Date: May 14, 2024

To: Mendocino County Employee Retirement Association Staff and Board of Trustees

From: Dan Gjerde, MCERA Board Trustee

Re: Fiduciary duty to optimize performance of MCERA investments

The investment advisor for Mendocino's pension system, Callan, will report that in the most recent 10 years (ending 3.31.24) our investment portfolio returned 7.04%, or 0.18% higher than half of the pension systems they track. If that's all you need to know, then you can stop reading this memo.

But in recent years, the County's employer contributions to the Mendocino County Employee's Retirement Association (MCERA) ballooned to $30 million a year, placing real hardship on the public. This memo shows actionable options to improve returns of MCERA's investments. The benefit? Better returns mean less time for the plan to reach full funding, shortening the timeframe for when the County can safely resume making smaller contributions to MCERA. These options deserve deliberation.

Random and Volatile Fund Performance

To start, let's look at returns from the last ten years. The table below shows the performance of MCERA's investments (loaded with highly volatile, actively managed stock funds), compared with less volatile index funds in combination with MCERA's best-performing bond fund.

Performance Summary — 10 year returns, ending 12/31/23. Tickers: VITSX, VFWSX, DODIX, VGSNX

Portfolio	MCERA Funds	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	Market Correlation
Vanguard US Total Market	11.06%	$10,000	$29,541	11.44%	15.64%	30.81%	-19.51%	-24.89%	0.69	1.07	1.00
Vanguard Int. Total Market	3.46%	$10,000	$15,031	4.16%	15.18%	27.26%	-15.47%	-27.67%	0.26	0.38	0.86
Dodge & Cox bonds	2.37%	$10,000	$13,164	2.79%	4.74%	9.73%	-10.86%	-15.11%	0.34	0.51	0.59
Vanguard Real Estate Index Institutional	5.80%	$10,000	$20,382	7.38%	17.77%	40.41%	-26.17%	-32.60%	0.42	0.62	0.76

Source: Portfoliovisualizer.com

Not surprisingly, Vanguard's award-winning index funds for the US and international markets beat MCERA's 11-fund stock composite by 10%. For details, follow this link.

Even starker, Vanguard's Real Estate index beat MCERA's real estate investments by 27%.

To be fair, actively managed funds can have their moment in the sun. During the most recent five years, MCERA's equities did slightly outperform the Vanguard index funds, but by a modest 6%. MCERA's real estate investments once again underperformed, however. During the last five years, MCERA's real estate investments yielded 68% lower returns than Vanguard's real estate fund.

MCERA currently splits its fixed-income investments between two funds. Of note, the Dodge and Cox fund performed admirably well in the five years including the 2022 bond market shake-up. Dropping the unremarkable Pimco fund and consolidating with the better-performing Dodge and Cox fund would have boosted MCERA's fixed income performance by 18% over the past 10 years.

Performance Summary — 5 year returns, ending 12/31/23. Tickers: VITSX, VFWSX, DODIX, VGSNX

Portfolio	MCERA Funds	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	Market Correlation
Vanguard US Total Market	15.14%	$10,000	$20,185	15.08%	19.14%	30.81%	-19.51%	-24.89%	0.73	1.15	1.00
Vanguard Int. Total Market	7.51%	$10,000	$14,315	7.44%	18.07%	21.60%	-15.47%	-27.67%	0.38	0.57	0.89
Dodge & Cox bonds	2.02%	$10,000	$11,425	2.70%	6.30%	9.73%	-10.86%	-15.11%	0.16	0.23	0.67
Vanguard Real Estate Index Institutional	2.27%	$10,000	$14,259	7.35%	21.04%	40.41%	-26.17%	-32.60%	0.35	0.51	0.87

Source: Portfoliovisualizer.com

Lack of Essential Information
Under the best circumstances, the odds are against any investor selecting the rare actively managed funds that beat Vanguard's industry-leading index funds over long durations. The odds are further stacked against MCERA's collection of mutual funds because the board is not provided sufficient information to make the very best selections:

1) The portfolio includes ten actively managed stock funds, but the board is not typically provided the ticker letters for these funds, denying board members and the public the ability to easily conduct independent research. (I had to ask for the tickers provided in this memo.)
2) The industry's leading source of comparative information on mutual funds is Morningstar, but the board is not provided subscription to Morningstar's website and its full content.
3) Of MCERA's ten actively managed stock funds, only one earned a gold rating from Morningstar. Three earned a silver rating. Two more were designated bronze or neutral. The remaining four are unrated by Morningstar, and the board has not seen third-party reviews of those funds.

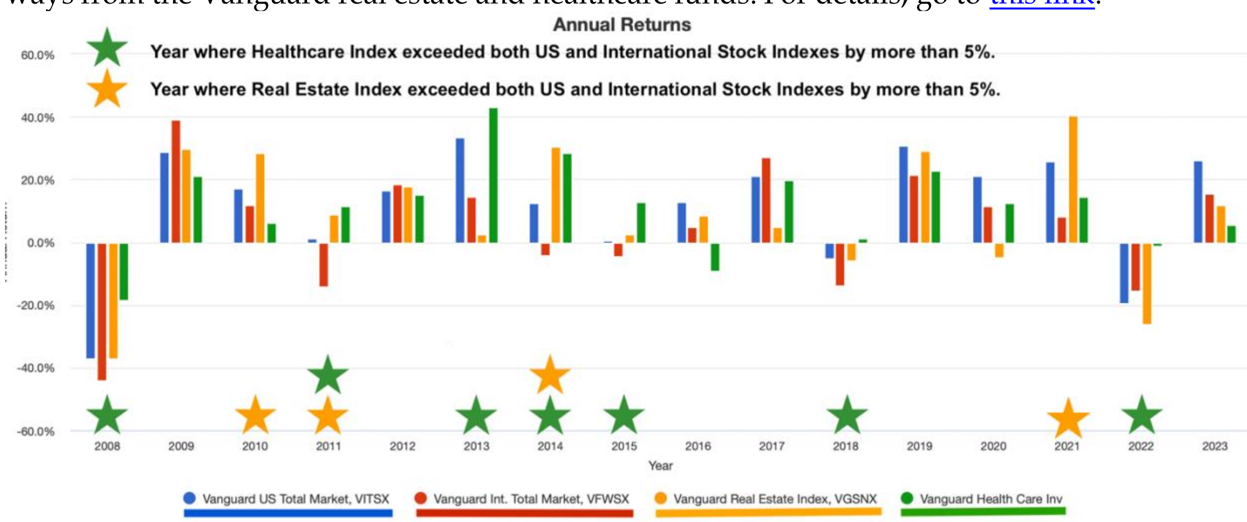
Real Estate: Room For Improvement
The MCERA board has invested 11% of the total portfolio into two private real estate funds and recently assigned another 6% of the total portfolio to infrastructure investments.

Early returns from private infrastructure investments look promising, with initial returns slightly above the results produced by MCERA's better real estate fund, RREEF.

Of MCERA's two real estate funds, neither has performed as well as the Vanguard Real Estate Index, but the RREEF fund only trailed by 8%, earning 6.83% compared with 7.38%. The Barings Core Property fund, in contrast, trailed by 71%, earning just 4.31% compared with 7.38% for the Vanguard fund.

If MCERA prudently withdrew from the Barings Core Property fund, MCERA's remaining investment in real estate and infrastructure could be expected to grow at a higher rate, with the combined real estate and infrastructure investments matching or besting Vanguard's Real Estate Index fund, it appears.

Comparing Diversifiers: Real Estate and Healthcare
Real estate is often allocated a sleeve in portfolios because it can perform somewhat differently from the core of most portfolios: broad stock markets. Likewise, the healthcare industry is seen as a defensive investment because it is resilient during all types of economic cycles. Below is a chart showing annualized returns of US stocks and international stocks, and how they perform in similar and different ways from the Vanguard real estate and healthcare funds. For details, go to this link.



From this chart, we can see the Vanguard healthcare index fund of 400 companies provided even greater diversification than real estate. Another plus: in the last 10 years, the Vanguard healthcare index grew at an annualized rate of 10.16%, significantly better than the 4.31% return of the poor-performing Barings Real Estate fund. If MCERA's portfolio held the healthcare index instead of Barings, MCERA's new defensive sleeve (of real estate, infrastructure, and health) would have earned 8.50% instead of 5.11%.

Performance Comparison of Alternative Asset Allocations

Now that we see how the MCERA portfolio can improve performance with index funds and better bond and defensive investments, let's establish three comparisons: 1) MCERA's asset allocation from the past 10 years; 2) Mix 4 (the 2023 adopted asset allocation); and 3) Mix 5, the asset allocation endorsed by trustee Gjerde. (For the 10 years ending 12/31/23 the average asset weight was 38% US stocks, 26% international stocks, 23% bonds, and 13% real estate and infrastructure.)

Callan options presented to MCERA 2/23

		Alternative Asset Mixes - Current Asset Classes				
Asset Class	Mendocino Target	Mix 1	Mix 2	Mix 3	Target / Mix 4	Mix 5
US Equity	37%	31%	33%	34%	37%	40%
Global ex-US Equity	25%	20%	22%	24%	25%	27%
US Fixed Income	21%	35%	30%	25%	21%	15%
Real Estate	11%	9%	10%	11%	11%	12%
Private Infrastructure	6%	5%	5%	6%	6%	6%
Totals	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Expected Return	7.0%	6.7%	6.8%	6.9%	7.0%	7.2%
Risk (Standard Deviation)	12.8%	10.6%	11.4%	12.2%	12.8%	13.7%
% Illiquid	17%	14%	15%	17%	17%	18%

As can be seen below, MCERA's actual performance produced annualized returns of 6.75%. The same weighted asset allocation (utilizing indexes for stocks, plus improvements in the bond and the new defensive sleeve of real estate, infrastructure, and health) would have resulted in a return of 7.42%. Over ten years, this was a 10% jump in return.

Performance Summary — MCERA 10-year performance as of 12/31/23: 6.75%.

Portfolio	Initial Balance	Final Balance	CAGR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio	Market Correlation
MCERA Effective Actual Weight, Indexed: 38% US Index, 23% D&C bonds, 26% Int. Index, 8.67% RREEF & Infrastructure*, 4.33% Healthcare Index	$1,000,000	$2,045,429	7.42% 6.75%	11.99% MCERA actual performance	22.99%	-16.34%	-22.61%	0.55	0.83	0.97
Mix 4, Indexed: 37% US Index, 21% D&C bonds, 25% Int. Index, 11.5% RREEF & Infrastructure, 5.5% Healthcare Index	$1,000,000	$2,071,086	7.55%	12.18%	23.38%	-16.61%	-22.84%	0.56	0.83	0.97
Mix 5, Indexed: 40% US Index, 15% D&C bonds, 27% Int. Index, 12% RREEF & Infrastructure, 6% Healthcare Index	$1,000,000	$2,135,394	7.88%	12.86%	24.43%	-17.02%	-23.53%	0.56	0.83	0.97

*Performance of RREEF + JP Morgan + IFM Infrastructure estimated to equal performance of Vanguard Real Estate Index.

Source: Portfoliovisualizer.com

Mix 4 above, with improved selection of investment funds, would have resulted in a return of 7.55%. Over ten years, this was a 12% jump in the total portfolio's annualized return. Go here for details.

Finally, Mix 5 above, with improved selection of investment funds, would have resulted in a return of 7.88%. Over ten years, this was a 17% jump in annualized return.

MCERA's Unusually High Cash Inflows

Since July 2007, employer contributions to the Mendocino County pension system ballooned at an annualized rate of 9.73%. That's more than four times the rate of inflation, with the County now contributing $30 million a year. The question is, can MCERA's portfolio of investments be designed to take advantage of this tremendous cash inflow?

In short, yes. Since 2018, MCERA's operational costs only required a maximum of \$8.1 million a year in fund outflow. That's a tiny amount from a portfolio of roughly \$700 million. To make monthly payments to beneficiaries and pay MCERA expenses, remaining funding comes from bi-weekly employer and employee cash inflows, which today amount to \$30 million and \$8.5 million each year.

Performance Summary — **Fund balances: comparing actual portfolio with optimized portfolios, 1/1/19 to 4/30/24.**

Portfolio	Initial Balance	Final Balance	CAGR	TWRR	MWRR	Stdev	Best Year	Worst Year	Max. Drawdown	Sharpe Ratio	Sortino Ratio
MCERA Effective Actual Weight, Indexed: 38% US Index, 23% D&C bonds, 26% Int. Index, 8.67% RREEF & Infrastructure, 4.33% Healthcare Index	$476,000,000	$713,815,565	7.89%	9.29%	9.38%	14.61%	22.99%	-16.34%	-22.61% (-23.36%)	0.54	0.81
	$476,000,000	$691,638,020	MCERA actual fund performance								
Mix 4, Indexed: 37% US Index, 21% D&C bonds, 25% Int. Index, 11.5% RREEF & Infrastructure, 5.5% Healthcare Index	$476,000,000	$714,024,216	7.90%	9.30%	9.39%	14.85%	23.38%	-16.61%	-22.84% (-23.59%)	0.53	0.80
Mix 5, Indexed: 40% US Index, 15% D&C bonds, 27% Int. Index, 12% RREEF & Infrastructure, 6% Healthcare Index	$476,000,000	$733,226,313	8.44%	9.82%	9.91%	15.61%	24.43%	-17.02%	-23.53% (-24.25%)	0.54	0.82

Fund balances include annualized withdraws of \$8.1 million. Source: Portfoliovisualizer.com.

Above we see the final fund balance of the optimized portfolios, all starting with MCERA's actual 1/1/19 beginning fund balance of \$476 million (see: page 9). On an annualized basis, \$8.1 million is withdrawn from each portfolio. For more, follow this link.

The indexed and optimized alternatives all produced significantly higher returns.

How do these improved returns impact MCERA's funding ratio? What is MCERA's funding ratio today, and what would the funding ratio be, as of April 30, 2024, if these indexed and optimized portfolios had been in effect since January 1, 2019?

- MCERA's historic asset allocation and investments, \$692 million, funding ratio estimated at 73.9%
- MCERA's historic asset allocation, optimized, \$714 million, funding ratio estimated at 76.2%
- Mix 4 asset allocation, optimized, \$714 million, funding ratio estimated at 76.2%
- Mix 5 asset allocation, optimized, \$733 million, funding ratio estimated at 78.2%

Methodology: rebalancing and withdraws occur quarterly, and full funding as of 4/30/24 is estimated at \$937 million.

Opportunity Cost of MCERA's Active Stock Funds

According to Callan's reports over the years, MCERA's actively managed stock funds are consistent by one benchmark: the active funds are more volatile than the total stock market. Callan's five-year lookbacks provided in 2018 and 2023 show that MCERA's US stock funds were approximately 7.5% more volatile than the US total market. Callan's reports also show MCERA's international stock funds were approximately 11.5% more volatile than the international total market.

In other words, MCERA's active stock funds add 6% extra volatility to MCERA's total portfolio.

That means Mix 4, which Callan estimated might have a standard deviation of 12.8%, can be expected to have 6% greater volatility when containing MCERA's actively managed stock funds, or a best-guess standard deviation of 13.6%. Callan's estimated standard deviation for Mix 5, utilizing typical market funds, was 13.7%, practically the same as what MCERA can expect with its active funds in Mix 4.

Here are two questions for any remaining advocates of MCERA's active funds: Constrained by the lower-performing Mix 4 asset allocation, is it remotely likely that MCERA's active stock funds will outperform Mix 5? What is the opportunity cost of keeping these randomly performing active funds?

Mix 5: Bigger Reward, Without Extra Risk

Finally, below you can see the results from thousands of simulations run by Portfoliovisualizer.com. This slide from the report shows the extraordinarily high success rate of the indexed and optimized funds in Mix 5, with annualized withdraws starting at $8.1 million (and withdraws going up with inflation).

Portfolio Model Mix 5, with optimized funds Source:portfoliovisualizer.com

Ticker	Name	Allocation
VITSX	Vanguard Total Stock Market Idx I	40.00%
DODIX	Dodge&Cox Income I	15.00%
VFWPX	Vanguard FTSE All-Wld ex-US Idx Ins Plus	27.00%
VGSNX	Vanguard Real Estate (equivalent to RREEF + JP Morgan + IFM funds)	12.00%
VHCIX	Vanguard Health Care Index Admiral	6.00%

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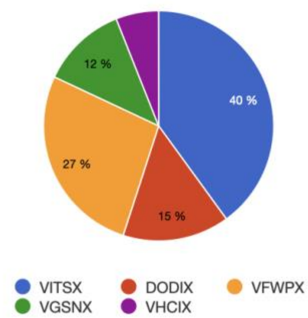

Performance Summary Less than 25% chance plan not fully funded in 15 yrs, if full funding is $1.5 billion.

	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile
Time Weighted Rate of Return (nominal)	4.61%	6.58%	8.81%	10.93%	12.78%
Time Weighted Rate of Return (real)	1.70%	3.78%	6.05%	8.25%	10.08%
Portfolio End Balance (nominal)	$1,160,758,170	$1,569,463,468	$2,190,323,978	$2,976,410,796	$3,848,804,132
Portfolio End Balance (real)	$761,430,046	$1,055,884,517	$1,495,289,200	$2,064,183,763	$2,681,549,138
Annual Mean Return (nominal)	5.40%	7.31%	9.43%	11.44%	13.18%
Annualized Volatility	10.72%	11.52%	12.44%	13.37%	14.18%
Sharpe Ratio	0.33	0.48	0.66	0.85	1.02
Sortino Ratio	0.48	0.72	1.02	1.34	1.68
Maximum Drawdown	-38.35%	-32.36%	-26.03%	-23.75%	-18.68%
Maximum Drawdown Excluding Cashflows	-36.55%	-31.29%	-24.40%	-23.53%	-18.52%
Safe Withdrawal Rate	7.07%	8.56%	10.34%	12.15%	13.74%
Perpetual Withdrawal Rate	1.70%	3.66%	5.72%	7.62%	9.15%

This shows inflation-adjusted growth in fund balance over the next 15 years, even in the worst 10% case scenarios. In the 50% chance scenarios, it shows inflation-adjusted fund balance more than doubles to $1.5 million. For details on the simulations run for the indexed and optimized Mix 5, go here.

Conclusion and Recommendations

In 2017 and 2018, MCERA made a big move. It dropped its actively managed funds for US large cap companies, exchanging those funds for the Vanguard S&P 500 index. That change was a big win for the MCERA portfolio. This memo concludes it is time for MCERA to complete the switch to proven index funds. Switching to indexes will substantially reduce volatility of MCERA's equity sleeves and enable the total portfolio to improve long-term returns by enlarging its holding of equities, without adding volatility, and reaching full funding sooner than the current investments with the Mix 4 asset allocation.

Recommendation #1) Switch MCERA's US and international equity investments to industry-leading index funds. Utilize Vanguard's gold-rated VITSX and VFWPX. These funds have fees of 2 and 6 basis points, compared with an average of 74 basis points for MCERA's 10 actively managed stock funds. The switch reduces volatility of MCERA's total portfolio by approximately 6%, and over the long run will outperform nearly all active funds, including MCERA's inconsistently rated active funds.

Recommendation #2) Move MCERA's fixed income investments out of the average-performing, silver-rated Pimco fund and consolidate with the better-performing, gold-rated Dodge & Cox fund.

Recommendation #3) Move MCERA's 6% asset allocation from the poorly performing Barings Real Estate Fund into the Vanguard healthcare index fund. Compared with real estate, history shows the 400 healthcare companies in this gold-rated index fund provide better resiliency to a downturn in the economy. History also shows the expected annualized return from Vanguard's healthcare index, VHCIX, is higher than the real estate market, with less volatility.

Recommendation #4) Switch to asset allocation Mix 5. Adoption of recommendation #1 will reduce the expected volatility of MCERA's total portfolio by 6%, meaning Mix 5 will be no more volatile than Mix 4 if it lacks MCERA's highly volatile, actively managed stock funds. Switching to Mix 5 increases MCERA's expected return, cautiously estimated by Callan to be an extra 0.20% over Mix 4. As a point of reference, in the last 10 years Mix 5 in fact enjoyed an additional annualized return of .33% over Mix 4.

Recommendation #5) Schedule a joint meeting with the plan sponsor, who hopes MCERA's investment returns will eliminate the unfunded liability as soon as reasonably possible. A two-way conversation would be beneficial for both the MCERA board and the board of supervisors.

MCERA Investment Fund	Cost	Ticker	Morningstar rating
~~S&P~~	0.02%	VIIIX	Gold
~~Fidelity*~~	0.92%	FLPSX	Silver
~~Janus*~~	0.66%	JDMNX	Silver
~~PGIM*~~	0.68%	TSVQX	Neutral
~~AB*~~	0.78%	QUAZX	Bronze
~~EuroPac~~	0.47%	RERGX	Gold
~~Harbor*~~	0.69%	HNINX	Silver
~~Oakmark~~	0.73%		?
~~Mondrian*~~	0.65%		?
~~T.Rowe*~~	1.04%		?
~~Ninety One~~	0.73%		?
~~Pimco*~~	0.46%	PTTRX	Silver
• **D&C**	**0.41%**	**DODIX**	**Gold**
• **RREEF**	**0.95%**		**Retain**
~~Barings*~~	0.82%		
• **JP Morgan***	**0.86%**		**Retain**
• **IFM**	**0.77%**		**Retain**
Vanguard Health Index	**0.10%**	**VHCIX**	**Gold, add to fund**
Vanguard Total US Index	**0.02%**	**VITSX**	**Gold, add to fund**
Vanguard Total Int. Index	**0.06%**	**VFWPX**	**Gold, add to fund**

* denotes investment fund management firms that paid for "educational, consulting, software, database, or reporting or services from Callan," as disclosed by Callan on 12.31.23. According to MCERA's 5.15.24 staff report, these 10 firms in 2023 paid Callan $611,095 in fees. These 10 companies are among just under 200 investment fund management firms that are listed on Callan's 12.31.23 financial compensation disclosure document.