The Functionally Focused Portfolio:
CCCERA Staff Proposal for New Approach to Portfolio Construction

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## Overview

The Functionally Focused Portfolio ("FFP") is an approach to portfolio construction that better aligns the long-term goals of CCCERA with the investment portfolio. By structuring three large pools of assets, those being liquidity, growth, and diversifying assets, a portfolio can be built around these themes to achieve CCCERA's objectives. For CCCERA, this involves storing a material amount (two to four years' worth) of benefit payments in safe, liquid assets, in order to meet near term benefit payments, which then allows the Board to focus on the long-term growth of the portfolio while ignoring short-term market noise.

## In a Nutshell

CCCERA staff have developed a new approach to pension fund management that, if implemented, would alter the conversation around portfolio construction as well as regular measures of performance. At its core, we propose that any investment pool can be broken down into three functional subdivisions:

1. Provide: There is a spending goal or explicit liability to every pool of assets.
2. Produce: The portfolio must grow, otherwise it's just a savings account.
3. Protect: The growth portfolio can be volatile. There should be an offset.

We believe that by basing portfolio construction decisions first on the provision of income and liquidity, then moving to the optimal mix between growth and diversifying assets, governing bodies can have a much more thoughtful and nuanced approach to the asset allocation exercise and ultimately to the oversight of pension plan or any investment pool.

## The Way It Was

CCCERA, and most other institutional investors, have for decades approached asset allocation as a total return optimization exercise. This approach, dominant among US investors since the late 1970's, seeks to assemble a group of asset classes (equities, bonds, real estate) that will respond favorably to differing economic climates, but when combined create an "approximately correct" portfolio for the investor. This optimization methodology is referred to as a Mean Variance Optimization (MVO). It should be stated clearly that CCCERA has enjoyed robust returns from this approach for over 30 years.

The key weakness of the MVO approach is also the source of its popularity. It is a simple model that assumes away real world noise and relies on single point forecasts of expected return, volatility and correlations between asset classes. MVO assumes that the top priority of an investor is the maximum return for a stated amount of risk, and does not account for other investor priorities, such as liquidity or income. The model assumes that correlations between the asset classes are stable over time. This has, at times, led to significant failures of the model over short periods (for example, the model did not work during the 2008/09 financial crisis) though it does give us a workable long-term model. Historically, when the MVO approach has failed, actuarial science has provided a buffer through smoothing of returns and long-term amortization of actuarial gains and losses.

This has worked well enough, but it pushes the impact of any shortfall below the assumed actuarial rate to the plan sponsors. It may also lead to excessive risk taking by at least nudging a Board to adopt asset mixes with rates of return near the current actuarial assumption, regardless of the level of risk that comes along with that asset mix. This is by no means a critique of CCCERA's or any other Board, but rather of how asset allocation data is typically discussed with governing bodies. Staff and consultants present limited data, usually focused first on expected return, then standard deviation. The numbers are presented with one or two decimal points of false precision and any discussion of the range of outcomes is left for later exhibits.

We think we have a better idea.

## Three Big Levers

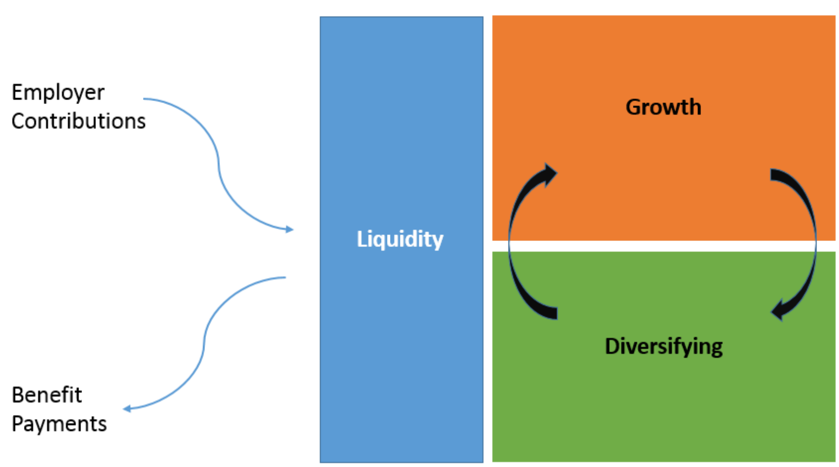
The vast majority of us know how to drive a car. While our skill levels vary, we know the basics of how to make a car function: gas, brake, steering wheel. Coupled with that knowledge of how to drive a vehicle, we know the rules of the road which govern how we interact with other drivers. Keep in your lane, signal your turns, look out for others, adapt to the road conditions as they change. Pension fund management can follow a similar model. You don't need to know the details of the internal combustion engine to get your car safely from point A to point B, you need to know how the car *functions*.

The rules vary slightly from place to place, but generally are so uniform that our knowledge of how to drive in our hometown can be applied to how we might drive in another nation or in various conditions that we do not typically encounter (gravel roads, sand paths and snow-covered highways). The three main functions of operating the car don't change, but the environment in which the car is operated can vary.

Similarly, the three big levers of pension management identified earlier don't vary a lot from fund to fund (every fund needs to grow, disburse benefits, and provide diversification), but how these functions are identified and managed can have a material influence on how well the fund operates in different economic environments.

Let's turn to how FFP would work in practice. The FFP approach puts liquidity at the center of the process and builds in growth and diversification once that core function has been satisfied. The portfolio has the three subdivisions discussed earlier: Provide, Produce and Protect.

1. The Provide (liquidity) portfolio would be set up to generate a contractual monthly cash flow designed to meet the CCCERA benefit payment, currently approximately $35 million.
2. The Produce (growth) portfolio provides the long-term growth that has been the historical focus of the CCCERA investment program.
3. The Protect (diversifying) portfolio would house investments designed to reduce the volatility inherent in the growth portfolio.



The key decision for the Board is to set the target liquidity level (based on the number of benefit payments held in safe, liquid assets) and the allowable range around that level. All other decisions, including the ultimate size and risk compositions of the growth and diversifying programs, flow from that one decision about the Provide portfolio.

Inherent in this structure is that risk (volatility and illiquidity) will be accepted in portions of the program where it is appropriate to do so (growth assets that are earmarked for the next generation of retirees) and will not be accepted in the portion of the portfolio that has clear and immediate liquidity needs.

The illustration below highlights the general categorization of asset classes and vehicles that might be considered under an FFP framework and where we might choose to pair assets with liabilities.

Highly Certain

| Function | Liabilities | Asset / Cash Flow |
|---|---|---|
| Provide | Current Retiree Benefits | Short Duration Government Bonds / Normal Cost |
| Protect | Future Benefits for Current Employees | Core real estate, high quality credit / UAAL |
| Produce | Future Benefits for Future Hires | Equities, real estate development / POB Issuance |

Highly Uncertain

**What goes into each Category?**

Earlier in this paper, we highlighted the rough spectrum of uncertainty around CCCERA liabilities as well as around the assets in which we might choose to invest. That illustration was a simplistic approach. In reality, a single investment can exhibit several attributes. For example, a real estate investment trust (REIT) has a relatively stable dividend payment but the price of the security fluctuates widely. Therefore, we might take an investment such as a REIT and think about its dividend payment as an attribute that is somewhat distinct from its share value. It would essentially serve distinct roles in two sub-portfolios: growth and liquidity.

The table below shows how we would approach the translation of the risk attributes of our investments into their functional roles. Liquidity will largely come from income, maturity (payoff) of an investment or contractual cash flow (employer and employee contributions, long-term rental contracts). Growth assets will have a combination of market exposure (beta) and manager skill (alpha). Diversifying assets might have income, beta and alpha, but our baseline expectation is that their returns would largely come from the first two factors.

Risk Decomposition

Strategic Priority

| | Income | Beta | Alpha |
|---|---|---|---|
| Liquidity | X | | |
| Growth | | X | X |
| Diversifying | X | X | |

We believe that defining the functional roles of the assets in which we choose to invest is far more important than setting individual sub-asset class targets. In other words, defining the allowed growth exposure and the characteristics of assets that fulfill that growth function is key. The actual mix of growth assets will likely be fluid through time as valuations fluctuate and the strategies available to us from our asset management partners evolve.

Staff will work with the consultant to identify appropriate strategies to fill out the functional roles that have been defined by the Board. Examples of the asset classes that would likely be considered for each functional role are noted on the following page. These examples are not exhaustive, or exclusive, but are good starting points for our research and are explicitly modeled in the Verus asset allocation mixes.

**Provide**/Liquidity Assets: Absolute minimized risk assets. Examples include US Government Debt, AAA and AA short-term corporate debt, contractual income streams (real estate, energy transmission, any other long-term take or pay contract with a high credit counterparty).

**Produce**/Growth Assets: Long-term capital appreciation tied to global economic growth. Examples include public equity, private equity, high yield debt, non-US debt, real estate development, infrastructure development, any other asset where the bulk of the expected return comes from capital appreciation and not current income and/or is not expected to provide liquidity for an extended period of time.

**Protect**/Diversifying Assets: Assets that will tend to have low correlations to growth assets, particularly in times of distress. Real assets (energy, materials, timber, agricultural land), transportation assets (maritime, aircraft, rail), mature and operating infrastructure assets, explicit hedging strategies (long/short funds, tail risk hedges).

### Why start with liquidity?

Paying benefits is, hands down, CCCERA's most important function. It is written into California State Law, it is the basis of CCCERA's mission statement and, as Verus confirmed through the enterprise risk tolerance survey, that primacy is front and center in the minds of the trustees. Why, then, has this function taken a backseat to conversations about diversified growth for the vast majority of CCCERA history? I believe it has much to do with the cash flow position of the fund.

For the first 70 years of CCCERA history, contributions paid into the system from employers and employees have generally exceeded the outgoing benefit payments annually. In recent years, we have had to tap into the nominal income produced from equity dividends and bond coupons to meet the overall benefit needs. When there is a ready source of external capital that would largely or completely meet the spending requirements, liquidity falls into the category of "its small relative to overall fund, generally taken care of operationally and our attention is best focused elsewhere". This has worked and has been appropriate. All appropriate benefit payments have been paid and the trustees have been able to focus on the long-term growth of the system.

The liquidity function becomes our central focus today because:

1. CCCERA is no longer cash flow positive, and we are projected to become significantly cash flow negative over the coming decades.
2. This is occurring amidst of the effects of quantitative easing, which has inflated the price of risky assets, which has the effect of reducing the yield (income) available in the market today.

The confluence of these factors mean that change is necessary from a long-term, structural point of view but also that current market conditions make it expensive and difficult to make that change today.

To fund our own cash flow, we will need more than just a short-dated fixed income portfolio for the Provide portfolio.  FFP envisions a portfolio of assets that will generate cash flow every month to meet CCCERA benefit payments.  The table on the following page maps out the level of benefit payments that we project CCCERA will need to generate in the period 2016-2020.

| Year | Projected Monthly Benefit ($MM) | Projected Annual Benefit ($MM) |
|---|---|---|
| 2016 | $35 | $424 |
| 2017 | $37 | $446 |
| 2018 | $39 | $468 |
| 2019 | $41 | $491 |
| 2020 | $43 | $515 |

It is important to note that we do not envision capital calls and distributions being used in the liquidity planning process.  The funding of private investments would be an operational exercise similar to the structure that we have today.  Every private commitment will identify a specific public market portfolio that will be the source of all capital calls and recipient of all distributions.  In this way, we can mentally account for the underlying economics of investments without muddying the waters with respect to how we use these largely inconsistent cash flows.

## Annual Funding Plan

The Annual Funding Plan ("AFP") describes the process of keeping the liquid portion of the portfolio funded with the Board's targeted number of months of benefit payments. Given the importance of certainty in the liquidity provision of the portfolio for the FFP concept to work, having a process to regularly replenish the liquidity provision, and communicate the level and health of the liquidity in the portfolio is paramount to FFP's successful implementation.

Every year, staff will present the Annual Funding Plan, which will provide a road map of where the next incremental 12 months of benefit payments will likely come from. Ultimately, there are two sources of benefit payments for the Fund: the annual employer pre-payments, and investment assets. The benefits, drawbacks, and best uses of both are shown below:

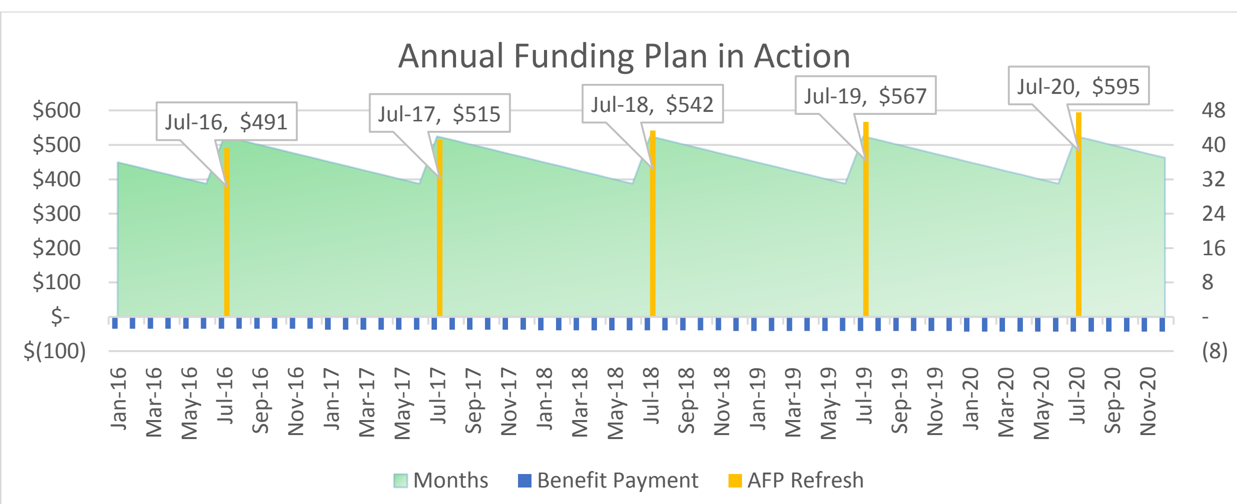
| Asset | Pros | Cons | Best Use |
|---|---|---|---|
| Annual Prepayment | Certainty - Staff can rely on the prepayment due to the financial health of the employers<br><br>The pre-payment is already liquid<br><br>The estimated amount is generally accurate and known well in advance of the payment being made | The prepayment currently covers only about 10 months of benefits, and this will shrink in future years<br><br>Passing through the prepayment removes those assets from consideration for a longer term investment | Passing through the prepayment is the best approach if the Board chooses to hold fewer months of benefit payments in the liquidity portfolio. The certainty of the prepayment would reduce any market risk on keeping the liquidity portfolio funded. |
| Investment Assets | Investment assets can be structured to produce cash flow for the purpose of keeping the liquidity portfolio funded<br><br>Asset sales can play a role in rebalancing the portfolio | Assets in the growth and diversifying portfolios will fluctuate in value. There is risk in selling these assets at a loss | Using plan assets for future benefit payments is the best approach when the Board chooses a longer hedge in the liquidity portfolio. This would allow for the longer term harvesting of portfolios, and would maintain flexibility for the use of the prepayment for attractive investment opportunities. |

Staff would be tasked with making the investment decisions to keep the liquidity portfolio funded, and would annually present to the Board the expected sources of the next incremental 12 months of benefits. Throughout the year, Staff would regularly report to the Board on the progress of funding the liquidity portfolio through either asset sales, harvesting income from assets, or reliance on the prepayment. Given the structure of Annual Funding Plan, the level of the liquidity fund would not normally be less than 12 months below the Board's target benefit payment threshold (should Staff feel the need to increase or decrease the liquidity provision beyond the Board's pre-determined level, Staff would come to the Board for approval of the change, as well as any changes in the allowable range). For example, if the Board targeted 36 months of benefit payments in the liquidity portfolio, at the beginning of the period, the fund would have 36 months of benefit payments funded, and would draw on 12 months over the course of the year. Over that same year, Staff would be responsible for raising an additional 12 months of benefit payments (either through selling investment assets, harvesting investment income, passing through the employer prepayment, or some combination of the three), such that at the end of the first year, there would still be 36 months of benefit payments in cash. This is shown in the example below:

**Example:**
Starting Monthly Benefit Payments: $35 mm
Three Years of Benefits Funded: $1.34 bn

| | *Annual Benefit Spend* | *AFP Cash Raise* | *Balance* |
|---|---|---|---|
| *Beginning of Period* | - | - | $1,338 |
| *Year 1* | -$424 | $491 | $1,405 |
| *Year 2* | -$446 | $515 | $1,474 |
| *Year 3* | -$468 | $542 | $1,548 |

This fund raising and subsequent drawdown is illustrated below.



In the preceding example, the Provide balance is stabilized by the annual spending and cash raising activity. It is important to note that during the year, there may be periods of time where this is less or more than $1.34 bn in the balance, based on the inter-year timing of cash flows. However, the balance would never be less than a pre-defined minimum (to be determined by the Board). In practice, we believe that a normal operating limit would be 12 months less than the number of months defined by the Board. This would be the required balance minus a full year of benefit payments (this would be the case in the unlikely event of spending 12 months of benefit payments before raising an entire year's worth of benefit payments on the 365th day). If extenuating circumstances lead us to believe a lower balance would be prudent, this temporary flexibility would have to be approved by the Board in advance. Given the level of authority Staff would have over this process, it is important to evaluate Staff on their success in keeping the liquidity portfolio funded.

The forward-looking plan for raising the assets will be communicated to the Board at the beginning of the period, and the Board will be updated regularly on the progress of funding, as well as any changes to the planned cash raise. By stabilizing the liquidity portfolio, and in turn the near-term needs of the Fund, the Board is able to direct its attention to the long-term health and growth of the Fund.

The key decisions for the Board will be:

1. Select the size of the Provide portfolio as determined by number of months of benefit payments to be "pre-funded".
2. Select the appropriate range around that level. Most importantly, what is the minimum number of months the Board is comfortable having in the Provide portfolio? For example, if the Board selects a desired level of 36 months, are you comfortable with starting with 36 months, drawing down to 25 months and then refreshing to 36 months with the next Annual Funding? Would you prefer start at some level above 36 months and draw down through that level so the average level over the course of the year is 36 months?
3. Or would you prefer to allow some additional flexibility for us to draw down to a lower level or pre-fund a larger number of benefit payments when market conditions make it prudent and cost effective to do so but keep 36 months as the neutral position? If so, what are the maximum and minimum limits for staff discretion, and under what circumstances would the Board like to make decisions in moving away from the neutral position?

## How best to determine the growth/diversifying Split

Once we have identified the portion of the portfolio that will be dedicated to providing liquidity and paying benefits, we know the overall size of the growth and diversifying strategies put together, but we don't know the appropriate split between those two segments. How should we approach this question?

We propose the following structure:

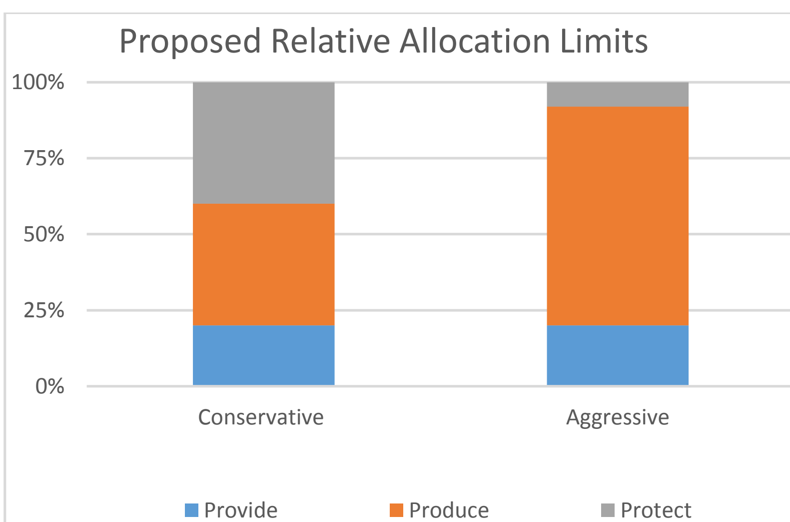
1. We know the overall size of the growth and diversifying portfolios.
2. We know that growth is the primary pursuit of the combined programs
3. We will seek to add diversification and protection when it is:
    a. Needed to pursue a CCCERA goal, or
    b. Available inexpensively and can be used opportunistically

Setting the exact mix between the two will be something of an art, rather than pure science. That said, we believe that some common sense guardrails make sense. In keeping with the goals identified above, we propose the following limits:

1. The Produce allocation will be the dominant allocation, at our most conservative, we would not reduce the growth exposure below a 50/50 split with the diversifying assets.
2. The goal of the Protect element is to keep us out of trouble by offsetting risk in the Produce portfolio and provide a backstop of assets that can be used to acquire low-priced assets during a downturn. Therefore, even at our most aggressive stance, we would maintain diversifying assets of at least 10% of the combined growth and diversifying portfolios.

**Proposed Guideline Example**

Assuming the Protect portfolio stands at roughly 20% of overall assets, the aggressive and conservative stances are shown below:




We are well aware that building out this structure will be something of a learning experience and these limits might be revised over time, but we believe this to be a good starting point.

## How do we measure success?

The success of the Functionally Focused Portfolio will be measured differently than the success of a traditionally structured portfolio. The total fund return and standard deviation numbers will still be observable, but will be secondary to the unique measures of success of each of the FFP sub-components: Provide, Produce, and Protect. Below we outline how each of the sub-components will be measured:

**Provide (liquidity portfolio)**

The safety and surety of the Provide portfolio is absolutely central to the FFP concept. The Provide portfolio is designed for the explicit purpose of storing and dispersing future benefit payments. With this simple function, the total fund achieves its primary goal for beneficiaries. Because of the importance of the Provide portfolio's surety, it can accept the absolute minimum level of any risk. For example, quantitatively this portfolio will have the shortest duration, and lowest credit exposures. Volatility can not be accepted in this portfolio, therefore no investment selected for this portfolio will be subject to material volatility. It is expected that this portfolio will be comprised primarily of fixed income and cash.

Qualitatively, the Board will be able to focus on the long-term facets of the portfolio (growth and diversifying strategies) by being satisfied that the provide portfolio is sufficient to cover near term needs. This is effectively a two part qualification: does the provide portfolio exhibit a low-risk, low-volatility profile that the Board would expect from an extremely safe portfolio? And, is the provide portfolio sufficiently sized to cover near term needs and protect near term benefit payments? The Board will receive regular reporting on the risk posture of the Provide portfolio in order to execute appropriate fiduciary oversight, and the Board will be setting the desired number of stored benefit payments, and setting any flexibility around that number. If the Board is satisfied with the Provide portfolio's risk posture and size, the Board is then able to direct their attention to the Produce and Protect portfolios.

**Produce (growth)**

Success in the growth portfolio will be measured by risk-adjusted returns, whereby the portfolio will be positioned for the maximum growth while minimizing the risk of a permanent impairment of capital. The produce portfolio carries the weight of growing Plan assets to be used for future benefit payments, but should avoid any investment where capital could be permanently lost, resulting and a shrinking of the assets available to grow. Results of the growth portfolio will be observable in the form of above benchmark returns.

**Protect (diversifying)**

The Protect portfolio is designed to offset some of the volatility of the growth portfolio. Ideally, the Protect portfolio will zig when the Produce portfolio zags. In addition, the Protect portfolio must maintain some liquidity in order to quickly respond to market events. Success will be measured by the Protect portfolios liquidity profile (with a floor of holding at least 1/3rd in liquid assets) and will be driven by different factors than the investments in the Produce portfolio, thereby providing a diversification benefit.

### Required Resources for Implementation

As we build out the strategies backing each function, we will be actively engaged with our asset management partners. We envision the first stage as defining our goals and eliciting feedback from our current managers, as well as others that we believe to have unique insights. Once we settle on the appropriate implementation strategies, we will need to identify the skill sets necessary to successfully build out the program. In that process, staff will look to find those skill sets on the most cost-effective basis. This might include:

- Adding expertise to the CCCERA Investment Staff to source and oversee new investments
- Adding consulting resources (either through Verus or the potential addition of other specialty consultants)
- Partnering more closely with select asset managers through better-aligned long-term relationships

During the build out process, we will periodically update the Board with our recommendation about when and how to add necessary expertise.

## Conclusion

The Functionally Focused Portfolio attempts to change the conversation that CCCERA has in the Boardroom. We want to focus the Board discussions on the setting big functional allocations and monitoring their success, rather than on focusing on implementation details that have a far smaller impact on CCCERA's long-term success in achieving our objectives. It is our hope and belief that changing the conversation will lead to more productive Board meetings and greater clarity about why CCCERA holds our various investments.

The level of transparency around each investment remains the same. Your staff and consultant remain available to discuss the pros and cons of every CCCERA investment. We can engage in every conversation we have now about managers, strategies and markets; but we can also do more by focusing on the key functional roles.

I would like each Trustee to ask themselves two questions:

1. When discussing the CCCERA investment program with members of the community, do you believe that you will have a more productive conversation by discussing the size and role of three big functions or by trying to describe the ten asset classes and over 60 individual strategies that we hold?

2. Do you believe that we will have a more robust conversation in the Boardroom when discussing three big functional roles that have a material influence on the performance of the entire CCCERA asset pool or on the selection of an individual manager that might hold a small percentage of CCCERA's assets and therefore have little impact on our overall results?

The CCCERA Investment Philosophy explicitly states we as an organization prefer simplicity to complexity. FFP is your staff's attempt to deliver on that goal.