



2023

ANNUAL INVESTMENT PLAN

For the Year Ended June 30, 2023



School Employees Retirement System of Ohio
Serving the People Who Serve Our Schools®



**SCHOOL EMPLOYEES RETIREMENT SYSTEM OF OHIO
ANNUAL INVESTMENT PLAN**

For the year ended June 30, 2023

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Serving the People Who Serve Our Schools®

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Executive Summary

EXECUTIVE SUMMARY

The Board's Statement of Investment Policy (SIP) requires the Chief Investment Officer prepare and present to the Board for its approval an Annual Investment Plan (Plan). The following document outlines the recommended Plan for Fiscal Year (FY) 2023.

As in prior years, the Plan reviews the economic environment based upon consensus reports from leading sources, SERS' asset allocation target and long-term performance objective for each portfolio, last year's objectives and accomplishments, a review of the market conditions over the last year and objectives for FY2023. Implementation Guidelines for each asset class portfolio are included to provide further details on how each portfolio will be managed in the coming year relative to portfolio construction parameters and risk limits. **This Plan is meant to be a living document subject to adjustment during the year.** If circumstances change or opportunities arise during the year, items will be discussed with the Board which may lead to intra-year changes to the Plan or Strategy Statements.

REVIEW OF FY2022 OBJECTIVES AND IMPLEMENTATION

The general objectives of the Investment Department for FY2022 were as follows:

- *Our major strategic goals remain unchanged. The focus will continue to be value added performance, risk management, cost effectiveness and maintenance of an investment program that meets or exceeds investment objectives over the long-term.*

Total Fund returns exceeded the policy benchmark for all periods over ten years. For FYTD, Total Fund return of 5.32% as of March 2022 exceeded the benchmark by 2.50%. For three years the return was 12.33% which exceeded the benchmark by 1.40%, and for five years the return was 10.65% with 1.22% excess return. The excess returns have been generated with modest active risk.

- *Continue to implement the asset allocation framework and targets approved by the Board in FY2020, specifically, increase allocations to Private Credit, Private Equity and Real Assets on a selective basis.*

Asset allocation implementation is nearly complete. Required implementation was to increase Real Assets from 15% to 17%; Private Equity from 10% to 12% and Private Credit from 0% to 5%. As of March 31, 2022, the allocation to Real Assets was at 18.5%, Private Equity was 12.1% and Private Credit was at 3.9%. Private Credit is expected to reach 5% by the end of FY2022. In FY2022, the Board approved a Total Fund leverage strategy with a limit of 10%. This program will be implemented when economic and financial conditions become more stable.

- *Research new strategies in renewable energy, infrastructure, and commodities and implement on a selective basis.*

In FY2022, Staff implemented two portfolios to further diversify the Total Fund and provide direct inflation hedging. One is an actively managed commodities portfolio and the other is a portfolio with a mixture of TIPS, gold and commodities implemented through ETFs. These allocations are accounted for within the Opportunistic bucket along with other tactical and diversifying assets and contributed positively to Total Fund returns.

- *Re-engage the investment team as they return to the office to maintain strong investment culture and teamwork.*

The team performance was highly productive during the remote working phase in terms of approving new investments and monitoring the portfolio. Since returning to the office in July, team development activities were conducted to maintain team culture and cohesion.

FY2023 OBJECTIVES

- *Our major strategic goals remain unchanged. The focus will continue to be value added performance, risk management, cost effectiveness and maintenance of an investment program that meets or exceeds investment objectives over the long-term.*
- *Continue to implement the asset allocation framework and targets approved by the Board and implement the leverage program as conditions and return expectations improve.*
- *Research new strategies in renewable energy, infrastructure, and commodities and implement on a selective basis.*

EXECUTIVE SUMMARY

CONCLUSION

As of March 31, 2022, SERS' Total Fund had net returns of 10.65% over five years and 9.47% over ten years exceeding the actuarial rate of 7.00%. Staff will remain focused on adding value relative to policy benchmarks and managing risks and costs.

The economic environment and market outlook have changed significantly in 2022, posing downside risks to investment returns. Inflation has spiked to 8.5% and the 10-year yield has increased to 2.8% in short order. This likely will cause GDP growth to slow and higher discount rates will depress asset valuations. So, expected returns will be lower than the returns experienced over recent periods.

Staff appreciates the support and guidance received from the Board in FY2022 and looks forward to working with the Board in FY2023 for another successful year.

ACKNOWLEDGEMENTS

SERS is very fortunate to have an experienced and deep Investment Staff. The following individuals contributed to this report.

- Economic Outlook – Farouki Majeed and Hai Yen Le
- Global Equities – Judi Masri and Dustin Matthiessen
- Global Private Equity – Steve Price and Phil Sisson
- Global Fixed Income – Jason Naber
- Global Private Credit – Adam Messerschmitt
- Global Real Assets – Paul Cheng and Michael Browning
- Cash Equivalents & Securities Lending – Jason Naber
- Opportunistic and Tactical – Farouki Majeed, Phil Sisson, Michael Browning, Dustin Matthiessen and Adam Messerschmitt
- Overlay Program – Farouki Majeed, Jason Naber and Judi Masri
- Investment Risk Management and Analytics – Hai Yen Le and Michael Browning
- Investment Operations – Terri Martin and Katie Swank

We would appreciate the opportunity to review the Annual Investment Plan with you at the June 2022 Board meeting. If you have any questions or comments before then, please let me know.

Respectfully submitted,



Farouki A. Majeed
Chief Investment Officer



Global Economic Outlook

GLOBAL ECONOMIC OUTLOOK

In 2021, the global economy recovered from the 2020 recession with a strong growth rate of 6.1%. The US growth rate was also solid at 5.9%. Accommodative monetary policy as well as fiscal stimulus in the US and other major economies during the pandemic were major supports for global recovery while issues related to the pandemic such as global supply chain disruption, materials and labor shortage were the main impediments in 2021.

Goods, labor and commodities shortages induced by the COVID-19 pandemic, combined with increased demand stemmed from the economic recovery, pushed inflation higher across the globe in 2021. US inflation was 4.7% while the euro area saw an inflation of 5.0% in 2021. According to the World Bank, 71% of emerging and developing economies faced an inflation rate of above 5% in 2021. The Russian-Ukraine war, which erupted in February 2022, added pressure to inflation, further increasing energy and food prices. US inflation reached a twenty year high of 8.5% in March 2022, caused by both supply constraints and higher demand from a combination of growth and fiscal stimulus.

The US labor market recovered strongly, adding 6.7 million jobs in 2021 and 1.7 million jobs in Q1 2022. The unemployment rate decreased from 6.7% in December 2020 to 3.9% in December 2021 and 3.6% in March 2022. In the US, a healthy labor market and solid economic growth have created favorable conditions for the Fed to shift monetary policy from expansionary to contractionary to combat historically high inflation. The Fed ended its bond-buying program and initiated the first interest rate hike of 25 bps in March 2022, while signaling more rate hikes to come in 2022. This has led to tightening monetary conditions. The 10-year rate increased from 0.93% in December 2020 to 1.52% in December 2021 and 2.93% by April 19, 2022.

In 2021, US equity markets rallied strongly, gaining 25.66%, exceeding returns of non-US markets. Non-US developed markets returned 12.63% while the emerging markets lost 2.54% in 2021. However, equity markets were down globally in Q1, 2022 due to increased inflation, the Russian-Ukraine war and the Fed's monetary policy shift. US consumer sentiment stayed below the historical average throughout 2021 and decreased further to 62.7 in February 2022, the lowest level since November 2011, due to higher inflation and slower economic growth concerns.

Economic forecasts from the Blue Chip Consensus (US) and the International Monetary Fund (IMF) are presented below:

US ECONOMY

The Blue Chip consensus expects the US economic recovery to moderate in the second half of 2022 and slow further in 2023. The US growth rate is expected to be 3.2% for 2022 and 2.3% for 2023.

According to the Blue Chip Economic forecasts, the unemployment rate is expected to decline to 3.6% in 2022 and 3.5% in 2023, indicating a tight labor market that will continue to add up-ward pressure on wages, thus contributing to keeping inflation high (Table 1). Inflation is expected to decrease to 6.8% in 2022 then decline to 3.0% in 2023. The yield on 10-year US Treasuries is expected to be 2.4% in 2022 and increase further to 2.9% in 2023. US corporate profits are expected to weaken to \$6.0 trillion in 2022 and \$2.4 trillion in 2023 from \$25.0 trillion in 2021.

Table 1

Period	Unemployment Rate (%)	Inflation Rate CPI (%)	T-Bill 3-Mo. (%)	T-Note 10-Yr. (%)	Corporate Profits (Cur. \$)
2018	3.9	2.4	2.0	2.9	8.3
2019	3.7	1.8	2.1	2.1	2.7
2020	8.1	1.2	0.4	0.9	-5.2
2021	5.4	4.7	0.0	1.4	25.0
2022 Consensus Forecast	3.6	6.8	1.2	2.4	6.0
2023 Consensus Forecast	3.5	3.0	2.4	2.9	2.4

Source: Blue Chip Economic Indicators, April 2022

GLOBAL ECONOMIC OUTLOOK

GLOBAL ECONOMY

The IMF forecasted global GDP growth is to slow down to a moderate level of 3.6% in 2022 and maintain the same level for 2023 (Table 2). For 2022, emerging and developing economies are expected to grow slightly faster than advanced economies as the former's expected growth rate is 3.8% while the latter's is 3.3%. For 2023, the emerging and developing economies are projected to strengthen their growth advantage as their growth is expected to accelerate to 4.4% while the advanced economies are expected to decelerate to 2.4%.

Table 2

Annual GDP Growth (in percent)	2021	2022 (projected)	2023 (projected)
World	6.1	3.6	3.6
US	5.7	3.7	2.3
Advanced Economies (including US)	5.2	3.3	2.4
Emerging and Developing Economies	6.8	3.8	4.4

Source: International Monetary Fund World Economic Outlook, April 2022

Portfolio Strategy

PORTFOLIO STRATEGY – Total Fund Asset Allocation

Actual asset allocation relative to policy target is shown in the table below:

	Target	Range	Actual		
			3/31/2022	7/1/2021	7/1/2020
Global Equities	45%	35-55%	44.4%	48.6%	45.5%
Global Private Equity	12%	8-16%	12.1%	10.4%	9.8%
Global Fixed Income	19%	12-26%	12.8%	15.1%	17.2%
Global Real Assets	17%	14-22%	18.5%	14.8%	15.7%
Global Private Credit	5%	3-7%	3.9%	2.4%	n/a
Multi-Asset Strategies	n/a	n/a	n/a	n/a	7.1%
Opportunistic	0%	0-7%	4.9%	4.3%	2.6%
Cash	2%	0-5%	3.3%	4.4%	2.1%
Total Fund	100%		100%	100%	100%

Staff has had a bias toward a neutral weight in Global Equities, an underweight in Global Fixed Income, overweight in Opportunistic investments and overweight in Cash in FY 2022. These tactical allocation decisions contributed to Total Fund excess returns, while a majority of the excess return of 1.74% for FY 2022 through March was from selection effects in Private equity, Real Assets, Private Credit and Opportunistic as these asset classes exceeded their respective benchmarks.

Both Global Equity and Global Fixed, which together account for nearly 65% of the Total Fund, have had negative returns in FY 2022 as inflation has spiked and interest rates have tightened causing valuations to compress. Further tightening is expected by the Fed through calendar year 2022 and this would mean that interest rates across the yield curve would increase and slow the economy and profit growth of companies. Staff believes it would be appropriate to maintain both equity and fixed income relative to targets in this environment until there is moderation of inflation and interest rates.

PORTFOLIO STRATEGY - Global Equities

INVESTMENT STRATEGY

SERS invests in equity securities to earn a premium over government treasury bonds, which is compensation for assuming the relatively higher risk inherent in public equity securities. A sizeable allocation to Global Equities is necessary to meet the long-term return goal.

SERS' Statement of Investment Policy sets the Global Equities target allocation as follows:

	Total Fund Target	Permissible Range
Global Equities	45%	35% - 55%

- The performance objective of the Global Equity portfolio is to exceed the return of the MSCI All Country World Net Total Return Index (USD) by 30 basis points net of management fees.

REVIEW OF FY2022 OBJECTIVES AND IMPLEMENTATION

FY2022 Annual Investment Plan objectives and related activities are as follows:

- *Monitor the portfolio for possible performance enhancement. Compare SERS active managers to peers and conduct any manager searches, if appropriate.*

The US Equity portfolio has underperformed its benchmark by 14 basis points in FYTD through March 2022. The allocation to passive management within the US Equity large cap composite has been increased from 77.45% as of June 30, 2021 to 82.92% as of March 31, 2022 with the aim of reversing the longer term underperformance and to meet the modest excess return goal cited above. Both the large and small cap composites outperformed their related style benchmark, but the small cap overweight led to underperformance since small cap returns were much lower than large cap in this period. Staff reduced small cap exposure during the FY from a 4% overweight to a 2.5% overweight, intending to stay slightly overweight as small caps are inexpensive versus large caps, however, small cap had a negative return.

After outperforming in FY2021, the Non-US Equity Developed market portfolio is underperforming by 154 basis points FYTD through March. Three, five and ten-year net excess returns remain positive, FYTD underperformance has been impacted by emerging market exposure, overweighting small cap and an underperforming growth mandate.

After outperforming in FY2021, the Non-US Equity Emerging market portfolio is underperforming by 217 basis points FYTD through March. Three, five and ten-year net excess returns remain positive. Emerging markets have experienced greater volatility and drawdown in FY2022 caused by the increase in inflation, the Russia-Ukraine war and Covid lockdowns in China. We expect the relative performance to improve in coming quarters. As macro and geopolitical risks are priced into markets manager performance is expected to rebound.

Staff will continue to pay more attention to the allocation within the portfolios relative to the benchmark exposures to better manage performance.

- *Complete the Non-US Equity Developed Market Small Cap and Emerging Market Dedicated China A-Share searches. Research and identify other new and innovative investment opportunities with managers who offer compelling return expectations.*

The Non-US Equity Developed Market Small Cap Investment Management Agreement (IMA) was signed effective October 1, 2021. The mandate was funded in March 2022 with an initial \$50 million due to high market volatility. Staff will fund an additional \$25 million over the next six months.

The Emerging Market Dedicated China-A Share strategy was funded with an initial \$50 million in October 2021 after the MSCI China Net Total Return USD Index declined 16.67% from January through September 2021 due to new Chinese technology regulation, COVID zero tolerance policy and real estate bank financing concerns. However, this Index declined another 12.39% from October 2021 through February 2022. Staff has a favorable outlook on this investment over the long term.

Staff is focused on diversifying the SERS US Equity small cap composite before considering other mandates. A new US small cap growth mandate was approved in March 2022 to reduce return volatility.

PORTFOLIO STRATEGY - Global Equities

- *Ensure the global equity portfolio has appropriate risk and return characteristics.*

The US Equity portfolio's overall active risk declined while beta increased from 0.97 last year to 0.98 mainly due to increasing passive management by 6.9%. The portfolio is still defensive as SERS' US large cap active managers have a beta of 0.81, unchanged from prior year. This low large cap active beta helped the portfolio in the current FY market downturn with our large active managers outperforming the index by 1.77% FYTD through March 2022.

The Non-US Equity Developed portfolio active risk declined during the year from 1.74 to 1.58 and beta declined from 1.00 to 0.98. Staff expects the lower market risk to be beneficial in the current volatile environment for European equities.

The Non-US Equity Emerging Market portfolio active risk increased from 2.54% to 2.75% as of January 2022. Managers moved to a more defensive position reducing portfolio beta from 1.03 to 0.96. This defensive positioning helped the portfolio to outperform during the market downturn through December 2021, but Omicron and the Russia-Ukraine war hurt performance in Q1 2022. Emerging Markets trade at only 12 times earnings and we expect our managers to recover from the first quarter 2022 losses.

- *Regularly evaluate and realign the Global Equity Portfolio to ensure that country exposure, management mix, capitalization weight, and style orientation are appropriate and make recommendations as necessary.*

In the US portfolio, \$135 million in net redemptions occurred during FY22 through March. The majority of redemptions aimed to reduce the 4% small cap overweight down to a 2.5% overweight. Large cap growth exposure was also reduced to increase the value style tilt, as growth stocks were overvalued.

In Non-US Equity Developed Markets, \$305 million in net redemptions occurred during FY22 through March. Staff redeemed \$105 million from an ACWI mandate to harvest gains after the manager posted a 14.46% net excess return for FY21 and help reduce emerging market exposure. An additional \$255 million was redeemed from passive management to fund operational expenses and allocate to new active strategies hired over the last two fiscal years. The Developed market passive allocation was reduced from 30.3% as of June 30, 2021, to 24.9% as of March 31, 2022 as active management has outperformed over longer time periods. The allocation changes have tilted the portfolio to a value style, which is expected to help performance.

In Non-US Equity Emerging Markets, \$75 million was redeemed from our current emerging market managers during the first nine months of FY22 due to Staff's negative outlook. This was offset by the new \$50 million China A-Share funding.

- *Review IMAs and Investment Guidelines on the review schedule and make necessary adjustments as needed.*

One Non-US Developed Market equity manager IMA was fully renegotiated in the current fiscal year. Two US Equity managers had new amendments added this fiscal year. One of these new amendments changed the manager's benchmark from the S&P 500 to the Russell 1000, better aligning the mandate with SERS index suite. The other US Equity amendment updated a manager's guideline to reflect higher market capitalization in today's market.

CURRENT MARKET CONDITIONS AND OUTLOOK

Cumulative Periods through March 31, 2022	Annualized Returns (in percent)				
	FYTD	1 Year	3 Year	5 Year	10 Year
Russell - 3000 Index	3.40	11.92	18.24	15.40	14.28
Russell - 3000 Growth Index	1.33	12.86	22.68	20.16	16.64
Russell - 3000 Value Index	5.64	11.10	12.99	10.16	11.61
Russell - 1000 Index	4.36	13.27	18.71	15.82	14.53
Russell - 2000 Index	(9.66)	(5.79)	11.74	9.74	11.04
MSCI - AC World Index (\$Net)	(0.11)	7.28	13.75	11.64	9.99
MSCI - AC World Ex-USA Index (\$Net)	(6.60)	(1.48)	7.51	6.76	5.55
MSCI - World Ex USA Index (\$Net)	(2.46)	3.04	8.55	7.14	6.25
MSCI - Emerging Markets Index (\$Net)	(15.62)	(11.37)	4.94	5.98	3.36

Source: Wilshire Compass

Fiscal years begin July 1 and end on June 30

PORTFOLIO STRATEGY - Global Equities

Global equity markets experienced strong returns of 19.04% for calendar year 2021 before a sharp first quarter 2022 decline reducing the 1-Year return ending March 2022 to 7.28%. The US market is the top performer amongst world equities again for the last year, keeping its lead over all time periods. After posting a FY21 return of 40.90%, emerging markets declined during the summer of 2021 while the US and Developed ex-US maintained positive returns for the full CY21. The combination of Omicron, inflation worries, and the Russia-Ukraine war hit all markets hard for the first quarter of 2022 with Non-US Developed posting a (4.81%) return, US declining (5.28%) and Emerging performing the worst at (6.97%) for the quarter. A more detailed summary follows for US and Non-US markets.

The Russell 3000 broad market US index posted a strong 25.66% for CY21 where US large cap outperformed small caps by 11.63%. Somewhat surprisingly, the market shook off the COVID Delta variant threat along with inflation fears in CY21. Value and growth styles changed leads during the year with value leading early in 2021, followed by growth being favored with the Delta variant onslaught. Value made a comeback by year-end and kept its lead into 2022 with talks of possible interest rate increases to combat inflation. First quarter brought a host of problems with inflation fears, the new Omicron variant and the Russia-Ukraine war. This led to the worst quarterly return of (5.28%) in two years as volatility spiked, bringing the US FYTD return down to 3.40% through March. US sector returns over the year ending March 31, 2022 has energy as the best performing sector with a 64.82% return. Communication services was the worst performing sector with (3.30%) return.

Non-US Equity Developed Markets posted a (2.46%) return FYTD through March as COVID and the Russian-Ukraine war impacted these markets worse than the US. Longer-term returns (out to 10-years) are behind the US by roughly 8 - 10% due to currency impacts and global market preference for technology-oriented US growth companies since the credit crisis. Developed Markets ex-US had dispersed sector returns with energy leading, posting a 38.66% return, and consumer discretionary posting the worst return of (9.22%) for the one-year ending March 31, 2022.

Non-US Equity Emerging Markets declined 15.62% for FYTD, after posting a 40.90% return for FY21. Emerging markets suffered as China markets declined due to its zero tolerance COVID policy, new technology regulations and real estate bank concerns. A strong commodity environment has not lifted emerging market returns as a strong US dollar and the Ukraine war has added more pain to the situation. Thus, Emerging markets lag Developed Market ex-US in all longer time periods and lag US markets by double digits in all periods. Like Developed Markets ex-US, energy was Emerging Markets top performer with a 16.02% return and consumer discretionary posted the worst return of (38.87%) for the one-year ending March 31, 2022.

Market volatility may continue due to higher interest rates in an attempt to combat inflation, supply-chain disruption from the pandemic and the Russia-Ukraine war. Thus, global equity returns are expected to be low, but positive over the next year as GDP is still expected to grow. The IMF expects Global GDP to grow 3.6% this year while US GDP is expected to grow 3.7% in 2022. Emerging market securities are the most inexpensive, trading at about 12 times earnings followed by developed market ex-US companies trading at 14 times earnings. US markets are the most expensive trading at 20 times earnings, but US companies are still reporting healthy earnings. US consumers also show strong spending trends led by the US housing market, which may help equities.

PORTFOLIO STRUCTURE

At the end of March, Global Equity was underweight the 45% target allocation by 0.59% as follows:

- The US portfolio was 1.74% overweight relative to its 55% Global Equity target allocation,
- The Non-US Developed Market portfolio was underweight by 0.28% relative to its 30% Global Equity target allocation and
- The Non-US Emerging portfolio was underweight by 1.46% relative to its 15% Global Equity target allocation.

Global Equities will likely remain underweight early into the next FY as equities are expected to be volatile. Redemptions will occur for pension benefits and for alternative capital calls as these asset classes ramp up allocations. FYTD, \$465 million in Global Equity redemptions have occurred.

PORTFOLIO STRATEGY - Global Equities

Both the US and Non-US portfolios have moved from a small growth bias towards a value tilt. Value exposure will gradually increase, depending on market conditions. We also remain overweight to small capitalization stocks, which is expected to continue as small caps are undervalued relative to large cap. This overweight to small caps has hurt Global Equity returns this FY, so some small cap exposure has been reduced. The US portfolio is currently 74.0% passively allocated, which may gradually increase. In Non-US, we are 24.9% passive in Developed markets and 100% active in Emerging markets as active management is expected to be more successful in Non-US Equities.

Effective July 2022, Staff proposes to manage the portfolio relative to the MSCI ACWI index rather than having specific targets to US, Developed Markets and Emerging Markets. The MSCI ACWI index has a current composition of 61% to US, which is higher than the SERS target of 55%. This change will result in a reallocation from Non-US Equities to US Equities in the SERS portfolio.

FY2023 OBJECTIVES

Staff will focus on the following objectives during FY2023:

- Monitor the portfolio for possible performance enhancement.
- Complete the US Equity Small Cap Growth and Core manager searches.
- Transition the Global Equity portfolio's structure from regionally specific mandates and benchmarks to global mandates and a global benchmark, the MSCI ACWI. The transition includes allocating to global mandates and converting the regional market allocations to MSCI ACWI geographic allocation ranges.
- Manage the Global Equity portfolio structure relative to benchmark exposures to achieve appropriate risk and return characteristics.
- Engage with Wilshire on a portfolio structure review. Global Equity will be reviewed for appropriate US and Non-US allocations, correct benchmarks, active-passive allocation and detailed manager alignment. Make portfolio adjustments, as necessary.
- Review IMAs and Investment Guidelines on the review schedule and make necessary adjustments as needed.

PORTFOLIO STRATEGY – Global Private Equity

INVESTMENT STRATEGY

SERS invests in private equity to provide risk adjusted returns in excess of those provided by publicly traded equities.

SERS' Statement of Investment Policy sets the Private Equity target allocation as follows:

	Target	Permissible Range
Global Private Equity	12%	8% - 16%

The performance objective for Private Equity is to provide returns in excess of the Burgiss All Private Equity Benchmark.

REVIEW OF FY2022 OBJECTIVES AND IMPLEMENTATION

The FY2022 Annual Investment Plan objectives and related activities are as follows:

- *Manage the Private Equity portfolio and fiscal year commitments to reflect the increased investment allocation of 12% of the Total Fund by the end of fiscal year 2022, subject to identifying opportunities that meet SERS' investment criteria.*

The Private Equity allocation has reached the 12% target with increased commitments since 2020. Staff has been actively working toward this goal and to date nearly \$610 million has been committed to eight private equity funds and four co-investments.

- *Review the Private Equity portfolio strategy and structure and develop a plan to improve risk and return characteristics of the portfolio, achieve fee reductions and optimize manager counts as appropriate.*

To date, eight commitments have been made to private equity funds with an average management fee of 1.4%. Additionally, four commitments were made to co-investments that have no management fees or carried interest. Together the average management fee on all approved commitments is 1.0%. These private equity commitments are diversified by investment strategy, sector focus and geography.

- *Actively seek co-investment opportunities where appropriate with current SERS' private equity general partners who meet co-investment criteria, as outlined in the Private Equity co-investment guidelines.*

Staff reviewed several co-investment opportunities throughout the fiscal year. Four opportunities met SERS criteria and were approved in fiscal year 2022. The Private Equity portfolio has a total of nine co-investments totaling \$96 million. The co-investments are in various stages of their life cycle and are generating an IRR of 26% and a 2.4x multiple of invested capital as of December 31, 2021.

- *Research and identify new and innovative investment opportunities with managers who offer compelling return expectations. These new opportunities may be used for a combination of purposes to replace current managers who no longer meet SERS' investment criteria or to target strategies that are not currently a directly invested component of the Private Equity portfolio. Current areas of interest under consideration include China and Asia focused private equity, niche venture capital, GP led secondaries and investments managed by emerging and minority managers.*

Staff reviewed over 100 investment offerings during the fiscal year 2022. Two opportunities with new managers met the investment criteria and SERS committed a total of \$125 million to these funds in fiscal year 2022.

PORTFOLIO COMPOSITION

	Allocations as of March 31, 2022	Target Ranges
Buyout	77%	55% - 95%
Venture Capital	3%	0% - 10%
Special Situations	16%	5% -25%
Co-Investments	4%	0% - 25%
Domestic	77%	55% - 95%
International	23%	5% - 45%

PORTFOLIO STRATEGY – Global Private Equity

CURRENT MARKET CONDITIONS AND OUTLOOK

Despite continued economic uncertainty surrounding the COVID-19 pandemic, 2021 was a banner year for private equity. Private equity deal values and exits roared to new heights, general partners had the second-best year for fund raising in the industry's tracked history and private equity funds accelerated their distributions to limited partners while continuing to deliver solid returns. All this was accomplished while navigating the challenges of a high valuation environment that has raised the bar for investors looking to create value. Taking a closer look at the data we see 2021 set a record as the level of transactions rose to \$1.1 trillion, well above the previous record of \$804 billion set in 2006 and twice as much as the \$570 billion completed in 2020. The volume of deals completed in 2021 rose by 16% to 4,300. The \$1.1 trillion record was driven by primarily by the average deal size climbing by 57% in 2021 to \$1 billion. This is reflective of a growing trend in the marketplace that has larger firms seeking out bigger transactions so that they can move the needle in their large and mega sized funds. The increase in deal flow is a direct result of the abundance of low-cost debt financing and the estimated \$3.3 trillion of dry powder available across all fund types and all geographies at the end of 2021. The intense competition for assets has led to growth in purchase price multiples and made it very difficult for private equity firms to find and purchase companies. Purchase price multiples have risen from approximately 9.0 times earnings in 2011 to an average of 12.3 times earnings in 2021. Nevertheless, the same factors that complicated deal making paved the way for an excellent exit market for private equity funds in 2021. Over 1,500 exits were completed in 2021 for a total value of \$957 billion. This set a record and more than doubled the \$427 billion reported in 2020. Private equity funds raised more than \$1.2 trillion, up 16% from 2020. Buyout funds once again led the way closing on over \$387 billion of new commitments, however, this total was aided by the number of large and mega buyout funds raised during the year. The level of investment activity at increased purchase valuations and steady uplift in dry powder once again underscores the importance of identifying and backing high quality private equity managers that remain disciplined in their process, due diligence and selection criteria throughout investment cycles.

Nonetheless, as illustrated in the below table, Private Equity continues to generate solid performance over all periods.

Annualized Returns (in percent) for Periods Ended March 31, 2022				
Fund Type	1-Year	3-Years	5-Years	10-Years
SERS Private Equity	42.12	26.94	23.37	19.56
Burgiss Benchmark	25.74	21.79	18.58	16.86

Source: Burgiss All Private Equity Index

After a record setting year in 2021, the outlook for private equity in 2022 remains positive. In the near term, the industry could be influenced by a wide range of factors that may include the economic effects of exiting a global pandemic, increased valuations, slower economic growth and global trade implications. Although it is too early to tell what impact these issues may have on the private equity market. In general, it is expected that fundraising and exit activity will continue at or near their current levels in 2022 as sellers seek to take advantage of increased valuations and investor appetite for private equity continues to rise. As mentioned earlier, the increased price expectations for sellers has resulted in the average private equity firm paying a higher price to acquire new portfolio companies. However, private equity firms with finely tuned strategies and repeatable value-creation models will prosper. Top quartile private equity managers find ways to overcome problems, generate returns for their limited partners and earn the capability to raise additional funds.

With this in mind, the outlook for the SERS Private Equity portfolio is favorable. Current market conditions reflect positively on the style of investing employed by the general partners that make up the core of the SERS Private Equity portfolio. Quality investments can be identified in the current market; however, finding these companies requires patience, discipline and the ability to fully understand the operations of the target company. The full impact of the pandemic, global trade implications lower economic growth on private equity remains to be seen. However, navigating through the pandemic to date has required firms to pay close attention to portfolio operations and in some cases reassess their approach to value creation. Top private equity firms understand and displayed their ability to create and maintain value in portfolio companies under difficult conditions early in 2020, generating an opportunity for investors to separate the top private equity firms more easily from the rest of the pack. SERS' Private Equity portfolio is comprised primarily of general partners who have demonstrated their ability to identify, create value and exit companies in all market environments. In an effort to ensure the portfolio is properly positioned for future uncertainty, our goals for the fiscal year include: continuing to identify and invest with operationally focused

PORTFOLIO STRATEGY – Global Private Equity

managers who primarily target the middle market and avoid the competition in the large and mega space; increasing exposure to attractive investments that meet our criteria and offer lower costs through co-investments; and ensuring that we stay on top of market trends and opportunities by continuing to research and seek out managers offering investment strategies that deliver private equity like returns with differentiated and unique strategies. Additionally, as the Total Fund moves into what many believe will be a low return environment, we will seek to increase the allocation level of Private Equity to its new target of 12% to obtain the benefit of this higher returning asset class to the Total Fund level. This will however take time as Private Equity is a long-term asset class where manager selection is critical and additional capital takes more time to deploy.

FY2023 OBJECTIVES

Staff will focus on the following objectives during FY2023:

- Manage the Private Equity portfolio and fiscal year commitments to reflect the increased investment allocation of 12%, subject to identifying opportunities that meet SERS' investment criteria.
- Review the Private Equity portfolio strategy and structure and develop a plan to improve risk and return characteristics of the portfolio, achieve fee reductions and optimize manager counts as appropriate.
- Actively seek co-investment opportunities where appropriate with current SERS' private equity general partners who meet co-investment criteria, as outlined in the Private Equity co-investment guidelines.
- Research and identify new and innovative investment opportunities with managers who offer compelling return expectations. These new opportunities may be used for a combination of purposes to replace current managers who no longer meet SERS' investment criteria or to target strategies that are not currently a directly invested component of the Private Equity portfolio.

PORTFOLIO STRATEGY - Global Fixed Income

INVESTMENT STRATEGY

SERS invests in fixed income assets for the primary purpose of risk diversification and decreasing the overall risk of the investment plan. Fixed income assets may include sovereign debt securities, global corporates, securitized securities, private placements, convertibles, derivatives and currency.

SERS' Statement of Investment Policy sets the Fixed Income target allocation as follows:

	Target	Permissible Range
Global Fixed Income	19%	12% – 26%

The performance objective for the Fixed Income portfolio is to exceed the Bloomberg US Aggregate Bond Index, net of manager fees, by 60 basis points over rolling three-year periods.

REVIEW OF FY2022 OBJECTIVES AND IMPLEMENTATION

The FY2022 Annual Investment Plan objectives and related activities are as follows:

- *Ensure the Fixed Income portfolio has appropriate risk and return characteristics given credit spreads have already recovered to pre-pandemic levels and interest rates are expected to continue rising.*

Although the portfolio has a negative return of -5.81%% through March 2022, the portfolio is outperforming the benchmark by six basis points on a fiscal year-to-date basis. Rising US Treasury yields in anticipation of future interest rate hikes has been the main driver of the negative return with the US Treasury 10-year yield rising from 1.47% in June 2021 to the current 2.34% at the end of March. The US Treasury Index fell -5.33%. The portfolio underweight to interest rate duration during the fiscal year was a positive contributor to performance. Allocations to high yield, long/short and structured credit were also additive to performance while emerging market debt was a detractor.

- *Tactically manage the allocations to core, core plus and tactical and diversifying sectors to enhance risk and return. Continue to research other potential new and innovative investment opportunities.*

The following allocation changes were implemented:

1. In August, the credit dislocation strategy, funded in 2020, returned capital to investors as the opportunities presented by market dislocation were no longer available. The strategy realized an 11% return for the one-year period. This strategy was held in the tactical and diversifying sector.
 2. In October, the existing emerging market debt manager was replaced with a new manager for \$80 million due to longer term underperformance and high excess volatility relative to the benchmark. In addition, a small redemption from a core manager was made to rebalance the manager's size relative to the other core managers.
 3. Due to significant underperformance in 2021, the fixed income arbitrage strategy in the tactical sector was fully redeemed at the end of December. In addition, a small redemption from the emerging market macro strategy was made due to underperformance. Both of these strategies are held in the tactical and diversifying sector and reduced the sector's overall portfolio allocation.
 4. In early February, \$25 million was withdrawn from a core manager to lower the exposure to a less diversified manager focused on investment grade corporate credit due to relative underperformance versus the benchmark.
 5. In April, \$50 million was reallocated from a core plus manager to a core manager and the high yield strategy in order to reduce the duration and emerging market debt exposure of the portfolio.
- *Review IMAs and Investment Guidelines to make necessary adjustments.*

Two core plus manager contracts were renegotiated during the fiscal year according to the normal five year contract renegotiation schedule. In addition, the contract for the new emerging market debt manager was negotiated and funded in October.

PORTFOLIO STRATEGY - Global Fixed Income

CURRENT MARKET CONDITIONS AND OUTLOOK

The Bloomberg US Aggregate Bond Index returned -5.87% for FY2022 through March. All of the major sectors of the index have negative returns for the fiscal year due to high inflation, expectations for multiple rate hikes in 2022, the end of quantitative easing and start of quantitative tightening later this year, and the Russian invasion of Ukraine. The worst performing sector has been investment grade debt at -7.48%. The higher duration of investment grade corporates relative to the benchmark in a rising rate environment has been the primary driver of the underperformance while spread widening has also contributed. In contrast, high yield corporate debt's shorter duration, low default rates and higher yields have led the sector to outperform with a return of -3.31%. Agency mortgages outperformed the index returning -5.23%, but the sector has started to come under pressure as the Fed ended its quantitative easing program in March. Emerging market debt has struggled during the fiscal year with the blended local and hard currency debt index returning -11.3% through March. The biggest impact has come from the Russian-Ukraine war, which caused commodity prices to increase, benefitting commodity producers, but hurting commodity importers. Additionally, in 2021 emerging market central banks started raising rates to fight rising inflation.

The outlook for fixed income markets remains challenging due to growing headwinds for growth, broad and persistent inflation, hawkish monetary policy and the geopolitical tensions in Europe. The Federal Reserve is expected to increase the policy rate by 200-250 basis points and start reducing the balance sheet this year, which will negatively impact bond yields. Agency mortgages are expected to remain under pressure as the market will need to absorb record agency mortgage supply when the Fed begins reducing the size of its balance sheet later this year. Higher interest rates will also impact demand for new mortgages. Investment grade corporates' fundamentals remain healthy despite broad financial market volatility, but elevated monetary policy and geopolitical risks make the outlook less certain going forward. High yield looks attractive with yields above 6% and strong fundamentals as default rates remain low, ratings are trending positively and companies have refinanced a significant amount of debt at lower rates over the last couple of years. The emerging market outlook remains challenged with rising global yields and geopolitical uncertainties leading to lower global growth expectations and higher volatility in these markets.

PORTFOLIO STRUCTURE

The Fixed Income portfolio is currently weighted 46% core, 42% core plus and 12% to tactical and diversifying strategies. The portfolio currently has a yield of 3.21% relative to the benchmark yield of 2.91% with an average investment grade credit rating of A+, which is two grades lower than the benchmark rating of AA. As the Federal Reserve is now expected to continue hiking interest rates over the next several years, the portfolio duration is 0.88 years shorter than the benchmark duration. We expect to keep the portfolio duration shorter as interest rates continue to rise.

The portfolio is underweight US government assets and overweight credit sectors to earn additional yield over the benchmark. Specifically, the portfolio has the biggest overweights to the emerging market debt, high yield and asset backed sectors while underweight agency mortgages. The underweight to mortgages was in anticipation of the Federal Reserve ending the quantitative easing in March and starting to reduce the size of its balance sheet by selling US Treasury and mortgages later in 2022. The portfolio also has a small overweight to bank loans, which have a floating interest rate that makes them less sensitive to rising interest rates.

FY2023 OBJECTIVES

Staff will focus on the following objectives in FY2023:

- Manage the portfolio structure and risk relative to the benchmark as the central banks around the globe embark on a rate hiking cycle and quantitative tightening over the next several years.
- Tactically manage the allocations to core, core plus and tactical and diversifying sectors to enhance the risk and return tradeoff. Continue to research other potential new and innovative investment opportunities to mitigate the impact of rising interest rates and diversify sources of return.
- Review IMAs and Investment Guidelines to make any necessary adjustments.

PORTFOLIO STRATEGY – Global Private Credit

INVESTMENT STRATEGY

SERS invests in private credit to provide risk adjusted returns in excess of those offered by publicly traded fixed income securities and to generate a consistent stream of income.

SERS' Statement of Investment Policy sets the Global Private Credit target allocation as follows:

	Target	Permissible Range
Global Private Credit	5%	3% - 7%

The performance objective for Global Private Credit is to produce net of fee returns in excess of the 90-day Treasury bill rate + 4.5%.

REVIEW OF FY2022 OBJECTIVES AND IMPLEMENTATION

The FY2022 Annual Investment Plan objectives and related activities are as follows:

- *Increase the Private Credit allocation toward 3% of the Total Fund by making new investments that fit the SERS' investment policy, subject to identifying opportunities that fit SERS' investment criteria.*

At the end of 2021, the Global Private Credit allocation increased to 3.4% of Total Fund and exceeded the interim target of 3%. Staff expects to reach the target allocation of 5% by the end of fiscal year 2023. To date, Staff has executed nearly \$1.2 billion in new capital commitments and total unfunded capital commitments has increased to \$1 billion. Of the new capital commitments executed, \$225 million was completed during fiscal year 2022. As the portfolio nears the target allocation, deployment will slow to a more normal pace.

- *Build the Private Credit allocation in line with the implementation guidelines and ensure appropriate risk and return characteristics are present within the new target allocation.*

Staff has executed \$982 million in capital commitments to investments that fall within the direct lending sub-asset class and \$175 million within the stressed/distressed sub-asset class. The portfolio continues to grow towards the target allocation of 5% and all sub-asset classes fall within the ranges stated in the implementation guidelines. In addition, Staff has executed investments that are diversified across industries, geographies, and contain various types of private credit instruments. Most of the new investments have been made within the direct lending sub-asset class, which is primarily comprised of investments that are senior in the capital structure of a company, contain a contractual income component, are structured with robust covenants to protect investors, and have priority over a company's cash flows or other assets in the event of a default.

- *Make new investments that serve a primary purpose of the Private Credit allocation to generate consistent income for the Total Fund, while considering different strategies that add further diversification to the portfolio, such as venture debt, specialty finance, emerging markets, or other niche categories.*

All the investments that have been executed or considered for the Private Credit portfolio include an income component, which is expected to comprise the largest part of the investment return. Most of the underlying investments within private credit funds include a contractual cash payment that is distributed to investors in the form of income on a quarterly basis. During the fiscal year, Staff reviewed numerous differentiated strategies that could provide additional diversification benefits to the portfolio and will continue to consider new strategies that could be a fit for the portfolio.

- *Monitor the USD LIBOR transition to SOFR and implement the replacement benchmark at the appropriate time.*

The replacement of the benchmark has completed. In February 2022, the Board approved a benchmark change from the 3-month LIBOR + 4.5% to the 90-day Treasury bill rate + 4.5%.

CURRENT MARKET CONDITIONS AND OUTLOOK

The private credit market continued to grow in 2021 and reached an estimated \$1.2 trillion in assets under management at the end of the year. The private credit market has been growing at an estimated 13.5% annually over the last decade and is forecast to reach nearly \$2.7 trillion by the end of 2026. It is likely that private credit will become one of the largest private asset classes in the next five years. During 2021, nearly \$200 billion was raised

PORTFOLIO STRATEGY – Global Private Credit

within private credit funds, which was approximately a 14% increase from 2020. The number of funds raised during the year decreased, however, the size of funds increased as deal sizes became larger. This trend has continued in recent years as larger companies look to the private markets for capital. The direct lending strategy raised \$112 billion during the year, which was the largest increase to date given the continued growth of the economy and pick up in private equity activity. Fundraising activity declined for distressed and special situation strategies that experienced larger inflows during 2020 as a result of the market disruption brought about by the pandemic. During 2021, many private credit managers saw a reversal of valuation markdowns related to the pandemic, but the long-term impacts of certain portfolio companies is still undetermined. While deal activity continued to rise during 2021, it slowed in Europe throughout the year. Nonetheless, the changing banking regulatory environment in Europe continues to promote the growth in private lending as traditional banks reduce exposure.

The Private Credit asset class performed as expected during 2021. In particular, the income focused direct lending strategy delivered an estimated 8.8% yield to investors, which was an attractive premium over the US high yield market of 4.0%, the US investment grade market of 2.1%, and the US 10-year Treasury of 1.7%. The US leveraged loan market stabilized after a volatile 2020, with yields beginning to increase at the end of 2021 as the expectation for rising rates increased.

The outlook for the private credit market is positive with considerable growth expected through 2026. However, the market environment is shifting as the US Federal Reserve increases interest rates in the US to combat rising inflation and the potential for slowed economic growth. While rising rates may negatively impact other assets classes, it can add to returns within the private credit asset class since many loans are structured with a floating rate. The increase in interest rates may impact the borrowers, leading to an increase in default rates. Therefore, it is increasingly important for private lenders to conduct a rigorous underwriting process on portfolio companies to ensure borrowers can withstand the impacts of a rising interest rate environment. Nonetheless, private equity dry powder remains high and deal activity is expected to be strong, providing lending opportunities within the private credit market. There also continues to be a growing need for larger borrowers to access the private markets for several reasons, including the speed and certainty of execution of loan documents. As the number of larger companies transition from the broadly syndicated loan market to private credit markets, direct lenders continue to absorb that market share. This secular shift in borrower activity is expected to continue, which can lead to an increase in the size of executed deals and the size of funds raising capital from investors.

FY2023 OBJECTIVES

Staff will focus on the following objectives in FY2023:

- Increase the Private Credit allocation to 5% of the Total Fund by making new investments that fit the SERS' investment policy, while managing the portfolio in conjunction with the pace of capital drawdowns for existing commitments.
- Build the Private Credit allocation in line with the implementation guidelines and ensure appropriate risk and return characteristics are present within the target allocation.
- Evaluate new investments with a cautious approach given the economic outlook and the rising interest rate environment, while focusing on increasing the cash yield of the portfolio and income distribution to the Total Fund.
- Consider differentiated strategies that can add further diversification to the portfolio while also contributing to the portfolio's return and cash yield.
- Continue to look for co-investment opportunities with existing managers that could be a fit for the portfolio and that increase the portfolio's cash yield.

PORTFOLIO STRATEGY - Global Real Assets

INVESTMENT STRATEGY

The role of SERS' Global Real Assets portfolio is to provide a stable income return from tangible assets, to be a partial inflation hedge over the long term and to provide low correlation to equities.

SERS' Statement of Investment Policy sets the Global Real Assets target allocation as follows:

	Target	Permissible Range
Global Real Assets	17%	14% - 22%

The performance objective for Global Real Assets is to produce net of fee returns in excess of the NCREIF Property Index ("NPI"), one quarter in arrears, over a market cycle, with the income component of the return comprising a significant portion of the total return.

REVIEW OF FY2022 OBJECTIVES AND IMPLEMENTATION

The FY2022 Annual Investment Plan objectives and related activities are as follows:

- *Formulate and implement a one-year plan to achieve and maintain a 17% allocation to Real Assets.*

The Real Assets portfolio ended 2021 with a Total Fund allocation of 16.8%. The Real Asset portfolio was able to increase the allocation throughout 2021 and nearly reached the target allocation because the Real Asset portfolio had approximately \$444 million of capital called, and Staff made new commitments totaling \$375 million during 2021. Staff will make appropriate allocation decisions to maintain the 17% Total Fund allocation.

- *Tactically manage real estate and infrastructure allocations to improve portfolio structure and returns without increasing risk.*

The Real Asset portfolio had about \$444 million of capital called during 2021. The majority (\$403 million) of the capital called during 2021 was invested in core fund strategies. Of the \$375 million in new commitments during 2021, the majority (\$240 million) was to core strategies. A full redemption was made from an underperforming real estate debt fund. The emphasis remains on operating assets, with the current exposure at 93%, vs non-operating assets at 7%.

- *Evaluate new investment strategies for the Real Assets portfolio such as energy transition, secondaries, co-investment funds, and ESG focused funds.*

Staff evaluated many new mandates for the portfolio and made commitments to three new investment strategies during the year. Staff made commitments to a new global transition fund, a single-family rental fund, and a digital infrastructure fund during FY2022. The new commitments will add exposure to new asset types in the Real Asset Portfolio.

- *As the Real Assets portfolio has been built out, switch focus to actively soliciting co-investment opportunities with existing managers.*

Staff reviewed several co-investment opportunities with existing general partners during 2021. Staff successfully executed one co-investment in a cell towers platform during 2021.

CURRENT MARKET CONDITIONS AND OUTLOOK

Across most property types, real estate returns were strong in 2021, rebounding from their pandemic lows. SERS' Real Assets portfolio returned 17.24% net of fees in 2021 versus a benchmark NPI return of 12.15% gross of fees, producing an excess return of 5.09%. The income return gross of fees during 2021 was 4.71%.

In general, 2021 was a cautiously optimistic year for real estate. Real estate returns are typically driven by demographics, economic growth, interest rates, and property type fundamentals. That was also true in 2021, as property types with strong fundamentals like industrial, life science, and multi-family continued to post strong net operating income (NOI) growth and asset appreciation. Property types like hotels and retail that suffered in 2020 generally saw recovery in occupancy and asset valuation. Urban-based apartments began to see an uptick in rents and occupancy in 2021 as workers returned to city-based offices.

The shift to work from home has changed the way businesses and employees use offices. However, the easing of COVID-related restrictions, "Zoom fatigue," and employers' mandates for office return resulted in many employees returning to the offices at least on a part-time basis by end-2021, with many organizations operating under a hybrid model of work from home / work in office. Office vacancy rates increased to about 16% at the end of 2021 (vs 15% in 2020). Rental collections for office remained strong during the pandemic because of long-term leases signed

PORTFOLIO STRATEGY - Global Real Assets

prior to the pandemic. Several key metrics to monitor is office tenants' lease renewal activity – square footage leased and rents – as they assess the amount of space they need in a hybrid work environment.

Retail was severely impacted by the lockdowns during the pandemic but began its recovery in 2021. A number of recent retail transactions suggest that a troughing process has occurred. While many fundamental challenges still face this sector, there was sufficient value and “green shoots” in the sector that buyers resurfaced.

Industrial was the biggest winner during the pandemic as more consumers chose to place orders online and have items delivered. As e-commerce sales continue to grow, the demand for industrial warehouses will continue to support future returns. Vacancy for industrial properties is at an all-time low of 3.2%. NOI growth for 2021 was very impressive, generally in the mid to high teens on a year-to-year basis.

Valuations for most properties increased in 2021 as transaction volumes began to recover. SERS remains overweight in the industrial and multifamily property types and underweight in office and retail. SERS' portfolio also has properties that are not in the benchmark, such as self-storage, single-family rentals, and senior housing, which provide diversification and enhanced returns.

Infrastructure assets across sectors also saw robust rebound. The strongest recovery occurred in those sectors hit the hardest during the pandemic – transportation and energy. Although passenger volumes and energy consumption are still below 2019 pre-pandemic levels, they have rebounded from their spring 2020 lows and continue to climb. Recent transactions in the transportation space (e.g. airports) suggest that investors are looking out to 2024-25 forecasts for normalized volumes / revenues for their valuation. Although the energy transition continues to take shape, potential dislocations in energy markets arising from the Ukraine situation reminds investors of the global economy's reliance on fossil fuels and strategic importance of certain midstream energy assets.

Sectors that demonstrated resilience during 2020 like utilities, digital infrastructure, and renewables still saw solid operating and financial results in 2021. The observable increase in sector focused fund offerings – and high LP commitments – for digital infrastructure and renewables / energy transition point to secular shifts in investors sentiments and that these sectors will increasingly become more mainstream.

Inflation, rising discount and cap rates, higher financing costs, ongoing COVID-variants, and geopolitical uncertainty must all be considered as we navigate 2022. In the US, most real estate properties benefit from continued strong fundamentals or rebound from 2020 lows. SERS' emphasis on core strategies that focus on income returns should provide some insulation from these uncertainties. As well, new allocations to digital infrastructure and single-family rentals, both of which benefit from favorable secular trends managed by sector-focused managers, position the portfolio well.

Real Assets returns will mostly be driven by income in 2022 and total returns for the benchmark are anticipated to be approximately 9.5% per an industry consensus forecast. Infrastructure ended 2021 with an allocation of ~28% of the Real Assets portfolio with the expectation for a higher allocation in FY2022 as capital commitments are called by managers. SERS' exposure to digital infrastructure, renewables, social, and healthcare are more defensive assets with contracted cash flows. The ongoing recovery should continue to boost asset values in real estate property types such as retail and office, and infrastructure sectors like transportation and energy.

FY2023 OBJECTIVES

Staff will focus on the following objectives in FY2023:

- Formulate and implement a portfolio allocation strategy that factors in macroeconomic risks in an inflationary environment with rising geopolitical uncertainty.
- Formulate and implement a one-year plan to achieve and maintain a 17% allocation to Real Assets.
- Tactically manage the existing real estate and infrastructure allocations to improve portfolio structure and achieve favorable risk-adjusted returns.
- Evaluate new investment strategies for the Real Assets portfolio such as niche real estate property types, non-US real estate, energy transition, agriculture / timber, listed infrastructure funds, and secondaries.
- Actively pursue co-investment opportunities with existing Real Assets managers.

PORTFOLIO STRATEGY - Cash Equivalents & Securities Lending

INVESTMENT STRATEGY

SERS invests in cash equivalents for the purpose of earning market returns on cash held for benefits and expenses and to provide short-term cash needed to fund other asset classes. Cash Equivalents are fixed income assets with maturities of less than 270 days and may include US government, asset-backed, corporate and high quality money market-type securities.

SERS' Statement of Investment Policy sets the Cash Equivalent target allocation as follows:

	Target	Permissible Range
Cash Equivalents	2%	0% – 5%

The performance objective for Cash Equivalents is to exceed the return on 30-day US Treasury Bills.

The Securities Lending program is designed to be a low risk, intrinsic value focused strategy that generates additional income for the plan by temporarily lending equity and fixed income securities. All loans are collateralized with cash at 102-105% of security market value and reinvested in government money markets and repurchase agreements. Loans to approved borrowers are limited to 25% of the average monthly market value of the loan from the prior year. Fixed income security loans require a ten basis point minimum spread at loan initiation. The program is implemented through a third-party lending agent and collateral reinvestment manager.

REVIEW OF FY2022 OBJECTIVES AND IMPLEMENTATION

The FY2022 Annual Investment Plan objectives and related activities are as follows:

- *Research and monitor money market funds.*

Staff continued to invest the daily short-term cash in the Fidelity Government Portfolio and the Federated Hermes Prime Obligations money markets. Since mid-November, only the Fidelity Government Portfolio has been utilized due to the impact of the falling NAV of Federated's Prime Obligation Fund outweighing the income earned.

- *Evaluate opportunities to improve the Cash Management process and maintain liquidity needs for the portfolio.*

Improvements to the cash forecasting process to include extended projections for capital calls and distributions for the increased commitments to private equity, real assets and private credit.

- *Monitor the Securities Lending program for opportunities to generate incremental income and ensure that it is operating within the program implementation guidelines.*

The Securities Lending program continues to add additional income through lending otherwise idle securities held by the custodian. Lending income was lower during the fiscal year due to lower demand for SERS securities inventory and the conservative reinvestment collateral guidelines that permits reinvestment to US Treasuries and repurchase agreements only.

CURRENT MARKET CONDITIONS AND OUTLOOK

Money market yields started rising in March 2022 with a 25 basis-point hike and are expected to continue rising as the markets have now priced in a further 200-250 basis points through the end of 2022. As rates increase, money markets will earn higher income. In anticipation of rate hikes, the portfolio's weighted average maturity is anchored in the 25-30 day range. Prime money markets are seeing a pickup in the issuance of short-term commercial paper and other prime instruments offering attractive rates, but are not going too far out on the maturity spectrum due to the uncertainty of the yield curve.

FY2023 OBJECTIVES

Staff will focus on the following objectives in FY2023:

- Research and monitor money market funds for opportunities to earn additional yield over the portfolio benchmark.
- Evaluate opportunities to improve the Cash Management process and maintain liquidity needs for the portfolio.
- Monitor the Securities Lending program for opportunities to generate incremental income and ensure it is operating within the program implementation guidelines.

PORTFOLIO STRATEGY – Opportunistic & Tactical

INVESTMENT STRATEGY

SERS invests in opportunistic investments for the purpose of earning returns greater than the Bloomberg US Aggregate Bond Index + 2% for investments that do not fit within the existing asset classes. The investments are defined as tactical or non-traditional investment opportunities. Such investments may involve capitalizing on short-term market dislocations or other unique situations or innovative strategies including tactical allocation.

SERS' Statement of Investment Policy sets the Opportunistic investments target allocation as follows:

	Target	Permissible Range
Opportunistic Investments	0%	0% – 7%

The performance objective for Opportunistic investments is to exceed the return of the Bloomberg US Aggregate Bond Index + 2%.

REVIEW OF FY2022 OBJECTIVES AND IMPLEMENTATION

The FY2022 Annual Investment Plan objectives and related activities are as follows:

- *Search for possible Opportunistic investments for the Fund that are expected to exceed the Bloomberg US Aggregate Bond Index + 2%, with an emphasis on high yielding investments. This will be accomplished through the evaluation of markets, strategies and specific funds that offer compelling risk adjusted returns. Specific investments under consideration include strategies that focus on climate sustainability as well as commodity-focused strategies that can serve as an inflation hedge. Investments that pass initial screening will undergo detailed due diligence prior to staff recommendation.*

Four new investments totaling \$250 million have been added to the portfolio this fiscal year. The first investment is to a commodities strategy that is focused on providing inflation protection. Two private debt funds were added to the portfolio. One is focused on providing loans to European-based companies and the other provides loans and other solutions to healthcare companies. The most recent investment is to a risk parity manager whose objective is to deliver stable returns across a variety of economic environments.

- *Actively manage the liquid portion of the portfolio to improve the risk and return profile.*

Staff continues to closely monitor and manage the liquid portion of the portfolio, which has grown in recent years. The portfolio is comprised of six funds that offer liquidity on a regular basis.

CURRENT MARKET CONDITIONS AND OUTLOOK

The Opportunistic portfolio consists of funds that seek to take advantage of market dislocations, or which do not fit within the risk and return objectives of other asset classes. The return objective of the portfolio is to outperform the Bloomberg US Aggregate Bond Index + 2%. The portfolio is positioned to take advantage of a market experiencing higher inflation and slowing economic growth. Current strategies include distressed assets, structured credit, long/short multi strategy funds, commodities, and risk parity.

In addition to the opportunities discussed above, staff continues to evaluate new strategies that can take advantage of rapidly changing market conditions. In March 2022, the fed funds rate was increased for the first time since 2018 with several more increases expected this year. Real GDP growth is projected to slow this year as a result of slowing consumer demand, global supply disruptions, and the risks of Russia's invasion of Ukraine. Against this backdrop, staff is actively managing the existing portfolio and researching new strategies that could benefit from this environment.

FY2023 OBJECTIVES

Staff will focus on the following objectives in FY2023:

- *Search for possible Opportunistic investments for the Fund that are expected to exceed the portfolio benchmark. This will be accomplished through the evaluation of markets, strategies and specific funds that offer compelling risk adjusted returns. Specific investments under consideration include strategies that provide diversification, downside protection, and inflation protection. Investments that pass initial screening will undergo detailed due diligence prior to staff recommendation.*
- *Actively manage the Opportunistic allocation to improve portfolio structure and returns without increasing risk.*

PORTFOLIO STRATEGY – Overlay Program

INVESTMENT STRATEGY

SERS invests in overlay strategies that trade derivatives of the Total Fund's underlying assets and currency exchange rates to enhance the Total Fund portfolio efficiency. The overlay program includes tactical asset allocation and active currency strategies.

The tactical asset allocation strategy aims to add value to the Total Fund performance through active allocations (long/short) across stocks and bonds thereby exploiting short-term macro market dislocations. The active currency strategies aim to add value and risk diversification to the Total Fund, as well as help manage currency risk by utilizing short-term inefficiency in the foreign exchange markets and low correlation of the strategies to the major asset classes such as US equity and fixed income.

The program is fully tactical; exposures to any overlay strategies in this program are not required by the Statement of Investment Policy.

The overlay program is targeted to add 10 to 20 bps excess return to the Total Fund's performance on a three to five year horizon. Tracking errors of the tactical rebalancing strategy and the currency program are expected in the ranges of 5 to 15 basis points and 5 to 8%, respectively.

REVIEW OF FY2022 OBJECTIVES AND IMPLEMENTATION

The FY2022 Annual Investment Plan objectives and related activities are as follows:

- *Actively monitor the Tactical Asset Allocation Strategy to enhance the impacts of the strategy to the Total Fund's performance.*

Russell has initiated several short-term trades fiscal year to date, each time going long US equities and short fixed income. Each trade has been profitable with total realized gains of \$18 million through March and \$71 million since inception. The program has added six basis points annualized to Total Fund performance over the last five years. The new tactical asset allocation manager, Alpha Engine, has been primarily short US, Non-US and emerging market equities and long fixed income with modest long positions in commodities (oil and precious metals only). This positioning has led to modest losses across all three asset classes of -\$2.4 million through March.

- *Actively monitor the Active Currency Strategies to improve the program's risk and return characteristics.*

The strategy was long the US dollar relative to other major currencies like the euro, Australian dollar and Japanese yen throughout the fiscal year. Based on US dollar strength, the strategy has added \$24 million in gains through March and \$4 million since inception. In Q2 2022, the target volatility of the program was increased from 6% to 8% while the notional value remained \$450 million.

FY2023 OBJECTIVES

Staff will focus on the following objectives in FY2023:

- Actively monitor the Tactical Asset Allocation Strategy to enhance the impacts of the strategy on the Total Fund performance.
- Actively monitor the Active Currency Strategies to improve the program's risk and return characteristics.

PORTFOLIO STRATEGY - Investment Risk Management & Analytics

Investment Risk Management and Analytics is responsible for the provision and communication of diligent, thorough, timely and forward-looking investment risk analytics and other investment analytics to the Board and Investment Staff.

Total Fund forecast volatility trended down during 2021 from 15.5% in January to 12.2% in December as the financial markets normalized from the 2020 downturn. The 3-years realized risk of the Total Fund also declined from 9.7% in January to 8.9% in December 2021.

The forecast risk is a forward-looking risk estimate based on a fund's current holdings at a point of time while the realized risk measures volatility of the historical return of the fund over a period of time; the former counteracts the smoothing effect of infrequent valuation of private investments that is inherent in the later. Hence, the forecast risk tends to be higher than the realized risk for a fund that includes private investments. The forward-looking risk is preferable for assessing allocation among assets and risk-return reward of an asset.

The Total Fund risk structure was stable over the year. The equity factors contributed 80%, and the remaining 20% was attributed to other factors like fixed income, private assets, and currency. The Total Fund's active risk stayed under the 3% limit stated in the Statement of Investment Policy as the 3-year realized active risk was 1.3% and forecast active risk was 1.5% in December 2021.

REVIEW OF FY2022 OBJECTIVES AND IMPLEMENTATION

The FY2022 Annual Investment Plan objectives and related activities are as follows:

- *Provide risk forecasts and analyses of the Total Fund and asset class portfolios.*

Staff utilized the risk system to generate risk analyses of the Total Fund and asset classes. The risk analyses based on SERS' investment holdings provide forecasted volatility of returns of portfolios. The analyses also provide portfolio risk decomposition by strategies, as well as by factors.

- *Report risk of the Total Fund to the Board and Investment Committee on a quarterly basis*

The quarterly risk report on the Total Fund is provided to the Board showing risk contribution of asset class weights, and active risk of asset classes and factor risks across the portfolio. The total risk decomposition by asset classes focused on their role in the Total Fund. The total risk decomposition by factors focused on cross factor exposures, especially equity factors among the asset class portfolios as the equity factors are the largest risk driver of the Total Fund. The active risk decomposition showed risk contribution from the investment implementation, which is comprised of active allocation among the asset classes and active selection of strategies and securities.

- *Communicate asset class portfolio's risk with asset class investment officer(s) and discuss any potential changes of the portfolio structure on a quarterly basis.*

Staff discussed the risk profile of asset class portfolios with each asset class team. The discussion was focused on i) trend and level of forecast risks, ii) the portfolio's risk structure in terms of manager line-up and factor tilts and iii) the portfolio's sensitivity to market movements. The discussions assisted each asset class team in balancing their portfolio risks and minimizing unintended risk tilts.

- *Provide return attribution analysis of the Total Fund and asset classes of the Fund to the Investment Strategy Team.*

Staff reported monthly return attribution analyses of the Total Fund, analyzing effects of active weights on alpha generation of each asset class. The analyses were presented to the Investment Strategy Team. Staff also delivered to the Investment Strategy Team attribution reports of each asset class portfolio analyzing the contribution of each account within an asset class.

- *Perform other portfolio and market analyses and research as needed.*

Staff conducted analyses of the Total Fund liquidity and leverage. Staff also conducted portfolio and market analyses as needed or upon request.

PORTFOLIO STRATEGY - Investment Risk Management & Analytics

FY2023 OBJECTIVES

Staff will focus on the following objectives in FY2023:

- Provide risk forecasts and analyses of the Total Fund and asset class portfolios.
- Report risk of the Total Fund to the Board on a quarterly basis.
- Communicate asset class portfolios' risk with asset class investment officer(s) and discuss any potential changes of the portfolio structure on a quarterly basis.
- Provide return attribution analyses of the Total Fund and asset classes of the Fund to the Investment Strategy Team.
- Perform other portfolio and market analyses and research as needed.

Investment Operations

The Investment Operations area is responsible for managing administrative activities for the Investment department, assisting the CIO and investment officers, and providing reports and information to Staff and the Board. The objectives for FY2023 remain consistent with those of FY2022 as these broad categories reflect the primary duties of Investment Operations.

REVIEW OF FY2022 OBJECTIVES AND IMPLEMENTATION

The FY2022 Annual Investment Plan objectives and related activities are as follows:

- *Coordinate, assist and participate in organizational initiatives including Policies, Procedures and Practices; fiscal budget; Subject Matter Experts (SMEs); and Corporate Emergency Preparedness Project (CEPP).*

Investment Operations assisted with the annual review and revisions to the Investment Department Policies, Procedures and Practices and participated in the system-wide Information Governance Project. Staff prepared and analyzed the fiscal budget for executive approval as well as participated in and provided feedback in relation to SME and CEPP activities.

- *Perform administrative duties and attend meetings for the Investment Committee, Strategy Team and Board meetings including establishing meeting dates and agendas, organizing and distributing documents to team members, producing reports and taking minutes.*

Operations attended all Investment Committee, Strategy Team and Board meetings. Agendas and documents were prepared and distributed, minutes were taken and distributed in a timely manner. Staff assisted with processing documents associated with hiring, terminating and redeeming of managers.

- *Assist with projects for the CIO and Investment officers including revising the Annual Investment Plan, updating the Statement of Investment Policy as needed, new manager searches as needed and aiding with special projects for Staff.*

Operations coordinated revisions to and produced the FY2022 Annual Investment Plan and the amended Statement of Investment Policy, onboarding of new Investment staff, and new manager searches throughout the fiscal year.

FY2023 OBJECTIVES

Staff will focus on the following objectives in FY2023:

- *Coordinate, assist and participate in organizational initiatives including Policies, Procedures and Practices; Information Governance Project, fiscal budget; Subject Matter Experts (SMEs); and *Emergency Response Program (ERP)*.*
- *Perform administrative duties and attend meetings for the Investment Committee, Strategy Team and Board meetings including establishing meeting dates and agendas, organizing and distributing documents to team members, producing reports and taking minutes.*
- *Assist with projects for the CIO and Investment officers including revising the Annual Investment Plan, updating the Statement of Investment Policy as needed, searches for new Investment managers as needed, and aiding with special projects for Staff.*

Implementation Guidelines

IMPLEMENTATION GUIDELINES - Global Equities

I. ROLE

The role of Global Equities is to earn the equity risk premium over US Treasury bonds by investing in common stock of publicly-listed companies.

II. ASSET ALLOCATION

	Total Fund Target	Range	
		Minimum	Maximum
Global Equity	45%	35%	55%

Global Equity is divided into two portfolios as follows:

Global Equity – Global Composite: Managers invest in securities from across all regional markets of the world including US, Non-US Developed Markets and Emerging Markets. This composite is benchmarked to the MSCI All Country World Net Total Return Index (MSCI ACWI).

Global Equity – Regional Composite: Managers invest in securities of assigned regional markets only. Staff manages the regional market allocation versus the MSCI ACWI. This composite is benchmarked to the MSCI ACWI. Typical benchmarks utilized within the regional market mandates are:

- US Equity: Russell 3000 Index
- Non-US Equity Developed Market: MSCI World ex-USA Net Total Return Index (USD)
- Non-US Equity Emerging Market: MSCI Emerging Markets Net Total Return Index (USD)

III. BENCHMARK:

The Global Equity benchmark is the MSCI All Country World Net Total Return Index (USD).

IV. PERFORMANCE OBJECTIVE

The annualized return objective, net of management fees, for both Global Equity portfolios is 30 basis points over the MSCI ACWI.

V. PORTFOLIO DESIGN AND CONSTRUCTION:

The *Global Composite* portfolio is currently run by one manager who selects securities from across the world, making their own active decisions between US, Non-US Developed Markets and Emerging Markets. This is a 100% active portfolio with a +/- 10% country range limit versus the MSCI ACWI.

The *Regional Composite* portfolio is constructed using a multi-manager line-up of US, Non-US Developed and Emerging Market mandates and a combination of active and passive strategies to deliver risk-adjusted performance relative to respective benchmarks. Portfolio design will consider risk/return characteristics, manager count and investment management fees.

VI. PERMISSIBLE INVESTMENTS

Security Type	US Equity Portfolio	Non-US Equity Portfolio
Common Stock	Y	Y
Stock Treated as Common Stock	Y	Y
Cash / Treasuries	Y	Y
Preferred Stock	Y	Y
Convertible Rights	Y	Y
Warrants	Y	Y
Depository Receipts	Y	Y

IMPLEMENTATION GUIDELINES - Global Equities

REITS	Y	Y
Rule 144a Issues	Y	Y
Private Placement	Y	Y
IPOs	Y	Y
Commingled Funds	Y	Y
Exchange Traded Funds	Y	Y
Futures	Y	Y
Options	Y	Y
Currency Forwards	N	Y
Currency Futures	N	Y
Currency Options	N	Y
Country Funds	N	Y

VII. RISK MANAGEMENT

Active Risk Target	
<i>Global Equity – Global Composite</i>	Tracking Error of 3.0% with a range of 3.0% to 7.0%
<i>Global Equity – Regional Composite</i>	Tracking Error of 1.5% within a range of 0.50% to 2.5%

Below are the guidelines for the *Global Equity – Regional Composite* Portfolio:

US Equity Implementation Guidelines			
	Investment Benchmark	Global Equity Target Allocation	Permissible Range
US Equity Allocation	Russell 3000 Index	MSCI ACWI US Allocation	+/- 5%
Portfolio Structure			
Capitalization			
Large Cap Equity	Russell 1000 Index	Neutral to BM	+/- 5%
Large Cap Active	Manager Specific	-	0% - 25%
Large Cap Passive	Russell 1000 Index	-	75% - 100%
Small Cap Equity	Russell 2000 Index	Neutral to BM	+/- 10%
Small Cap Active	Manager Specific	100%	n/a
Style			
Growth	Manager Specific	Neutral to BM	+/- 5%
Value	Manager Specific	Neutral to BM	+/- 5%

Factors such as currency, sector and country limits are manager specific and outlined in each manager's Investment Guidelines. Aggregate portfolio characteristics such as P/E, B/P, yield, size, etc., shall be within a reasonable range of the US equity benchmark.

IMPLEMENTATION GUIDELINES - Global Equities

Non-US Equity Implementation Guidelines			
	Investment Benchmark	Global Equity Target Allocation	Permissible Range
Non-US Equity Developed Markets	MSCI World ex-USA Net Total Return Index (USD)	MSCI ACWI Non-US Developed Market Allocation	+/- 5%
Non-US Equity Emerging Markets	MSCI Emerging Markets Net Total Return Index (USD)	MSCI ACWI Emerging Market Allocation	+/- 5%
Broad Market Exposure			
Developed Markets Active	Manager Specific	--	75-100%
Developed Markets Passive	MSCI World ex US Index (\$net)	--	0-25%
Emerging Markets Active	Manager Specific	100%	+/- 5%
Portfolio Structure			
Capitalization			
Large Cap Equity	Manager Specific	BM Weight	+/- 10%
Small to Mid-Cap Equity	Manager Specific	BM Weight	+/- 10%
Small Cap Equity	Manager Specific	BM Weight	+/- 10%
Micro Cap Equity	Manager Specific	BM Weight	+/- 5%
Style			
Growth	Manager Specific	Neutral to BM	+/- 10%
Value	Manager Specific	Neutral to BM	+/- 10%

Factors such as currency, sector and country limits are manager specific and outlined in each manager's Investment Guidelines. Aggregate portfolio characteristics such as P/E, B/P, yield, size, etc., shall be within a reasonable range of the Non-US developed and emerging market equity benchmarks.

IMPLEMENTATION GUIDELINES – Global Private Equity

I. ROLE

SERS invests in Private Equity to provide returns in excess of those provided by publicly-traded equities to compensate for private equity's liquidity and concentration risk.

II. ASSET ALLOCATION

The Private Equity target asset allocation is established with periodic asset allocation studies. The most recent asset allocation study authorized a 12% allocation target to Private Equity with a range of 8% - 16%.

III. BENCHMARK

Private Equity performance is benchmarked to the Burgiss All Private Equity benchmark.

IV. PERFORMANCE OBJECTIVE

The performance objective for Private Equity is to provide net returns in excess of the Burgiss All Private Equity Benchmark. Over time periods of five years and longer Private Equity net returns are expected to exceed SERS Global Equity portfolio by 2%.

V. PORTFOLIO DESIGN AND CONSTRUCTION

Capital allocation among the various market segments is a critical driver for the long-term success of the Private Equity portfolio. Capital allocation risk is controlled in a portfolio structure incorporating long-term sub asset target allocations.

Long-term sub-asset target exposure is detailed below:

	Range	
	Minimum	Maximum
Buyout		
Small/Middle	50%	70%
Large/Mega	5%	25%
Total Buyout	55%	95%
Venture Capital	0%	10%
Special Situations	5%	25%
Total		
Domestic	55%	95%
International	5%	45%
Total		
Primary Commitments	75%	100%
Fund of Funds	0%	15%
Co-Investments	0%	25%
Total		

The portfolio is tilted toward buyout investments and does not have a target allocation to venture capital due to higher risk and manager selection issues. Within buyouts, the preference is for small and middle market managers with a significant value creation approach and de-emphasizes larger firms with a financial engineering approach.

IMPLEMENTATION GUIDELINES – Global Private Equity

VI. PERMISSIBLE INVESTMENTS

Investment Structure	
Limited Partnership Interests	Y
Discretionary Managers investing in Private Equity Partnerships	Y
Co-Investments	Y
Separate Accounts	Y

Investment Type	
Buyouts	Y
Venture Capital	Y
Special Situations (secondary interests, distressed debt or equity, mezzanine, co-investments, energy, etc.)	Y

Buyout

Net Expected Return 10-15%, Moderate Risk

Capital is typically invested in more established companies, those further along the business life cycle having relatively predictable cash flows and the ability to raise capital along the entire capital structure, including secured and unsecured debt. Buyouts are targeted to represent 75% of the Private Equity portfolio.

Venture Capital

Net Expected Return: 15-25%, High Risk

Venture capital equity is targeted at companies in the earliest phases of a business life cycle. Companies may be classified as seed, early, middle and late stage and are characterized by their inability to access public equity and other forms of capital such as secured and unsecured debt. These companies have uncertain revenues and a need for cash to build their businesses and are subject to high failure rates. Venture capital is targeted to represent 0% of the portfolio.

Special Situations

Net Expected Return: 10-20%, Moderate Risk

Many private equity opportunities have characteristics of buyout or venture capital but have enough differences as to require separate classification. These investments include energy, distressed debt, mezzanine, opportunity and secondary funds. Special situations is targeted to represent 25% of the portfolio.

Co-Investments

Net Expected Return: 15-20%, Moderate Risk

Co-Investments are direct investments in a single asset of a multi-asset fund, made alongside the Fund's investment in the asset. Typically, co-investments are offered on more attractive economic terms and shorter time frames than those of the Fund. Co-Investments are targeted to represent up to 10% of the portfolio.

VII. RISK MANAGEMENT

The primary risk management tool in private equity is industry diversification as well as extensive due diligence of prospective investments. Monitoring is managed through a combination of quantitative and qualitative constraints. The following sections identify the most significant risks with private equity investments and the method of control.

Liquidity Risk

Private equity investments are illiquid and typically have expected holding periods of 10-12 years. Investments are typically held until maturity and selling prior to maturity typically results in a discount to fair market value. Liquidity risk is managed by minimizing the possibility of forced sales that may arise from exceeding maximum exposure limits or lowering asset allocation exposure limits.

Geographic Risk

Geographic risk is controlled through a long-term international target exposure of 25% by market value.

IMPLEMENTATION GUIDELINES – Global Private Equity

Vintage Risk

Vintage reflects the year of first capital draw and vintage risk refers to the variability of private equity commitments over time. The investment-pacing model controls the short and long-term private equity commitment amounts and attempts to minimize vintage risk while achieving targeted exposure. Commitments will be dependent on the availability of investments that meet SERS' investment criteria and will not be driven by the target investment pace in any given year.

Manager Risk

Manager risk consists of two elements, managing the exposure within a partnership and controlling the number of general partners in our private equity portfolio. Partnership exposure is controlled by limiting the commitment size within a partnership and the maximum commitment to a partnership will be 25% of a fund's size. The 25% limit does not apply to funds committed to a discretionary manager or a separate account. The maximum market value exposure to a single manager is targeted to be less than 20% of the portfolio. The optimum number of general partners in the portfolio varies with time.

Firm Risk

Firm risk is the exposure to a private equity general partner and is controlled by limiting the maximum commitment to funds operated by a general partner and its affiliates.

Currency Risk

The Private Equity program accepts the currency risks consistent with the geographic constraints. Private equity partnerships generally do not hedge currency risk and the private equity program will not implement currency hedges.

Industry Risk

Typically, private equity partnerships are permitted to invest in a wide variety of industries. Industry risk is controlled primarily through appropriate diversification across classes and subclasses.

Leverage Risk

General partners invest capital from private equity partnerships throughout the capital structure of firms. The capital markets control the maximum leverage available to the general partners and limited partners control leverage exposure through partnership selection and portfolio construction.

IMPLEMENTATION GUIDELINES – Global Fixed Income

I. ROLE

The primary role of diversified fixed income is to reduce the overall risk of the investment plan. Fixed income securities should provide stable income returns through yield oriented assets. Fixed income provides risk reduction through lower correlations to the investment program.

II. ASSET ALLOCATION

The Global Fixed Income allocation is established with periodic asset allocation studies. The most recent asset allocation study authorized a 19% market value exposure to Global Fixed Income with a range of 12% - 26%.

III. BENCHMARK

Global Fixed Income performance is benchmarked to the Bloomberg US Aggregate Bond Index.

IV. PERFORMANCE OBJECTIVE

The annualized return objective for the Global Fixed Income portfolio is 60 basis points net of fees above the benchmark over rolling three year periods and is comprised of the following strategies:

Strategy	Expected Excess Return	Tracking Error	Benchmark
Core	20 basis points	N/A	Bloomberg US Aggregate Bond Index
Core Plus	60 basis points	N/A	Bloomberg US Aggregate Bond Index
Tactical & Diversifying	200 basis points	N/A	Bloomberg US Aggregate Bond Index
Total Portfolio	60 basis points	0 – 5%	Bloomberg US Aggregate Bond Index

V. PORTFOLIO DESIGN AND CONSTRUCTION

SERS seeks to obtain broad fixed income market exposure to gain diversification while receiving income. The portfolio is 100% externally managed in active strategies, in broad mandates of core, core plus, and Tactical & Diversifying strategies. Core mandates invest primarily in benchmark type securities. Core sector weightings can deviate from the benchmark, depending on the external manager's market views and strategies. Core plus mandates allow investments in all sectors of the Bloomberg US Aggregate Bond Index with additional allocations to the extended sectors of high yield, Non-US debt and emerging market debt. The Tactical & Diversifying sector invests in return seeking or diversification enhancing strategies and can provide high excess returns. The sector invests in emerging market debt, high yield, long/short credit and fixed income relative value arbitrage strategies.

Below are the current sector exposure limits:

Strategy	Range	
	Minimum	Maximum
Core	30%	70%
Core Plus	25%	50%
Tactical & Diversifying	0%	20%

IMPLEMENTATION GUIDELINES – Global Fixed Income

VI. PERMISSIBLE INVESTMENTS

Security Type	Core	Core Plus	Tactical & Diversifying
Governments			
US Treasuries, TIPS and Agencies	Y	Y	Y
Sovereigns/Quasi-Sov. in US \$	Y	Y	Y
Sovereigns/Quasi-Sov. in local currency	N	Y	Y
Corporates			
US Corporates	Y	Y	Y
Non-US Corporates in US \$	Y	Y	Y
Non-US Corporates in local currency	N	Y	Y
High Yield	N	Y	Y
Bank Loans	N	Y	Y
Structured Credit			
Mortgages	Y	Y	Y
Asset Backed	Y	Y	Y
Collateralized Loan Obligations	N	Y	Y
Other			
144 (A)s	Y	Y	Y
Commingled Funds	Y	Y	Y
Convertibles	N	Y	Y
Currency	N	Y	Y
Derivatives	N	Y	Y
Equity	N	Y	N
Exchange Traded Funds	Y	Y	Y
Money Markets	Y	Y	Y
Municipals	Y	Y	Y
Repurchase Agreements	Y	Y	Y

VII. RISK MANAGEMENT

For strategies held in separate accounts, the following risk factors are controlled through limits specified in each manager's Investment Manager Agreement (IMA) and Investment Guidelines. Duration, sector and credit risk are reviewed on a total portfolio basis quarterly by SERS:

Interest Rate

Controlled by duration band limits around the benchmark duration.

Yield Curve Risk

Controlled by duration band limits around the benchmark duration.

Sector Risk

Riskier sectors like high yield, non-US, non-agency mortgages and CMBS are controlled around set limits with each individual manager. Portfolios are allowed 25% maximum exposure to any one industry.

Credit Risk

Portfolios must maintain a minimum exposure to investment grade securities. In addition, each manager of individual portfolios has an established average weighted credit quality that must be maintained at all times.

IMPLEMENTATION GUIDELINES – Global Fixed Income

Currency Risk

Currency is not hedged at the overall portfolio level. Managers who demonstrate skill are allowed to purchase non-US securities on a hedged or unhedged basis or take direct currency positions without owning securities.

Issuer Risk

Issuer limits are specified in each IMA investment guidelines.

Liquidity Risk

Accounts have a maximum 144(A) limit without registration rights.

Active Risk

Normal tracking error is expected to be 2-4% over any rolling three-year time horizon. During periods of increased volatility, tracking error should not exceed 5% over any rolling three-year time horizon.

IMPLEMENTATION GUIDELINES – Global Private Credit

I. ROLE

The role of SERS' Private Credit portfolio is to provide risk adjusted returns in excess of those provided by publicly traded fixed income securities and to generate a consistent stream of income.

II. ASSET ALLOCATION

SERS' Statement of Investment Policy sets the private credit target allocation at 5%, with a range of 3% to 7%.

III. BENCHMARK

The private credit benchmark is the 90-day Treasury bill rate + 4.5%.

IV. PERFORMANCE OBJECTIVE

The performance objective of the Private Credit portfolio is to provide net returns in excess of the SERS Global Fixed Income portfolio over time periods five years and longer, with the income component of the return comprising a significant portion of the total return.

V. PORTFOLIO DESIGN AND CONSTRUCTION

The Private Credit portfolio is designed to gain exposure to various aspects of the private credit market with a focus on consistent income generation. It is expected that a greater portion of the Private Credit portfolio will be allocated to direct lending investments with higher expected cash yields.

Long-term sub asset target exposure is detailed below:

	Target	Range	
		Minimum	Maximum
Direct Lending	80%	60%	100%
Mezzanine	0%	0%	10%
Stressed/Distressed	10%	0%	15%
Structured Credit/Other	10%	0%	15%
Total	100%		
Domestic	60%	40%	85%
International	40%	15%	60%
Total	100%		
Primary Commitments	100%	80%	100%
Secondaries	0%	0%	10%
Co-Investments	0%	0%	10%
Total	100%		

The portfolio is tilted toward direct lending investments and does not have a target allocation to mezzanine due to the structure of investments typically containing a less predictable cash income component than direct lending.

IMPLEMENTATION GUIDELINES – Global Private Credit

VI. PERMISSIBLE INVESTMENTS

Investment Structure	
Limited Partnership Interests	Y
Co-Investments	Y
Separate Accounts	Y

Investment Type	
Direct Lending	Y
Mezzanine	Y
Stressed/Distressed	Y
Structured Credit and Other	Y

Direct Lending

Net Expected Return 6-8%, Moderate Risk

Direct Lending represents loans made directly to small to medium size companies; secured by assets/cash flows/contracts, etc. depending on the type of loan. Direct Lending is targeted to represent 80% of the Global Private Credit portfolio.

Mezzanine

Net Expected Return: 8-12%, High Risk

Mezzanine debt is subordinated to senior loans and typically is structured as an unsecured fixed or floating rate loan with an equity component. Mezzanine is targeted to represent 0% of the Global Private Credit portfolio.

Stressed/Distressed

Net Expected Return: 12-25%, High Risk

Stressed/Distressed debt represents loans made to companies that are financially stressed and/or are likely to go through restructuring/bankruptcy. These investments typically have longer holding periods where the lender sometimes is seeking to take control of the company. Stressed/Distressed is targeted to represent 10% of the Global Private Credit portfolio.

Structured Credit & Other

Net Expected Return: 5-20%, Moderate to High Risk

Structured credit includes investments in collateralized loan obligation tranches and other asset backed securities. Other Private Credit investments include specialty financing, non-performing loans, and other investment types that do not fit within the other categories. Structured credit & other is targeted to represent 10% of the Global Private Credit portfolio.

VII. RISK MANAGEMENT

The primary risk management tool in private credit is extensive due diligence of prospective investments and diversification. The following sections identify the most significant risks of private credit investments and the method of control.

Credit Risk

Credit risk is the primary risk associated with the asset class. Thorough due diligence of investments will be completed to ensure the general partners have sufficient measures in place to monitor and assess the risks involved with underlying investments, as well as the capabilities to structure loans with adequate covenants to protect the lender.

Interest Rate Risk

Interest rate risk is inherent within the Private Credit portfolio since investments are typically structured as floating rate credit instruments and interest rates will fluctuate over time. The risk is managed by the general partners through the structuring process to ensure appropriate interest rate floors and other measures are in place to manage an acceptable level of interest income.

Liquidity Risk

Private credit investments are illiquid but have shorter holding periods than other private security types, with 3 – 5 years being a typical holding period. Investments are typically held until maturity and selling prior to maturity typically results in a discount to fair market value. Liquidity risk is managed through the portfolio construction process by limiting the amount of exposure to more illiquid areas of private credit, such as distressed debt.

Geographic Risk

International exposure refers to non-US investments and is limited to 60% of the portfolio.

Vintage Risk

Vintage reflects the year of first capital draw and vintage risk refers to the variability of private credit commitments over time. The investment-pacing model controls the short and long-term private credit commitment amounts and attempts to minimize vintage risk while achieving targeted exposure. Commitments will be dependent on the availability of investments that meet SERS' investment criteria and will not be driven by the target investment pace in any given year.

Manager Risk

Manager risk consists of two elements, managing the exposure within a partnership and controlling the number of general partners in the Private Credit portfolio. Partnership exposure is controlled by limiting the commitment size within a partnership and the maximum commitment to a partnership will be 25% of a fund's size. The 25% limit does not apply to funds committed to a discretionary manager or a separate account. The maximum market value exposure to a single manager is targeted to be less than 35% of the portfolio. The optimum number of general partners in the portfolio varies with time.

Firm Risk

Firm risk is the exposure to a private credit general partner and is controlled by limiting the maximum commitment to funds operated by a general partner and its affiliates.

Currency Risk

The Private Credit program does not hedge currency risk and relies upon its external managers to determine if such hedges are appropriate. Currency risk will be managed through geographic exposure limits, as shown above under geographic risks.

Industry/Sector Risk

Typically, private credit partnerships are permitted to invest in a wide variety of industries and sectors. Industry/Sector risk is controlled primarily through appropriate diversification across classes and subclasses.

Leverage Risk

The capital markets control the maximum leverage available to the general partners and limited partners control leverage exposure through partnership selection and portfolio construction. Leverage at an individual fund level is managed through the portfolio construction process.

Valuation Risk

The valuation frequency for private credit is dependent upon the external managers' internal and external valuation policies, which are reviewed during the operational due diligence process.

IMPLEMENTATION GUIDELINES – Global Real Assets

I. ROLE

The role of SERS' Global Real Assets portfolio is to provide a stable income return from tangible assets, to be a partial inflation hedge over the long term and to provide low correlation to equities.

II. ASSET ALLOCATION

SERS' Statement of Investment Policy sets the global real assets target allocation at 17%, with a permissible range of 14% to 22%.

III. BENCHMARK

The global real assets benchmark is the NCREIF Property Index (NPI), one quarter in arrears.

IV. PERFORMANCE OBJECTIVE

The performance objective for Global Real Assets is to produce net of fee returns in excess of the benchmark over a market cycle, with the income component of the return comprising a significant portion of the total return.

V. PORTFOLIO DESIGN AND CONSTRUCTION

The Global Real Assets portfolio is designed to achieve the performance objective, to manage risks and to focus on the overall role of global real assets within the Total Fund. SERS' Global Real Assets Implementation Guidelines set the private market, public market and asset type exposures for Global Real Assets, as shown in the table below.

Strategy	Target	Range	
		Minimum	Maximum
Private Core Real Estate	60%	40%	80%
Private Non-Core Real Estate	5%	0%	15%
Private Infrastructure	30%	15%	40%
Public Market Real Assets	5%	0%	10%

Core real estate investments include substantially leased or fully operational institutional quality properties or projects located in developed markets. The revenue streams from core real estate are generally long duration and comprise a majority of the asset's total return. Core real estate strategies are typically implemented through open-end commingled funds.

Non-core real estate investments include value-added and opportunistic strategies in which properties or projects are re-leased, re-developed, or newly constructed, particularly in developing or transitional markets. This strategy has a higher return expectation, but has higher reliance on capital appreciation (vs income return). Non-core real estate strategies are typically implemented through closed-end commingled funds.

Private infrastructure typically involves the movement of goods, people, water and energy (definition provided by JP Morgan Asset Management). The sectors include, but are not limited to, power (including renewables), energy, utilities, transportation, communication, social infrastructure sectors. Infrastructure revenue streams are typically long-dated, contractual and inflation linked. Private infrastructure is implemented through both open and closed end commingled funds, as well as co-investments.

Public market real assets are securities of companies whose primary source of revenue comes from the operation of tangible assets, including, but not limited to, real estate (REITs), listed infrastructure, natural resources and master limited partnerships. While more liquid in nature, public market real assets exhibit greater volatility than privately held real assets. Master limited partnerships, or MLPs, are publicly traded limited partnerships that derive most of the partnership's cash flows from infrastructure and natural resource assets. The advantage of an MLP is that it combines the tax benefits of a limited partnership with the liquidity of a publicly traded company.

IMPLEMENTATION GUIDELINES – Global Real Assets

VI. PERMISSIBLE INVESTMENTS

The underlying investments included in the Global Real Assets portfolio generally are tangible assets, have long term investment horizons or holding periods, produce attractive income returns and cash yields and provide a partial inflation hedge over the long term. Permissible investment structures and types are as follows.

Investment Structure and Type	
Limited Partnership Interests	Y
Co-Investments	Y
Separate Accounts	Y
Commingled Funds	Y
Secondaries Vehicles	Y
Joint Ventures	Y
Real Estate Operating Companies (REOCs)	Y
Private Real Estate Equity and Debt	Y
Real Estate Investment Trusts (REITs)	Y
Exchange Traded Funds	Y
Private Infrastructure Equity and Debt	Y
Public Infrastructure Securities and MLPs	Y
Natural Resources and Commodities	Y

VII. RISK MANAGEMENT

Qualitative constraints and quantitative measures are used to manage risk in the Global Real Assets portfolio. The following sections identify the most significant risks with real asset investments and the method of control.

Real Estate Life Cycle Risk

Life cycle risk refers to the stage of an investment's life and generally falls into two categories, operating and non-operating. Operating investments are those that are leased or functioning at a level in which the contractual cash payments are supporting operations. Non-operating investments are those in pre-development, construction, conversion, or in a stage of major releasing. A significant portion of the private market real assets portfolio will be in operating investments in order to achieve Global Real Assets' role.

	Operating	Non-Operating
Target Exposure	≥85%	≤15%

Real Estate Property Type Risk

Property type risk refers to the level of exposure of the major property type categories in the private market real estate portfolio relative to the NCREIF Property Index. Property type risk will be managed through portfolio design and the use of diversified commingled funds. At least 80% of the private market real estate portfolio will be invested in the four primary property type categories including apartment, industrial, office and retail.

(as of December 31, 2021)	NCREIF Property Index	Range
Apartment	26%	15% - 45%
Industrial	28%	15% - 45%
Office	30%	15% - 40%
Retail	15%	5% - 25%
<i>Subtotal</i>	99%	80% - 100%
Hotel/Other	<1%	5% - 20%
Total	100%	

IMPLEMENTATION GUIDELINES – Global Real Assets

Real Estate Geographic Risk

Geographic risk can be broken down into two segments: US regional exposure and non-US exposure. US regional exposure refers to the level of exposure in the four US regions in the private market real estate portfolio relative to the NCREIF Property Index.

(as of December 31, 2021)	NCREIF Property Index	Range
West	41%	20% - 50%
East	30%	20% - 50%
Midwest	8%	5% - 20%
South	21%	10% - 30%
Total	100%	

Global Real Assets Geographic Risk

Non-US exposure refers to the level of exposure of non-US investments in the total Global Real Assets portfolio. Non-US exposure will be limited to 35% of the private market portfolio.

Liquidity Risk

Private market real asset investments are illiquid, with both holding periods and commingled fund terms ranging from 7-10 years or longer. Liquidity risk will be managed through target allocations to private and public market real assets as well as vintage year diversification.

Leverage Risk

Private market real asset investments typically are acquired with a combination of equity capital and mortgage financing. The amount of leverage per asset or pool of assets depends on debt availability, property type, tenant quality, and asset life cycle. The amount of leverage and financing terms ultimately are the responsibility of SERS' external real asset managers and are governed and constrained by partnership agreements. The leverage maximum for the total private market real assets portfolio is 50% of the gross asset value of the private market real assets portfolio. Leverage risk will be managed through target allocations and portfolio design.

Currency Risk

The Global Real Assets program does not hedge currency risk and relies upon its external managers to determine if such hedges are appropriate. Currency risk will be managed through geographic exposure limits, as shown above under geographic risks.

Valuation Risk

The valuation frequency for private market real assets is dependent upon the external managers' internal and external valuation policies, which are reviewed during the operational due diligence process.

Manager Concentration Risk

A single manager utilizing core strategies shall not constitute more than 25% of the net assets of the Global Real Assets program. For non-core strategies, a single fund commitment shall not constitute more than 10% of the net assets of the Global Real Assets program and a single manager with multiple fund commitments, including co-investments, shall not constitute more than 20% of the net assets of the Global Real Assets program.

IMPLEMENTATION GUIDELINES – Cash Equivalents & Securities Lending

I. ROLE

Short-Term Cash should provide liquidity for funding investment capital calls and operational expenses. Cash should be invested in conservative, low risk securities/funds to preserve capital for future expenditures and investments.

II. ASSET ALLOCATION

The Cash allocation is established with periodic asset allocation studies. The most recent asset allocation study authorized a 2% exposure to cash with a range of 0% - 5%.

III. BENCHMARK

The Short-Term cash benchmark is the Citigroup 30-day Treasury Bill Index.

IV. PERFORMANCE OBJECTIVE

The annualized return objective for the Short-Term portfolio is five basis points net of fees over the benchmark.

V. PORTFOLIO DESIGN AND CONSTRUCTION

The Cash portfolio is designed with preservation of capital in mind. A cash balance of one to three months of expenditures is usually maintained. A higher allocation to cash may also be used to preserve capital in volatile markets. The average weighted maturity of the portfolio will not exceed 20 days.

Risk is constantly assessed before investment purchases are made in the portfolio. Only top tier commercial paper is purchased. Money market holdings are also reviewed on a regular basis along with choosing a top tier money market provider with a deep credit analyst team and whose short-term investments are important to the organization.

The Securities Lending program is designed to be a low risk, intrinsic value focused strategy that can generate additional income for the system. The program is implemented through a third-party lending agent and collateral reinvestment manager. Separately, additional securities lending income is earned by the commingled passive global equity accounts.

VI. PERMISSIBLE INVESTMENTS

Security Type	
US Treasury Bills	Y
Commercial Paper rated A-1/P-1 or higher	Y
Money Market Funds rated at least A-1/P-1	Y
Unrated Market Funds comparable to an A-1/P-1 equivalent fund	Y

VII. RISK MANAGEMENT

Liquidity Risk

The weighted average maturity shall not exceed 20 days. All money market funds must provide daily liquidity.

Credit Risk

A commercial paper issuer must be on the approved credit list or approved by the Chief Investment Officer before purchasing. Market and issuer news are reviewed daily by the Senior Investment Officer – Global Fixed Income. Money market funds must regularly send a holdings report to SERS, where it is reviewed on a regular basis.

Issuer Risk

Single issuer commercial paper investments are limited to \$20 million. Related entity commercial paper investments are limited to the lower of 30% of the short-term account or \$40 million. Overnight commercial paper issuer maturities are limited to \$50 million.

IMPLEMENTATION GUIDELINES – Cash Equivalents & Securities Lending

Securities Lending Risk

All loans will be collateralized with cash at 102% for US securities and 105% for non-US securities and marked-to-market daily. Collateral will be reinvested in government money market funds and/or repurchase agreements. Loans on fixed income securities will be subject to a ten-basis point minimum spread requirement at loan initiation. Loans to approved borrowers will be limited to 25% of the average monthly market value on loan for the prior calendar year.

IMPLEMENTATION GUIDELINES – Opportunistic & Tactical

I. ROLE

The role of SERS' Opportunistic portfolio is to earn a return above the Bloomberg US Aggregate Bond Index + 2% by investing in assets and strategies that do not fit within the existing asset classes. The investments are defined as tactical or non-traditional investment opportunities.

II. ASSET ALLOCATION

SERS' Statement of Investment Policy sets the opportunistic target allocation at 0%, with a range of 0% to 7%.

III. BENCHMARK

The Opportunistic benchmark is the Bloomberg US Aggregate Bond Index + 2%.

IV. PERFORMANCE OBJECTIVE

The performance objective of the Opportunistic portfolio is to earn a net of fee return in excess of the Bloomberg US Aggregate Bond Index + 2% , with a meaningful component of the total return coming from current income.

V. PORTFOLIO DESIGN AND CONSTRUCTION

The Opportunistic portfolio may consist of a wide variety of investment types, structures and strategies targeting cash yield as well as price appreciation. Investment strategies include separate accounts, commingled funds, ETFs, co-investments and derivatives.

VI. PERMISSIBLE INVESTMENTS

Permissible investments include, but are not limited to, common stock, preferred stock, debt securities, currencies, commodities, etc.

VII. RISK MANAGEMENT

Leverage Risk

Leverage will be prudent for the given strategy and consistent with the fund's offering memorandum.

Liquidity Risk

Liquidity will be monitored regularly to ensure the portfolio can be traded or rebalanced within a reasonable timeframe. Liquidity risk will be managed through target allocations to private and public market assets as well as through portfolio design.

Currency Risk

The Opportunistic portfolio does not directly hedge foreign currency risk and relies upon its external managers to determine if such hedges are appropriate.

IMPLEMENTATION GUIDELINES – Overlay Program

I. ROLE

SERS invests in Overlay strategies that trade derivatives of the Total Fund's underlying asset exposures and currency exchange rates to enhance the Total Fund portfolio's efficiency. The Overlay program includes i) tactical asset allocation rebalance, and ii) active currency strategies.

The tactical asset allocation strategy aims to add value to the Total Fund performance through long and short positions based on short-term relative attractiveness of assets.

The active currency strategies aim to add value to the Total Fund on a risk-adjusted basis by employing long and short positions in various currency pairs based on relative attractiveness of the currencies. The strategies are expected to have low correlation to the major asset classes such as US equity and fixed income.

II. ASSET ALLOCATION

The target allocation of the tactical asset allocation and Currency program is 0% since long and short positions net out.

The tactical asset allocation program's notional exposure limit is +/-7% of the Total Fund to each of the following assets: US fixed income, US equity and Non-US equity. Since the tactical asset allocation positions are employed for short periods, the notional exposures are not subject to the policy asset allocation ranges set forth in the Statement of Investment Policy; however, the active risk contribution by the overlay program as a whole is subjected to the overall guideline on active risk for the management of the Total Fund specified in the Risk Management Policy.

The notional value of the active currency program is capped at 50% of the Non-US Equity portfolio's value.

III. BENCHMARK

The benchmark for the tactical asset allocation and Currency Overlay program is 0% since net exposure is 0%.

IV. PERFORMANCE OBJECTIVE

The Overlay program is expected to add 5 to 10 bps of excess return to the Total Fund's performance on a three to five year horizon.

V. PORTFOLIO DESIGN AND CONSTRUCTION

The mandates are unfunded. The Overlay strategies buy (long) or sell (short) futures or forwards contracts to get exposures to desired markets in order to exploit shifts in relative valuation of assets and currencies.

The tactical rebalancing strategy's net exposures, sum of long and short positions, are valued at zero on the initiating position time. Active currency strategies can go either net long or net short US dollar. Both tactical rebalancing and active currency aggregate portfolios are constructed to have no dependency on any single risk factor.

VI. PERMISSIBLE INVESTMENTS

Tactical asset allocation: equity, fixed income, commodity and precious metals futures and options on futures.

Currency Overlay: currency forwards, currency futures, gold forwards, gold futures, and limited currency options.

VII. RISK MANAGEMENT

Counter-party risk management

- Futures and exchange traded options are traded at exchanges thus having default risk only to the clearinghouse while having no credit risk to trade counterparties.
- Forward contracts and over-the-counter options entail default risk of the counterparties. Counterparty risk of these contracts is managed through ISDA (International Swaps and Derivatives Association) and EMIR (European Market Infrastructure Regulation) umbrella agreements with managers.

Volatility management

- The tactical asset allocation program's tracking error range is 5 to 15 bps.
- All active currency strategies have targeted tracking error equal to or less than 8%; the aggregate active currency program's tracking error is expected to be in the range of 5 to 8%.

Liquidity

- The use of derivatives requires initial margin as well as daily variation margin for futures. Liquidity risk will be managed by ensuring that an adequate reserve of cash is available to meet margin requirements at all times.

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Glossary

GLOSSARY

Active Risk – see Tracking Error.

Alpha – the premium an investment portfolio earns above a certain benchmark (such as the Standard & Poor's 500 Index). A positive alpha indicates the investor earned a return in excess of the index return.

Alternative Reference Rates Committee (ARCC) – The ARCC was established by the Federal Reserve to identify risk-free alternative reference rates for USD LIBOR, identify best practices for contract robustness, and create an implementation plan with metrics of success and a timeline to support an orderly adoption of the replacement rate.

Asset Allocation – the practice of allocating a certain percentage of a portfolio between different types of investment assets, such as stocks, bonds, real estate, cash, etc. By diversifying among asset classes it is expected to create a favorable risk/reward ratio for the portfolio.

Bloomberg US Aggregate Bond Index – a market capitalization weighted US bond index published by Bloomberg LLC. Most US traded investment grade bonds are represented in the index. The Bloomberg US Aggregate Bond Index is SERS' global fixed income policy benchmark.

Basis Point – one hundredth of one percent. For example, an addition of 40 basis points to a yield of 7.50 percent would increase the yield to 7.90 percent. Basis points are normally used when quoting yields or returns, alpha, or fees paid to investment managers.

Benchmark – a measurement or standard that serves as a point of reference by which portfolio performance is measured. Benchmarks must meet standard criteria.

Burgiss All Private Equity (BAPE) – BAPE is comprised of data from more than 5,000 private equity funds contributed by limited partners that are Burgiss clients and use Burgiss' web-based institutional portfolio management platform Private i. The benchmark data is sourced from Burgiss' limited partner clients and includes complete transactional and valuation history between the limited partner and their fund investments. Burgiss publishes a detailed breakdown of the dataset every quarter allowing for increased transparency.

Citigroup 30-day T-Bill Index – an index that measures the rate of return for 30-day US Treasury Bills, which are considered representative of the performance of short-term money market instruments. The Citigroup 30-day T-Bill index is SERS' policy benchmark for Cash Equivalents.

Co-investment – a direct investment in a single asset of a multi-asset Fund, made alongside the Fund's investment in the asset; typically involves terms that are more attractive and with shorter time frames than those of the Fund.

Derivatives (Derivative Instruments) – financial instruments (securities or contracts) whose values are derived from underlying financial assets, indices or other instruments. Derivative performance is based on the performance of assets, interest rates, currency exchange rates and various domestic and foreign indices underlying the instruments. The common forms of derivatives are forward, futures, swap and options contracts.

Diversification – the method of reducing risk by distributing investment assets among a variety of investment securities which have different risk/ reward ratios.

Due Diligence – an investigation or audit of a potential or existing investment.

Equity Investment – claims held by the residual owners of a firm. May also be referred to as common stock. Investments in Real Estate and certain Private Markets classifications may also be considered equity.

Fixed Income Investment – a security issued by a borrower that obligates the issuer to make specified payments to the holder over a specific period. May also be referred to as "debt" or "bonds."

Fund – fund means a limited partnership, trust or commingled investment vehicle in which SERS invests or may invest (e.g., hedge fund, private equity fund, or real estate fund).

GLOSSARY

Global Equities – reflects the consolidation of what had been treated by SERS as US Equity and Non-US Equity asset classes; includes equities of US and non-US origin, equities of various capitalizations (e.g., large cap, small cap, mid cap, etc.), equities from developed, emerging and frontier markets, growth and value equities and passive and active strategies. Investments in Global Equities strategies are made in accordance with established investment guidelines, and amended as necessary, by mutual agreement between the Chief Investment Officer and the Investment Consultant.

Guidelines – refers to an Investment Manager’s “Investment Guidelines,” established between the Investment Manager and Staff as part in an investment management agreement. Guidelines may be general or specific.

Hedge Fund – a private investment partnership or an offshore investment corporation in which the general partner has made a substantial personal investment and whose offering memorandum allows for the Fund to take both long and short positions, using leverage and derivatives and invest in many markets. Hedge funds often use strategies involving program trading, selling short, swaps and arbitrage.

Investment Committee – a committee comprised of the Chief investment Officer and Investment Officers from SERS’ Investment Department who possess the Ohio State Retirement System Investment Officer (SRSIO) license, with clearly defined structure, rules and procedures for reviewing and approving investments in a timely and prudent fashion.

Investment Consultant – any consultant hired by the Board or by Staff to advise or assist with the Investment Program in accordance with the Statement of Investment Policy. Board investment consultants must be approved by the Board. Staff investment consultants shall be approved by the Executive Director.

Investment Manager – a manager or potential manager of SERS assets, both public market and private market. Includes, but is not limited to managers of equity, fixed income, private equity, real estate, hedge funds, commodities and cash.

Investment Staff – members of the investment department of SERS, including the Chief Investment Officer, Investment Officers and other department personnel.

Leverage – in investments, this is the control of a large amount of money by a smaller amount of money, such as buying on margin. In finance, this is the relationship of debt to equity on a company’s balance sheet in the form of the debt/equity ratio.

LIBOR – London Interbank Offered Rate, the interest rate that is commonly used as the benchmark reference rate for lenders. The 3-month LIBOR is a reference rate previously utilized by Staff.

Long a futures contract or a forward contract – buying exposure to the underlying assets of the contract without actually owing those assets. When the underlying assets deliver a positive return, the long position gains; when the underlying assets deliver a negative return, the reverse is true.

Morgan Stanley Capital International – All Country World Free ex-USA Index (\$Net) – an equity index representing 44 developed and emerging countries. “Free” indicates the index reflects actual investable opportunities for global investors by taking into account local market restrictions on share ownership by foreigners. “Net” indicates that dividends are reinvested after the deduction of withholding taxes applicable to non-resident institutional investors. The MSCI-ACWI ex-USA Index, net of dividends reinvested is SERS’ policy benchmark for Non-US Equities.

NCREIF Property Index (NPI) – a quarterly time series composite total rate of return measure of investment performance of a very large pool of individual commercial real estate properties acquired in the private market for investment purposes only. The NCREIF Property Index is a component of SERS’ Global Real Estate Policy Benchmark.

Opportunistic and Tactical Investments – global opportunistic investments are tactical or non-traditional investment opportunities that may be short-term or may not fit within the generally accepted risk/return parameters of specific asset classes or strategy groupings. Such opportunities may involve capitalizing on short-term market

GLOSSARY

dislocations or other such unique situations. Tactical investments may include strategies with dynamic allocations to single assets or across multiple asset types or other innovative approaches.

Options contract - a form of financial derivatives. In an options contract, two parties (buyer and seller) agree that the buyer, who pays an option premium to the seller, has the right to exercise an option whether or not to buy or sell a particular asset at a specified price at a specified future date.

Portfolio – a collection of investments owned, managed, or overseen by an individual or investment manager, a board or an organization. Portfolio can mean a manager account or subset thereof (e.g., Goldman Sachs Core Plus account), an asset class (e.g., US Equity), or the entire fund (e.g., SERS' Total Fund).

Rebalancing – adjusting asset class or portfolio allocations relative to their targets or ranges to adjust for actual or anticipated market movements.

Russell 3000 Index – a market-value weighted equity index published by the Frank Russell Company. The index measures the performance of the 3,000 largest US companies in terms of market capitalization. The Russell 3000 Index is SERS' Domestic Equity Policy Benchmark.

Secondaries – pre-existing investor capital commitments to private funds that are purchased in the secondary market.

Secured Overnight Financing Rate (SOFR) – SOFR is a broad measure of the cost of borrowing cash overnight collateralized by Treasury securities. There is a considerable volume of transactions executed that utilize SOFR and the rate is published on each business day.

Securities Lending – the temporary loan of a security from an institutional investor's portfolio to a broker/dealer to support the firm's trading activities. Loaned securities are collateralized with cash at 102-105% of the loan exposure. The lender retains the entitlement to all the benefits of the loaned security, including dividends and interest, except the right to vote proxies. The lender has a right to recall the loan at any time.

Short a futures contract or forward contract – selling exposure to the underlying assets of the contract without transferring the ownership of those assets to the buyers. When the underlying assets deliver a positive return, the short position experiences losses; when the underlying assets deliver a negative return, the reverse is true.

Style – style refers to an investment product, strategy or style offered by an Investment Management Firm and reflects how the assets are invested. For example, value versus growth; core versus value added; quantitative versus fundamental; etc.

T-bill – refers to Treasury Bill. Staff utilizes the 90-day T-bill rate as a reference benchmark.

Total Fund – refers to SERS' total investment assets.

Tracking Error – standard deviation of the excess return of the portfolio relative to the Benchmark measured over rolling three year periods.

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