Mr. Zecha asked about the third quarter returns. Mr. Grzejka stated they were down slightly but have otherwise been pretty consistent. The entry point is important, as is the risk being assumed. Mr. McKenna asked if there would be no more Large Cap Growth manager, and Mr. Grzejka stated that right now there is so much overlap with the index that the question becomes whether the active management fee is justifiable. We have five good Large Cap Value options. Coho's performance was not strong last year, but they did exactly what they were hired to do over the long term. The question becomes who might be the best complement to the index. Aristotle has a good blend, with only a small position in Microsoft. Seizert's offering is more of an all-cap approach, but the concern is that half of the assets are from a single client. Dodge & Cox is massive with a 70-year value track record. It is core-ish with some S&P exposure. Newton has low turnover, and is the most diversified. The issue is that returns tend to converge to the mean over time, and Newton and Dodge & Cox have outperformance that may not be sustainable. The Board must consider how the manager fits in the portfolio over all. Mr. McKenna stated he is concerned with what are we spending and what are we getting in return. Mr. Grzejka stated that approximately 53bps seems to be a standard fee for the universe, and that anything less effectively adds to performance. Mr. Horan asked about the Russell 1000 Value index, since returns are expected to converge. Mr. Grzejka commented that Aristotle has outperformed the index, but last year (2022) was a different story, and next year (2024) could be a different story. Aristotle has had good absolute and relative returns since 2015. Coho has adhered to the value style, but that will hurt when value is out of favor. Mr. Horan asked if in hiring whether the long-term numbers would matter more, and Mr. Grzejka concurred. Coho provided the most downside protection among the group over the long term. All had a decent information ratio, which indicates that the risk taken is compensated in the form of returns. Newton is a little different stylistically. All are strong, but what is the edge? Mr. Grzejka broke the decisions down to:

1) What is the right active/passive mix?
2) What to do with Coho and Polen? and
3) If Coho and Polen are gone, then who is the replacement?

Right now, the mix is roughly 60/40 Active/Passive. Mr. Horan commented that Aristotle seems best overall. Mr. Fleming agreed. Mr. Grzejka concurred that their performance has been good overall, and their fee is lower than the others'. Mr. Fleming expressed concern that Aristotle is headquartered in California, but Mr. Grzejka stated they do have a local office.

On a motion by Mr. Horan and seconded by Mr. McKenna:
VOTED
to hire Aristotle as the Large Cap Value manager. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

Mr. Grzejka then moved to the question of what to do with the current managers. Polen's performance can be captured through the index, at a much lower fee. Mr. McKenna stated he still thinks the portfolio needs downside protection, and asked if it would be appropriate to keep a small allocation with Coho. Mr. Grzejka stated a reduced size allocation would dilute any impact on the portfolio. Mr. Zecha made a motion, seconded by Mr. Horan, to allocate the US Large Cap portfolio to Rhumbline S&P 500 Index and Aristotle, and to eliminate Coho and Polen. Mr. Horan asked if Polen's fee is 50bps, and Mr. Grzejka responded affirmatively. Mr. Grzejka continued that Polen overlaps with the index, so the downside protection piece is the concern, and Coho did provide protection. In 2022 when Polen was down 38%, the S&P was down 18%, and the Russell 1000 Value was down 7.5%, Coho was down 4.2%. Mr. Horan asked if Aristotle has shown good long-term results, and Mr. Grzejka stated that they have, but will not protect as well as Coho on the downside. Mr. Horan noted that Arisotle's lower fee provides somewhat of a buffer. Mr. McKenna asked what if a Board member wants to retain one of the two. Mr. Fleming stated that the motion currently on the floor would need to be amended. Mr. McKenna cautioned against "throwing the baby out with the bathwater" and stated Coho was the best performing manager when the markets were down. Mr. Horan responded that the Board shouldn't base the decision on one year's performance, and needs to look at long-term results. Mr. McKenna stated that this year may be bumpy, and made a motion, seconded by Mr. Fleming, to retain a position with Coho. Mr. Zecha stated he would be voting no to the amendment. Where the index is the manager is, PERAC's fee report shows the System is paying comparatively more in fees, and the fees will be reduced with their elimination.

On a motion by Mr. McKenna and seconded by Mr. Fleming:
VOTED
to amend the motion to eliminate Coho and Polen to instead eliminate Polen but retain a position with Coho in order to provide downside protection. 2-3, the motion to amend fails, with Mr. Fleming voting yes, Mr. McKenna voting yes, Mr. Peña voting no, Mr. Zecha voting no, and Mr. Horan voting no.

On the original motion by Mr. Zecha and seconded by Mr. Horan:
VOTED
to allocate the US Large Cap portfolio to Rhumbline and Aristotle, and to eliminate Coho and Polen. 3-2, the motion prevails, with Mr. Peña voting yes, Mr. Zecha voting yes, Mr. Horan voting yes, Mr. McKenna voting no, and Mr. Fleming voting no.

Returning to Item 15 (c), Mr. Grzejka stated that he had made the rebalance recommendations prior to the Board's vote to eliminate both Coho and Polen from the portfolio. It would now be his recommendation to table the recommendations pending the asset allocation discussion in February, while we await PERAC's acknowledgment for the new investment in Aristotle, and while the Executive Director completes the subscription documents. He stated that he believes cash is at $19m, and asked the Executive Director to confirm whether the cash would be sufficient. She said she expects it will be, and noted that $4m of the $19m would be gone to payroll and accounts payable in the next few days.

On a motion made by Mr. Horan and seconded by Mr. McKenna:
VOTED
at the recommendation of NEPC to table the monthly transfers for January. 4-1, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Fleming voting yes, and Mr. Zecha voting no.

Through the Chair, the Executive Director reported that although the Board decided at the Special Meeting on January 11, 2024, as indicated in the minutes, that Dahab, Meketa, NEPC and Verus would be called in for interviews as finalists in the Consulting Services search, due to an oversight, a formal vote was not taken.

On a motion by Mr. McKenna and seconded by Mr. Horan:
VOTED
to formalize the decision made at the January 11, 2024 Special Meeting to call in for interviews Dahab, Meketa, NEPC and Verus as finalists in the Consulting Services search. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes.

The Executive Director then requested a consensus from the Board in regard to scheduling for the interviews. Mr. Fleming suggested the regular February meeting, but the Executive Director reminded the Board that the Asset Allocation meeting is already scheduled for February, and in the event the Board were to select a new Consultant at the February meeting, it would not be practicable to then hold the asset allocation discussion at the same meeting. She reminded the Board that the Actuary needs the Asset Allocation to move forward with the Valuation and Segal's portion of the ACFR. Any delay in the Asset Allocation will therefore delay the funding schedule, which is needed in a timely manner for the Authority's budgeting purposes. The Board members concurred a special meeting is the best option, and agreed all would be available on February 7, 2024 at 10:00 a.m. for a remote meeting. Mr. Horan offered to host. The Executive Director will contact the firms to assign times, and get the list of attendees to Mr. Horan.

On a motion made by Mr. Zecha and seconded by Mr. Horan:
VOTED
to adjourn the January 25, 2024 meeting of the MWRA Employees' Retirement Board. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes. The meeting was adjourned at 12:47 p.m.

The following communications were distributed to the Board for review:

PERAC MEMO #28/2023 – 2023 Disability Data Changes
PERAC MEMO #29/2023 – Tobacco Company List
PERAC MEMO #30/2023 – Mandatory Retirement Board Member Training – 1st Quarter 2024
PERAC MEMO #1/2024 – 840 CMR 10:10(3) & 10:15(1)(c) - Annual Review of Medical Testing Fee
PERAC MEMO #2/2024 – 2024 Interest Rate set at 0.1%
PERAC MEMO #3/2024 – Required Minimum Distribution: Now Age 73 for This Year's Notifications
PERAC MEMO #4/2024 – 2024 Limits under Chapter 46 of the Acts of 2002
PERAC MEMO #5/2024 – 2024 Limits under Section 23 of Chapter 131 of the Acts of 2010
PERAC MEMO #6/2024 – COLA Notice
PERAC Pension News December 2023

The Board reserves the right to consider items on the agenda out of order. The listing of items is those reasonably anticipated by the Chair to be discussed received at least forty-eight (48) hours prior to the meeting. Not all items listed may in fact be discussed and other items not listed may also be brought up for discussion to the extent permitted by law. Items identified for discussion in Executive Session may be conducted in open session, in addition to, or in lieu of discussion in Executive Session. Date of next scheduled regular Retirement Board meeting is Thursday, February 29, 2024, 10:00 a.m., Chelsea, MA. A Special Meeting will be held February 7, 2024 at 10:00 a.m. for the purpose of conducting Consulting Services interviews.

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James Fleming, Chair

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Matthew Horan Appointed Member

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Kevin McKenna, Elected Member

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Brian Peña, Ex Officio Member

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Frank Zecha, Fifth Member

MWRA EMPLOYEES' RETIREMENT BOARD SPECIAL MEETING
FEBRUARY 7, 2024

A special meeting of the MWRA Employees' Retirement Board was conducted in-person on Thursday, February 7, 2024 for the purpose of conducting Consulting Services Interviews. Remote access was provided to the public via Zoom, with call-in information provided on the official Meeting Notice posted to www.mwraretirement.com and the MA Secretary of State's website. Present at the in-person meeting were Board members Matthew Horan, Kevin McKenna, Brian Peña, Frank Zecha, and James Fleming, staff members Carolyn Russo, and Julie McManus. Members of the public also attended via remote access. Mr. Fleming called the meeting to order at 10:02 a.m.

1) Call the meeting to order-roll call of members: Mr. Horan, Mr. McKenna, Mr. Peña, Mr. Zecha, and Mr. Fleming present.

2) Consulting Services Search Presentations – VOTE
10:00 a.m. New England Pension Consultants
10:20 a.m. Dahab Associates
10:40 a.m. Meketa Investment Group
11:00 a.m. Verus

Representatives Michael Manning, Sebastian Grzejka, and Mike Sullivan joined the meeting representing NEPC. Mr. Grzejka began by thanking the Board for the 25-year relationship, noting that it is not taken for granted and that NEPC would like to continue to contribute to the System's success. There have been few changes to the NEPC team over that timeframe, demonstrating the institutional knowledge and memory at the Board's disposal. Should the Board re-hire NEPC, Mr. Sullivan would be joining the team. Mr. Fleming asked whether Mr. Grzejka would still be assigned to the account, and Mr. Grzejka responded affirmatively. He continued that the portfolio has evolved over time and has gotten more complex. Since the 2016 RFP, NEPC had conducted over 25 manager searches, two custody searches, six asset allocation reviews and hundreds of due diligence meetings. The Consultant needs to be the right one. The day-to-day relationship is important. Mr. Manning referred the Board to page 3 for the team details. He thanked the Board for the 25-year relationship. Page 5 shows the progress of the fund and the growth of the firm over that time. In 1999, MWRAERS AUM were $98m and are now $680m. NEPC has grown from $107bn to $1.6tn AUM, from 33 employees to 359 employees, and the dedicated research team grew from 3 to 69 professionals. Mr. Fleming asked how many clients are assigned to each Consultant. Mr. Manning responded that the average is 6, which gives them time to get to know their clients, and how best to leverage the depth of research to the client's benefit. Mr. Zecha asked how many are currently assigned to Mr. Grzejka, and Mr. Grzejka responded 8. Mr. Zecha asked the same of Mr. Sullivan, and he responded 7 as lead Consultant, with 4 in a back-up role, requiring little active involvement. Mr. Manning stated that NEPC uses a partnership model to provide an intense level of client service. Mr. McKenna stated that Mr. Grzejka has been great, and that we've grown at the same time, but it appears that NEPC may not be vested in growing its business, and could be pulling back. He stated that he knows we ask a lot of NEPC as a client, and asked whether NEPC has hit a saturation point, forgoing growth to focus on current clients. Mr. Manning stated that NEPC is still growing and expanding business in a healthy way, but wants to keep current clients happy. Prospective new clients do not want to see outflow of existing clients. Mr. McKenna stated that he had read something in the original proposal that gave him that impression. Mr. Manning stated that over 37 years NEPC has maintained growth at a reasonable pace, because otherwise you'd be doing a disservice to both your employees and your clients. Mr. Zecha asked about NEPC's rate of returns and performance over time compared to other MA public funds. He added that he has met managers at conferences and received calls from managers who appear to be top decile performers, but who state they can't get NEPC to answer their calls or emails. He asked about NEPC's focused placement list, and how a manger would get on it. Mr. Manning stated that it is an open door policy, and that every search starts out as open to the universe. NEPC's research team looks for the strongest managers, but Clients are always welcome to bring ideas to NEPC. The research databases will sometimes yield a less well-known manager's bubbling to the top. Mr. Grzejka noted that there has been a give and take, noting that Mesirow, LMCG, Constitution and TerraCap all had no prior relationship with NEPC and found their way into the portfolio because the research backed it. Mr. Zecha asked then what the focused placement list actually means, and Mr. Grzejka stated that the research and investment teams have already fully vetted the manager. All consultants do that, but new names are always coming in because NEPC is seeking to identify the best. Mr. Manning added that there is an art and a science that goes into the analysis, both qualitative and quantitative. Mr. Zecha asked about the fee. Mr. Grzejka directed the Board to page 26, and stated the fee is $150,000 per year billed quarterly, and is a fair representation of the amount of work required. Mr. Zecha asked if that would include 12-14 on-site meetings per year, plus others if needed, and Mr. Grzejka confirmed that it would. Mr. McKenna asked if there is any cap on RFP's, and Mr. Grzejka stated there is not. Mr. Fleming thanked the representatives from NEPC for the 26-year relationship, and stated that the Board will decide and let them know. NEPC signed off the call a 10:24 a.m.

Mr. Greg McNeillie from Dahab joined the call. Mr. Fleming stated that Dahab would have 20 minutes for the presentation including time for questions at the end. The Board conducted the RFP process because the seven-year contract maximum was reached. Mr. McNeillie reported that Dahab's philosophy has not changed since the 2017 RFP was done. Mr. Dahab, founding partner, is stepping away from day-to-day operations, but his son will be stepping in. Mr. Kevin Condy will be the Consultant assigned to the account. The firm has gone from 83 to 86 clients over that timeframe, and from $13bn to $16bn AUM. Dahab pays attention to the little things, and some firms don't. For example, every search is public, and Dahab sorts 60-80 responses generally for public fund searches. They look for independent sources of returns over a range of market capitalizations. Fixed Income returns are enhanced through PRIT's Alternatives, Real Estate, Timber and Agriculture. Dahab will not use expensive strategies that offer low returns. They do not like Hedge Funds, and don't use fixed income with hidden equity risk. Mr. Zecha asked if Lord Abbett or Garcia Hamilton are in any of their public fund portfolios. Mr. McNeillie said there is Garcia Hamilton exposure, and some clients other than public funds have Lord Abbett. Mr. Zecha noted Dahab has done well, but MWRAERS wants less risk given the funded ratio, and asked for confirmation that they don't use private equity of hedge funds. Mr. McNeillie responded that Private Equity and Private Debt are difficult to negotiate without scale, so Dahab has employed the PRIT private equity sleeves. Taunton has used this approach. PRIT has a staff of 58, and Dahab uses PRIT in its "hub and spokes" approach for Dukes County, Franklin County, and Shrewsbury, and has beaten PRIT's returns by allocating to the sleeves in a different way. Mr. Zecha asked if Dahab has a focused placement list, and if so, how does it work. Mr. McNeillie said no, all clients' searches are public every seven years, they use PERAC's ranking system, and the process generates the list. Some may be screened for size, concentration, etc. Shrewsbury is fully funded and reduces risk by tweaking PRIT sleeve allocations. Mr. Horan asked about fees, and Mr. McNeillie responded $120k all-in. Mr. Fleming asked if that includes 12 in-person regular meetings plus special meetings, and Mr. McNeillie responded that it does. Mr. Horan asked if the fee stays the same over the duration of the contract, and Mr. McNeillie responded affirmatively. Mr. McNeillie thanked the Board and signed off the call at 10:40 a.m.

At 10:41 a.m., Mr. Daniel Dynan, Ms. Allie Wallace Stone, and Ms. Lisa Rubin joined the call representing Meketa. Mr. Dynan referred the Board to page 2 for their biographies. Mr. Dynan and Ms. Stone joined Meketa in 2008 and 2009 respectively. Mr. Dynan began that he knows there is safety in the familiarity with the current consulting relationship, but he believes there are gaps and wants to bring the Board into the future, through the next 20 years. Page 3 shows the potential benefits to MWRAERS. Meketa develops client-focused solutions. The team builds consensus and has a nearly 100% retention rate. The research team has 74 people, and Meketa has been a top decile performer. Market efficiency makes identifying alpha more difficult. The team has significant national and MA public fund experience. Ms. Stone reported that as shown on page 4, the firm has 249 clients, with $13.3bn in assets under advisement for 13 MA clients, including Worcester, Plymouth County, and MHFA. Consulting is the sole line of business so there are no conflicts. Page 5 shows that Meketa maintains a low consultant to client ratio, so they can get to know the clients and the portfolios well. The average is 5 clients per consultant, and the consultants are accessible for meetings by phone or in person. Mr. Fleming asked if that would apply to special meetings on top of the 12 regular meetings, and Ms. Stone responded that it would. Mr. Zecha asked whether Meketa has a focused placement list, and if so, how a manager would get on it. Mr. Dynan responded in the negative, and stated every search is an open process, but noted that Meketa does have a list of managers that they "support." They will look at all responses, and if it's not a fit, they won't use the manager. Mr. Zecha asked for clarification of the fee structure, questioning whether the structure includes three increases to the initial $220k annual fee. Mr. Dynan stated that it does, but the Board could also hire Meketa for Private Markets only, using PRIT PE sleeves, and the fee would be $50k per year. Mr. McKenna asked if it is tiered, and whether there would be an additional cost for 25 RFP's, and Mr. Dynan stated it would cover all the Board is currently doing. Customizing the PE portfolio would be additional. Mr. Dynan added that in the 2017 search the Board found the pricing too expensive, but stated that the Board made a mistake. Price is what you pay, value is what you get. Meketa's scale allows favorable fee negotiations with managers, and Mr. Dynan began to cite a case study. Mr. McKenna then asked if in 2017 Meketa drilled down into the portfolio and if there were any points. Mr. Dynan referred Mr. McKenna to page 12 for observations from the 2017 presentation as well as from the current one. Meketa recommends leaning toward active management, reducing hedge fund exposure and increasing private equity. Fixed Income is attractive, including both public and private debt. Meketa has performed well in all market weather. Client results are shown on page 8. Mr. McKenna asked if Meketa uses PRIT sleeves to reduce fees. Mr. Dynan stated that they do, but they customize the mix. He commented that the Board last updated the Investment Policy Statement (IPS) in 2015 and it needs to be updated. He asserted that the fund would be $77m more if the Board had hired Meketa in 2017, adding that the fund went from 98% funded to 89% funded in the interim, and the Board needs to work on that. Mr. Fleming interjected that CoVid-19 happened in the meantime. Mr. Rubin thanked the Board for the opportunity. Mr. Dynan, Ms. Stone and Ms. Rubin signed off the call at 11:00 a.m. (*Editorial notes provided for context: In the intervening time period cited by Mr. Dynan, the Board adopted a lower investment return assumption and approved the use of updated mortality tables, both measures intended to reduce the risk of future actuarial losses, and implemented benefit enhancements in the form of an increased COLA base, all of which impact the funded ratio. The IPS was last updated in 2022, not in 2015.)*

At 11:01 a.m., Mr. Mark Brubaker, Mr. Mike Patalsky, Mr. Chris Shelby, and Mr. Ted Hermann joined the meeting representing Verus. Mr. Brubaker introduced himself as the Senior Consultant for the team, with 33 years' experience in portfolio construction, including a 20-year relationship with Massport. Mr. Patalsky stated he has 24 years of experience, including in public funds, and that he has been assigned to the Massport account for the past 10 years. He serves as the team leader on the OK and SC state funds, with a total of 4 clients, allowing a high level of service. Mr. Evan Benedict serves as Support Consultant. Mr. Shelby is the Managing Director of the Private Markets team, with 17 years' experience. Mr. Hermann is in Business Development. Verus has assembled a customized client-specific team for MWRAERS, and the portfolio development process is research-driven. Mr. Brubaker added that there will be a dedicated support team. Mr. Fleming asked where the team is based. Mr. Brubaker responded that the firm's headquarters is in Seattle with a satellite office in San Francisco, but that he, Mr. Patalsky, Mr. Shelby, and Mr. Benedict are based in Pittsburgh. The firm has just over $1tn in assets under advisement, with 30 public fund clients. The average client to consultant ratio is 5-1. Currently Mr. Brubaker has 4 and Mr. Patalsky has 4. Mr. Fleming asked if the fee already includes attendance at 12 regular meetings plus special meetings, and Mr. Brubaker confirmed that it does include in-person attendance. Mr. McKenna asked if Verus is an advisor to PRIM. Mr. Bruker answered affirmatively, noting that the account was a big win for the firm. For the past three years, Verus has been PRIM's benchmark consultant for public transparency as well as compensation purposes. MWRAERS would be an important client to Verus. Page 5 demonstrates client satisfaction, with Verus earning a 4.7 responsiveness rating (out of 5). There is no conflict of interest risk. Mr. Zecha asked if Verus has a focused placement list, and if so, how it works. Mr. Brubaker stated that Verus does have a list of rated managers they like, but that there is an open-door policy. Clients often bring names to the firm for vetting. Page 7 shows observations Verus has made about MWRAERS. Mr. Patalsky noted that the plan is well-funded, with a 6.9% investment return assumption which is in line with like plans. The current IPS is well-diversified, and overall the portfolio is well-positioned. Mr. Patalsky would, however, recommend an increase to passive in the large cap space, and a reduction in overlap identified in the International and Emerging Markets portfolios. He would also encourage a more consistent private equity pacing model. Mr. McKenna asked if there is a way to quantify the overlap in in the EM space. Mr. Patalsky referred the Board to page 9, which demonstrates overlap among Baillie Gifford, Schroders, and SEG in the international space, and between ABS and Axiom in Emerging Markets. Over-allocation to EM has driven underperformance. The developing and emerging market managers have a high correlation to the benchmark, so they will move in the same way, rather than being complementary managers. The areas of overlap are seen in the red and yellow. There has been some underperformance in large cap. Coho and Polen have had headwinds. SEG and Baillie Gifford have also underperformed in the International portfolio. Page 10 shows the rating system used to identify the best managers. Page 24 shows that the Verus "high-conviction" managers have provided excess returns across asset classes. The Manager Research group is experienced, and has to have a high conviction in ideas. Mr. Shelby directed the Board to page 11 for private markets pacing considerations. A consistent allocation to PRIT's vintage years adds good opportunities to the portfolio. Mr. Brubaker directed the Board to page 26 for a peer comparison for the private markets team. Page 12 shows the reduced fee of $175k because Verus wants the opportunity to work with MWRAERS. They have a dedicated team, and are committed to in-person meetings. Mr. Zecha asked about 2023 returns. Mr. Brubaker stated that he does not believe they have all reporting yet, but will email an update to the

Executive Director. The Verus representatives thanked the Board and signed off the call at 11:30 a.m.

Mr. Zecha asked for a 10-minute recess at 11:31 a.m. The Board re-convened for discussion at 11:37a.m.

Mr. Zecha noted any of the four could do the job. Dahab has no alternatives program and just uses PRIT sleeves, so the portfolio would need restructuring. For that reason, it would be his recommendation that Dahab be eliminated. Mr. Peña agreed, but asked if the Board should update the ranking before getting into the discussion. The Executive Director through the Chair stated that is her understanding as well.

The Board members completed the post-interview ranking sheets for each of the four candidates. Mr. Zecha began reading his results, followed by Mr. McKenna. Mr. Horan stated that NEPC's rankings were mixed, because he doesn't like the idea of a preferred list. Dahab was also more expensive. Mr. Pena reported his rankings were largely unchanged, although his impression of Meketa improved somewhat due to their understanding of the portfolio.

The Executive Director asked for another brief recess so she and the Retirement Coordinator can complete the official tally of the post-interview results. The Board again called a recess at 11:50 a.m. for the Executive Director and Retirement Coordinator to tally the results.

The Board reconvened at 12:08, and the Chair read the following final tally results into the record:

NEPC 3.86
Meketa 3.85
Dahab 3.71
Verus 3.67

Mr. Fleming asked if any Board members would care to make a motion. Hearing none, Mr. Fleming moved to hire NEPC as the Consultant. Mr. McKenna seconded.

> On a motion made by Mr. Fleming and seconded by Mr. McKenna:
> **VOTED**
> to hire NEPC as the Consultant. 3-2, with Mr. Horan voting no, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting no, and Mr. Fleming voting yes. The motion to retain NEPC prevailed.

On a motion made by Mr. Zecha and seconded by Mr. Horan:
VOTED
to adjourn the February 7, 2024 special meeting of the MWRA Employees' Retirement Board. 5-0, with Mr. Horan voting yes, Mr. McKenna voting yes, Mr. Peña voting yes, Mr. Zecha voting yes, and Mr. Fleming voting yes. The meeting was adjourned at 12:12 p.m.

The Board reserves the right to consider items on the agenda out of order. The listing of items is those reasonably anticipated by the Chair to be discussed received at least forty-eight (48) hours prior to the meeting. Not all items listed may in fact be discussed and other items not listed may also be brought up for discussion to the extent permitted by law. Items identified for discussion in Executive Session may be conducted in open session, in addition to, or in lieu of discussion in Executive Session. Date of next scheduled regular Retirement Board meeting is Thursday, February 29, 2024, 10:00 a.m., Chelsea, MA.

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James Fleming, Chair

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Matthew Horan Appointed Member

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Kevin McKenna, Elected Member

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Brian Peña, Ex Officio Member

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Frank Zecha, Fifth Member

MONTHLY PERFORMANCE REPORT

MWRA EMPLOYEES’ RETIREMENT SYSTEM

January 31, 2024

GOALS & OBJECTIVES

Investment Return Objective

"Its primary goal is to provide promised benefits to participants and beneficiaries of the MWRA Employees' Retirement system. Plan assets should be equal to or greater than the present value of the projected benefit obligations ("fully funded"). When Plan assets are less than the present value of projected benefit obligations, a schedule will be established and a plan will be in place to meet a fully funded status. When achieving return objectives required to fully fund the system, the Board is intent on controlling risk. Consistency of returns and risk of loss are primary considerations. The Board has also determined that the annual performance of plan assets should not vary substantially from returns achieved by other public pension funds with similar goals and objectives."

Return Expectations

The investment growth should be maintained in such a manner that the minimum nominal rate of return does not cause a negative real rate of return over a full market cycle:

- **Time Horizon:** Return assumptions will be based on a ten-year time horizon with a detailed review and analysis to be made at least annually to monitor allocations and assumptions. Should a manager deviate from proscribed mandate or expected risk and return profile by a consequential degree, that manager may be reevaluated at any time.
- **Liquidity Needs:** Presently contributions exceed plan withdrawals to provide benefits, payouts, and/or plan expenses. Portfolio liquidity will be managed based on the cash flow needs of the System.
- **Regulatory Considerations:** Assets of this Fund shall be invested in a manner consistent with the fiduciary standards established under Code of Massachusetts Regulations 840 ("840 CMR"). The Board shall also use as precedent the Employee Retirement Income Security Act (ERISA).

EXECUTIVE SUMMARY

	Market Value ($)	1 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Composite	**677,454,355**	**0.0**	**5.3**	**3.1**	**6.5**	**6.0**	**6.4**	**Feb-99**
Allocation Index		*-0.3*	*6.3*	*4.0*	*7.1*	*6.6*	*5.7*	
Policy Index		*-0.2*	*7.0*	*4.4*	*7.8*	*6.9*	*6.1*	

20 years as of January 31, 2024				
	Return	Standard Deviation	Sharpe Ratio	Sortino Ratio
Composite	**6.6**	**8.5**	**0.9**	**0.9**
Allocation Index	*6.3*	*8.0*	*0.9*	*0.9*
Policy Index	*6.7*	*8.6*	*0.9*	*0.9*

Performance

- The Composite had a preliminary return of 0.0% (net) for the month, outperforming the Allocation Index of -0.3% and the Policy Index of -0.2%.
- In equities, the S&P 500 Index gained 1.7%, with the so-called Magnificent 7 companies contributing 0.7% of the broader index returns. Notably, small-cap equities underperformed with the Russell 2000 falling 3.9% as uncertainty surrounding interest rates weighed on sentiment. The portfolio's Domestic Equity composite returned 0.7% (net) and the Non-US Equity composite was up -1.5% (net).
- In fixed income, the Fed held rates steady at a range of 5.25%-5.50%, with Fed Chair Jerome Powell signaling that a rate cut at the next meeting in March is unlikely. As a result, longer-tenor interest rates rose with the 10-and 30-year Treasury yields rising seven and 16 basis points, respectively.. The Fixed Income composite returned 0.0% (net) for the month while the Bloomberg Agg and the Bloomberg US HY returned -0.3% and 0.0%, respectively.
- This brings the total plan return for the trailing one-year period to 5.3% (net), while the Allocation Index and Policy Index both returned 6.3% and 7.0%, respectively.

Returns for 20 years Risk/Return and Statistics Summary are gross of fees.
Since inception return is 8.2% gross of fees. Prior to 1999, performance history does not capture separate net and gross returns.

TOTAL FUND PERFORMANCE DETAIL (NET)

	Allocation			Performance (%)						
	Market Value ($)	% of Portfolio	Policy(%)	1 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Composite	**677,454,355**	**100.0**	**100.0**	**0.0**	**5.3**	**3.1**	**6.5**	**6.0**	**6.7**	**Jan-86**
Allocation Index				*-0.3*	*6.3*	*4.0*	*7.1*	*6.6*		
Policy Index				*-0.2*	*7.0*	*4.4*	*7.8*	*6.9*		
Total Balanced	**3,837,427**	**0.6**	**0.0**	**0.0**	**6.6**	**5.7**	**6.8**	**4.9**	**4.9**	**Dec-10**
PRIT Core Fund	3,837,427	0.6	0.0	0.0	6.6	5.7	8.1	7.7	6.9	Apr-99
60% S&P 500 / 40% Bloomberg Aggregate				*0.9*	*13.1*	*5.3*	*9.1*	*8.4*	*6.3*	
Total Domestic Equity	**208,149,397**	**30.7**	**31.0**	**0.7**	**12.4**	**6.4**	**11.5**	**10.4**	**7.6**	**May-99**
Russell 3000 Index				*1.1*	*19.1*	*9.1*	*13.5*	*12.0*	*7.5*	
Large Cap	**159,943,779**	**23.6**	**24.0**	**2.1**	**16.6**	**7.9**	**12.6**	**11.4**	**12.5**	**Dec-10**
Rhumbline Advisors S&P 500 Index Fund	65,998,559	9.7	10.0	1.7	20.7	10.9	14.2	12.5	9.2	Apr-97
S&P 500 Index				*1.7*	*20.8*	*11.0*	*14.3*	*12.6*	*9.2*	
Coho Relative Value Equity	50,711,826	7.5	7.0	1.0	1.0	6.8	8.9		9.6	Mar-16
Russell 1000 Value Index				*0.1*	*6.1*	*9.2*	*9.3*		*10.3*	
Polen Focused Growth	43,233,394	6.4	7.0	4.0	29.9	4.5	13.8		14.5	Feb-16
Russell 1000 Growth Index				*2.5*	*35.0*	*10.0*	*18.0*		*17.5*	
Small Cap	**48,205,618**	**7.1**	**7.0**	**-3.5**	**-0.6**	**1.6**	**7.8**	**7.8**	**10.4**	**Dec-10**
Loomis Sayles Small Cap Growth	24,480,080	3.6	3.5	-2.3	1.8	-2.5	8.0	8.7	6.6	Jan-97
Russell 2000 Growth Index				*-3.2*	*4.5*	*-6.0*	*6.2*	*7.0*	*6.6*	
Mesirow Small Cap Value Equity CIT - Founders Class	23,725,538	3.5	3.5	-4.7					2.9	Apr-23
Russell 2000 Value Index				*-4.5*					*10.2*	
Total Non-US Equity	**111,077,081**	**16.4**	**19.0**	**-1.5**	**0.1**	**-5.6**	**1.8**	**2.3**	**3.7**	**Mar-99**
International Equity	**73,300,845**	**10.8**	**12.0**	**-0.6**	**1.4**	**-3.9**	**3.8**	**3.2**	**3.3**	**Sep-05**
SEG Baxter Street	30,700,919	4.5	5.0	0.5	-0.7	-3.6	3.8		5.8	May-16
MSCI AC World ex USA (Net)				*-1.0*	*5.9*	*1.1*	*5.3*		*5.9*	
Schroder International Alpha Trust Class 1	29,793,812	4.4	4.0	-0.4	6.5	1.4	8.3	5.9	6.6	Mar-12
MSCI AC World ex USA (Net)				*-1.0*	*5.9*	*1.1*	*5.3*	*4.2*	*4.7*	
Baillie Gifford International Growth Fund Class K	12,806,115	1.9	3.0	-3.6	-4.0	-14.1			-6.9	Oct-20
MSCI AC World ex USA (Net)				*-1.0*	*5.9*	*1.1*			*6.0*	

Since inception return is 6.7% Net of fees. Prior to 1999, performance history does not capture separate net and gross returns.
In November 2019, Loomis Sayles and Schroders transitioned from a mutual fund to a CIT structure. Performance prior to the transition to the CIT investment vehicle is linked to mutual fund performance history.
Preliminary performance is subject to change once finalized.

TOTAL FUND PERFORMANCE DETAIL (NET)

	Allocation			Performance (%)						
	Market Value ($)	% of Portfolio	Policy(%)	1 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Emerging Markets Equity	**37,776,236**	**5.6**	**7.0**	**-3.1**	**-2.6**				**-10.9**	**Mar-21**
Axiom Emerging Markets Trust Class 2	17,979,475	2.7		-2.4	-5.8				-13.5	Mar-21
MSCI Emerging Markets (Net)				*-4.6*	*-2.9*				*-8.0*	
ABS Emerging Markets MA Fund	19,796,760	2.9		-3.8	0.3				-7.8	Dec-21
MSCI Emerging Markets (Net)				*-4.6*	*-2.9*				*-7.1*	
Total Fixed Income	**137,544,216**	**20.3**	**20.0**	**0.0**	**3.2**	**-1.5**	**2.4**	**2.6**	**5.6**	**Mar-99**
Garcia Hamilton Fixed Income Aggregate	30,588,351	4.5	6.0	-0.5	0.5	-3.1	0.6		0.9	Apr-18
Blmbg. U.S. Aggregate Index				*-0.3*	*2.1*	*-3.2*	*0.8*		*1.2*	
Lord Abbett Core Fixed Income	39,647,984	5.9	4.0	-0.1	2.4	-2.9	1.1		1.4	Apr-18
Blmbg. U.S. Aggregate Index				*-0.3*	*2.1*	*-3.2*	*0.8*		*1.2*	
Loomis Sayles Multisector Full Discretion Trust	52,856,411	7.8	8.0	0.1	4.0	-1.5	3.2	3.2	6.8	Mar-99
Blmbg. U.S. Aggregate Index				*-0.3*	*2.1*	*-3.2*	*0.8*	*1.6*	*3.9*	
Blmbg. U.S. Corp: High Yield Index				*0.0*	*9.3*	*1.9*	*4.4*	*4.5*	*6.3*	
LMCG Serenitas Credit Gamma Offshore	14,436,285	2.1	2.0	0.5					3.0	Sep-23
HFRI Relative Value (Total) Index				*0.7*					*3.7*	
Blmbg. U.S. Aggregate Index				*-0.3*					*3.8*	
Invesco Mortgage Recovery Loans Feeder Fund	15,185	0.0		0.0	-0.9	-0.1	-1.0	4.9	9.1	Apr-10
Blmbg. U.S. Aggregate Index				*-0.3*	*2.1*	*-3.2*	*0.8*	*1.6*	*2.3*	
Total Hedge Fund	**39,075,431**	**5.8**	**6.0**	**0.6**	**7.7**	**4.6**	**5.4**	**3.4**	**3.6**	**Oct-06**
PRIM Portfolio Completion Strategies	12,348,898	1.8		0.2	7.2	5.3	4.8	4.1	4.0	Oct-06
Corbin Pinehurst Partners	14,390,044	2.1		1.5	11.5	4.0	6.2		6.0	Nov-18
HFRI Fund of Funds Composite Index				*0.8*	*5.0*	*2.7*	*4.8*		*4.6*	
UBS Neutral Alpha Strategies	12,287,896	1.8		0.0	4.5	6.4	6.8		6.3	Nov-18
HFRI Fund of Funds Composite Index				*0.8*	*5.0*	*2.7*	*4.8*		*4.6*	
Entrust Peru Wind Down	48,593	0.0		-0.6	-25.7	-59.9	-43.0		-37.2	Dec-17
HFRI Fund of Funds Composite Index				*0.8*	*5.0*	*2.7*	*4.8*		*3.7*	
Other	**17,007,737**	**2.5**	**0.0**	**0.3**	**5.2**	**2.2**	**2.0**	**1.3**	**1.0**	**Dec-10**
Cash Account	17,007,737	2.5		0.3	5.2	2.2	2.0	1.3	1.9	Feb-00
90 Day U.S. Treasury Bill				*0.4*	*5.1*	*2.3*	*1.9*	*1.3*	*1.7*	

Importantly, all returns in this report, including those of the private markets managers, are based on a time weighted return calculation and not based on IRRs, which can result in return differences.

Preliminary performance is subject to change once finalized.

MWRA Employees' Retirement System

January 31, 2024

TOTAL FUND PERFORMANCE DETAIL (NET)

	Allocation			Performance (%)						
	Market Value ($)	% of Portfolio	Policy(%)	1 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Total Real Estate	**68,140,811**	**10.1**	**12.0**	**0.0**	**-3.7**	**9.1**	**7.2**	**9.0**	**7.8**	**Apr-99**
NCREIF Property Index				*0.0*	*-7.9*	*4.6*	*4.3*	*6.8*	*8.0*	
Morgan Stanley Prime Property ($2.8m commitment in '95)	24,247,435	3.6		0.0	-3.7	7.5	5.9	8.5	8.3	Sep-95
TA Realty Core Property Fund, LP ($15m commitment in '19)	24,791,248	3.7		0.0	-3.6	10.8			9.0	Jun-19
Invesco Mortgage Recovery II ($3M commitment in '15)	599,654	0.1		0.0	-32.7	-17.0	-21.2		-8.5	Oct-15
Landmark VI ($2m commitment in '11)	6,021	0.0		0.0	-6.9	-3.8	-9.6	-2.3	1.4	Jul-11
Landmark VIII ($4m commitment in '17)	2,212,119	0.3		0.0	-3.4	14.5	11.7		15.0	Nov-17
StepStone Real Estate Fund II ($2m commitment in '11)	348,139	0.1		0.0	-2.4	-1.1	-3.3	2.6	1.4	May-12
Cerberus Institutional Real Estate Partners III ($1.5m commitment in '12)	502,381	0.1		0.0	7.9	19.6	15.8	13.8	14.4	May-13
TerraCap Partners III, LP ($2.6m commitment in '15)	1,602,672	0.2		0.0	-0.5	8.0	6.0		9.8	Jul-15
TerraCap Partners IV, LP ($4m commitment in '17)	3,509,679	0.5		0.0	-4.4	6.2	7.0		8.0	Nov-17
TerraCap Partners V, LP ($8m commitment in '22)	8,321,463	1.2		0.0	-2.2				4.4	Jun-22
TA Realty Value XIII	2,000,000	0.3		0.0					0.0	Dec-23
Total Private Equity and Debt	**92,622,257**	**13.7**	**12.0**	**-0.1**	**4.8**	**16.1**	**13.6**	**13.9**	**10.3**	**Apr-99**
C|A US All PE				*0.0*	*5.9*	*13.4*	*15.0*	*13.2*	*12.8*	
NASDAQ W/O Income				*1.0*	*30.9*	*5.1*	*15.8*	*14.0*	*7.6*	
PRIM Vintage Year 2008 ($3m commitment in '08)	882,551	0.1		-0.1	24.7	20.1	15.1	18.3	10.7	Jun-08
PRIM Vintage Year 2009 ($1m commitment in '09)	50,260	0.0		0.0	-0.6	14.1	23.6	22.9	12.6	Nov-09
PRIM Vintage Year 2010 ($1m commitment in '10)	355,760	0.1		-0.1	-15.3	4.1	7.5	14.7	8.7	Jun-10
PRIM Vintage Year 2011 ($1.5m commitment in '11)	690,064	0.1		-0.1	-2.8	24.7	18.4	21.5	8.8	May-11
PRIM Vintage Year 2012 ($1m commitment in '12)	420,550	0.1		-0.5	1.4	2.8	10.0	12.4	-8.4	Jun-12
PRIM Vintage Year 2014 ($2m commitment in '14)	1,895,489	0.3		-0.1	1.8	16.7	17.7		7.7	Jun-14
PRIM Vintage Year 2017 ($2m commitment in '17)	2,606,063	0.4		-0.6	9.7	21.8	19.9		15.1	May-17
PRIM Vintage Year 2020 ($5m commitment in '20)	4,532,492	0.7		-0.4	5.5	14.8			13.5	Mar-20
PRIM Vintage Year 2021 ($5m commitment in '21)	4,061,442	0.6		0.0	10.4	2.5			2.4	Dec-20
PRIM Vintage Year 2022 ($7.5m commitment in '22)	2,090,390	0.3		-0.6	6.3				0.1	Apr-22
PRIM Vintage Year 2023 ($10m commitment in '23)	612,649	0.1		-0.1					-0.2	May-23
Alcentra European DLF ($5m commitment in '14)	20,448	0.0		0.0	13.7	30.1	15.5		12.1	Jan-15
Ascent Fund IV-B ($1m commitment in '16)	20,104	0.0		0.0	-2.1	-28.6	-29.0		-20.6	Jul-16
Ascent Fund V ($2m commitment in '08)	1,299,603	0.2		0.0	3.0	2.0	-0.6	1.1	3.9	Oct-08
Ascent VI ($3m commitment in '15)	3,119,079	0.5		0.0	-4.3	0.6	-1.5		0.4	Dec-15
CVI Credit Value Fund IV A LP ($6m commitment in '17)	4,373,067	0.6		0.0	6.2	9.1	7.4		6.4	Dec-17
Invesco Fund VI ($5m commitment in '13)	477,377	0.1		0.0	-29.3	-6.9	5.6	10.4	10.1	Jul-13

Importantly, all returns in this report, including those of the private real estate managers, are based on a time weighted return calculation and not based on IRRs, which can result in return differences.
Preliminary performance is subject to change once finalized.

TOTAL FUND PERFORMANCE DETAIL (NET)

	Allocation			Performance (%)						
	Market Value ($)	% of Portfolio	Policy(%)	1 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Kayne Energy Fund VII ($5m commitment in '15)	2,765,200	0.4		0.0	11.1	36.0	-13.5		-2.5	Jan-16
Foundry 2007 ($3m commitment in '07)	218,788	0.0		0.0	5.7	-10.2	-9.4	2.2	12.7	Dec-07
Foundry 2010 ($3m commitment in '10)	3,830,853	0.6		0.0	-36.1	6.0	8.7	8.0	9.1	Feb-11
Foundry 2010 Annex ($0.4m commitment in '15)	540,786	0.1		0.0	-50.9	13.3	33.7		24.7	Sep-15
Pinebridge PEP V ($6.23m commitment in '07)	237,665	0.0		0.0	4.1	-2.4	3.9	6.1	6.8	Dec-10
Pinebridge (AIG) PEP V Asia ($.55m commitment)	30,091	0.0		0.0	-5.2	-11.0	-12.6		-12.8	Oct-18
Pinebridge (AIG) PEP V Europe ($1.6m commitment)	2,560	0.0		0.0	-2.3	-14.8	96.0		87.9	Oct-18
Pinebridge (AIG) PEP V Large Market US Buyout ($.7m commitment)	50,760	0.0		0.0	32.9	9.9	16.1		12.4	Oct-18
Pinebridge (AIG) PEP V Preferred Participation Fund ($.5m commitment)	59,357	0.0		0.0	-13.3	-16.6	-6.2		-7.5	Oct-18
Pinebridge (AIG) PEP V Secondary ($.6m commitment)	14,546	0.0		0.0	-12.5	-16.4	-14.1		-11.6	Jan-17
Pinebridge (AIG) PEP V Small-Mid Market US Buyout ($.9m commitment)	39,224	0.0		0.0	0.1	2.7	12.3		12.3	Oct-18
Pinebridge (AIG) PEP V US Venture ($.48m commitment)	41,127	0.0		0.0	3.1	-4.0	-2.9		-4.7	Oct-18
Landmark XV ($3m commitment in '13)	556,596	0.1		0.0	-4.8	-3.5	2.5	6.6	8.9	Nov-13
JFL Equity Investors IV, L.P. ($6m commitment in '16)	2,816,100	0.4		0.0	54.7	40.3	40.0		39.1	Jan-17
Private Advisors Small Co. Coinvestment Fund, LP ($4m commitment in '17)	5,202,408	0.8		0.0	21.4	18.1	21.0		19.7	Feb-17
Park Square Credit Opportunities III ($3m commitment in '17)	2,791,720	0.4		0.0	7.7	7.4	8.1		7.1	Feb-18
Ironsides Constitution Opportunities ($3m commitment in '18)	1,487,561	0.2		0.0	8.4	9.4	11.6		10.9	Oct-18
HarbourVest Dover Street X ($9m commitment in '20)	7,392,375	1.1		0.0	2.7	23.1			43.4	Jun-20
Hamilton Lane Secondary Fund V LP ($9m commitment in '20)	6,890,855	1.0		0.0	2.0	18.6			23.8	Jul-20
Constitution Ironsides Co-Investment Fund VI ($12m commitment in '21)	12,936,538	1.9		0.0	6.3				3.8	Nov-21
HarbourVest Co-Investment Fund VI ($8m commitment in '21)	5,807,700	0.9		0.0	8.4					Jan-22
JFL Equity Investors V, L.P. ($9m commitment in '20)	11,639,722	1.7		0.0	19.4	15.6			10.1	Sep-20

Importantly, all returns in this report, including those of the private markets managers, are based on a time weighted return calculation and not based on IRRs, which can result in return differences.

NOTES

1 - Results for periods longer than one year are annualized.

2 - Total Balances, Large Cap, Small Cap, and Other Composite performance starts 12/1/2010.

3 - Preliminary Total Composite net of fee since inception return is 6.7% for the current month.

4 - Preliminary Total Composite gross of fee since inception return is 8.2% for the current month.

5 - Targets, Allocation Index, and Policy Index have been updated to reflect new allocation of 02/01/2022.

6 - Policy Index changed from Nasdaq to Cambridge All PE to reflect as of 5/1/2012.

7 - Policy Index Consists of: 24% S&P 500, 7% Russell 2000, 12% MSCI ACWI IMI, 7% MSCI Emerging Markets, 12% Bloomberg US Aggregate TR, 8% Bloomberg US Universal TR, 6% HFRI Fund of Funds Composite Index, 12% NCREIF Property Index, 12% C|A US All PE.

8 - Allocation index consists of: Weighted index of underlying managers to their respective benchmark.

9 - All Private Market managers are final as of 9/30/23 and preliminary as of 12/31/23 , but Step Stone RE II is final as of 6/30.

MWRA Employees' Retirement System

FEE SCHEDULE

January 31, 2024

Account Name	Fee Schedule	Market Value ($)	% of Portfolio	Estimated Annual Fee ($)	Estimated Annual Fee (%)
PRIT Core Fund	0.49 % of Assets	3,837,427	0.57	18,803	0.49
Rhumbline Advisors S&P 500 Index Fund	0.04 % of Assets	65,998,559	9.74	26,399	0.04
Coho Relative Value Equity	0.50 % of First $75 M 0.40 % of Next $75 M 0.35 % Thereafter	50,711,826	7.49	253,559	0.50
Polen Focused Growth	0.65 % of Assets	43,233,394	6.38	281,017	0.65
Loomis Sayles Small Cap Growth	0.45 % of Assets Minimum Fee: $45,000	24,480,080	3.61	110,160	0.45
SEG Baxter Street	1.00 % of Assets	30,700,919	4.53	307,009	1.00
Schroder International Alpha Trust Class 1	0.55 % of Assets	29,793,812	4.40	163,866	0.55
Baillie Gifford International Growth Fund Class K	0.60 % of Assets	12,806,115	1.89	76,837	0.60
Axiom Emerging Markets Trust Class 2	0.77 % of Assets	17,979,475	2.65	138,442	0.77
ABS Emerging Markets MA Fund	0.75 % of Assets	19,796,760	2.92	148,476	0.75
Garcia Hamilton Fixed Income Aggregate		30,588,351	4.52	38,235	0.13
Lord Abbett Core Fixed Income	0.19 % of Assets	39,647,984	5.85	75,331	0.19
Loomis Sayles Multisector Full Discretion Trust	0.39 % of First $50 M 0.30 % Thereafter	52,856,411	7.80	203,569	0.39
Mesirow Small Cap Value Equity CIT - Founders Class	0.45 % of Assets	23,725,538	3.50	106,765	0.45
Invesco Mortgage Recovery Loans Feeder Fund		15,185	0.00		
PRIM Portfolio Completion Strategies		12,348,898	1.82		
Corbin Pinehurst Partners	0.85 % of Assets	14,390,044	2.12	122,315	0.85
UBS Neutral Alpha Strategies	0.90 % of Assets	12,287,896	1.81	110,591	0.90
Entrust Peru Wind Down	0.50 % of Assets	48,593	0.01	243	0.50
LMCG Serenitas Credit Gamma Offshore	Performance Based 1.50 and 20.00	14,436,285	2.13	216,544	1.50
Cash Account		17,007,737	2.51		
Morgan Stanley Prime Property ($2.8m commitment in '95)		24,247,435	3.58		
TA Realty Core Property Fund, LP ($15m commitment in '19)		24,791,248	3.66		
TA Realty Value XIII		2,000,000	0.30		
Invesco Mortgage Recovery II ($3M commitment in '15)		599,654	0.09		
Landmark VI ($2m commitment in '11)		6,021	0.00		
Landmark VIII ($4m commitment in '17)		2,212,119	0.33		
StepStone Real Estate Fund II ($2m commitment in '11)		348,139	0.05		
Cerberus Institutional Real Estate Partners III ($1.5m commitment in '12)		502,381	0.07		
TerraCap Partners III, LP ($2.6m commitment in '15)		1,602,672	0.24		

FEE SCHEDULE

Account Name	Fee Schedule	Market Value ($)	% of Portfolio	Estimated Annual Fee ($)	Estimated Annual Fee (%)
TerraCap Partners IV, LP ($4m commitment in '17)		3,509,679	0.52		
TerraCap Partners V, LP ($8m commitment in '22)		8,321,463	1.23		
PRIM Vintage Year 2008 ($3m commitment in '08)		882,551	0.13		
PRIM Vintage Year 2009 ($1m commitment in '09)		50,260	0.01		
PRIM Vintage Year 2010 ($1m commitment in '10)		355,760	0.05		
PRIM Vintage Year 2011 ($1.5m commitment in '11)		690,064	0.10		
PRIM Vintage Year 2012 ($1m commitment in '12)		420,550	0.06		
PRIM Vintage Year 2014 ($2m commitment in '14)		1,895,489	0.28		
PRIM Vintage Year 2017 ($2m commitment in '17)		2,606,063	0.38		
PRIM Vintage Year 2020 ($5m commitment in '20)		4,532,492	0.67		
PRIM Vintage Year 2021 ($5m commitment in '21)		4,061,442	0.60		
PRIM Vintage Year 2022 ($7.5m commitment in '22)		2,090,390	0.31		
PRIM Vintage Year 2023 ($10m commitment in '23)		612,649	0.09		
Alcentra European DLF ($5m commitment in '14)		20,448	0.00		
Ascent Fund IV-B ($1m commitment in '16)		20,104	0.00		
Ascent Fund V ($2m commitment in '08)		1,299,603	0.19		
Ascent VI ($3m commitment in '15)		3,119,079	0.46		
CVI Credit Value Fund IV A LP ($6m commitment in '17)		4,373,067	0.65		
Invesco Fund VI ($5m commitment in '13)		477,377	0.07		
Kayne Energy Fund VII ($5m commitment in '15)		2,765,200	0.41		
Foundry 2007 ($3m commitment in '07)		218,788	0.03		
Foundry 2010 ($3m commitment in '10)		3,830,853	0.57		
Foundry 2010 Annex ($0.4m commitment in '15)		540,786	0.08		
Pinebridge (AIG) PEP V Asia ($.55m commitment)		30,091	0.00		
Pinebridge (AIG) PEP V Europe ($1.6m commitment)		2,560	0.00		
Pinebridge (AIG) PEP V Large Market US Buyout ($.7m commitment)		50,760	0.01		
Pinebridge (AIG) PEP V Preferred Participation Fund ($.5m commitment)		59,357	0.01		
Pinebridge (AIG) PEP V Secondary ($.6m commitment)		14,546	0.00		
Pinebridge (AIG) PEP V Small-Mid Market US Buyout ($.9m commitment)		39,224	0.01		
Pinebridge (AIG) PEP V US Venture ($.48m commitment)		41,127	0.01		
Landmark XV ($3m commitment in '13)		556,596	0.08		
JFL Equity Investors IV, L.P. ($6m commitment in '16)		2,816,100	0.42		
Private Advisors Small Co. Coinvestment Fund, LP ($4m commitment in '17)		5,202,408	0.77		
Park Square Credit Opportunities III ($3m commitment in '17)		2,791,720	0.41		

FEE SCHEDULE

Account Name	Fee Schedule	Market Value ($)	% of Portfolio	Estimated Annual Fee ($)	Estimated Annual Fee (%)
Ironsides Constitution Opportunities ($3m commitment in '18)		1,487,561	0.22		
HarbourVest Dover Street X ($9m commitment in '20)		7,392,375	1.09		
Hamilton Lane Secondary Fund V LP ($9m commitment in '20)		6,890,855	1.02		
Constitution Ironsides Co-Investment Fund VI ($12m commitment in '21)		12,936,538	1.91		
JFL Equity Investors V, L.P. ($9m commitment in '20)		11,639,722	1.72		
HarbourVest Co-Investment Fund VI ($8m commitment in '21)		5,807,700	0.86		
Investment Management Fee		**677,454,355**	**100.00**	**2,398,163**	**0.35**

DISCLAIMERS & DISCLOSURES

Past performance is no guarantee of future results.

Returns for pooled funds, e.g. mutual funds and collective investment trusts, are collected from third parties; they are not generally calculated by NEPC. Returns for separate accounts, with some exceptions, are calculated by NEPC. Returns are reported net of manager fees unless otherwise noted.

A “since inception” return, if reported, begins with the first full month after funding, although actual inception dates (e.g. the middle of a month) and the timing of cash flows are taken into account in Composite return calculations.

NEPC’s preferred data source is the plan’s custodian bank or record-keeper. If data cannot be obtained from one of the preferred data sources, data provided by investment managers may be used. Information on market indices and security characteristics is received from additional providers. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within. In addition, some index returns displayed in this report or used in calculation of a policy index, allocation index or other custom benchmark may be preliminary and subject to change.

All investments carry some level of risk. Diversification and other asset allocation techniques are not guaranteed to ensure profit or protect against losses.

The opinions presented herein represent the good faith views of NEPC as of the date of this presentation and are subject to change at any time. Neither fund performance nor universe rankings contained in this report should be considered a recommendation by NEPC.

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Source of private fund performance benchmark data: Cambridge Associates, via Refinitiv

ASSET ALLOCATION REVIEW & OUTLOOK

MWRA RETIREMENT SYSTEM

FEBRUARY 29, 2024

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Mike Sullivan, Partner
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INTRODUCTION

- **NEPC and MWRAERS conduct an annual asset allocation to reaffirm policy targets**
  - The goal is to ensure the strategy meets the System's needs, and is positioned to take advantage of market opportunities in a risk controlled manner

- **The current approach is structured to support the long term goals of the System:**
  - The primary goal is to provide benefits to participants and beneficiaries of the System, with the goal of becoming fully funded. In order to achieve this goal, consistency of returns and risk of loss are primary considerations
  - The Plan currently has an assumed rate of return of 6.9%

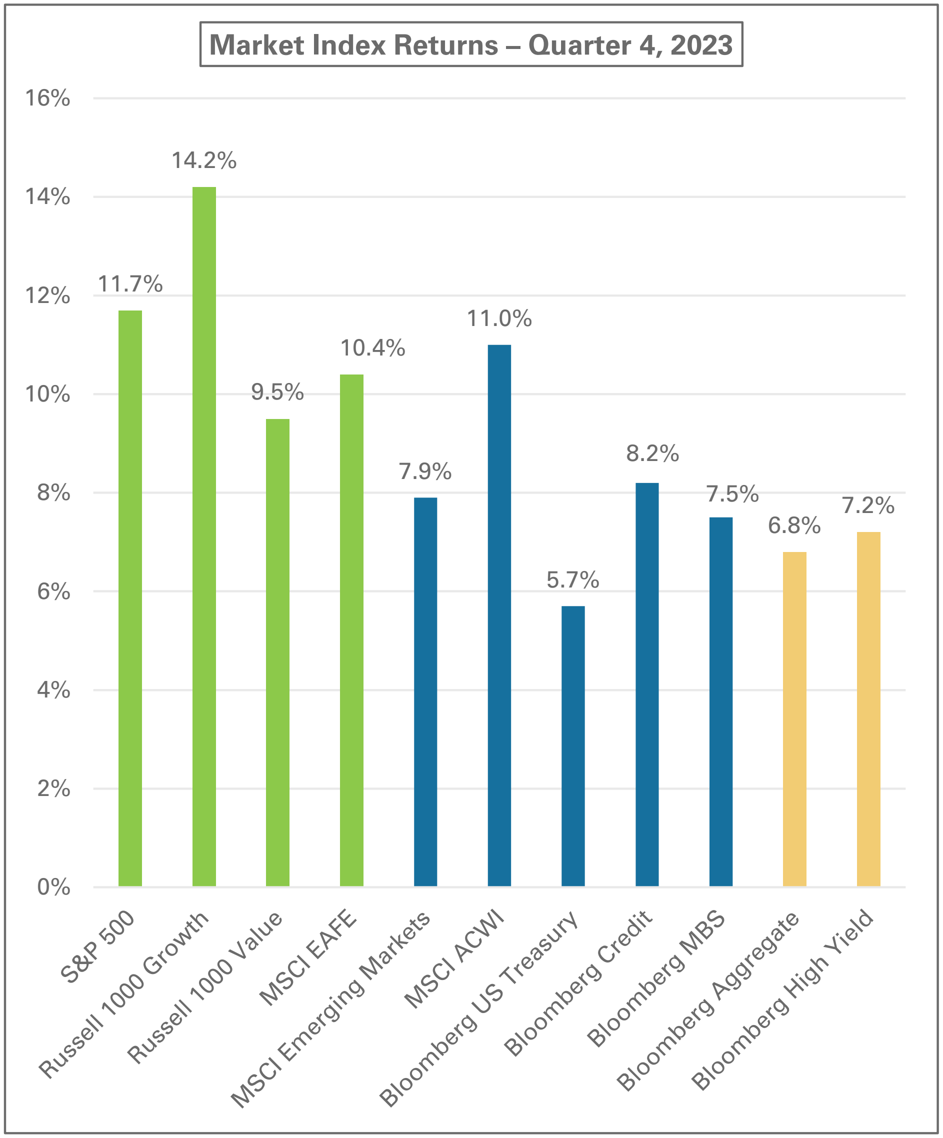
- **Today, we want to focus on ongoing implementation of the portfolio, specifically:**
  - ***Adjust Asset Allocation:*** We have provided two mixes for the Board's consideration, looking to balance risk, return and cash needs
  - ***Implementation:*** NEPC recommends review of International Equity and have provided analysis separately. We have also provided a rebalance recommendation based on recent changes in the US equity allocation
  - ***Private Assets:*** NEPC will provide the annual pacing analysis at the next meeting to focus on 2024 commitments

- **We have provided an updated asset allocation analysis to review these topics**

MARKET OVERVIEW

Q4 2023 IN REVIEW

- **U.S. stocks broadly outperformed during Q4**
  - The fourth quarter witnessed robust performance in U.S. equities, driven by lower inflation figures and strong economic data
  - The S&P 500 index surged by nearly 12% during the quarter and concluded the year with an impressive gain of over 26%.
- **International equity markets experienced similar gains due to lower interest rate fears and strong small cap performance**
  - International developed and emerging market equities posted positive performance, with the MSCI EAFE Index returning 10% in the fourth quarter and an impressive 18% for the entire year.
  - The MSCI EM Index recorded approximately 8% gains in the fourth quarter, contributing to a solid 10% increase for the year 2023, demonstrating resilience in emerging markets.
- **Fixed income markets suffered amidst continued messaging from the Fed of higher interest rates**
  - Treasuries experienced a turnaround in the fourth quarter, driven by a more dovish Federal Reserve, resulting in a rally in shorter maturities.
  - Credit spreads tightened in fixed-income markets, leading to positive returns, with investment-grade corporate bonds seeing a 22 basis point reduction in spreads and high-yield corporate bonds experiencing a substantial 71 basis point reduction.



CURRENT MARKET OUTLOOK

Better-than-expected economic data pushed out market rate cut expectations, even as markets remain biased to lower rates

The Magnificent 7 supported broader index returns as stronger-than-expected earnings bolstered performance

We are concerned about U.S. mega-caps and suggest reducing exposure, while maintaining U.S. large-cap value exposure

We remain comfortable holding greater levels of cash to heighten portfolio liquidity levels

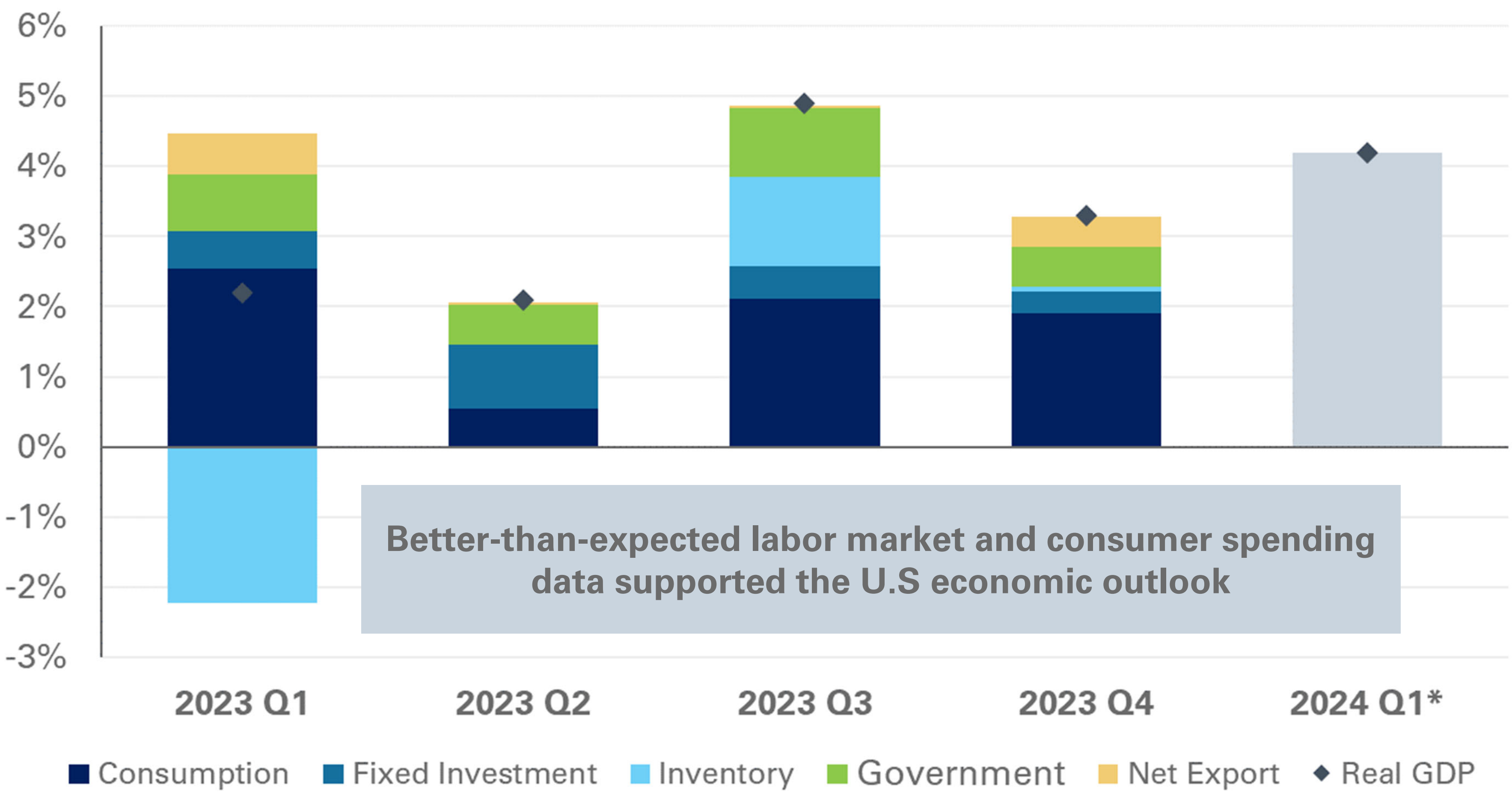
U.S. TIPS remain attractive with normalized real interest rate levels and subdued breakeven inflation expectations

MAGNIFICENT SEVEN

DOMINANT PERFORMANCE IN 2023

CONSUMER SPENDING SUPPORTED THE ECONOMY

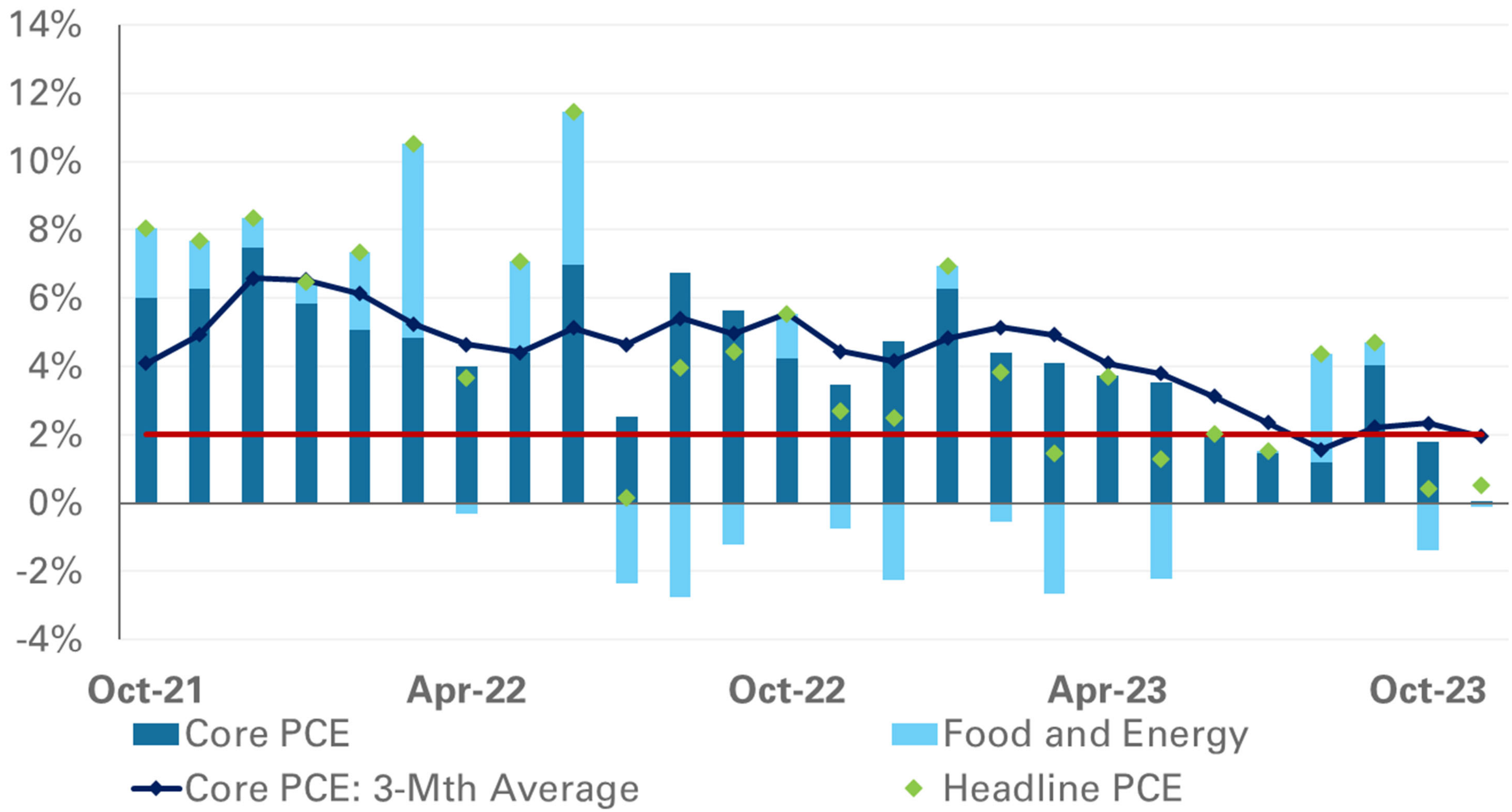
CONTRIBUTIONS TO U.S. REAL GDP



2024 Q1* represents Atlanta Federal Reserve GDPNow forecasts for Q1 as of 2/1/2024
Source: Bureau of Economic Analysis, Federal Reserve Bank of Atlanta, FactSet

CORE INFLATION TRENDED TO THE FED'S TARGET

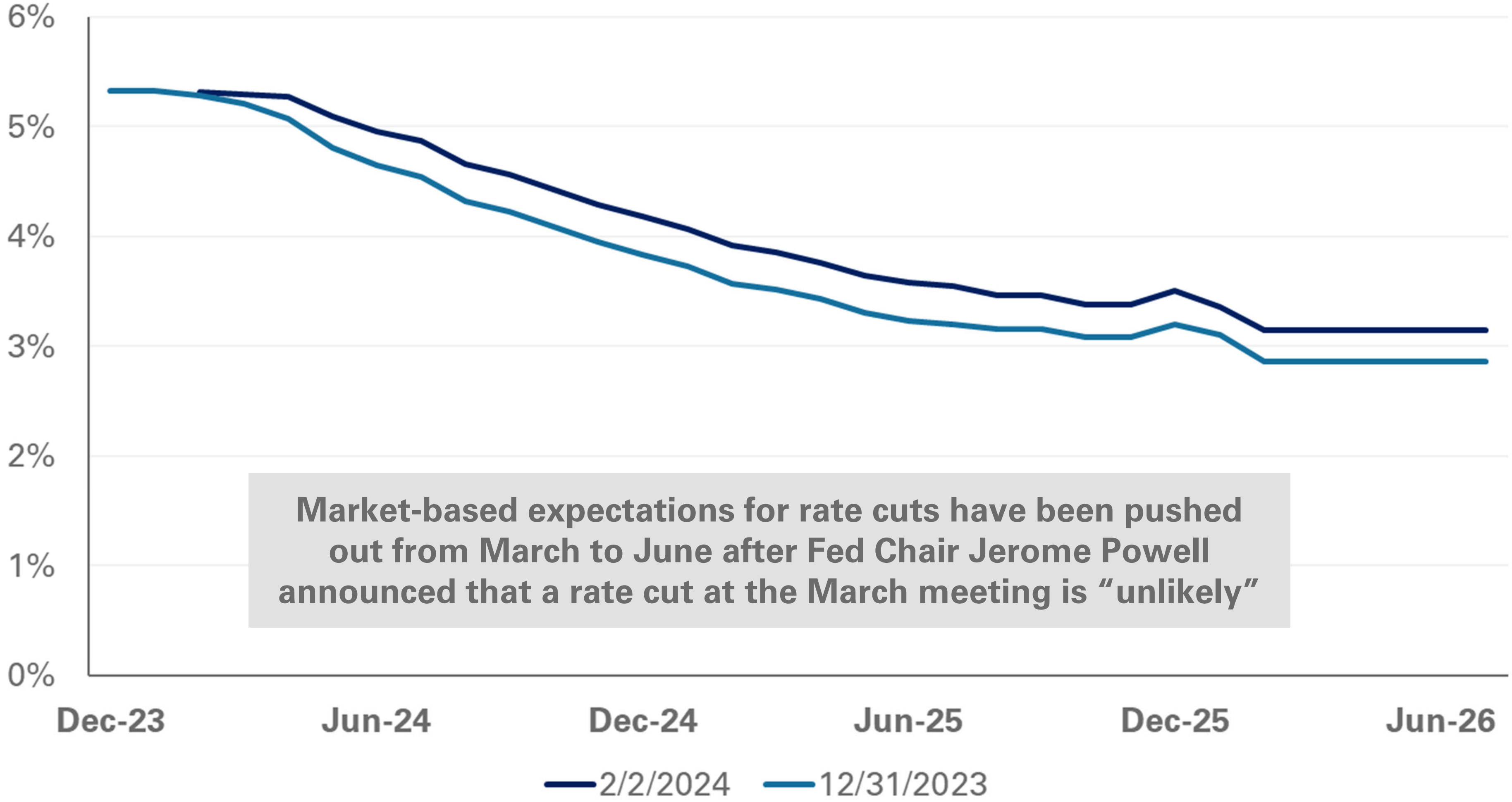
ANNUALIZED MONTHLY U.S. PCE PRICE INDEX CHANGES



Sources: Bureau of Labor Statistics, FactSet

THE MARKET NOW EXPECTS FIVE CUTS IN 2024

FEDERAL FUND FUTURES



Source: FactSet

MARKET BACKDROP

	2022	2024
S&P 500	4,766	4,769
IG OAS	0.92	0.99
HY OAS	2.93	3.23
Gold	1,895	2,072
Oil	75	72

	2022	2024
Fed Funds	0.25	5.50
US 10 Year	1.51	3.88
CPI	7.19	3.12

2024 MARKET THEMES

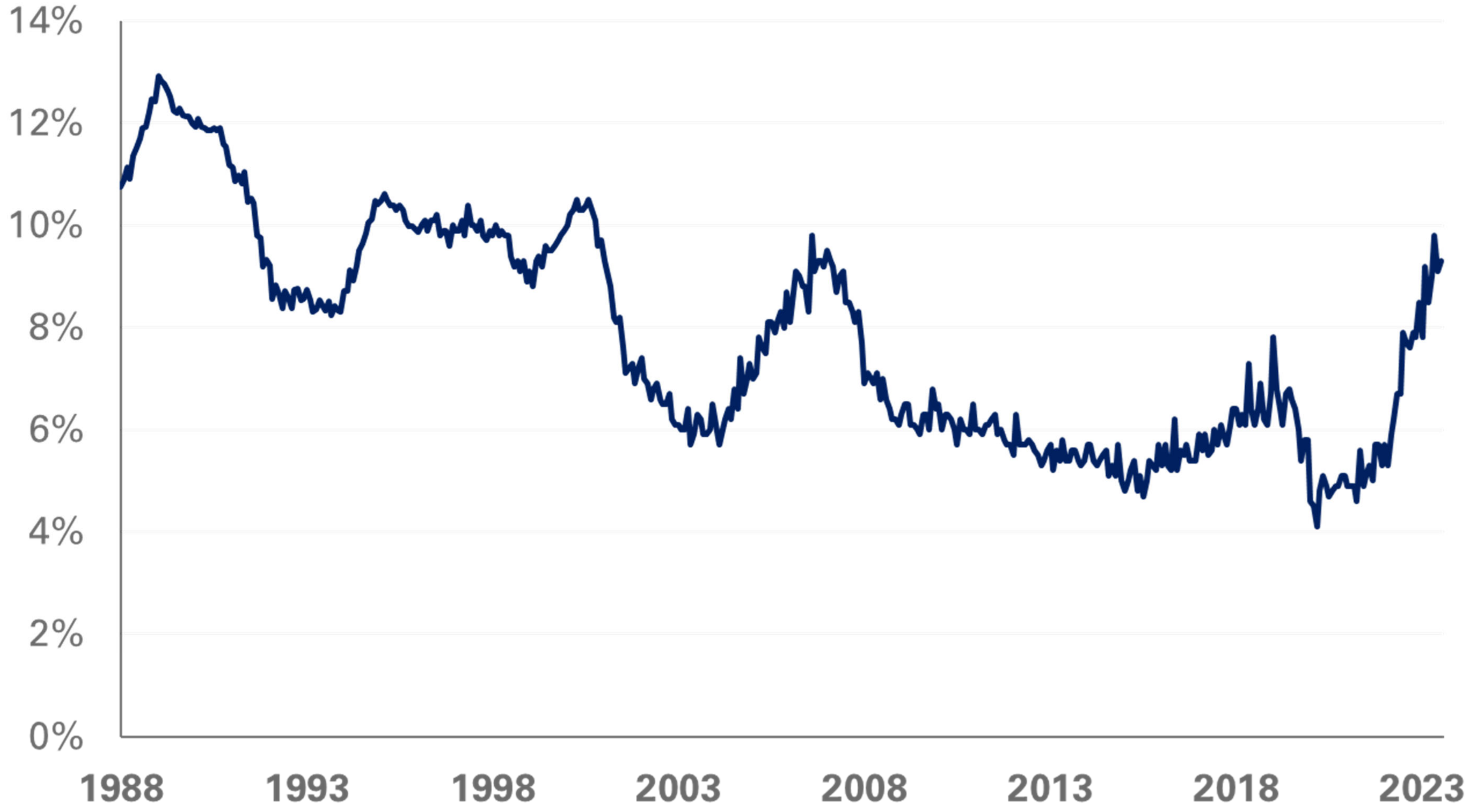
NEPC MARKET OUTLOOK

Theme	Outlook
Cost of Capital	Economy is not acclimated to long-term interest rate environment of 4% or higher
Magnificent Seven	Priced for Perfection: Sky-high earnings growth expectations challenge potential valuation upside
U.S. Fiscal Debt	Fundamentals suggest perpetual deficit cycle requires higher interest rates
Artificial Intelligence	AI Proof Statement: Novel products and successful adoption will test valuations in 2024
Geopolitics	The speed of information amplifies tail risks; look to rebalance opportunities amid volatility

SMALL BUSINESSES FEELING RATES PRESSURE

COST OF CAPITAL THEME

ACTUAL INT. RATE PAID ON SHORT-TERM LOANS



Source: National Federation of Independent Business, FactSet

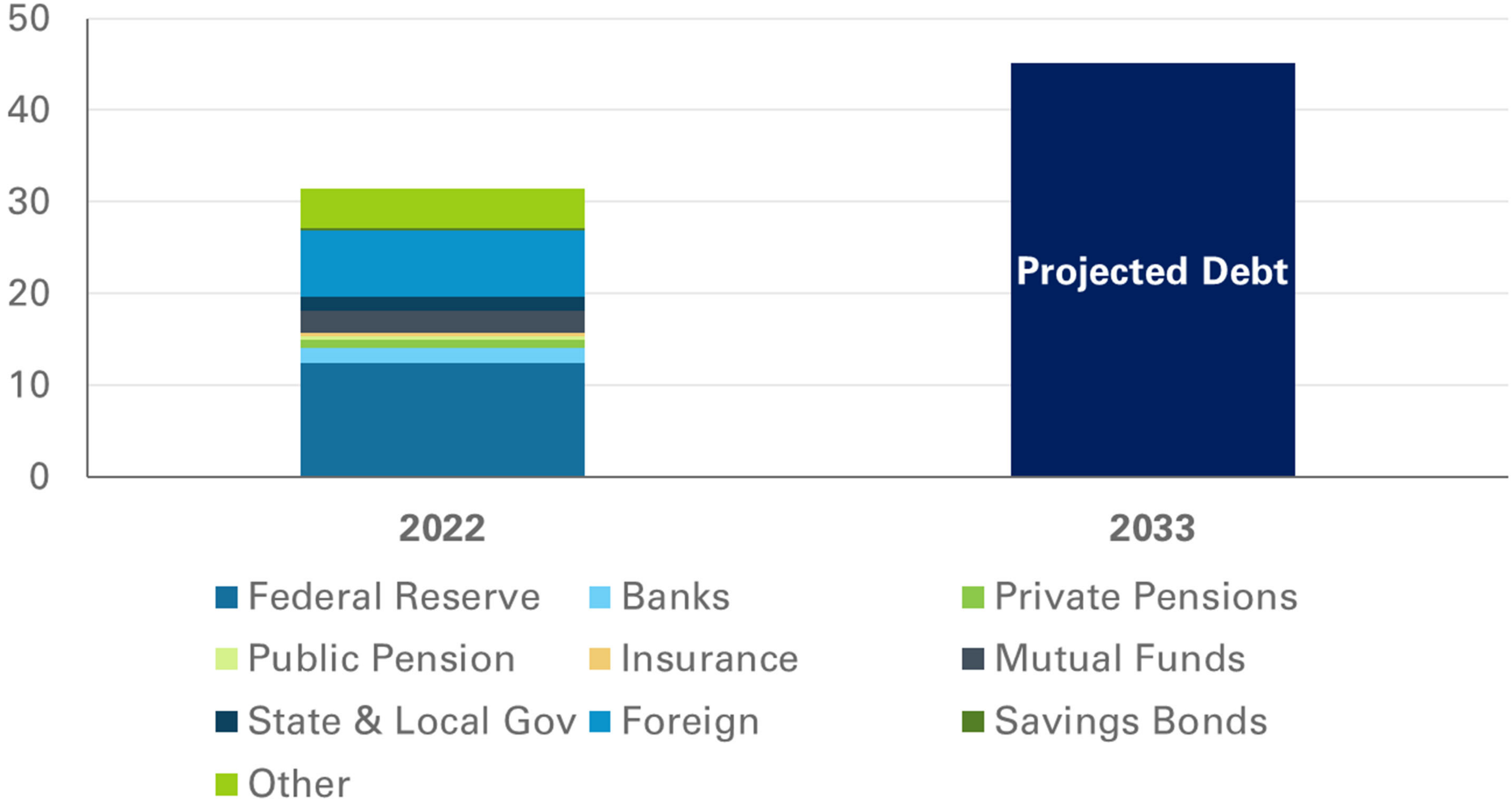
MAGNIFICENT SEVEN

BUT REALLY JUST ANOTHER ROUNDTRIP

WHO'S GOING TO BUY ALL THE NEW DEBT?

U.S. FISCAL DEBT THEME

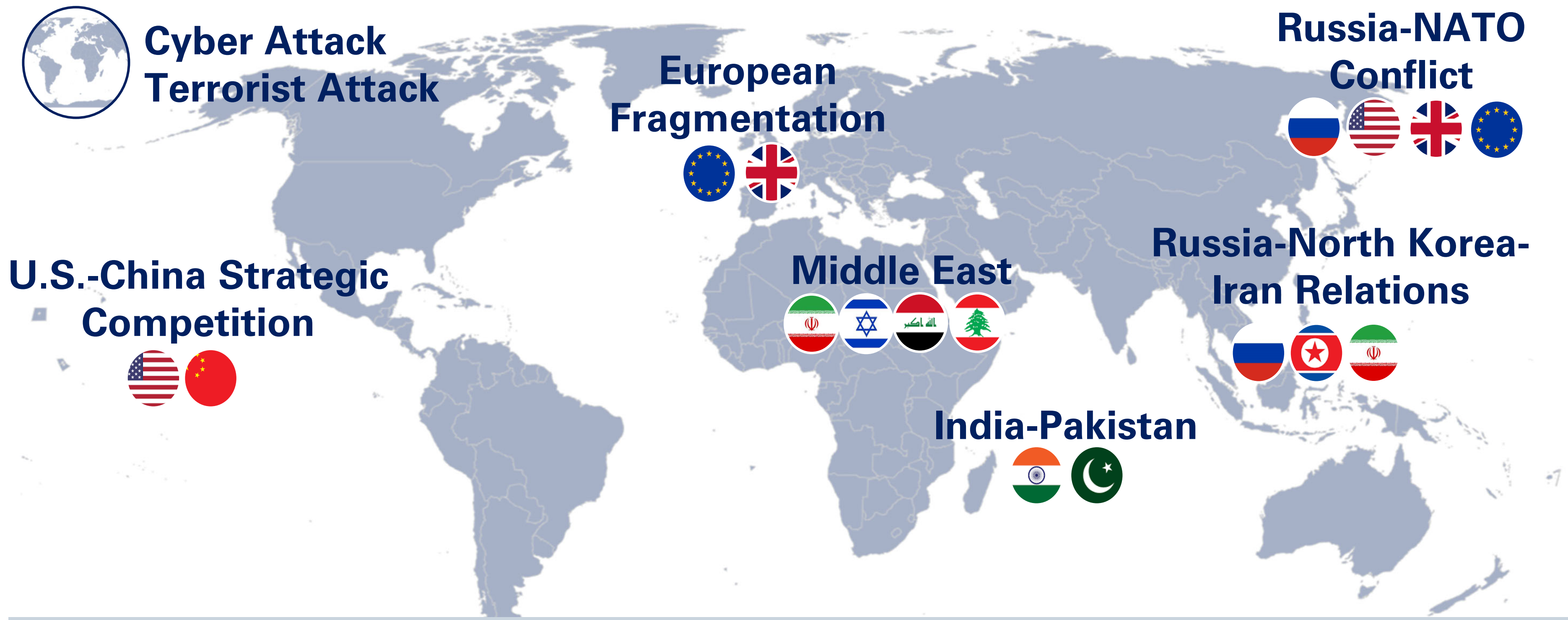
OWNERSHIP OF U.S. TREASURY SECURITIES IN TRILLIONS



Source: U.S. Treasury, Congressional Budget Office
As of December 31

2024 GEOPOLITICAL FLASHPOINTS

ESCALATION RISK IS KEY FOR CAPITAL MARKETS



Potential Economic and Market Impact:

- Food Supply
- Global Trade
- Global Inflation
- Energy Supply
- Economic Growth
- Currency Volatility

INTEREST IN AI EXTENDS PAST TECH COMPANIES

AI MENTIONED ON EARNINGS REPORT IN RUSSELL 3000

Source: Russell, FactSet

INVESTMENT REGIME SHIFTS TAKE TIME

2024 MARKET OUTLOOK

Economic Resilience	**Robust labor market reinforces a "no recession" outcome for the U.S.**
Long and Variable Monetary Policy Lag	**Access to capital and liquidity slowly adjusting to the investment landscape**
Higher for Longer Interest Rates	**Market participants have not accepted long-term interest rates above 4%**
Inflation Expectations Are Awry	**Market expectations are anchored to the low inflation levels of the past decade**
Geopolitical Dynamics	**Geopolitical trends are straining supply chains and macroeconomic conditions**

MWRA ASSET ALLOCATION REVIEW

NEPC STRATEGIC ASSET ALLOCATION VIEWS

The current efficient frontier curve has flattened - a flat risk curve reduces the marginal benefit of adding risk to the portfolio

The market environment offers a challenging path for several years and will be difficult to repeat the last decade of strong returns

Be mindful of long-term wealth objectives as shifts to fixed income from equity limit the potential return upside for portfolios

Equity exposure over the long-term offers a wider range of outcomes and can provide returns well-above median expectations

ASSET ALLOCATION OVERVIEW

Today, we recommend adjustments to the current approach, balancing risk and return characteristics as well as current and forward-looking opportunities.

	Current Policy	Mix A	Mix B
Large Cap	24%	26%	22%
Small Cap	7%	8%	7%
Non US Equity	12%	10%	8%
Emerging Equity	7%	6%	5%
Global Equity	-	-	8%
Total Equity	**50%**	**50%**	**50%**
Core Bonds	10%	8%	8%
Multi Sector Credit	10%	10%	10%
Total Debt	**20%**	**18%**	**18%**
Private Equity/Debt	12%	15%	15%
Private Assets	**12%**	**15%**	**15%**
Real Estate	12%	10%	10%
Total Real Estate	**12%**	**10%**	**10%**
Hedge Funds	6%	5%	5%
Total Multi Asset	**6%**	**5%**	**5%**
Cash	**-**	**2%**	**2%**

Measure*			
Expected Return (10 Years)	6.3%	6.3%	6.3%
Expected Return (30 Years)	7.6%	7.6%	7.6%
Standard Deviation	15.1%	14.9%	14.9%
Sharpe Ratio (10 Years)	0.16	0.16	0.16

The current portfolio has been structured to help meet the long-term needs of the Plan.

Potential to add a global equity allocation, allowing for greater flexibility within public equity and an area that has experienced strong active management.

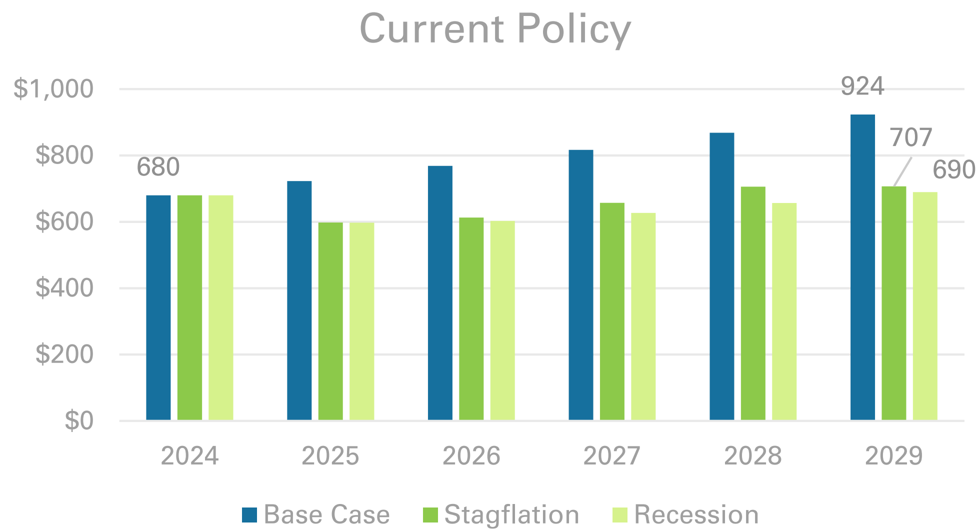
Reduction of real estate in favor of private equity/debt allows for a greater focus on opportunities present in this area of the market.

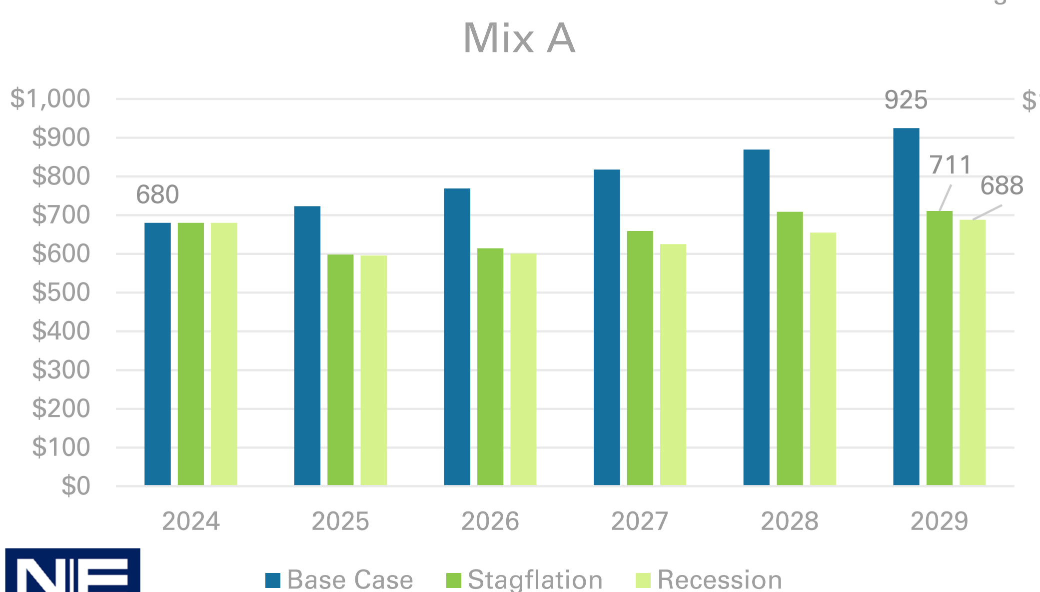
Finally, we recommend adding a strategic target to cash, given current and future cash needs coming from the Plan.

*Expected return is net of fee and beta only

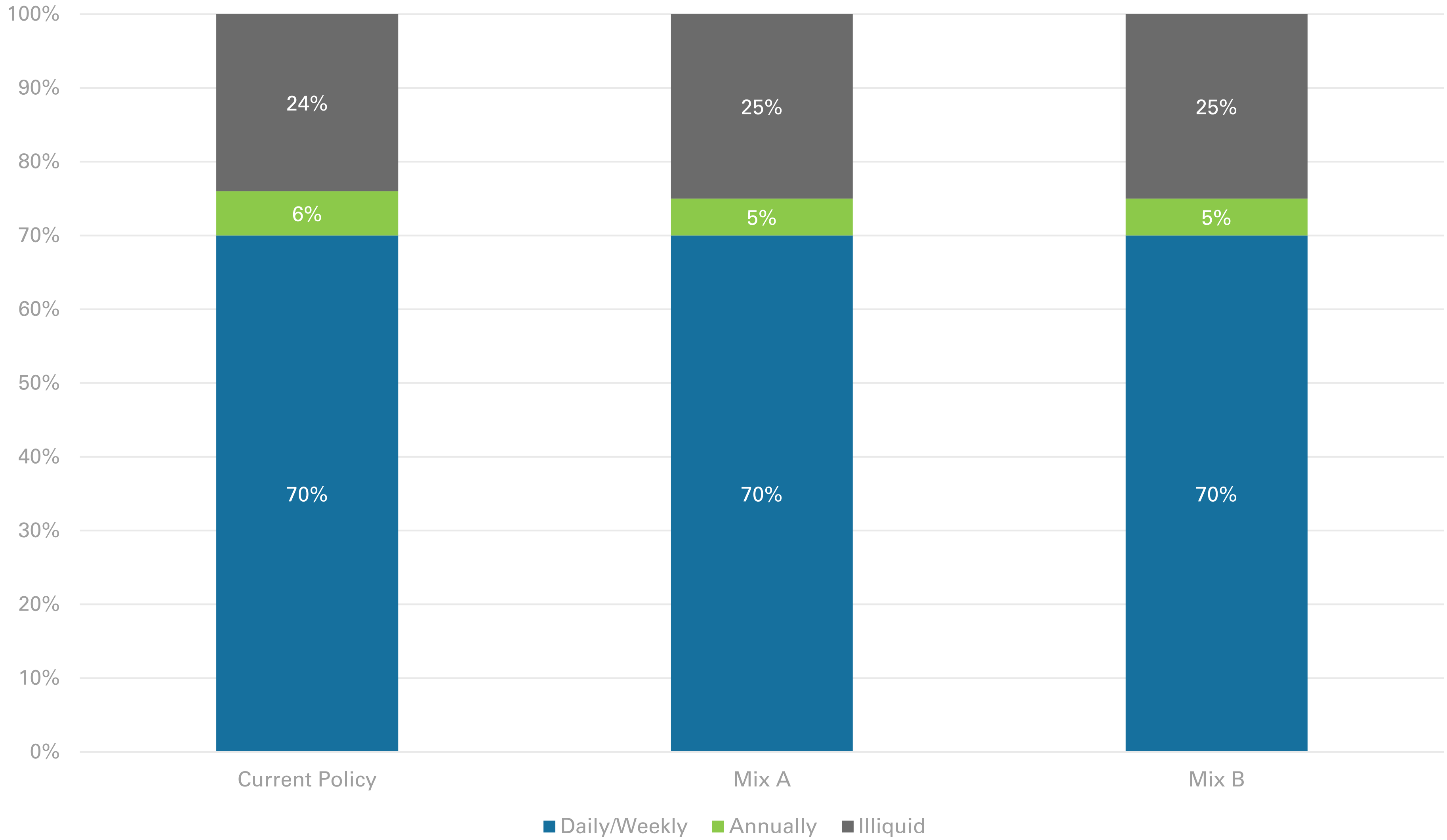
SCENARIO ANALYSIS – STRATEGIC ALLOCATION

All mixes are well positioned in growth regimes, and protect over time in drawdown scenarios. Given the annual review of the asset allocation, its likely adjustments would be made along the way.





LIQUIDITY OVERVIEW



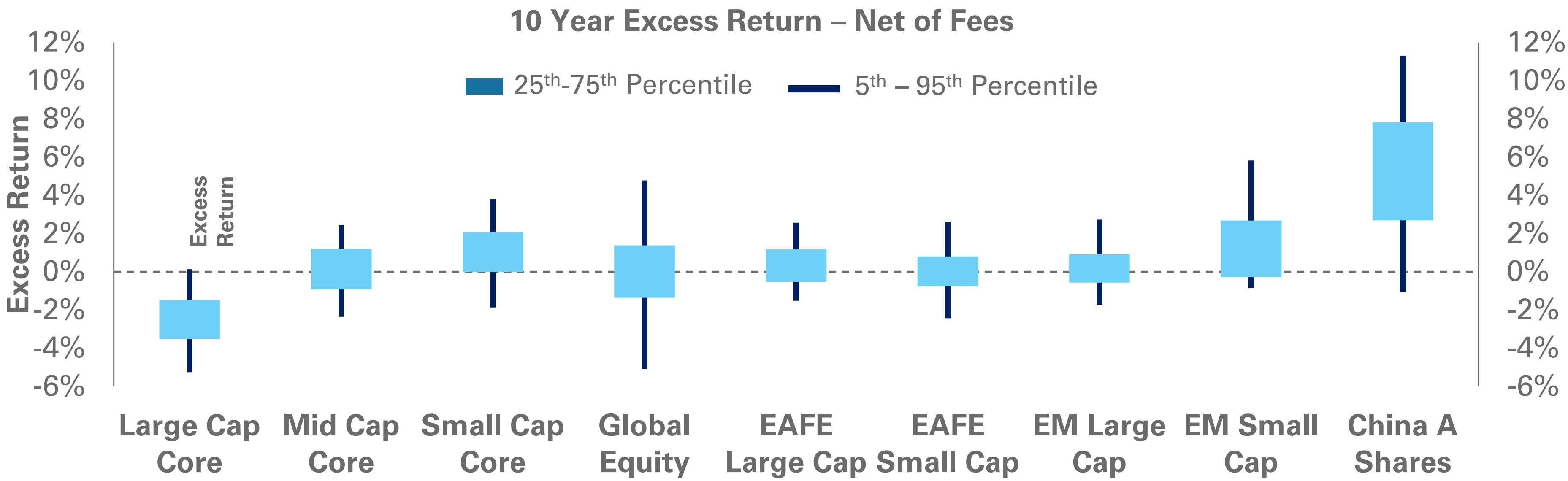
NEPC CURRENT OPPORTUNITIES

	RATIONALE	IMPLEMENTATION VIEW
Maintain U.S. Large-Cap Value Exposure *Maintain U.S. large-cap value exposure with S&P 500 as the funding source*	▪ U.S. large-cap value exposures can mitigate the portfolio impact of declining valuation premiums associated with the S&P 500 and mega-cap stocks	**U.S. Large Cap Equity** **Portfolio Tilt**: 70% S&P 500, 30% U.S. Large-Cap Value **Opportunity Cost**: S&P 500
Increase U.S. High Yield Bond Exposure *Increase U.S. high yield and credit exposure with S&P 500 as the funding source*	▪ U.S. high yield bonds offer a greater return relative to the S&P 500 and we recommend increasing credit exposure	**U.S. High Yield Bonds** **Portfolio Tilt**: 100% U.S. High Yield Bonds **Opportunity Cost**: S&P 500
Add to Active Global Equity Strategies *Increase exposure to active global equity strategies with S&P 500 as the funding source*	▪ We encourage greater use of active equity approaches and recommend tilting equity exposure to global equity strategies	**U.S. Large Cap Equity** **Portfolio Tilt**: 100% MSCI World **Opportunity Cost**: S&P 500

EQUITY IMPLEMENTATION PHILOSOPHY

ACTIVE IMPLEMENTATION IN LESS EFFICIENT MARKETS

- **Global Equity or ACWI ex US allocations complemented by satellite positions in alpha rich asset classes provide the best structure for outperformance**
  - Preference for Global or ACWI ex US implementation complemented by satellite positions in US Small Cap or Emerging Markets/Emerging Markets Small Cap
- **Stand alone US Large Cap allocations should be expressed through an efficient implementation approach and active risk should be taken in other areas**
  - Consider fully indexing the US Large Cap or using passive management for the bulk and complementing with 1-2 high conviction active strategies



Asset Class eVestment Universe Excess Returns are net of fees and as of 9/30/2023

CORE ASSET CLASS RETURN ASSUMPTIONS

	Asset Class	12/31/23 10-Year Return	12/31/22 10-Year Return	Delta
	Cash	3.9%	4.0%	-0.1%
	U.S. Inflation	2.6%	2.5%	+0.1%
Equity	U.S. Large-Cap Equity	4.4%	5.4%	-1.0%
	Non-U.S. Developed Equity	4.6%	5.6%	-1.0%
	Emerging Market Equity	8.6%	9.6%	-1.0%
	Global Equity*	5.4%	6.3%	-0.9%
	Private Equity*	9.0%	9.2%	-0.2%
Fixed Income	U.S. Treasury Bond	4.2%	4.2%	-
	U.S. Municipal Bond	3.5%	4.4%	-0.9%
	U.S. Aggregate Bond*	4.6%	4.8%	-0.2%
	U.S. TIPS	4.6%	4.4%	+0.2%
	U.S. High Yield Corporate Bond	6.1%	7.1%	-1.0%
	Private Debt*	8.3%	8.8%	-0.5%
Real Assets	Commodity Futures	4.6%	4.2%	+0.4%
	REIT	6.0%	6.2%	-0.2%
	Gold	4.9%	5.1%	-0.2%
	Real Estate - Core	5.4%	4.0%	+1.4%
	Private Real Assets - Infrastructure	6.8%	6.6%	+0.2%
Multi-Asset	60% S&P 500 & 40% U.S. Aggregate	4.8%	5.3%	-0.5%
	60% MSCI ACWI & 40% U.S. Agg.	5.4%	6.0%	-0.6%
	Hedge Fund*	6.1%	6.5%	-0.4%

*Calculated as a blend of other asset classes

APPENDIX

U.S. INFLATION ASSUMPTIONS

OVERVIEW

- **Inflation is a key building block to develop asset class assumptions**
- **Inflation assumptions are model-driven and informed by multiple inputs for both the U.S. and global assets**
- **NEPC's inflation assumption forecasts near-term paths for major Consumer Price Index (CPI) components including food, energy, core services, and shelter costs**
  - CPI is expected to converge with breakeven inflation rates over the long-term
- **A composite inflation assumption reflects a blend of NEPC's inflation forecast and market-implied breakeven inflation rates**

Region	10-Year Inflation Assumption	12-Month Change	30-Year Inflation Assumption	12-Month Change
United States	2.6%	+0.1%	2.6%	-

PUBLIC EQUITY ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Valuation	Represents P/E multiple contraction or expansion relative to long-term trend
Inflation	Market-specific inflation based on country-level revenue exposure
Real Earnings Growth	Market-specific real growth based on a weighted-average of country revenue exposure and GDP growth
Dividend Yield	Income distributed to shareholders adjusted to reflect market trends

Asset Class	12/31/23 10-Yr Return	12-Month Change
U.S. Large-Cap Equity	4.4%	-1.0%
U.S. Small/Mid-Cap Equity	6.0%	-0.5%
Non-U.S. Developed Equity	4.6%	-1.0%
Non-U.S. Developed Small-Cap Equity	6.4%	-0.3%
Emerging Market Equity	8.6%	-1.0%
Emerging Market Small-Cap Equity	7.9%	-1.4%
China Equity	9.9%	+1.2%
Hedge Fund - Equity	5.5%	-0.5%
Global Equity*	5.4%	-0.9%
Private Equity*	9.0%	-0.2%

Source: NEPC
*Calculated as a blend of other asset classes

FIXED INCOME ASSUMPTIONS

BUILDING BLOCKS

Illiquidity Premium	The return expected for assets with illiquidity risk
Government Rates Price Change	Change due to shifts in current yields relative to forecasted rates
Credit Deterioration	The average loss for credit assets due to defaults and recovery rates
Spread Price Change	Valuation change due to changes in credit spreads relative to long-term targets
Credit Spread	Yield premium provided by securities with credit risk
Government Rates	The yield attributed to sovereign bonds that do not have credit risk

Asset Class	12/31/23 10-Yr Return	12-Month Change
U.S. TIPS	4.6%	+0.2%
U.S. Treasury Bond	4.2%	-
U.S. Corporate Bond	5.3%	-0.6%
U.S. MBS	4.4%	-0.1%
U.S. High Yield Corporate	6.1%	-1.0%
U.S. Leveraged Loan	7.2%	-0.6%
EMD External Debt	7.1%	-
EMD Local Currency Debt	6.1%	-1.1%
Non-U.S. Govt. Bond	2.4%	-0.2%
U.S. Muni Bond (1-10 Year)	2.9%	-0.3%
U.S. High Yield Muni Bond	4.5%	-1.2%
Hedge Fund – Credit	6.6%	-0.5%
U.S. Aggregate Bond*	4.6%	-0.2%
Private Debt*	8.3%	-0.5%

Source: NEPC

*Calculated as a blend of other asset classes

REAL ASSET ASSUMPTIONS

BUILDING BLOCKS

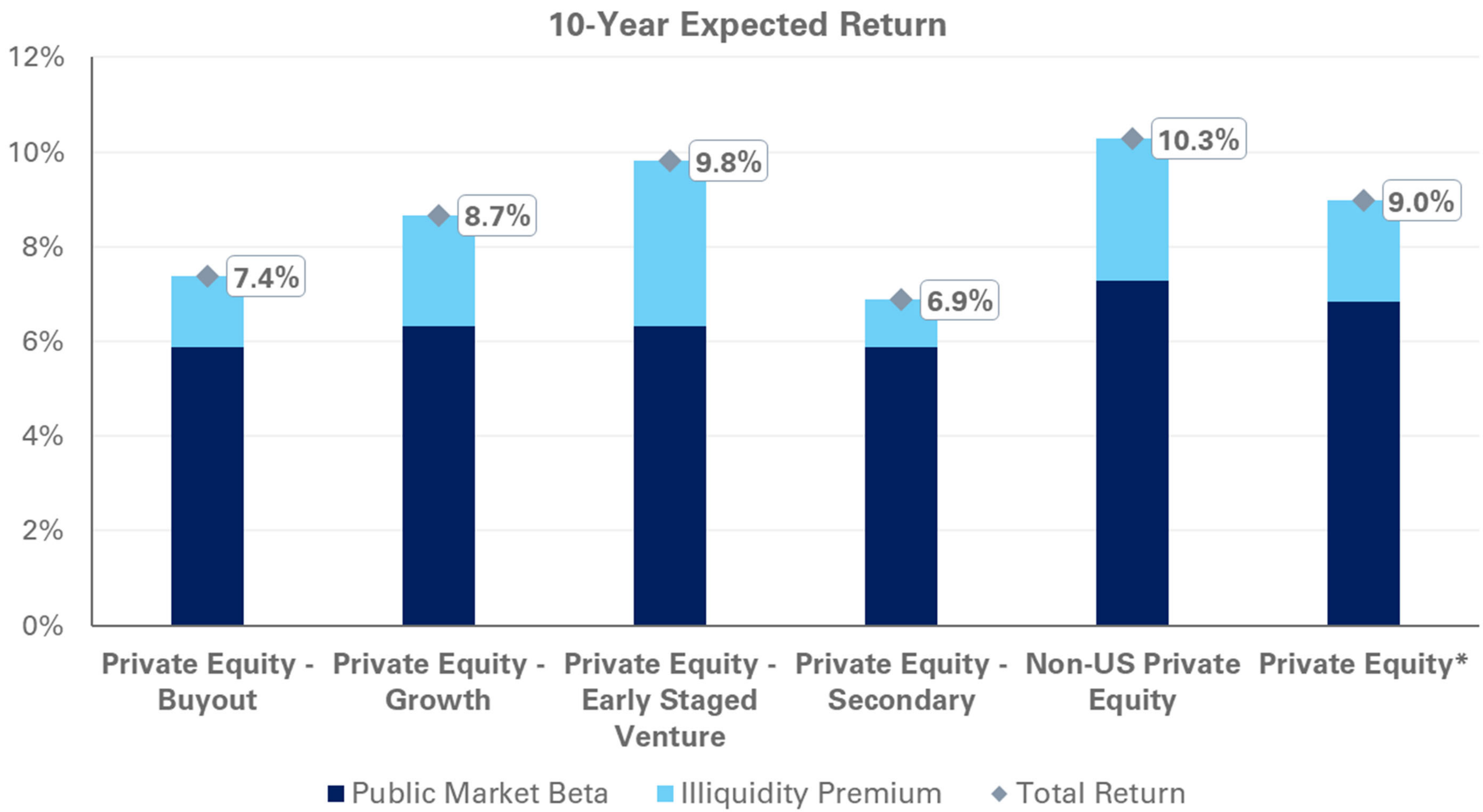
Illiquidity Premium	The return expected for assets with illiquidity risk
Valuation	The change in price of the asset moving to a terminal value or real average level
Inflation	Based on the inflation path as defined by breakeven-inflation rates and NEPC assumptions
Growth	Market-specific real growth based on a weighted-average of country-level revenue exposure and GDP growth
Real Income	The inflation-adjusted income produced by the asset

Asset Class	12/31/23 10-Yr Return	12-Month Change
Commodity Futures	4.6%	+0.4%
Midstream Energy	5.5%	-0.5%
REIT	6.0%	-0.2%
Global Infrastructure Equity	6.6%	+1.0%
Global Natural Resources Equity	6.2%	+0.7%
Gold	4.9%	-0.2%
Real Estate - Core	5.4%	+1.4%
Real Estate – Non-Core	7.1%	+1.8%
Private Debt - Real Estate	6.3%	+0.5%
Private Real Assets - Natural Resources	8.2%	+0.1%
Private Real Assets - Infrastructure	6.8%	+0.2%

Source: NEPC
*Calculated as a blend of other asset classes

PRIVATE EQUITY

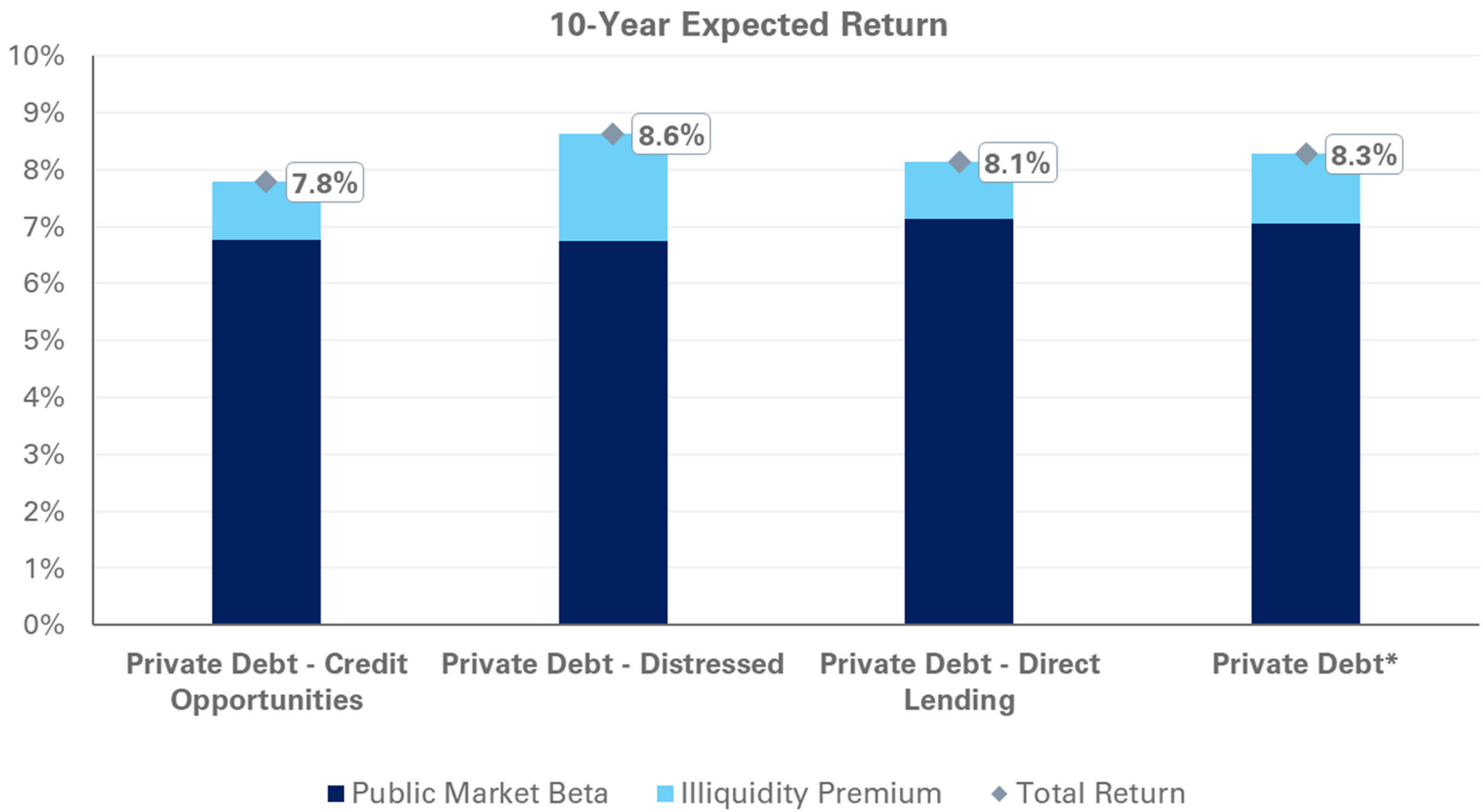
BUILDING BLOCKS



Source: NEPC

*Private Equity is a derived composite of 34% U.S. Buyout, 34% U.S. Growth, 8.5% U.S. Secondary, 8.5% U.S. Venture, 15% Non-U.S. PE

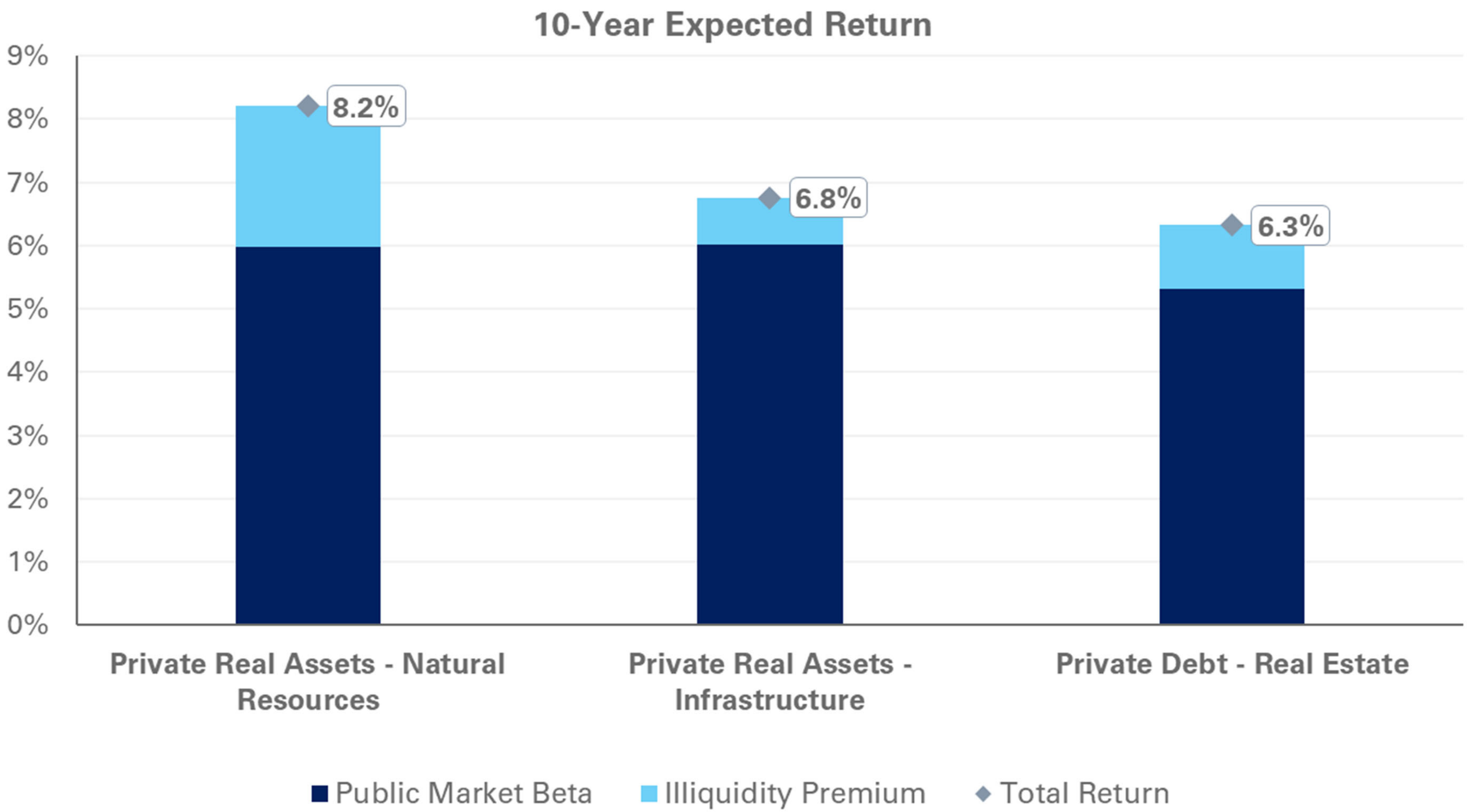
PRIVATE DEBT
BUILDING BLOCKS



Source: NEPC
*Private Debt is a derived composite of 25% Mezzanine, 25% Distressed, 50% Direct Lending

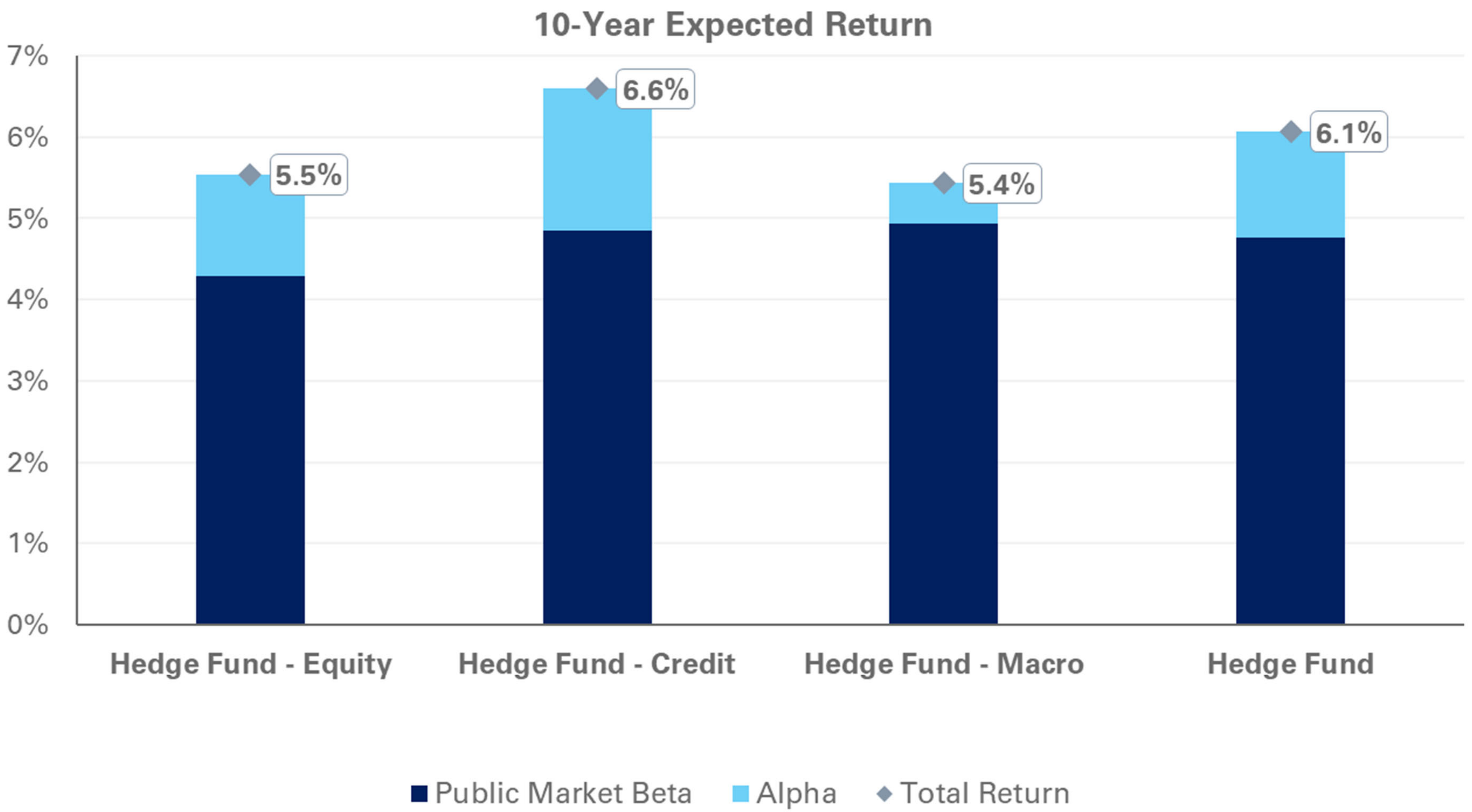
PRIVATE REAL ASSET

BUILDING BLOCKS



Source: NEPC

HEDGE FUND
BUILDING BLOCKS



Source: NEPC
*Hedge Funds is a derived composite of 40% Long/Short, 40% Credit, 20% Macro

INFORMATION DISCLAIMER

Past performance is no guarantee of future results.

The goal of this report is to provide a basis for substantiating asset allocation recommendations. The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.

Information on market indices was provided by sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.

All investments carry some level of risk. Diversification and other asset allocation techniques do not ensure profit or protect against losses.

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MWRA Employees' Retirement System

Estimated Asset Allocation Rebalance Summary

February 23, 2024

	Market Value	Weight in Fund	Target Weight	Recommendation	New Market Value	New Weight
Composite	**$684,043,443**	**100.0%**	**100.0%**	**$0**	**$684,043,443**	**100.0%**
Total Balanced	**$3,837,427**	**0.6%**	**0.0%**	**$0**	**$3,837,427**	**0.6%**
PRIT Core Fund	$3,837,427	0.6%	0.0%	$0	$3,837,427	0.6%
Total Domestic Equity	**$214,081,072**	**31.3%**	**31.0%**	**$0**	**$214,081,072**	**31.3%**
Rhumbline Advisors S&P 500 Index Fund	$65,998,559	9.6%	10.0%	$25,000,000	$90,998,559	13.3%
Aristotle Relative Value	$0	0.0%	0.0%	$30,000,000	$30,000,000	4.4%
Coho Relative Value	$52,127,764	7.6%	7.0%	-$30,000,000	$22,127,764	3.2%
Polen Focused Growth	$45,050,703	6.6%	7.0%	-$25,000,000	$20,050,703	2.9%
Mesirow Smcall Cap Value	$24,948,461	3.6%	3.5%	$0	$24,948,461	3.6%
Loomis Sayles Small Cap Growth	$25,955,585	3.8%	3.5%	$0	$25,955,585	3.8%
Total International Equity	**$113,144,380**	**16.5%**	**19.0%**	**$0**	**$113,144,380**	**16.5%**
SEG - Baxter Street Fund	$30,700,919	4.5%	5.0%	$0	$30,700,919	4.5%
Schroders International Alpha	$30,973,647	4.5%	4.0%	$0	$30,973,647	4.5%
Baillie Gifford	$13,693,579	2.0%	3.0%	$0	$13,693,579	2.0%
Axiom Emerging Markets	$17,979,475	2.6%	3.5%	$0	$17,979,475	2.6%
ABS Emering Markets Strategic Portfolio	$19,796,760	2.9%	3.5%	$0	$19,796,760	2.9%
Total Equity	**$327,225,452**	**47.8%**	**50.0%**	**$0**	**$327,225,452**	**47.8%**
Total Fixed Income	**$135,770,422**	**19.8%**	**20.0%**	**$0**	**$135,770,422**	**19.8%**
Garcia Hamilton	$29,951,061	4.4%	10.0%	$0	$29,951,061	4.4%
Lord Abbett	$39,013,616	5.7%		$0	$39,013,616	5.7%
Loomis Sayles Multi Sector Bonds	$52,354,275	7.7%	8.0%	$0	$52,354,275	7.7%
LMCG Serenitas	$14,436,285	2.1%	2.0%	$0	$14,436,285	2.1%
Invesco Mortgage Recovery	$15,185	0.0%	0.0%	$0	$15,185	0.0%
Total Hedge Fund	**$39,075,431**	**5.7%**	**6.0%**	**-$4,000,000**	**$35,075,431**	**5.1%**
PRIM Absolute Return Fund	$12,348,898	1.8%		-$2,000,000	$10,348,898	1.5%
Corbin Pinehurst Partners	$14,390,044	2.1%		-$2,000,000	$12,390,044	1.8%
UBS Neutral Alpha Strategies	$12,287,896	1.8%		$0	$12,287,896	1.8%
Entrust Peru Winddown	$48,593	0.0%		$0	$48,593	0.0%
Total Real Estate	**$68,140,811**	**10.0%**	**12.0%**	**$0**	**$68,140,811**	**10.0%**
TA Realty Core	$24,791,248	3.6%		$0	$24,791,248	3.6%
Morgan Stanley PPF	$24,247,435	3.5%		$0	$24,247,435	3.5%
Total Private Equity & Debt	**$92,622,257**	**13.5%**	**12.0%**	**$0**	**$92,622,257**	**13.5%**
Cash	**$17,371,643**	**2.5%**	**0.0%**	**$4,000,000**	**$21,371,643**	**3.1%**
M&T Cash	$17,371,643	2.5%	0.0%	$4,000,000	$21,371,643	3.1%

INTERNATIONAL EQUITY STRUCTURE REVIEW

MWRA RETIREMENT SYSTEM

FEBRUARY 29, 2024

Sebastian Grzejka, CAIA, Partner
Mike Sullivan, Partner
Francesca LoVerde, Consulting Analyst

EXECUTIVE SUMMARY

- **The purpose of todays presentation is to review the current structure and implementation of the International equity allocation**
  – The goal is to reaffirm the structure and consider next steps in the implementation of the exposure

- **Today, we want to focus on the following areas**
  – ***International Equity Implementation:***
    - We have provided a detailed quantitative analysis of the current allocation
    - The goal is to reaffirm the existing approach, or consider adjustments to implementation that best meets the Systems goals
    - We have provided two options for consideration to enhance the exposure
  – ***Private equity and debt implementation:***
    - At the next meeting we will review pacing analysis for 2024 commitments
    - As a reminder, the Board approved a $10M commitment to PRIM VY 2024

- **Based on today's review, we will issue an RFP for International Equity**

WORK PLAN BASED ON TIME SINCE LAST RFP

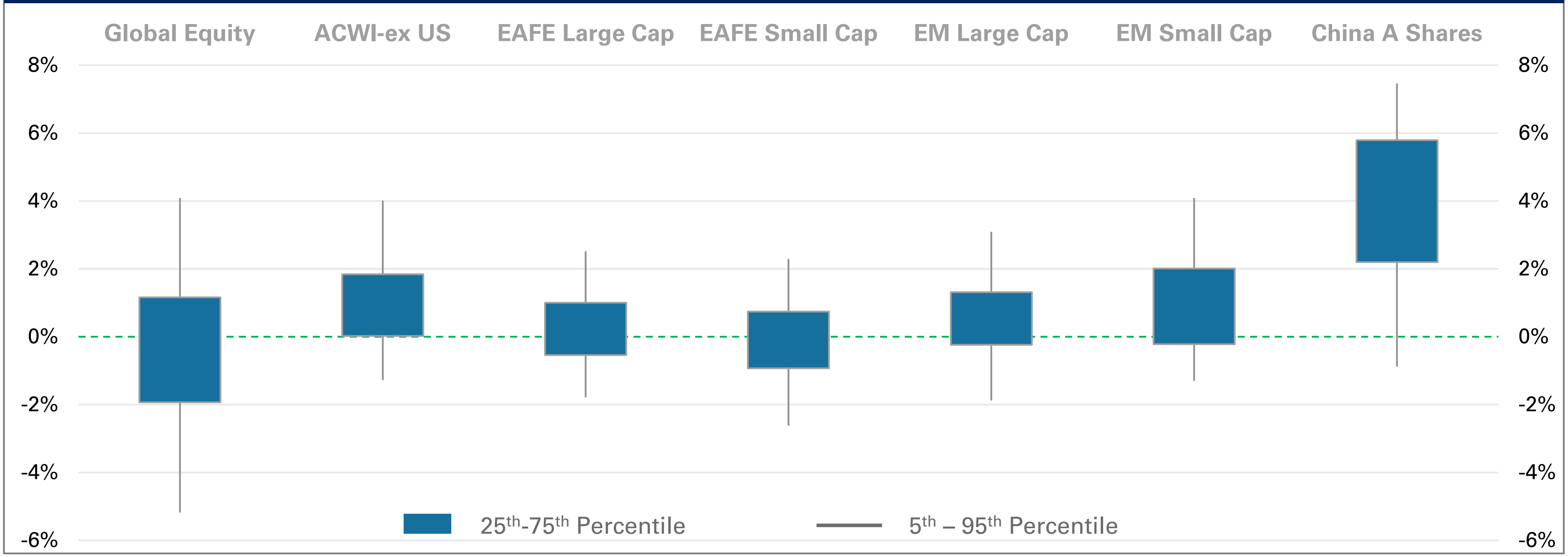
	2024	2025	2026	2027	2028
International Equity (Value)	✖				
Core Fixed Income		✖			
Hedge Funds		✖			
Yield Seeking Fixed Income			✖		
Core Real Estate			✖		
International Equity (Growth)				✖	
Emerging Markets				✖	
Small Cap Value					✖
Passive US Equity					✖
Private Equity/Debt					
Private Real Estate					

NON-US EQUITIES

ACTIVE VS. PASSIVE VIEWS

	Global Equity	ACWI ex US	EAFE Large Cap	EAFE Small Cap	EM Large Cap	EM Small Cap	China A Shares
Test 1 (Dispersion)	Pass	Pass	Fail	Fail	Fail	Pass	Pass
Test 2 (Rolling Outperformance)	Pass	Pass	Pass	Pass	Pass	Pass	Pass
Efficient Passive Option	Yes	Yes	Yes	Yes	Yes	Yes	Yes

10 Year Excess Return – Net of Fees



Source: eVestment. Data as of 6/30/2023

*Benchmarks used in the above analysis are detailed within appendix

INTERNATIONAL EQUITY STRUCTURE REVIEW

PORTFOLIO CONSTRUCTION SUMMARY

Fund	Current Allocation	Mix 1 (Add Passive)	Mix 2 (SEG/ Passive)	Mix 3 (Schroder/ Passive)	Mix 4 (Baillie/ Passive)	Benchmark	Analysis Start Date	Analysis End Date
Select Equity Baxter Street	41%	30%	50%	---	---	MSCI ACWI Ex-US	9/30/2012	12/31/2023
Schroder International Alpha (ACWI Ex-US)	41%	30%	---	50%	---	MSCI ACWI Ex-US	9/30/2012	12/31/2023
Baillie Gifford International Growth	18%	10%	---	---	50%	MSCI ACWI Ex-US	9/30/2012	12/31/2023
MSCI EAFE	---	30%	50%	50%	50%	MSCI EAFE	9/30/2012	12/31/2023
Total	**100%**	**100%**	**100%**	**100%**	**100%**			

	Current Allocation	Mix 1 (Add Passive)	Mix 2 (SEG/ Passive)	Mix 3 (Schroder/ Passive)	Mix 4 (Baillie/ Passive)
Active Risk and Return					
Realized Alpha	1.1%	0.8%	0.3%	0.9%	0.4%
Beta	1.00	1.00	0.97	1.00	1.07
Tracking Error	4.0%	2.7%	2.5%	1.6%	4.5%
Diversification Ratio	1.3	1.3	1.0	1.0	1.0
Information Ratio	0.3	0.3	0.1	0.6	0.1
Style and Size Regression					
Style	High Growth	Growth	Growth	Growth	Growth
Size	Large Cap	Large Cap	Large Cap	Large Cap	Large Cap
Return Decomposition					
Upside Market Capture	106.6%	103.9%	98.1%	103.8%	113.7%
Downside Market Capture	100.2%	99.6%	97.3%	99.6%	107.7%

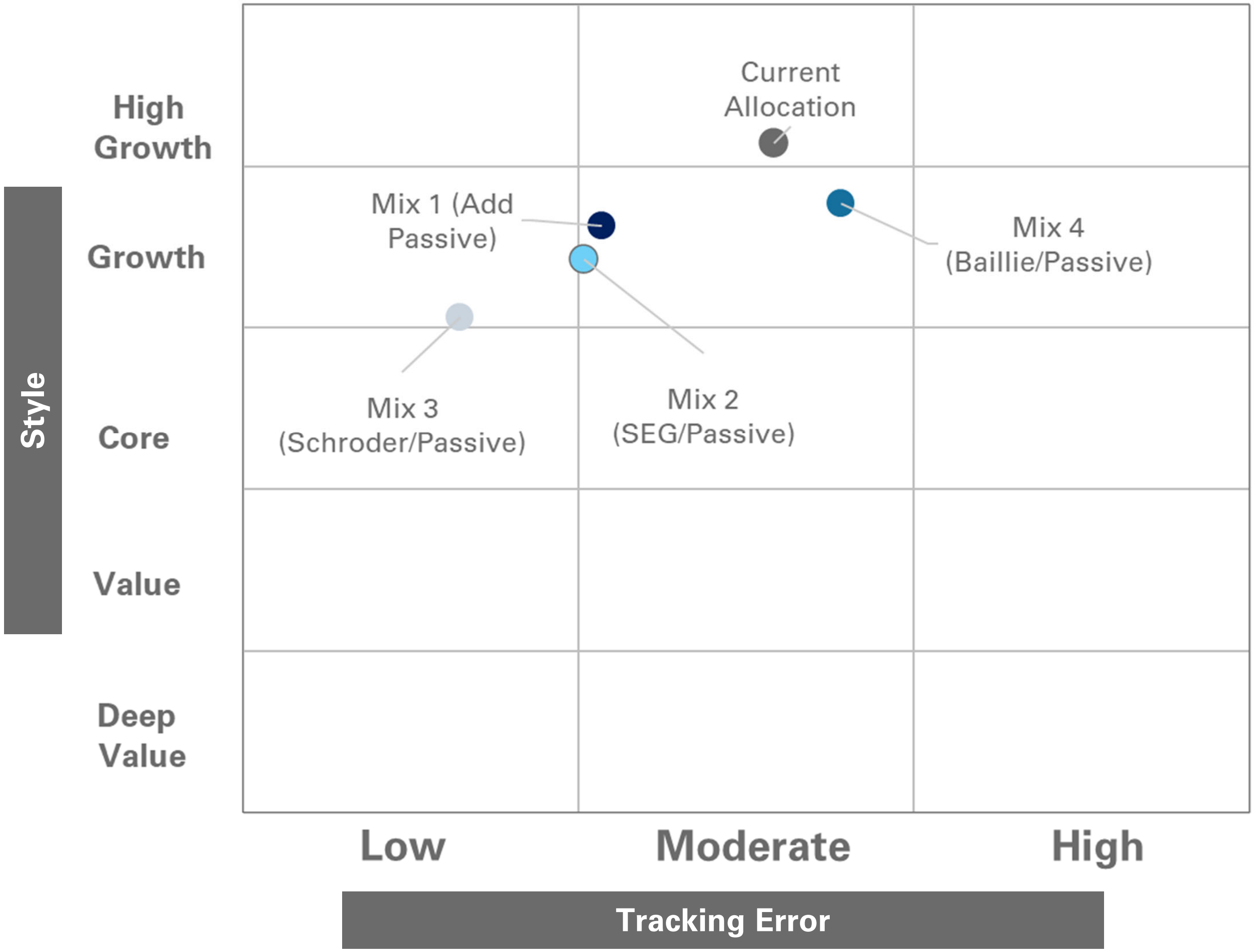
The current allocation looks to balance between growth, value and geographically outside of the United States.

Adding passive exposure helps reduce tracking error, balancing overall exposure.

In a “core”-”satellite” approach, pairing passive with a single satellite manager, there is potential to maintain existing return characteristics, while limiting tracking further.

All Risk/Return statistics calculated through 12/31/23. Portfolio metrics calculated by combining fund statistics at specified weights.
Diversification Ratio defined as: ∑(Fund Active Risk * Fund Weight)/(Total Portfolio Active Risk). Higher numbers represent greater diversification.
Information Ratio defined as: Realized Alpha/Tracking Error.

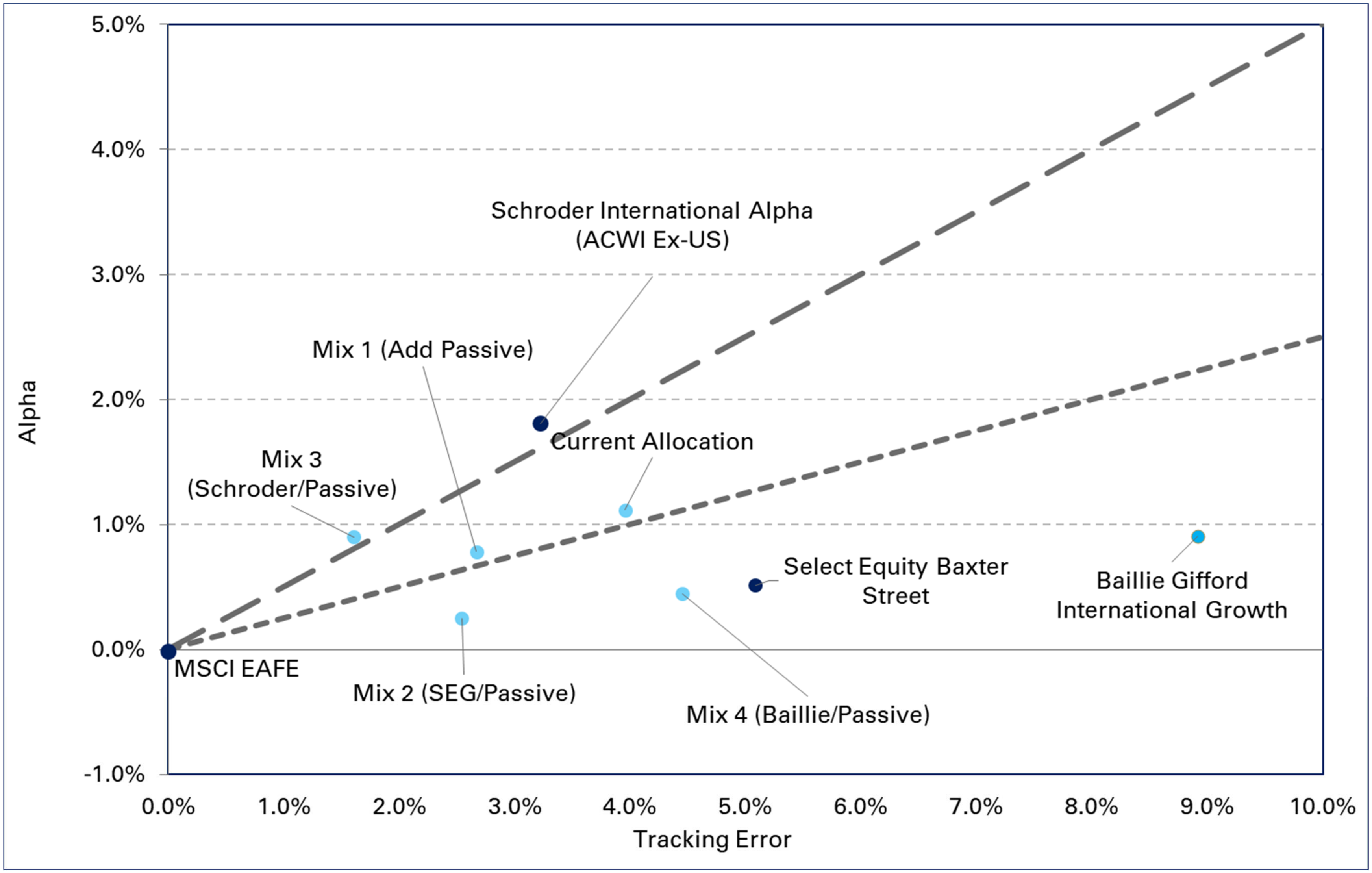
STYLE/TRACKING ERROR MATRIX – PORTFOLIO LEVEL



All Risk/Return statistics calculated through 12/31/23. Portfolio metrics calculated by combining fund statistics at specified weights.

ACTIVE RISK/RETURN – FUND LEVEL

ALPHA, TRACKING ERROR, & INFORMATION RATIO

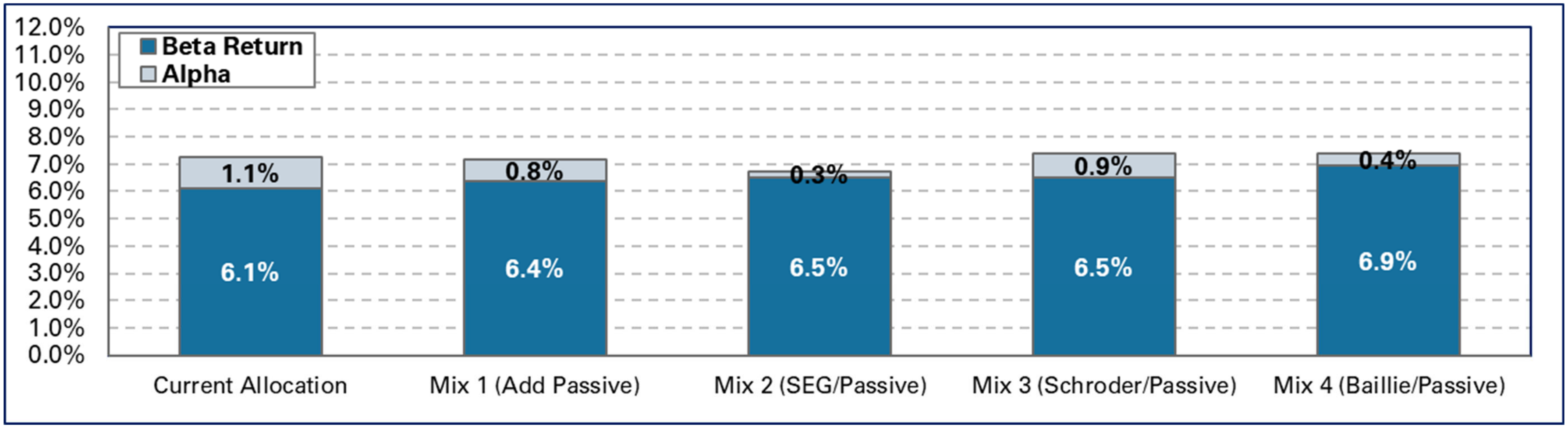


All Risk/Return statistics calculated through 12/31/23. Portfolio metrics calculated by combining fund statistics at specified weights.

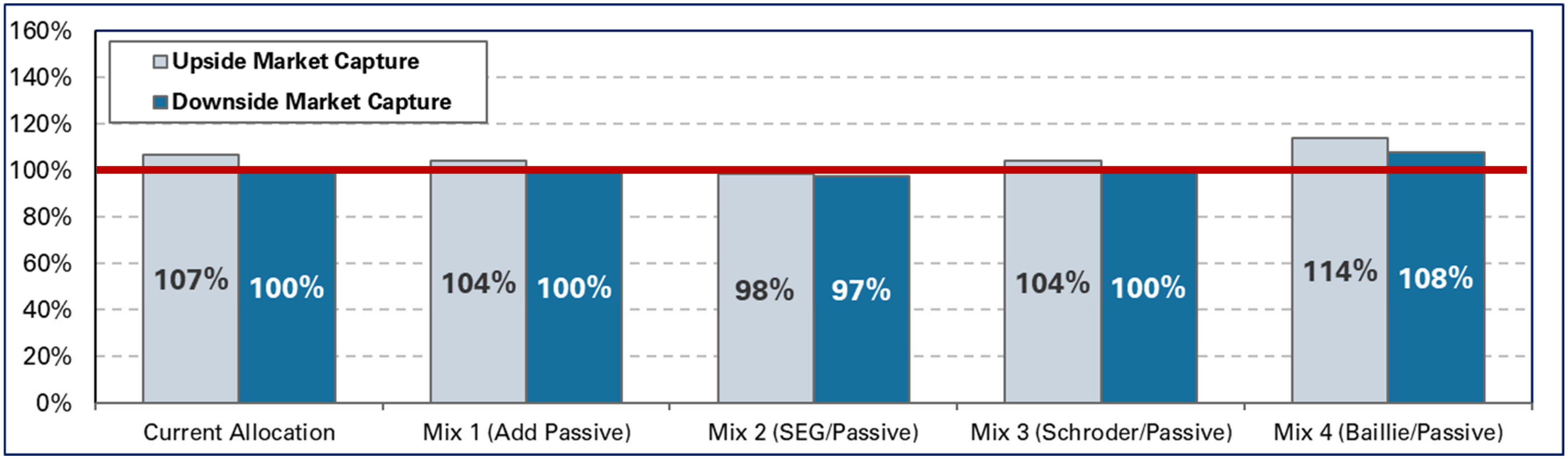
RETURN DECOMPOSITION – PORTFOLIO LEVEL

ALPHA/BETA BREAKDOWN & UPSIDE/DOWNSIDE CAPTURE

Alpha/Beta Breakdown



Upside/Downside Market Capture

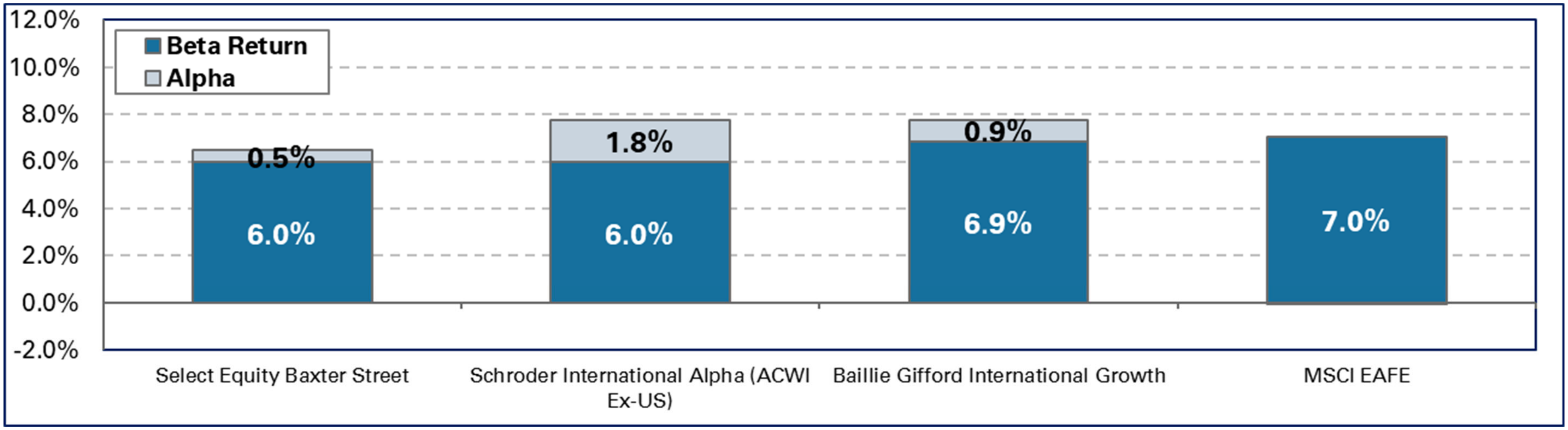


All Risk/Return statistics calculated through 12/31/23. Portfolio metrics calculated by combining fund statistics at specified weights.

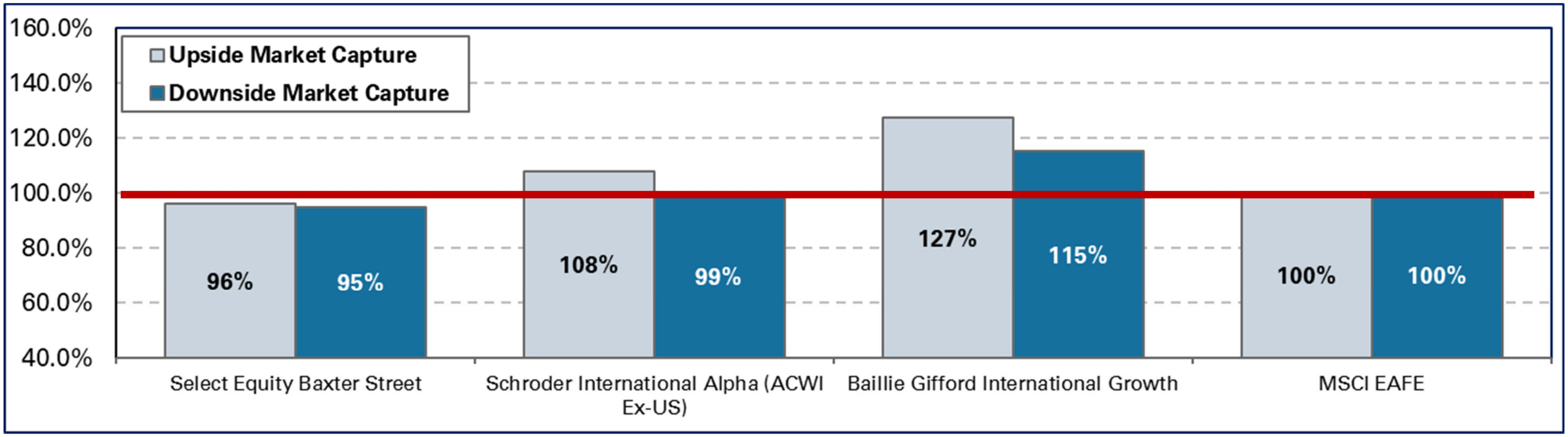
RETURN DECOMPOSITION – FUND LEVEL

ALPHA/BETA BREAKDOWN & UPSIDE/DOWNSIDE CAPTURE

Alpha/Beta Breakdown



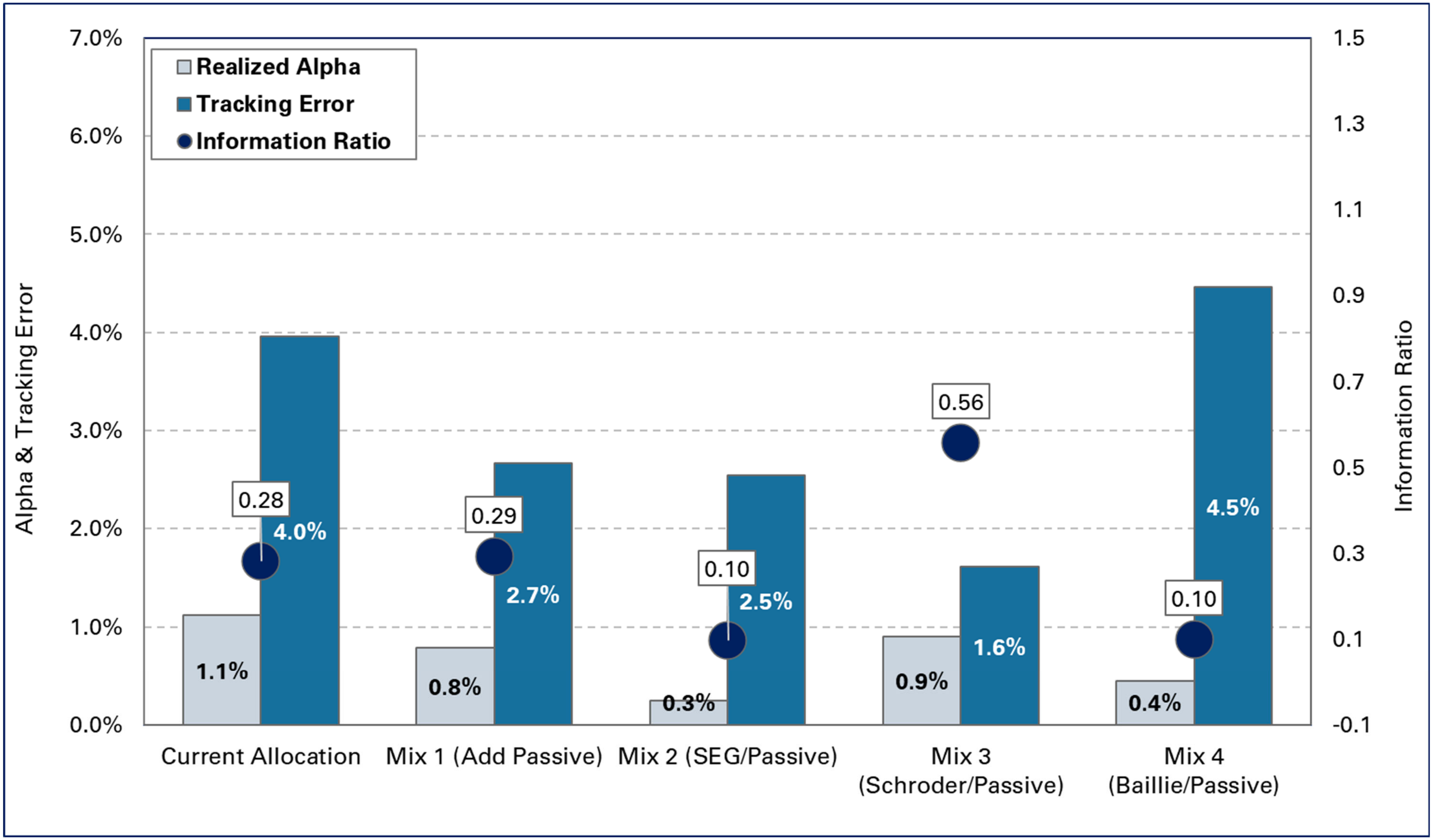
Upside/Downside Market Capture



All Risk/Return statistics calculated through 12/31/23. Portfolio metrics calculated by combining fund statistics at specified weights.

ACTIVE RISK/RETURN – PORTFOLIO LEVEL

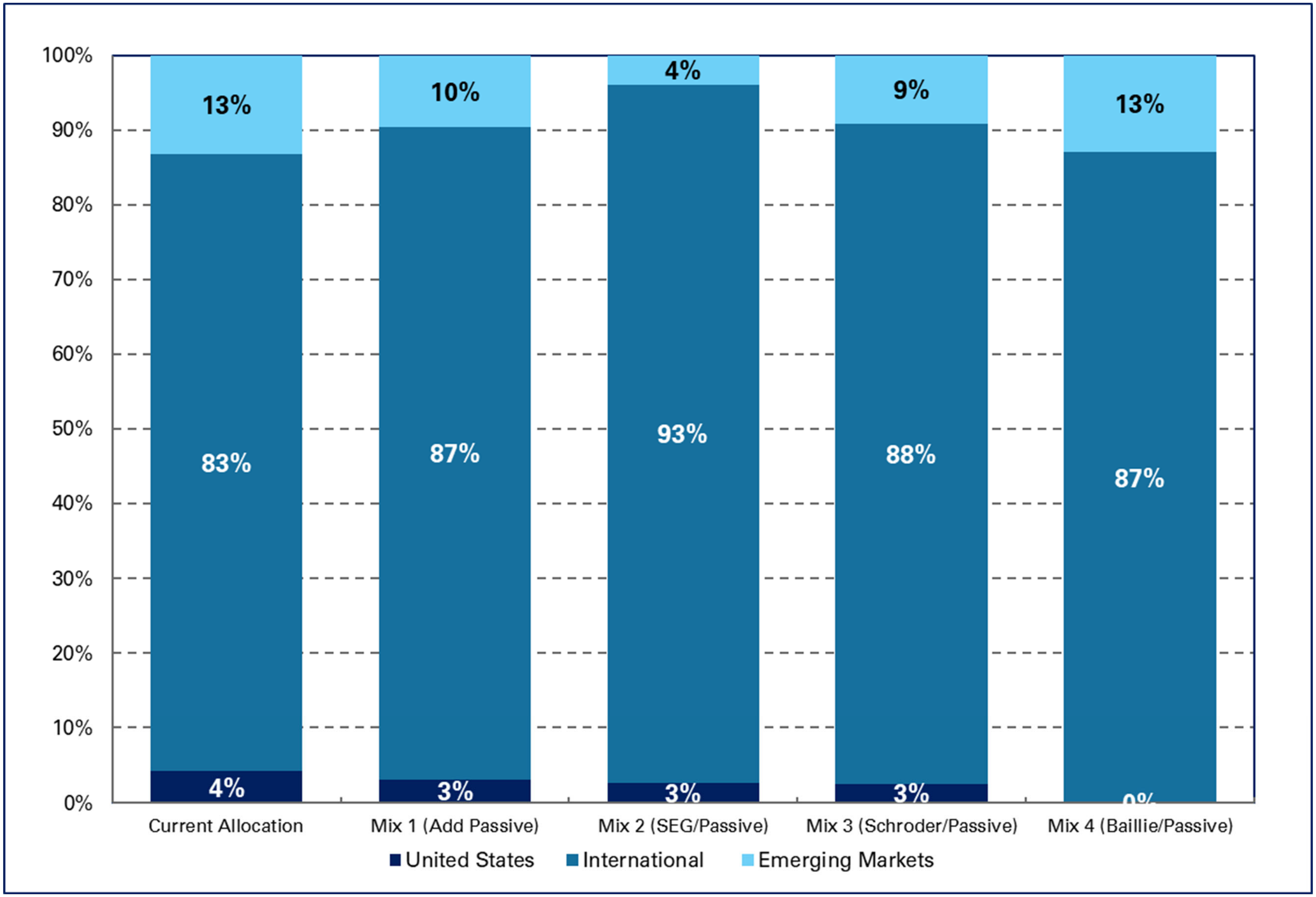
ALPHA, TRACKING ERROR, & INFORMATION RATIO



All Risk/Return statistics calculated through 12/31/23. Portfolio metrics calculated by combining fund statistics at specified weights.

REGIONAL EXPOSURES – PORTFOLIO LEVEL

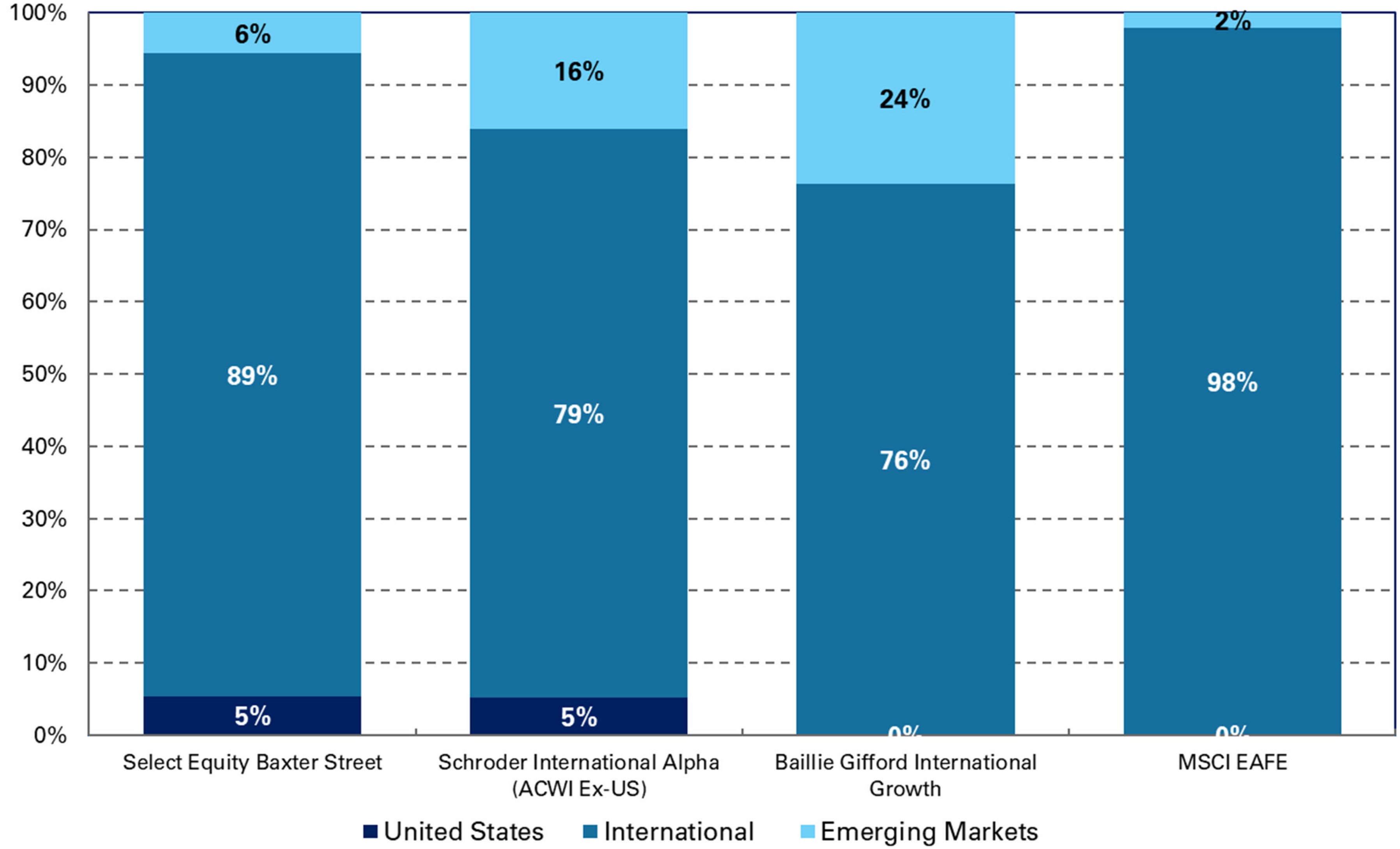
Market Cap Exposure



Source: eVestment

REGIONAL EXPOSURES – FUND LEVEL

Market Cap Exposure



Source: eVestment

CONCLUSION AND NEXT STEPS

- **The current allocation has been designed to provide a balanced and diversified approach**
  - While this has been achieved over time, there have been periods where the performance and tracking of certain strategies has been outside of expectations
  - Further, fees are an important consideration of any implementation

- **Given these discussions, we provide two options for the allocation:**
  - *Option One:* Add passive, while maintaining multi-manager active approach
    - Passive EAFE exposure complements current approach, which tends to have a growth tilt
    - Adding passive helps reduce fees and tracking from the allocation
    - Would require two RFPs: One active (SEG allocation) and one new passive exposure
  - *Option Two:* Move to a “Core”-“Satellite” approach
    - The “core” EAFE passive exposure would provide diversifying, cost-effective exposure
    - This would be complemented by one high conviction active “satellite” manager
    - The structure of this exposure could be ~ 50% passive and ~50% active
    - This profile results in risk, return and diversification benefits of current approach, at lower fees

- **While both options result in an implementation change, they maintain a balanced approach for the allocation while helping reduce overall fees**
  - However, NEPC recommends option two for the allocation
  - NEPC will work with the Board to issue the appropriate RFP for the allocation

APPENDIX

PORTFOLIO CONSTRUCTION DATA DISCLOSURES

ANALYSIS PERIOD AND SUMMARY STATISTICS

	Select Equity Baxter Street	Schroder International Alpha (ACWI Ex-US)	Baillie Gifford International Growth	MSCI EAFE
Total Risk and Return				
Annualized Return (Since Inception)	6.5%	7.8%	7.8%	7.0%
Annualized Standard Deviation	15.0%	15.2%	19.9%	14.8%
Active Risk and Return				
Realized Alpha	0.5%	1.8%	0.9%	0.0%
Beta	0.94	1.01	1.14	1.00
Tracking Error	5.1%	3.2%	8.9%	0.0%
Information Ratio	0.10	0.56	0.10	---
Style and Size Regression				
Style	High Growth	Growth	High Growth	Neutral
Size	Large Cap	Large Cap	Large Cap	Large Cap
Return Decomposition				
Upside Market Capture	96.3%	107.7%	127.4%	100.0%
Downside Market Capture	94.6%	99.1%	115.3%	100.0%

All Risk/Return statistics calculated through 12/31/23.

PORTFOLIO CONSTRUCTION DATA DISCLOSURES

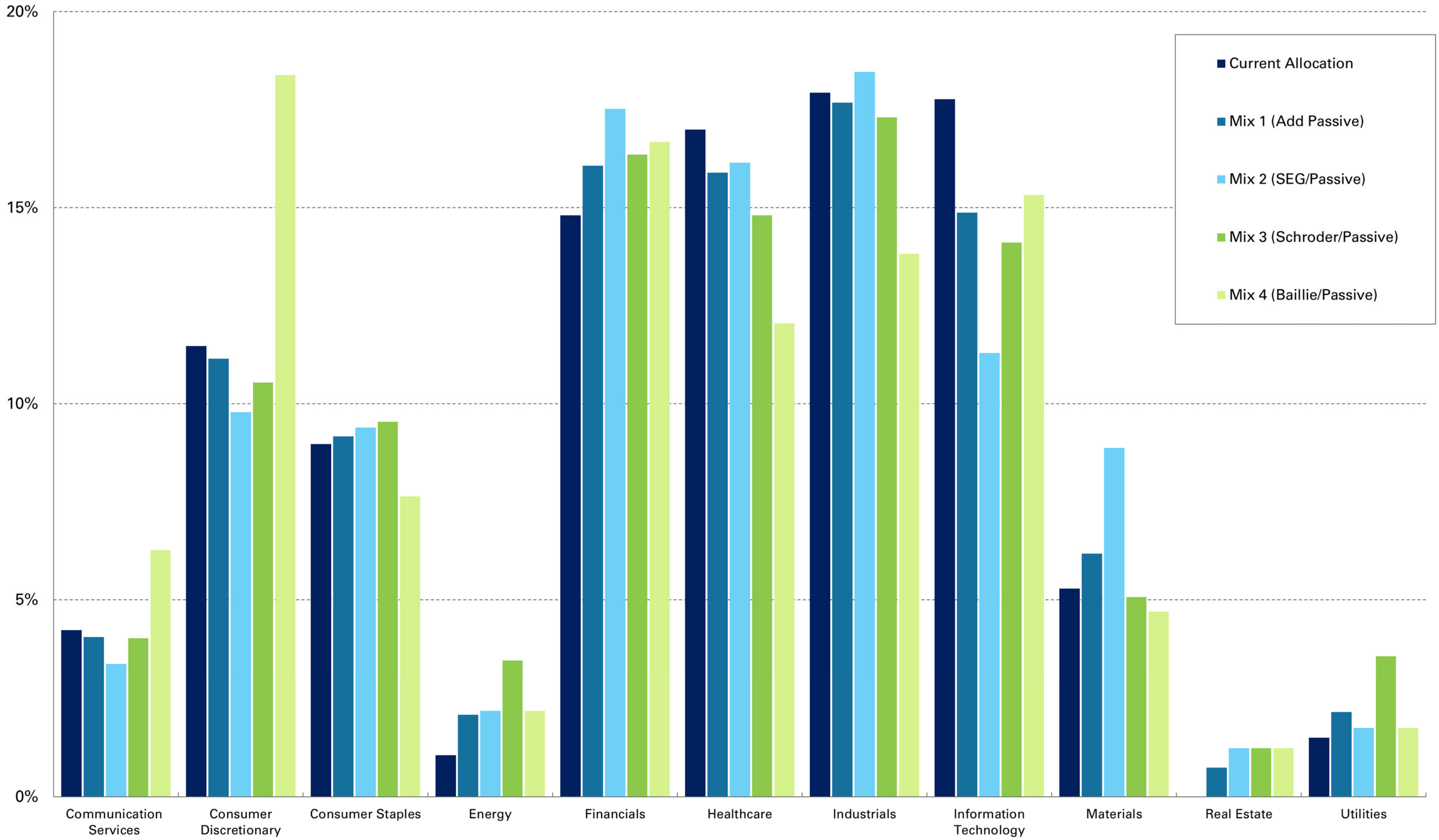
INVESTMENT MANAGER TRAILING RETURNS

Displayed is a summary of the data we modeled.

Fund	Analysis Start Date	Analysis End Date	Last 3 Months	YTD	1 Year	3 Years	5 Years	7 Years	10 Years	Since Analysis Start Date
Select Equity Baxter Street	9/30/2012	12/31/2023	9.2%	7.9%	7.9%	-5.2%	4.8%	5.3%	4.1%	6.5%
MSCI ACWI Ex-US			9.8%	16.2%	16.2%	2.0%	7.6%	6.8%	4.3%	6.0%
Excess Return			*-0.6%*	*-8.3%*	*-8.3%*	*-7.2%*	*-2.8%*	*-1.5%*	*-0.3%*	*0.4%*
Schroder International Alpha (ACWI Ex-US)	9/30/2012	12/31/2023	11.5%	17.2%	17.2%	1.9%	11.0%	9.9%	6.3%	7.8%
MSCI ACWI Ex-US			9.8%	16.2%	16.2%	2.0%	7.6%	6.8%	4.3%	6.0%
Excess Return			*1.7%*	*1.0%*	*1.0%*	*-0.2%*	*3.4%*	*3.0%*	*2.0%*	*1.7%*
Baillie Gifford International Growth	9/30/2012	12/31/2023	12.6%	15.0%	15.0%	-13.0%	8.2%	8.7%	5.1%	7.8%
MSCI ACWI Ex-US			9.8%	16.2%	16.2%	2.0%	7.6%	6.8%	4.3%	6.0%
Excess Return			*2.8%*	*-1.2%*	*-1.2%*	*-15.1%*	*0.6%*	*1.9%*	*0.8%*	*1.7%*
MSCI EAFE	9/30/2012	12/31/2023	10.5%	18.8%	18.8%	4.5%	8.7%	7.4%	4.8%	7.0%
MSCI EAFE	9/30/2012	12/31/2023	10.5%	18.9%	18.9%	4.5%	8.7%	7.4%	4.8%	7.0%
Excess Return			*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*

SECTOR EXPOSURE – PORTFOLIO LEVEL

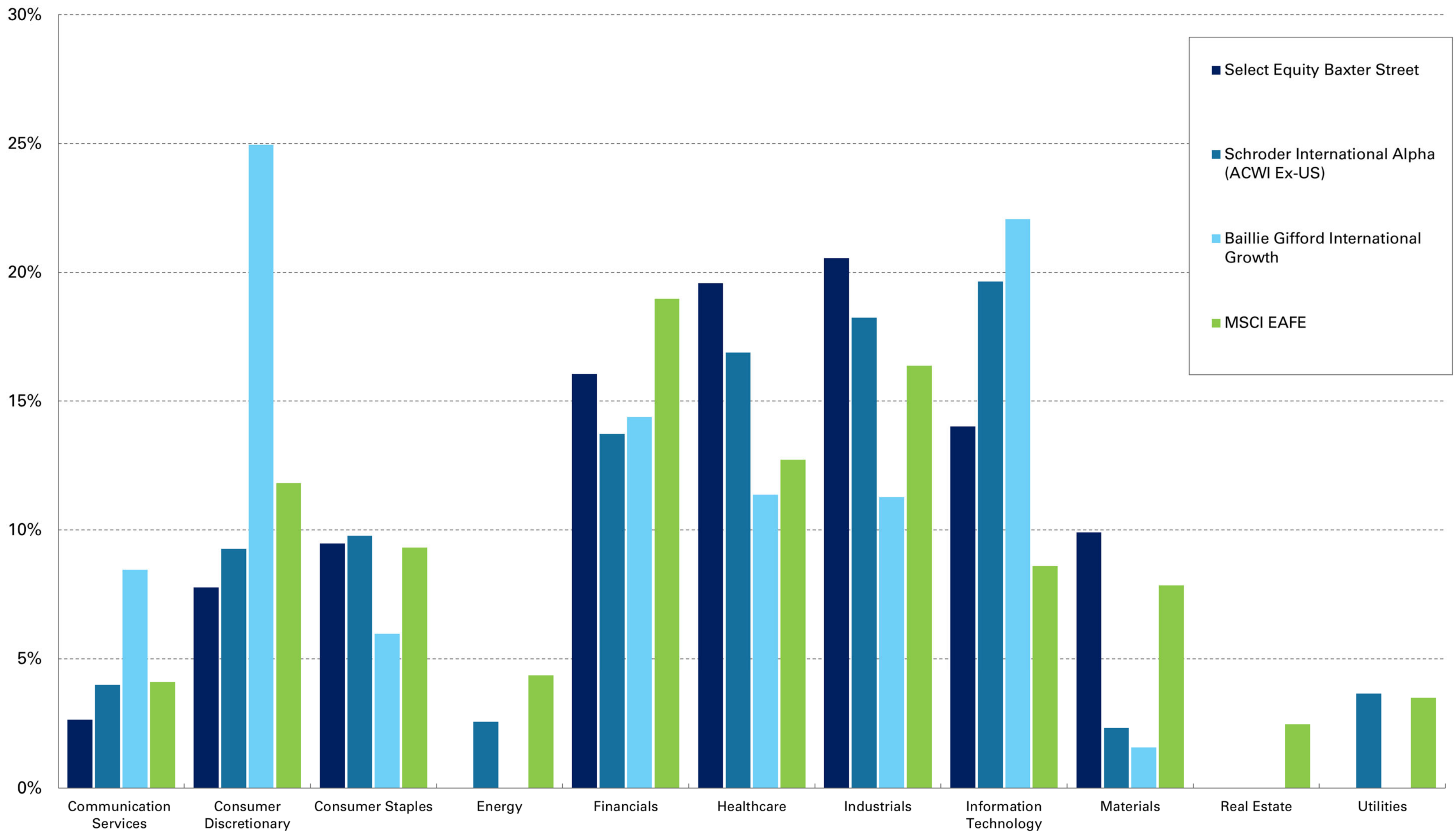
Sector Exposure



Source: eVestment

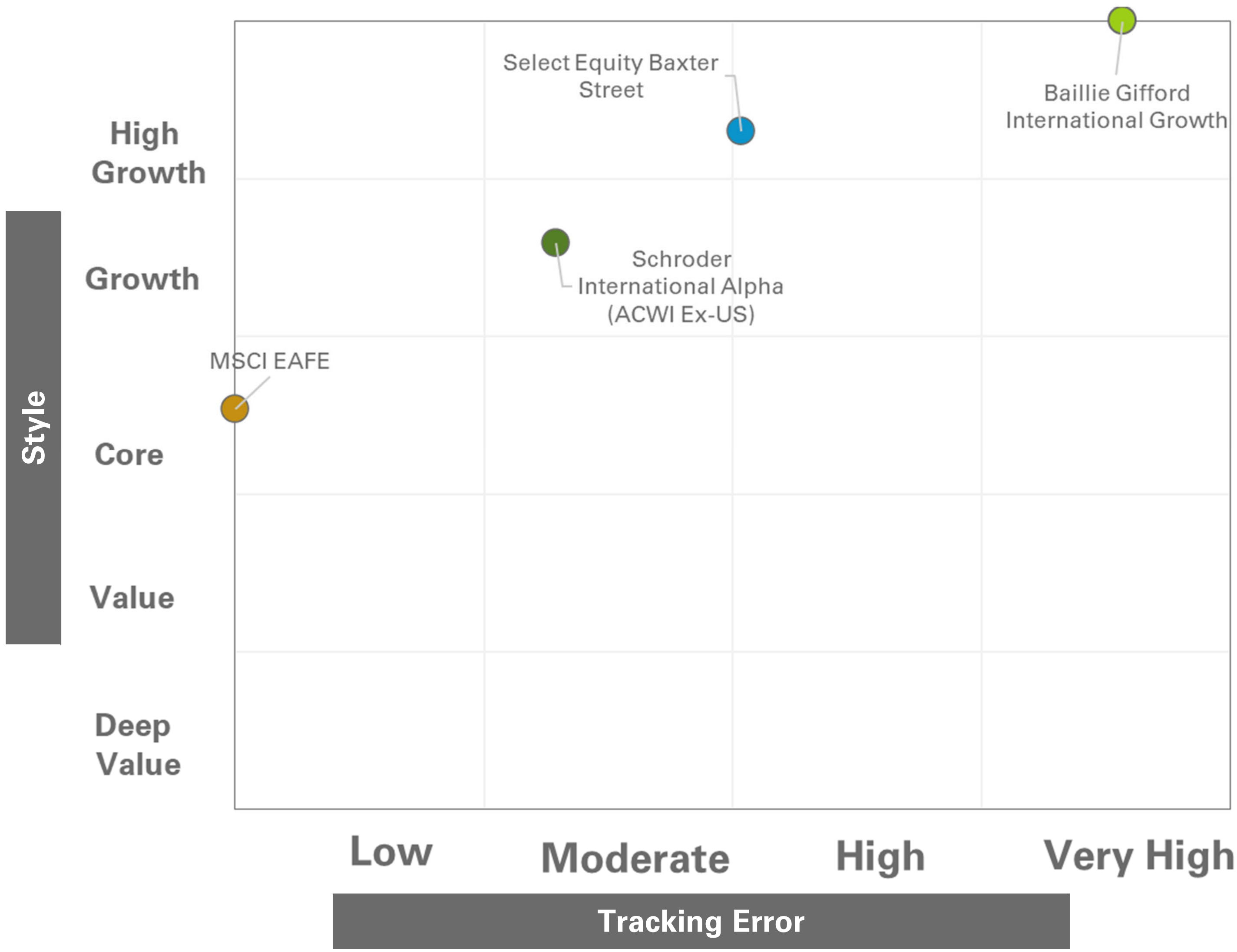
SECTOR EXPOSURE – FUND LEVEL

Sector Exposure



Source: eVestment

STYLE/TRACKING ERROR MATRIX – MANAGER LEVEL



All Risk/Return statistics calculated through 12/31/23. Portfolio metrics calculated by combining fund statistics at specified weights.

NEPC DISCLOSURES

Past performance is no guarantee of future results.

All investments carry some level of risk. Diversification and other asset allocation techniques do not ensure profit or protect against losses.

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