August 31, 2021

Ms. Theresa Taylor
Chair of the Investment Committee
California Public Employees' Retirement System
400 P Street
Sacramento, CA 95814

Re: Consultant Trust Level and Program Reviews

Wilshire's 2021 program reviews continues with a broader, more holistic approach (versus previous iterations which examined asset class programs individually) with an emphasis on how the various programs combine to influence Total Fund results. The review process included virtual onsites with both video conference and teleconference discussions with senior team members across the following programs and functional areas:

- Trust Level Portfolio Management
- Global Equity
- Global Fixed Income
- Opportunistic Strategies
- Real Assets – general oversight

These formal discussions have been supplemented with regular conference calls with the Managing Investment Directors (MIDs) and key investment personnel throughout the year to discuss team structure, portfolio construction, positioning, and performance. This opinion letter starts with an organizational review that is consistent across each program, followed by a summary and review of the individual programs, and wraps up with an appendix of the scores for each program consistent with past annual reviews.

Organization

In evaluating the quality of an asset management organization, Wilshire assesses factors contributing to the stability of the organization and the alignment of incentives between the team and the organization's long-term objectives. This year's overall Organization score (see appendix) remains materially impacted by the vacancy of the Chief Investment Officer (CIO) position. While the Board has been clear in the strategic direction driven by the approved portfolio asset allocation and is currently going through a rigorous Asset-Liability Management (ALM) process, the process of making the significant number of investment decisions associated with implementing that strategic portfolio is now in flux. Wilshire remains confident that senior Investment Office (INVO) professionals, including the Deputy Chief Investment Officer (DCIO) acting as the interim CIO, are capable investors who understand the complexities and nuances of managing a large pool of capital. Nevertheless, the ongoing search for a permanent CIO cannot help but be a distraction for the broader organization, and Wilshire's evaluation continues to reflect that reality. There is substantial room for improvement in the overall evaluation score, but that will require meaningful continuity in investment team leadership.

Wilshire's score does take into account positive impacts from the filling of the Managing Investment Director (MID) role in Trust Level Portfolio Management (TLPM), and the naming of a permanent MID in Board Governance and Sustainability (formerly interim). As evidence of CalPERS' strong senior team, the DCIO has acted capably in the interim CIO capacity over the past year, ensuring a level of implementation continuity. However, that impact is overwhelmed by the uncertainty driven by the vacated CIO position, as well as negative impacts from the departure of other senior staff members such as the MID of Real Assets and Investment Directors (IDs) in various asset classes. The interim DCIO is acting as head of both Global Fixed Income and Global Equity until the second DCIO-Growth position is filled. The unfortunate passing of the MID of the Research and Strategy Group has required the MID of TLPM to step in as the interim head of that functional group. This provides additional evidence that the senior team has considerable talent, but the Board needs to understand the strain this places on the INVO team.

The impact from potential changes in the structure of the investment teams and their resulting compensation contributes to that elevated uncertainty as well. There are a few positions that will require backfilling through recruitment or promotion, and it is critical to ensure that sufficient resources are in place to execute on the Board's strategic investment decisions. Wilshire has been clear in our view that the vacant CIO position and highlight instability for INVO staffing and gives us pause. However, a point we made last year bears repeating:

" . . . this is also an opportunity to continue shaping INVO culturally and strategically to focus on Total Fund performance. During this period, it is absolutely crucial to maintain a focus on Investment Belief #4 – long-term value creation requires effective management of three forms of capital: financial, physical and human; and #10 - strong processes and teamwork and deep resources are needed to achieve CalPERS goals and objectives."

Wilshire remains attuned to the uncertainty in the current environment, which is reflected in the organizational score.

Ensuring that CalPERS continues to have the tools necessary to recruit and retain qualified, diverse candidates should be a strong focus. As a governmental entity, CalPERS faces some unique organizational risks that for-profit enterprises have greater flexibility in managing, such as the inability to provide employees direct and indirect ownership opportunities. These long-term forms of incentives are common within private sector investment organizations and can serve as significant retention tools. The absence of such compensation structures can expose the organization to the increased risk of losing intellectual capital at the INVO Senior Staff level to asset managers and other financial institutions.

We do note that the organization has made strides to adjust pay scales to be more competitive in the marketplace, as well as aligning incentive compensation with Total Fund performance objectives. This includes a Long-Term Incentive Plan designed around exceeding the overall Fund's current 7% return target, which helps align Staff incentives with those of the plan stakeholders. The Board's compensation consultant is undergoing a review of the incentive compensation structure as well. While the specifics continue to be evaluated, it is worth noting that CalPERS is competing for talent in a challenging environment and any changes to the compensation structure should be undertaken with a clear understanding of the risks they might introduce for increased turnover or recruiting.

Over the last year, the Board Governance & Sustainability Team was formed combining two previously distinct functions under the leadership of the now permanent MID who reports to the CEO, and has a dotted reporting line to the Interim CIO. Board governance includes the board self-evaluation process and the Sustainability function covers: financial markets advocacy; human capital management, including the responsible contractor policy; and stakeholder engagement. The Team is responsible for delivering the third installment of the Sustainable Investment Research Initiative, leveraging off three resources from the Research and Strategy Group.

The Team also leads Diversity, Equity and Inclusion work in INVO, led by an IM with two direct reports. This includes the emerging manager program, which will be refreshed during 2021. There is close interaction between the Team and Global Equity as well as the asset class sustainability leads from Private Equity, Real Assets and Global Fixed Income. There is regular collaboration between the Team and both legislative affairs and stakeholder relations, as well as ICOR that leads the divestment mandates, across state, Board and management-led exclusions.

Trust Level Portfolio Management & Implementation (TLPMI)

The role of TLPMI within INVO has evolved over the last few years, and in last year's program review we summarized the role of TLPMI into three major functions:

- Strategic Asset-Liability Management
- Investment Trading Team (ITT)
- Affiliate Fund Management

Over the last year, these core functions have remained in place for the TLPMI team and, under the leadership of a newly hired MID, the team has successfully undertaken several initiatives that included the start of a new ALM cycle which is a critical process underpinning the investment outcomes of the PERF.

It should be noted that during the last year there was a change to the role of TLPMI, and that was the reintegration of the Research and Strategy Group (RSG) within TLPMI. The RSG function was separated last year into a standalone functional team that served the whole of INVO as a shared resource. This INVO-wide coverage has not changed because of the team's migration back to TLPMI, however with the recent focus on the ALM process it is fair to assess that having RSG resources under the TLPMI umbrella has benefitted the team and ensured adequate resources were dedicated to that project. Our *Information Gathering* scoring for this group was slightly decreased this year (but remains highly rated from an overall standpoint) as we would like to ensure that the RSG team has the necessary bandwidth to cover the research needs and requests from all programs while continuing to support the ALM.

Current FTE for TLPMI is broken out below, however in total there are 50 FTE including the new MID (5 positions are currently open).

1. Allocation Management (FTE) – Currently stands at 10 which is increase of 1 from last year
2. Investment Treasury Team (FTE) – Currently stands at 12, which is a decrease of 2 from last year
3. Research and Strategy Group (FTE) – Currently at 26, which is an increase of 1 from last year
4. Portfolio Design (FTE) – This is a new group that will be discussed later in the review, currently 1 ID in that group

Over the last year, the Allocation Management team has focused on the 2021 ALM cycle by first providing an overview of the key concepts, milestones, and deliverables that will go into the process. The team also continued research and development related to how discount rates, expected returns and realized returns influence the PERF's funding ratio and contribution rates. In working with the TLPMI team, Wilshire has seen a top down emphasis coming from the new MID that is focused on putting in place processes to help systematize the decision making process. The RSG team has collaborated throughout by using multiple valuation models, uncertainty modeling, and multi-tiered optimization to help guide, inform, and support any potential recommendations. Given our observations, the overall *Forecasting* score for this program was increased.

The Affiliate Fund Management function worked on multiple initiatives throughout the last year:

- ALM Study and Process Review for Affiliate Funds
- Long Term Care ALM & Manager Selection
- Stakeholder relationship management
- Team integration with TLPMI - Asset Allocation, Monitoring, Rebalancing

A common theme we have observed with regards to the work done for the affiliates is trying to ensure (to the extent possible given different portfolios) some degree of process consistency in managing the affiliate funds as well as the PERF. This relates not only to portfolio construction but also to policy changes. The Long Term Care ALM project took up a majority of the group's bandwidth over the year but each step throughout the process starting with the RFP phase through manager selection was measured, carefully thought out, and well communicated.

With regards to the other functions in TLPMI, the Investment Trading Team (*formerly called Execution Services and Strategy*) focused on several initiatives in addition to their core function which is designed to reduce operational risk by centralizing trading to a large extent for both Global Fixed Income and Global Equity. The implementation of new synthetic carve outs that provide exposure to liquid equity and fixed income markets and help manage leverage in the portfolio has occurred, and going forward leverage and liquidity management will be initiatives that this team will continue to work on. Depending on the Board's desired target asset allocation after the ALM process, ensuring sufficient staffing on the trading desk to efficiently implement the portfolio will be important.

Portfolio Design is a recent carve out within TLPMI that is currently staffed by an ID that transitioned from the Investment Risk and Performance team. This new role is intended to complement the portfolio construction process by helping to guide how the approved asset segments come together. Some of the areas that will be front and center for this team (staffing is still under review) will relate to risk budgeting for the portfolio, as well as setting up a process to help guide active management decision making for the PERF. The decision over the last year to educate the Board and formalize the adoption (pending Committee approval) of the "Actionable Tracking Error" metric is a good example of a governance change that can help improve the decision making process. We view this type of initiative as an example of what Portfolio Design will bring to TLPMI and INVO as a whole and has lead us to increase our *Portfolio Construction* score for the program.

Utilizing Wilshire's standard manager research scoring framework, Wilshire's qualitative assessment of the Program places it in the 3rd decile, which is an improvement from last year (4th decile). Forecasting and Portfolio Construction saw clear upgrades with some of the work done with regards to the ALM. Continued stability of the team will help to move the team score upward and ensuring that the centralized RSG group has the bandwidth for all of INVO could be an area of focus as well. Our Team and Information Gathering scores are still high relative to peers. There was no change in our Implementation score as that function is already rated very highly and we did not observe any materially changes.

INVO has focused a significant amount of time on improving the management of liquidity for the Total Fund. A centralized liquidity dashboard provides INVO with a holistic view on liquidity sources and uses over different time horizons. This allows CalPERS to optimize liquidity management on an ongoing basis. Taking advantage of the most efficient and least costly sources of liquidity will be critical for implementing and maintaining strategies discussed and potentially adopted during the ALM process. Wilshire views this enhancement very positively and an improvement in the overall management of the portfolio. Additionally, summary reporting on liquidity remains available to the Investment Committee to enhance oversight.

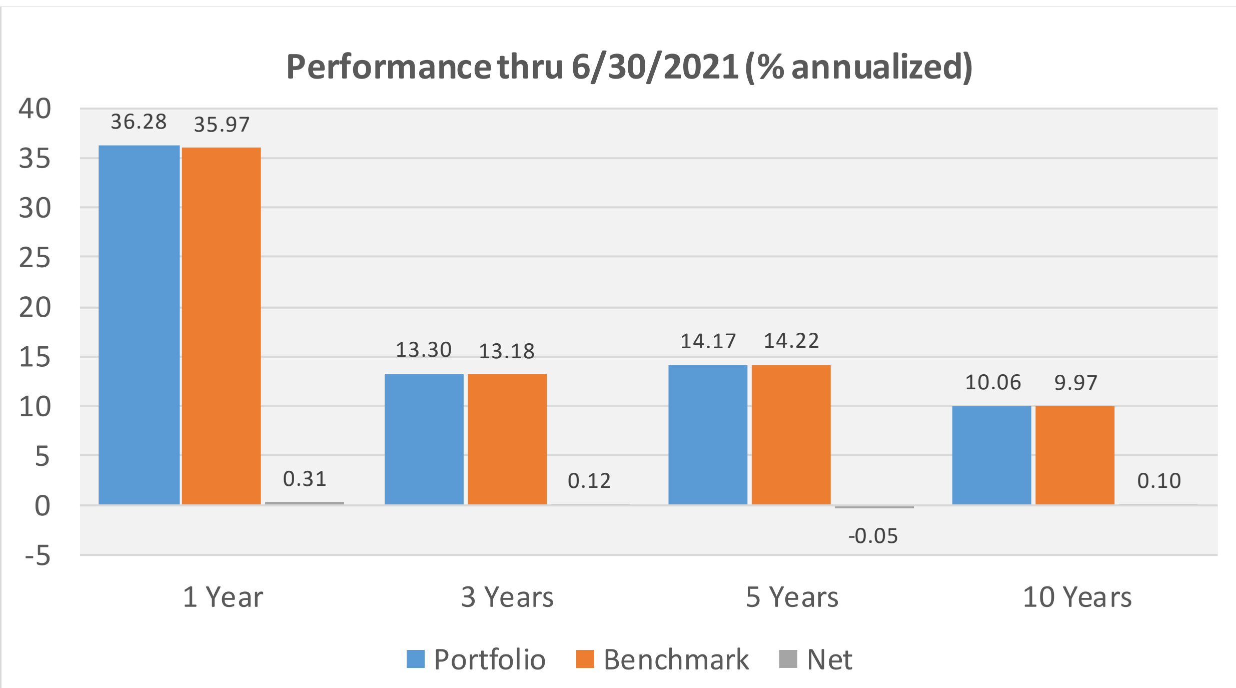
Increased utilization of the Board approved authority to invest in **Opportunistic Strategies (OS)** is discussed in more detail below, but it is worth highlighting as one of the key strategies deploying capital in idiosyncratic investment areas to improve Total Fund returns.

Global Equity

The Global Equity (GE) Program's mandate is to efficiently deliver low cost global equity beta to the PERF, which provides the Fund strategic exposure to global growth and the equity risk premium. Equity returns (absolute) for the latest fiscal year reflected a significant bounce back from the early market drawdowns experienced in Q1 2020 with a portfolio return of 36.3%. The GE portfolio team was able to add an additional 31 basis points via some of the actively managed strategies in the portfolio. Staff manages the portfolio within a narrow risk budget (i.e. tracking error) and this risk budget aligns with continuation of moving the GE portfolio away from a portfolio that contains material active management. Of the $242.2 billion within GE, $233.6 billion is now invested in index-oriented accounts which equates to 96.5% of the portfolio. This is essentially on par with the allocation to index oriented accounts that we reviewed last year.

The GE team decreased in size by one person due to the retirement of an Investment Director (ID) that is not expected to be backfilled. Given the heavy tilt towards index orientation we feel that the team is adequately staffed to manage the portfolio going forward. Wilshire would want to re-evaluate this view if there is a desire to drive higher levels of return through active portfolio management in the future.

As can be seen in the chart below, the GE portfolio exceeded its benchmark by 0.31% in the 2020-2021 fiscal year and by an annualized 0.12% and 0.10% over the latest three and ten year fiscal year periods, while underperforming over the last five years. The portfolio has also contributed very strong absolute returns over the ten-year period (10.1% annualized), which when factoring in the global pandemic, is remarkably robust. Given the consistency of the portfolio and continued outperformance we have no change to the forecasting score which remains high.



The overall makeup of the GE portfolio continues to be predominately index-oriented with the elimination of a majority of the actively managed strategies in recent years. As can be seen in the table below, there is a minimal change in percent allocated to internal vs external strategies which was driven by active strategy outperformance. The number of internal vs external accounts was unchanged.

June 2021 vs. June 2020

Managed	Index Oriented	Active				Total
		Traditional	Alt Beta	Activist	Emerging Managers	
Internally	-0.8%	0.0%	0.1%	0.0%	0.0%	-0.7%
Externally	0.0%	0.7%	0.0%	0.0%	0.0%	0.7%
Total	-0.8%	0.7%	0.1%	0.0%	0.0%	0.0%

As of June 2021

Managed	Index Oriented	Active				Total
		Traditional	Alt Beta	Activist	Emerging Managers	
Internally	96%	0%	1%	0%	0%	96.5%
Externally	0%	3%	0%	0%	0%	4%
Total	96%	3%	1%	0%	0%	100%

From a portfolio construction standpoint, the major accomplishments of the last year are centered around changes to the benchmark:

- Adopted and implemented a narrowed Policy Benchmark to improve extraction of the equity risk premium and reduce operational complexity
- Removed companies only offering non-voting shares from the benchmark to improve shareowner rights

Work is ongoing with regards to implementing the Total Fund governance & sustainability strategic plan, and progress continues to be made. Our portfolio construction score remains high for this year's review.

From an attribution standpoint there is typically an inverse correlation between the need for attribution and a portfolio that is increasingly passive. The recent change to an actionable Tracking Error metric provides solid Board oversight for the GE program if the portfolio management team decides to take on a more active stance in the future.

The GE performance in the table below decomposes the overall segment into the subcomponents (Cap Weighted, and Factor Weighted). The recent performance of the Cap Weighed segment was positive for the 1 year period which was a result of positive excess performance for the externally managed active manager pool.

	Asset Value* ($Billion)	Quarter	1-Year	3-Year	5-Year	10-Year	VaR ($Billion)	5-Year Ratios Sharpe	Info
PUBLIC EQUITY	**$ 242.2**	**6.8%**	**36.3%**	**13.3%**	**14.2%**	**10.1%**	**$ 50.4**	**0.9**	**-0.2**
Public Equity Policy Benchmark		6.8%	36.0%	13.2%	14.2%	10.0%		0.9	0.0
Public Equity - Cap Weighted**	**$ 171.7**	**7.2%**	**42.0%**	**15.0%**	**15.2%**	**10.5%**	**$ 39.2**	**0.9**	**-0.2**
CalPERS Custom FTSE Global Benchmark		7.2%	41.6%	14.9%	15.2%	10.4%		0.9	0.0
Public Equity - Factor Weighted	**$ 70.5**	**5.8%**	**22.6%**	**10.7%**	**-.-%**	**-.-%**	**$ 11.8**	**N/A**	**N/A**
MSCI ACWI Select Factor Weighted Index		5.8%	22.6%	10.6%	-.-%	-.-%		N/A	N/A

* Asset values shown may reflect the first day of the following month when rebalancing and/or large cash flows occur on the last day of the quarter.

** The CalPERS asset values shown include derivative exposure.

GE Program – Corporate Governance

We have dedicated this section of the review to focus on the important work done with regards to corporate governance which resides within the GE team structure.

The GE program includes a fully integrated Corporate Governance (CG) team that oversees proxy voting, corporate engagement, partnerships and research on best practices. Relative to assets under management, the CG team is lean, consisting of six full time Staff, following the departure of one member of Staff in 2019/2020. The CG team is focused on 3 priorities: (1) seeking alignment with portfolio companies on executive compensation; (2) improving corporate board diversity and accountability; and (3) improving climate disclosures and environmental risk management. Given the lean team structure, the implementation model is focused on collaborations and partnerships. For example, as Chair of the Climate Action (CA) 100+ Steering Committee, this collaboration has led to tangible outcomes with over half (53%) of CA100+ companies having set a net zero by 2050 target or ambition and the successful election of three Engine No.1 directors to the ExxonMobil board. Collaborations with peer asset owners such as CalSTRS, LACERA and SFERS on the California Board Diversity Initiative has led to improved board diversity at S&P 500 companies surrounding underrepresented groups. Escalation procedures through shareowner campaigns are in place where diversity engagements did not result in constructive outcomes with five majority vote and three vote “no” campaigns.

Global Equity has access to meaningful information resources through external ESG quantitative and qualitative data from both MSCI and Sustainalytics for each portfolio and their underlying investments. Use of these platforms provides Global Equity with information on over 8,000 global companies including company profiles, thematic and sector reports and controversies.

GE’s manager selection process formally includes an ESG scoring component, which requires managers to articulate how they integrate ESG considerations into their investment process. Staff's ESG scoring model directly contributes to a strategy's final ranking in determining its portfolio selection. Portfolios are measured on each of the three components of E, S and G.

Global Equity staff contributes to portfolio construction by identifying ESG risks found in individual portfolios and using the information to initiate discussions with its partners to better understand the potential risk/reward pay-off and the justification for holding highlighted securities. Global Equity's external partners are expected to evaluate and respond accordingly to the impact of ESG risks and opportunities in an identified investment or portfolio. Wilshire views this as a sound process for monitoring and managing ESG risks across individual strategies and the aggregate portfolio

Consistent with CalPERS' approved program of divestments, Global Equity excludes some markets and industries including Tobacco, Iran, Sudan, Firearms and Thermal coal. With the change of approach from excluding companies that failed the Emerging Equity Markets (EM) Principles to a new risk-based EM screen and engagement model, the CG team expect deeper engagements with EM flagged companies going forward.

GE Program Total Scoring

Utilizing Wilshire's standard manager research scoring framework, Wilshire's qualitative assessment of the Program places it in the 3rd decile. While this is the same score as last year, it reflects a minor reduction in the information gathering score as the centralized RSG team has undergone some transition and is focused on the current ALM process. Overall, the score continues to reflect a very strong team that is engaged in implementing a defined roadmap with careful thought and deliberate action. Communication seems to be particularly strong and the forward looking view is positive across the board for this group.

Global Fixed Income

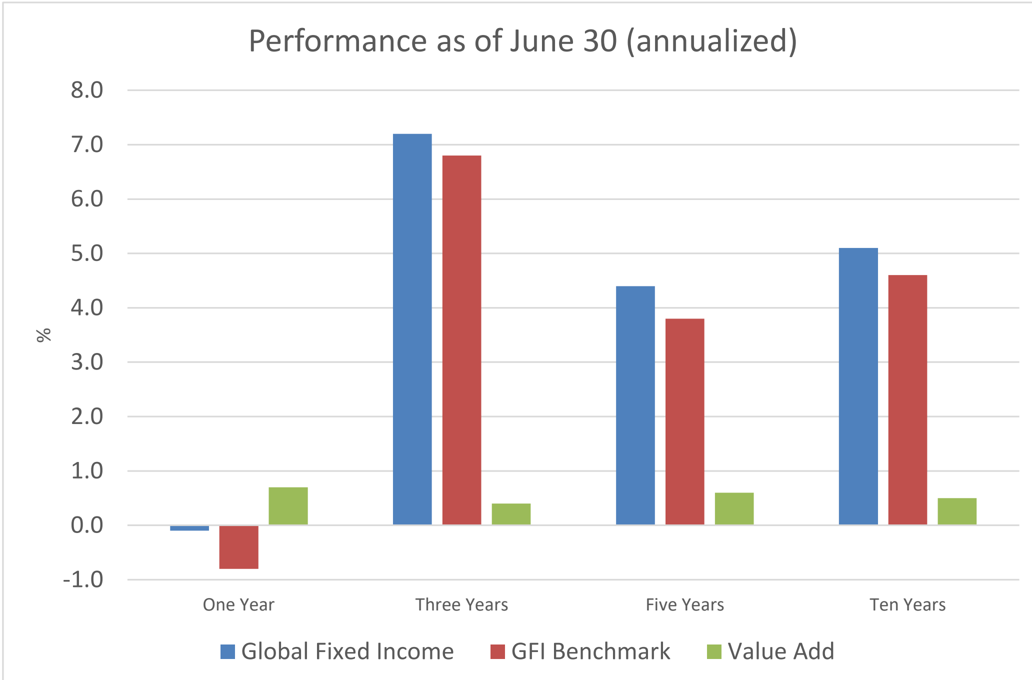
The CalPERS Global Fixed Income (GFI) Program is designed to diversify equity risk for the total fund and provide current income and liquidity. The Program is actively managed with 96% of the $140.4 billion in assets managed internally by staff, and the remaining 4% outsourced to external managers. The review process included discussions with senior staff members of each fixed income segment within the GFI Program. Review topics included Program investment process, personnel and resource management, as well as investment and risk management procedures.

We believe the Global Fixed Income Program is managed in an effective and risk-conscious manner, leveraging the deep expertise of the senior management team. Of note, the MID of Global Fixed Income is currently also acting as interim Deputy CIO and overseeing the Global Equity program. Wilshire again notes that the total size of the internal GFI team has declined and, in Wilshire's view, represents a risk factor to ensuring continuity of the demonstrated investment success of the portfolio. Other senior GFI staff members continue to contribute a meaningful amount of time to various sub-committees designed to find ways to improve Total Fund performance. Staff's participation in these cross-functional initiatives provides important insights and is a reflection of their dedication to the success of the plan. This additional demand on the staff's time reinforces the need for efficient resource management, particularly with respect to recruiting and retaining talent for the organization.

It is clear that the MID – Global Fixed Income understands this dynamic and is actively looking to strengthen the team. However, an improving labor market and lengthy job posting and recruitment process continue to challenge efforts to bring on talented investment professionals. The risk is mitigated by the experience level of the senior fixed income staff (AIM's and above) which provides some level of assurance that the successful implementation of the global fixed income program will continue. This dynamic was highlighted over this past fiscal year as relative results remained strong even as the MID took on substantial Total Fund responsibilities.

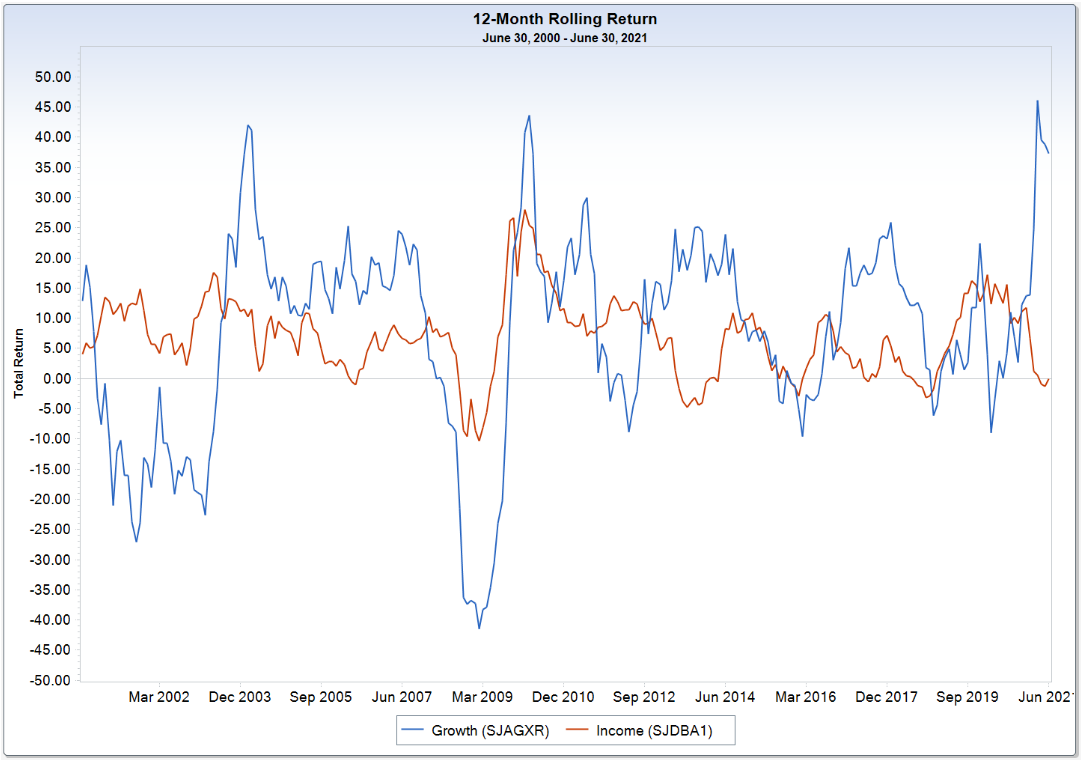
GFI is broken down into three component segments: 1) Treasuries, 2) Spread sectors, and 3) High Yield. The roles and characteristics of each segment are sufficiently distinct that separating them during the asset allocation optimization process allowed for more efficient portfolio construction. Treasuries offer very high levels of liquidity and have offered solid protection against equity drawdowns, but experience direct sensitivity to interest rate changes. High yield bonds behave more like equities in bear markets but offer a significant pickup in yield versus other instruments and some diversification in more typical markets. Spread sectors represent the bulk of the portfolio and balance interest rate sensitivity with higher quality credit risk. This granularity allows for a higher level of flexibility in the asset allocation process to help achieve CalPERS' investment objectives.

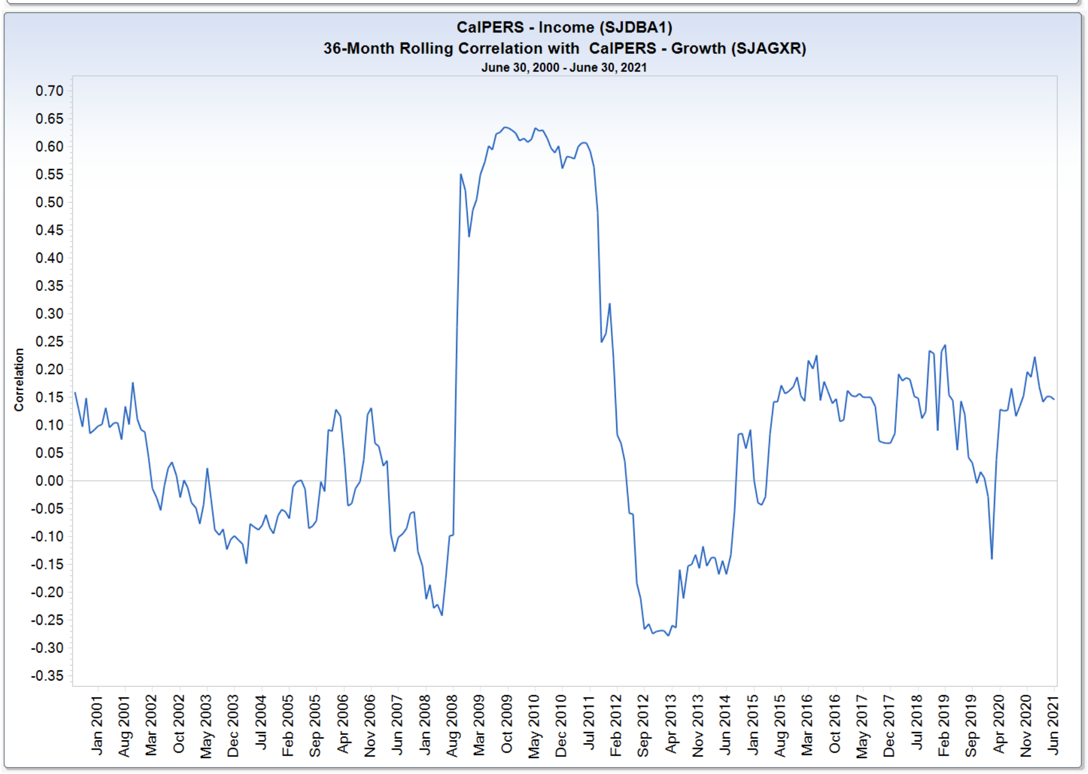
The chart below shows the Program's historical performance relative to its benchmark.



While Global Fixed Income was the best performing asset class during the turbulent 2020 fiscal year, it ranked as the worst performing asset class in absolute terms in fiscal year 2021. The Program's longer duration exposure (vs. core fixed income) during FY 2021 was a meaningful headwind for absolute performance with the 10-year Treasury rate moving higher after hitting a trough of 0.53% in July of 2020.

The 12-month rolling returns and 3-year rolling correlation with Global Equity are shown in the following charts. Together, these demonstrate the strategic role the GFI portfolio plays in diversifying equity returns over different market cycles throughout the past 20+ years. Interest rate risk remains an important consideration for the Board during the ongoing ALM process given the risk characteristics of the fixed income return pattern and its potentially diminished ability to serve as a trusted portfolio diversifier. Wilshire has previously discussed that as yields approach a lower bound, their potential return pattern risks becoming asymmetric in shape with diminished upside potential. So, while today's low bond yields provide a reliable picture of the long-term destination of bond returns, the path they take in realizing that destiny is less certain and has important implications on overall portfolio risk.

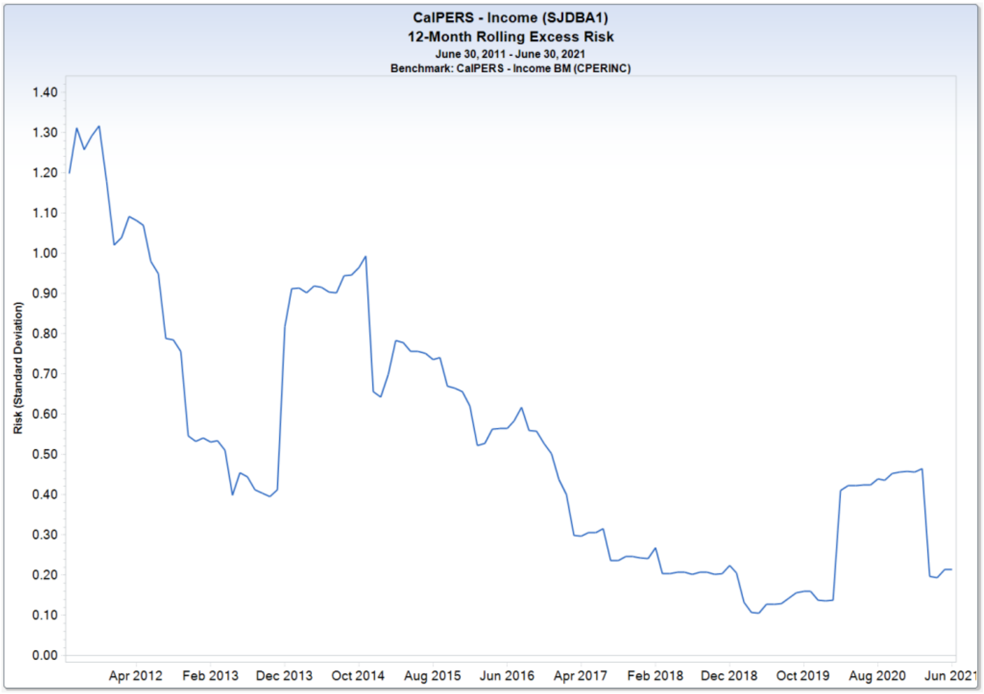




However, from an active return perspective, the CalPERS GFI program continued to generate positive value-add across all periods and added 70 bps over the benchmark for the most recent one-year period. The most recent 1-year period includes a contribution to active return from fully liquidating legacy positions in life settlements, which contributed about 25 bps of positive relative return. In addition, the decision to implement a tilt towards Spread relative to Treasuries in the aftermath of the pandemic market dislocation positively contributed to returns. While taking into account that these situations will not repeat every year, the last fiscal year's relative returns were strong.

The underlying active strategies in the fixed income portfolio (Structured Securities, Credit, Sovereign) continue to outperform over one, three, and five years. This has been a consistent theme and one reason for the continuation of internal active management within fixed income. This was affirmed by the Total Fund active strategy review conducted last fiscal year. An ongoing, critical look into strategy efficacy from a Total Fund perspective is an important process that should be regularly undertaken.

The GFI portfolio has consistently demonstrated a level of forecasting success as evidenced by the positive relative returns for the portfolio as a whole, which continues to rank very positively in Wilshire's evaluation. The portfolio construction approach is very well aligned with Investment Beliefs #1 – Liabilities, #2 – Long-Term Horizon, and #7 – Risk vs. Reward. For example, given current investment grade spread levels, the team believes the potential for spread widening overwhelms the yield advantage and are taking a more cautious position. The portfolio construction score was moderately increased this year, as Wilshire observed that active risk positioning has been dynamic but has not resulted in wholesale increases in tracking error for the GFI portfolio as a whole. This is a sign of a well defined risk budgeting process.



The investment approach of the total GFI program remains consistent with its key strategic objective of providing income, stability, and equity risk diversification within the Total Fund. At the same time, GFI has outperformed its benchmark consistently through both sub-sector relative value decisions and tactical positioning. GFI portfolios have taken advantage of alpha generating opportunities in different markets, while maintaining relatively prudent risk positioning over time. The team has continued to improve portfolio implementation with increased use of portfolio trades, improved counter party relationships, and remaining active in the new issue market.

Utilizing our standard manager research scoring framework, Wilshire's qualitative assessment of the Program places it in the 3rd decile. While this is the same score as last year, it reflects a reduction in information gathering resources and an increase in portfolio construction and implementation. Overall, the score continues to reflect the strong team in place and clear success at managing the portfolio as charged.

Opportunistic Strategies

The Opportunistic Strategies Program (OS) invests in strategies that may not fit into one specific asset class / type, but possess characteristics that present relative value opportunities to enhance Total Fund performance. The total market value limit for OS investments is limited to 5% of the total fund. The Program's current focus is on private debt strategies, and the sub-strategy targets were formally defined in the Total Fund Policy as follows:

Strategy	Range
Bank Loans and CLO	0-40%
Public Markets Dislocation	0-50%
Middle Market Direct Lending	0-80%
Specialty Lending	0-40%
Liquidity Financing	0-40%
Real Estate Financing	0-40%
Structured Products and Whole Loans	0-20%

The OS team has made meaningful strides during the past year in researching and identifying the first set of opportunities to include in the within the private credit sector. The team has made several commitments to capture core opportunities within these strategies, ranging from commingled investments to co-investments. As noted in our review last year, the team size is considered small considering the amount of capital to be invested across multiple sub-strategies. Given the MID's extensive experience in managing the CLO portfolio, the OS team has been able to efficiently build the first layer of the portfolio through tapping existing market knowledge to identify multiple managers that present a wide range of opportunities. However, currently, the senior members of the OS team must explore and diligence investments across all of the sub-strategies. As the program's scope requires exploring multiple sub-strategies in order to identify suitable investments, we believe enhancing the team resources with additional permanent headcount is critical for the success of the program going forward. Once the team resources are increased, the structure of the OS team will allow for specialization within the sub-strategies, similar to that of the GFI team.

Throughout this year, the OS team also put in place a governance roadmap that defines roles and responsibilities of the team. This roadmap outlines the policies and guidelines governing the program's activities, as well as the constraints, the diligence and approval processes, and the monitoring / reporting of the investments. In addition, in order to facilitate TLPM's management of liquidity and leverage, the OS team has put in a process to provide an estimate of capital call and leverage estimates on a regular basis.

In terms of portfolio construction approach, the initial commitments and investments have been focused on core lending strategies that take advantage of U.S. private financing needs. Once those core strategies are in place, the team will focus on satellite strategies that invest in more esoteric opportunities such as special situations across different regions.

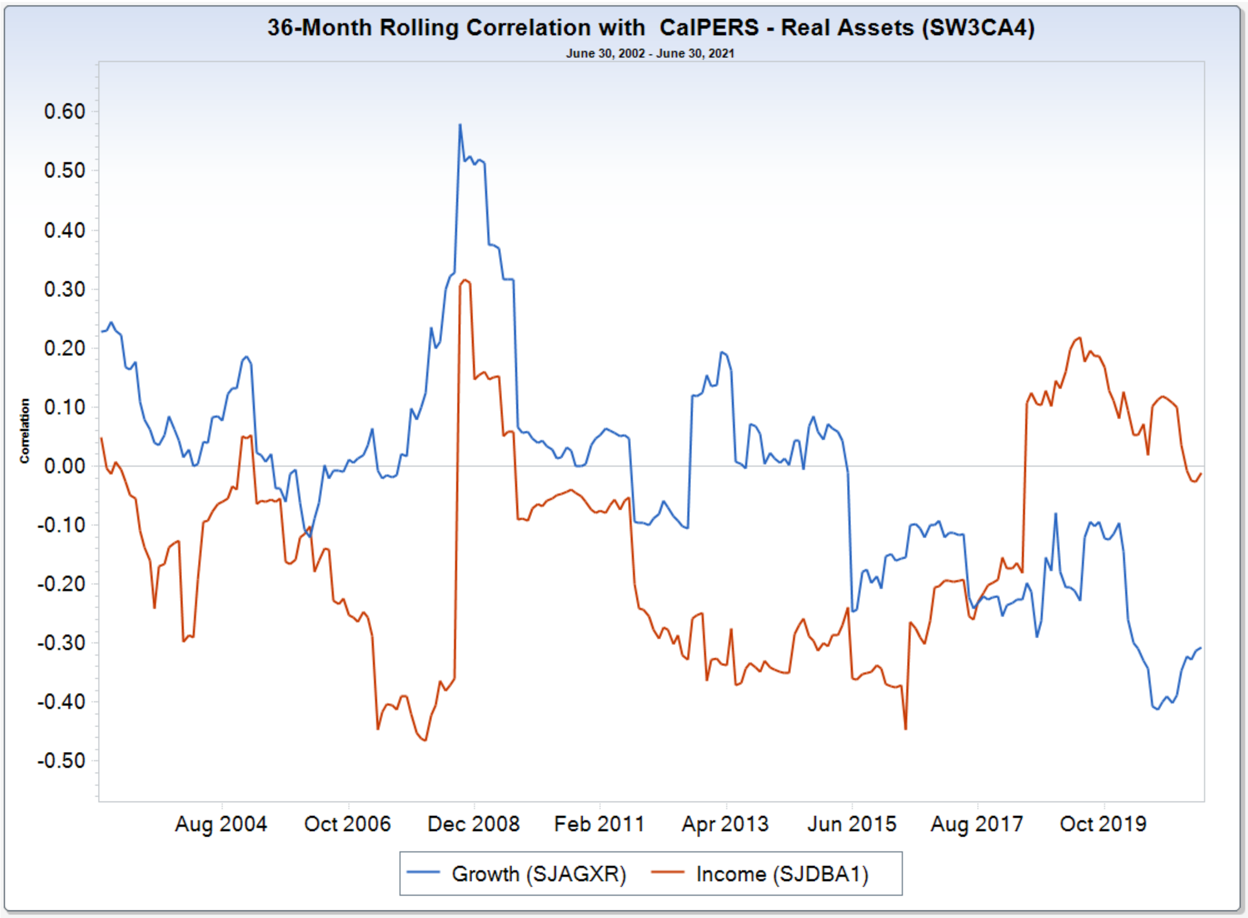
With respect to attribution, the portfolio is still in its infancy and there are no meaningful realization of the private debt investments to measure the performance. The nature of the wide ranging strategies and a lack of an investable benchmark make it challenging to evaluate the performance of the Program particularly over a short term horizon. As the program ramps further, it will be important to monitor the types of credit exposure across the underlying strategies to understand the potential return and risk profile as the program ramps.

Wilshire's qualitative assessment of the OS Program is a 4th decile. Overall, we believe that the OS program continues to be led by talented staff, with a focus on enhancing the Total Fund performance by identifying opportunities in non-traditional asset classes. The team has proven to be capable of quickly identify the first set of opportunities suitable for the Program and have made meaningful strides in ramping up the portfolio, as well as putting the necessary processes in place.

Real Assets

Wilshire acts in a general oversight role with the Real Assets portfolio in order to provide the Board with a holistic view of the entire portfolio. This is meant to supplement the work that is provided by the dedicated real assets consultant, who will provide an in depth evaluation under separate cover. Wilshire's work in Real Assets involves regular discussions with the MID to understand high-level investment initiatives, portfolio construction, performance attribution, and how risk is being managed in the portfolio.

The strategic role of the Real Assets Program is to provide stable cash flows, serve to provide long-term inflation protection and act as a diversifier for equity risk. The 5-year correlation between the returns of the Real Assets Program and global equities has been low, measured at -0.28. It is important to note that asset class correlations are unstable and that in times of crisis they tend to increase, though the risk asset rebound after the pandemic sell-off happened too quickly for longer term correlations to show much change . The following chart plots the rolling 3-year correlation of the Real Assets program relative to both the Growth and Income portfolios. Broadly, each has exhibited low levels of correlation outside of the late 2008, early 2009 period. More recently, the correlation with equity returns has remained low while that to Income been effectively uncorrelated.



Performance of the Real Asset portfolio was slightly positive on an absolute basis for the last fiscal year, and added value relative to the Real Asset policy benchmark. This performance was primarily driven by the Infrastructure portfolio, though Real Estate was also ahead of the benchmark. The Real Asset team is seeing a stabilization in those sectors most impacted by the pandemic as, for example, rent collections in retail have recovered from a low of 30% to 90%+. As with any private asset class, shorter term returns do not fully capture the performance of a program. As the table shows, the longer term 5 and 10-year results have also moderately outpaced the policy benchmark even taking into account the legacy impact of Forestland and a challenging environment for some real estate sub-sectors. The Real Assets team incorporates an appraisal policy, which utilizes independent 3rd party appraisals as the basis for determining fair market value. In addition, per industry norms, performance is reported on a one quarter lag.

	Asset Value* ($Billion)	Quarter	1-Year	3-Year	5-Year	10-Year
REAL ASSETS	**$ 45.3**	**1.5%**	**2.6%**	**3.6%**	**5.2%**	**8.1%**
Real Assets Policy Benchmark		1.9%	1.3%	3.9%	5.1%	8.0%
Real Estate	**$ 38.3**	**1.6%**	**1.9%**	**3.6%**	**5.0%**	**8.7%**
CalPERS Custom Real Estate Benchmark		1.9%	1.3%	3.9%	5.2%	8.6%
Infrastructure	**$ 6.1**	**1.4%**	**7.2%**	**6.0%**	**9.6%**	**10.6%**
CalPERS Custom Infrastructure Benchmark		1.9%	1.3%	3.9%	4.9%	5.1%
Forestland	**$ 0.8**	**-1.6%**	**1.4%**	**-3.3%**	**-1.4%**	**-2.0%**
CalPERS Custom Forestland Benchmark		1.9%	1.3%	3.9%	3.8%	5.2%

The Real Asset team is focused on positioning the portfolio for the current environment, while being cognizant to realize value where possible. Infrastructure remains an area of focus for the team as they vet multiple opportunities.

As discussed in previous reviews, the Real Assets program has focused on higher quality, stable income producing assets to a larger degree than seen prior to the credit crisis, which should provide greater diversification during risk-off market environments. With the uncertainty facing the real estate market in general, and retail in particular, Real Assets have lagged broader equity markets. This diversification from what has been the best performing market segment has detracted from absolute returns. However, Wilshire believes that Real Assets is appropriately structured to meet its strategic objectives, including protection against unanticipated inflation, and improve both the expected risk-adjusted returns of the Total Fund and relative results versus the Program benchmark.

Appendix - Evaluation Scores for all Programs

CalPERS Global Equity	Tier	Letter
Total Qualitative Score	3rd	B

	Weight	Tier	Letter
Organization	20%	5th	C
FIRM	*50%*	7th	D
Quality and Stability of Senior Management			
Quality of Organization			
Ownership/Incentives			
TEAM	*50%*	3rd	B
Stability of Investment Professionals			
Quality of Team			
Commitment to Improvement			
Information Gathering	20%	4th	B
Information Resources			
Depth of Information			
Breadth of Information			
Forecasting	20%	3rd	B
Clear & Intuitive Forecasting Approach			
Repeatable Process			
Strength, Clarity, and Intuitiveness of Valuation Methodology			
Forecasting Success			
Unique Forecasting Approach			
Portfolio Construction	20%	1st	A
Risk Budgeting/Control			
Defined Buy/Sell Discipline			
Consistency of Portfolio Characteristics			
Implementation	10%	2nd	A
Resources			
Liquidity			
Compliance/Trading/Monitoring			
Attribution	10%	1st	A
Depth of Attribution			
Integration of Attribution			

CalPERS Global Fixed Income		Tier	Letter
Total Qualitative Score		3rd	B

	Weight	Tier	Letter
Organization	**20%**	**5th**	**C**
FIRM	***50%***	**7th**	**D**
Quality and Stability of Senior Management			
Quality of Organization			
Ownership/Incentives			
TEAM	***50%***	**4th**	**B**
Stability of Investment Professionals			
Quality of Team			
Commitment to Improvement			
Information Gathering	**20%**	**2nd**	**A**
Information Resources			
Depth of Information			
Breadth of Information			
Forecasting	**20%**	**2nd**	**A**
Clear & Intuitive Forecasting Approach			
Repeatable Process			
Strength, Clarity, and Intuitiveness of Valuation Methodology			
Forecasting Success			
Unique Forecasting Approach			
Portfolio Construction	**20%**	**2nd**	**A**
Risk Budgeting/Control			
Defined Buy/Sell Discipline			
Consistency of Portfolio Characteristics			
Implementation	**10%**	**2nd**	**A**
Resources			
Liquidity			
Compliance/Trading/Monitoring			
Attribution	**10%**	**2nd**	**A**
Depth of Attribution			
Integration of Attribution			

CalPERS Opportunistic Strategies		**Tier**	**Letter**
Total Qualitative Score		**3rd**	**B**
	Weight	**Tier**	**Letter**
Organization	**20%**	**5th**	**C**
FIRM	***50%***	**7th**	**D**
Quality and Stability of Senior Management			
Quality of Organization			
Ownership/Incentives			
TEAM	***50%***	**3rd**	**B**
Stability of Investment Professionals			
Quality of Team			
Commitment to Improvement			
Information Gathering	**20%**	**2nd**	**A**
Information Resources			
Depth of Information			
Breadth of Information			
Forecasting	**20%**	**3rd**	**B**
Clear & Intuitive Forecasting Approach			
Repeatable Process			
Strength, Clarity, and Intuitiveness of Valuation Methodology			
Forecasting Success			
Unique Forecasting Approach			
Portfolio Construction	**20%**	**2nd**	**A**
Risk Budgeting/Control			
Defined Buy/Sell Discipline			
Consistency of Portfolio Characteristics			
Implementation	**10%**	**3rd**	**B**
Resources			
Liquidity			
Compliance/Trading/Monitoring			
Attribution	**10%**	**4th**	**B**
Depth of Attribution			
Integration of Attribution			

CalPERS Trust Level Portfolio Management		**Tier**	**Letter**
Total Qualitative Score		**3rd**	**B**

	Weight	**Tier**	**Letter**
Organization	**20%**	**5th**	**C**
FIRM	***50%***	**7th**	**D**
Quality and Stability of Senior Management			
Quality of Organization			
Ownership/Incentives			
TEAM	***50%***	**4th**	**B**
Stability of Investment Professionals			
Quality of Team			
Commitment to Improvement			
Information Gathering	**20%**	**3rd**	**B**
Information Resources			
Depth of Information			
Breadth of Information			
Forecasting	**20%**	**4th**	**B**
Clear & Intuitive Forecasting Approach			
Repeatable Process			
Strength, Clarity, and Intuitiveness of Valuation Methodology			
Forecasting Success			
Unique Forecasting Approach			
Portfolio Construction	**20%**	**2nd**	**A**
Risk Budgeting/Control			
Defined Buy/Sell Discipline			
Consistency of Portfolio Characteristics			
Implementation	**10%**	**2nd**	**A**
Resources			
Liquidity			
Compliance/Trading/Monitoring			
Attribution	**10%**	**3rd**	**B**
Depth of Attribution			
Integration of Attribution			