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INDEPENDENT AUDITORS' REPORT

The Board of Trustees
Missouri Department of Transportation and
Highway Patrol Employees' Retirement System

Report on the Financial Statements

We have audited the accompanying statement of fiduciary net position of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (the System), as of June 30, 2018, and the related statement of changes in fiduciary net position for the year then ended, and the related notes to the financial statements, which collectively comprise the System's basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with U.S. generally accepted accounting principles; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with U.S. generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the System's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the System's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the System at June 30, 2018, and the changes in fiduciary net position for the year then ended, in conformity with U.S. generally accepted accounting principles.

Other Matters

Required Supplementary Information

U.S. generally accepted accounting principles require that the management's discussion and analysis on pages 3 through 6 and the schedules of changes in the employers' net pension liability, employers' contributions, investment returns, changes in net OPEB liability and related ratios, MPERS' proportionate share of net OPEB liability, and related notes on pages 27 through 29 be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board, who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context.

We have applied certain limited procedures to the required supplementary information in accordance with U.S. generally accepted auditing standards, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise the System's basic financial statements. The introductory, investment, actuarial and statistical sections and the additional information presented on pages 30 through 32 are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The additional information presented on pages 30 through 32 is the responsibility of management and was derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. The additional information presented on pages 30 through 32 has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with U.S. generally accepted auditing standards. In our opinion, the additional information presented on pages 30 through 32 is fairly stated in all material respects in relation to the basic financial statements as a whole.

The introductory, investment, actuarial and statistical sections have not been subjected to the auditing procedures applied in the audit of the basic financial statements and, accordingly, we do not express an opinion or provide any assurance on them.

Williams-Keepers LLC

November 2, 2018

MANAGEMENT'S DISCUSSION AND ANALYSIS

The management of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (the System, or MPERS) provides this discussion and analysis of the System's financial performance for the fiscal year ended June 30, 2018. While this discussion is intended to summarize the financial status of MPERS, readers should consider this information in conjunction with the information that is furnished in the more detailed financial statements and corresponding notes.

DESCRIPTION OF BASIC FINANCIAL STATEMENTS

As required by the Governmental Accounting Standards Board (GASB) accounting standards, this financial report consists of *Management's Discussion and Analysis* (this section), the basic financial statements (including notes to the basic financial statements), and other required supplementary information.

Financial Statements report information about MPERS, using accounting methods similar to those used by private-sector companies, by using the economic resources measurement focus and accrual basis of accounting. These statements provide both long-term and short-term information about the System's overall financial status. These statements follow this *Management's Discussion and Analysis* section:

- The *Statement of Fiduciary Net Position* includes all the System's assets and liabilities, with the difference between the two reported as net position.
- The *Statement of Changes in Fiduciary Net Position* accounts for all the current year's additions (income) and deductions (expenses), regardless of when cash is received or paid.

Notes to the Financial Statements are included following the financial statements. The notes to the financial statements provide additional information that is essential for a full understanding of the data provided in the financial statements.

Required Supplementary Information follows the notes and further supports the information in the financial statements.

ANALYSIS OF FINANCIAL POSITION AND RESULTS OF OPERATIONS

Overall, the financial position of MPERS strengthened by $145 million, reported as the "net increase." This is primarily a result of net appreciation in the fair value of investments for the year ended June 30, 2018. The funded status of the plan remained consistent with the prior year, due to actuarial gains offset by changes in actuarial assumptions.

The following schedules present summarized comparative data from the System's financial statements for each of the fiscal years ended June 30, 2018 and 2017. Following each schedule is a brief summary providing explanation and analyses of the major reasons for changes in the condensed financial statements.

Summarized Comparative Statements of Fiduciary Net Position

	As of June 30, 2018	As of June 30, 2017	% Change 2018/2017
Cash and Receivables	$ $22,452,794	$ 18,697,840	20
Investments	2,306,942,650	2,162,264,152	7
Invested Securities Lending Collateral	133,616,408	56,823,478	135
Capital Assets	858,546	1,204,317	-29
Total Assets	2,463,870,398	2,238,989,787	10
Deferred Outflows of Resources	34,090	--	n/a
Accounts Payable	8,789,084	10,109,326	-13
OPEB Obligation	1,545,180	715,962	116
Securities Lending Collateral	138,840,857	58,389,459	138
Total Liabilities	149,175,121	69,214,747	116
Deferred Inflows of Resources	199,219	--	n/a
Net Position	**$ 2,314,530,148**	**$ 2,169,775,040**	**7**

The increase in cash and receivables is primarily attributable to increased accrued investment interest and investment sales receivables as of June 30, 2018. Some fluctuations in this area are normal, based on investment activity.

The System's investments represent the main component of total assets. These investments include equities, fixed income, limited partnerships, hedge funds, and short-term investments. The increase in fair value of investments as of June 30, 2018 is primarily due to favorable market conditions experienced during the year. The fiscal year 2018 investment return was 9.42% as calculated on a time-weighted rate of return methodology.

Capital assets decreased in fiscal year 2018 due to depreciation of existing assets and no purchases of new equipment during the year.

The addition of deferred outflows of resources related to OPEB (Other Post-Employment Benefits), required by Governmental Accounting Standards Board (GASB) Statement 75 in fiscal year 2018, had a minimal effect on MPERS' financial statements. The deferred outflows of resources relate to the timing of contributions paid.

The decrease in accounts payable for fiscal year 2018 is primarily attributable to lower investment purchases payable. Some fluctuations in this area are normal, based on investment activity.
The OPEB obligation liability of $1,545,180 at June 30, 2018 and $715,962 at June 30, 2017 reflects MPERS' provision of post-employment health care benefits through its participation in the MoDOT and MSHP Medical and Life Insurance Plan. This plan is an internal service fund of the Missouri

Department of Transportation; therefore, assets have not been set aside. With this, the increase from fiscal year 2017 to fiscal year 2018 is expected.

The largest component of liabilities is securities lending collateral. This represents the amount owed for collateral to be returned as the result of investment securities lent. The increase in securities lending collateral liability from fiscal year 2017 to fiscal year 2018 is due to the increase in the fair value of investments and more securities being utilized for lending. The corresponding securities lending collateral asset is valued at a lower amount than the securities lending collateral liability at June 30, 2018 due to the fair value of the securities on loan being less than the collateral value.

The addition of deferred inflows of resources related to OPEB, required by GASB Statement 75 in fiscal year 2018, had a minimal effect on MPERS' financial statements. The deferred inflows of resources relate primarily to the amortization of changes in actuarial assumptions.

The System's total net position was $2.315 billion at June 30, 2018, a $145 million increase from the $2.170 billion at June 30, 2017.

Summarized Comparative Statements of Changes in Fiduciary Net Position

	Year Ended June 30, 2018	Year Ended June 30, 2017	% Change 2018/2017
Contributions	$ 211,824,042	$ 213,198,963	-1
Net Investment Income	197,619,367	220,301,127	-10
Other Income	472	614	-23
Total Additions	409,443,881	433,500,704	-6
Benefits	259,058,863	251,284,152	3
Administrative Expenses	4,693,492	4,515,458	4
Total Deductions	263,752,355	255,799,610	3
Net Increase	145,691,526	177,701,094	-18
Net Position-Beginning	2,168,838,622	1,992,073,946	9
Net Position-Ending	**$ 2,314,530,148**	**$ 2,169,775,040**	**7**
OPEB Implementation Adjustment		(936,418)	
Net Position-Ending, as Restated		**$ 2,168,838,622**	

Net investment income, a primary component of plan additions, resulted in income of $198 million for fiscal year 2018, represented a 9.45% return for the fiscal year ended June 30, 2018. In comparison, the fiscal year 2017 gain of $220 million represented an investment return of 11.22%. Annual fluctuations within the broad investment markets are outside the control of the System and are expected to fluctuate from year to year. The Board of Trustees has approved a diversified asset allocation that, over long periods of time, is expected to realize the assumed actuarial rate of investment return of 7.00%.

Benefits increased due to an increase in the total number of retirees for the years shown and due to a one-time buyout option offered to terminated vested members. The buyout payment was 50% of the present value of the member's deferred normal retirement annuity. Approximately 17% of the eligible terminated vested members participated in the buyout provision resulting in $5.69 million paid to 383 members.

Administrative expenses increased in fiscal year 2018 primarily due to career progression and general increases in the costs of services.

GASB Statement 75, Accounting and Financial Reporting for Postemployment Benefits Other than Pensions (OPEB) was implemented in fiscal year 2018. This required an OPEB implementation adjustment to fiscal year 2017 to realize the OPEB liability in accordance with the new statement. See Note 10 in the Notes to the Financial Statements for complete disclosure information.

CURRENTLY KNOWN FACTS AND RECENT EVENTS

Based on the June 30, 2018 actuarial valuation, the Board of Trustees approved no change in the required state contribution rate, effective July 1, 2019. The rate applied to both non-uniformed payroll (MoDOT, civilian patrol, and MPERS) and uniformed patrol payroll remains at 58.00%.

Based on the June 30, 2017 actuarial valuation, the Board of Trustees approved no change in the required state contribution, effective July 1, 2018. The rate applied to both non-uniformed payroll (MoDOT, civilian patrol and MPERS) and uniformed patrol payroll remained at 58.00%.

CONTACTING THE RETIREMENT SYSTEM'S MANAGEMENT

This financial report is designed to provide a general overview of the System's finances. Questions about this report or requests for additional financial information should be sent to:

MoDOT and Patrol Employees' Retirement System
PO Box 1930
Jefferson City, MO 65102-1930
mpers@mpers.org

STATEMENT OF FIDUCIARY NET POSITION

As of June 30, 2018

ASSETS:		
Cash	$	539,497
Receivables		
Contributions		8,686,626
Accrued Interest and Income		6,383,098
Investment Sales		6,843,573
Total Receivables		21,913,297
Investments, at Fair Value		
Equities		470,017,822
Fixed Income		656,008,238
Limited Partnerships		981,543,412
Hedge Funds		147,595,231
Short-Term Investments		51,777,947
Total Investments		2,306,942,650
Invested Securities Lending Collateral		133,616,408
Net Investment in Capital Assets		
Land		84,000
Building		581,619
Furniture, Equipment and Software		3,504,218
Accumulated Depreciation		(3,311,291)
Net Investment in Capital Assets		858,546
TOTAL ASSETS	**$**	**2,463,870,398**
DEFERRED OUTFLOWS OF RESOURCES	**$**	**34,090**
LIABILITIES:		
Accounts Payable	$	1,731,684
OPEB Obligation		1,545,180
Security Lending Collateral		138,840,857
Investment Purchases		7,057,400
TOTAL LIABILITIES	**$**	**149,175,121**
DEFERRED INFLOWS OF RESOURCES	**$**	**199,219**
NET POSITION RESTRICTED FOR PENSIONS	**$**	**2,314,530,148**

See accompanying Notes to the Financial Statements.

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION

For the Year Ended June 30, 2018

ADDITIONS:		
Contributions-Employer	$	204,955,180
Contributions-Employee		3,721,983
Contributions-Service Transfers from Other System		1,867,445
Contributions-Other		1,279,434
Total Contributions		211,824,042
Investment Income from Investing Activities		
Net Appreciation in Fair Value of Investments		157,187,088
Interest and Dividends		70,726,752
Less: Investment Expenses		30,486,906
Net Investment Income		197,426,934
Income from Securities Lending Activities		
Securities Lending Gross Income		985,860
Less: Securities Lending Expenses, net		793,427
Net Income from Securities Lending Activities		192,433
Other Income		472
TOTAL ADDITIONS	**$**	**409,443,881**
DEDUCTIONS:		
Monthly Benefits		
Retiree and Survivor Annuity Benefits		237,850,981
BackDROP Payments		14,546,108
Disability Benefits		2,475,725
Death Benefits		860,000
Service Transfer Payments		2,823,042
Employee Contribution Refunds		503,007
Administrative Expenses		4,693,492
TOTAL DEDUCTIONS	**$**	**263,752,355**
NET INCREASE	$	145,691,526
NET POSITION RESTRICTED FOR PENSIONS		
Beginning of Year	**$**	**2,169,775,040**
Adjustment for OPEB Reporting Implementation		**(936,418)**
Beginning of Year, Restated		**2,168,838,622**
End of Year	**$**	**2,314,530,148**

See accompanying Notes to the Financial Statements.

NOTES TO THE FINANCIAL STATEMENTS

For the Year Ended June 30, 2018

NOTE 1 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

As established under Section 104.020 of the Revised Statutes of Missouri (RSMo.), the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (MPERS) is a body corporate and an instrumentality of the State of Missouri (State). Due to the nature of MPERS' reliance on funding from the Missouri Department of Transportation (MoDOT) and the Missouri State Highway Patrol (MSHP) and control of the overall plan document by the legislative and executive branches of state government, MPERS is considered a part of the State of Missouri financial reporting entity and is included in the State's financial reports as a component unit shown as a pension trust fund.

Note 1 (a) – Basis of Accounting

The financial statements were prepared using the accrual basis of accounting. Contributions are due to MPERS when employee services have been performed and paid. Contributions are recognized as revenues when due, pursuant to statutory requirements. Benefits are recognized when due and payable and expenses are recorded when the corresponding obligations are incurred. Dividend income is recognized when dividends are declared. Interest income is recognized when earned.

The Governmental Accounting Standards Board (GASB) approved a new accounting and reporting standard, GASB Statement 75, Accounting and Financial Reporting for Postemployment Benefits Other than Pensions. GASB 75 is effective for fiscal years beginning after June 15, 2017.

The primary objective of GASB 75 is to improve accounting and financial reporting for postemployment benefits other than pensions (other postemployment benefits or OPEB). This statement establishes standards for recognizing and measuring liabilities, deferred outflows of resources, deferred inflows of resources, and expenses/expenditures. Comprehensive footnote disclosure regarding this statement is presented in Note 10.

Note 1 (b) – Method Used to Value Investments

Investments are reported at fair value on a trade date basis. Bonds and stocks traded on a national or international exchange are valued at the reported sales price at current exchange rates. Mortgages are valued on the basis of future principal and interest payments and are discounted at prevailing interest rates for similar instruments. The fair value of real estate and timber investments are based on net asset value estimates provided by the general partners' administrators or portfolio managers, which are compared to independent appraisals. Investments that do not have an established market are reported at estimated fair value. The fair value of the hedge fund portfolios and partnership portfolios are based on valuations of the underlying assets as reported by the general partner or portfolio manager.

Note 1 (c) – Net Investment in Capital Assets

MPERS capitalizes assets with an expected useful life greater than one year and a cost greater than $3,000. Capital assets are depreciated on the straight-line method over the estimated useful lives of the related assets. The estimated useful lives are as follows:

Furniture, Equipment and Software	3 – 10 years
Building and Improvements	30 years

Note 1 (d) – Use of Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements, and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

NOTE 2 – PLAN DESCRIPTIONS AND CONTRIBUTION INFORMATION

MPERS is a body corporate and an instrumentality of the state as a multiple-employer, public employee retirement system with one plan that has three benefit structures known as the Closed Plan, the Year 2000 Plan, and the Year 2000 Plan-2011 Tier. The plan provides retirement, survivor, and disability benefits for employees of MoDOT, MSHP, and MPERS. The plan is administered in accordance with the requirements of a cost sharing, multiple-employer, public employee retirement plan under the Revised Statutes of Missouri. In MPERS are vested the powers and duties specified in sections 104.010 to 104.312, 104.601 to 104.805, and 104.1003 to 104.1093, RSMo, and such other powers as may be necessary or proper to enable it, its officers, employees, and agents to carry out fully and effectively all the purposes outlined pursuant to these sections. Responsibility for the operation and administration of the System is vested in the Board of Trustees, which consists of eleven members, four elected by the active and retired plan members, three Highway and Transportation Commissioners, a State Senator appointed by the President Pro-Tem of the Senate, a State Representative appointed by the Speaker of the House, and the Director of the MoDOT and Superintendent of the MSHP who serve as ex-officio members. Detailed information regarding contributions can be found in Note 5.

Generally, all covered employees hired before July 1, 2000, are eligible for membership in the Closed Plan. All covered employees hired on or after July 1, 2000, and before January 1, 2011, are eligible for membership in the Year 2000 Plan. All covered employees hired on or after January 1, 2011 are eligible for membership in the Year 2000 Plan's 2011 Tier.

Membership in the Closed Plan, Year 2000 Plan, and 2011 Tier as of June 30, 2018

	Closed	Year 2000	2011 Tier	Total
Retirees, Beneficiaries, and Disabilities				
Currently Receiving Benefits	4,974	3,985	8	8,967
Terminated Employees Entitled to				
But Not Yet Receiving Benefits	1,145	817	23	1,985
Active Employees				
Vested	2,402	2,377	415	5,194
Non-Vested	3	64	2,154	2,221
Total Membership	**8,524**	**7,243**	**2,600**	**18,367**

Closed Plan Description

Employees covered by the Closed Plan are fully vested for benefits upon receiving 5 years of creditable service. Under the Closed Plan, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:

- Age 65 with 4 or more years of creditable service (active);
- Age 65 with 5 or more years of creditable service (terminated & vested);
- Age 60 with 15 or more years of creditable service (active or terminated & vested); or
- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active or terminated & vested).

The following provisions apply for uniformed patrol members of the Closed Plan:

- Age 55 with 4 or more years of creditable service (active);
- Age 55 with 5 or more years of creditable service (terminated & vested);
- "Rule of 80" – at least age 48 with sum of member's age and service equaling 80 or more (active or terminated & vested); or
- Mandatory retirement at age 60 (active).

All non-uniformed members may retire early, with reduced benefits, at age 55 with at least 10 years of creditable service.

The base benefit in the Closed Plan is equal to 1.6% multiplied by the final average pay multiplied by years of creditable service. For members of the uniformed patrol, the base benefit is calculated by applying the same formula, then multiplying the product by 1.333333.

Retired uniformed members will receive an additional benefit of $90 per month, plus cost-of-living adjustments (COLAs), until attainment of age 65. This payment, however, is reduced by any amount earned during gainful employment. This benefit is not available to uniformed members hired on or after January 1, 1995, or to vested deferred members.

For members employed prior to August 28, 1997, COLAs are provided annually based on 80% of the increase in the consumer price index for all urban consumers for the United States (CPI-U). The minimum rate is 4% and the maximum rate is 5%, until the cumulative amount of COLAs equals 65% of the original benefit. Thereafter, the 4% minimum rate is eliminated and the annual COLA rate will be equal to 80% of the increase in the CPI-U (annual maximum of 5%). For members employed on or after August 28, 1997, COLAs are provided annually based on 80% of the increase in the CPI-U, up to a maximum rate of 5%.

The BackDROP is a payment option that is available to eligible members upon retirement. This option provides for a benefit to be calculated as if the member elected to retire at a previous date. If the BackDROP is elected, the monthly benefit payable on the actual retirement date is based on the benefit that would have been received by the member had he/she left employment and retired on the BackDROP date. In addition, the member will receive a lump sum payment equal to 90% of the life income annuity amount the member would have received during the BackDROP period. This lump sum amount includes any COLAs and other benefit increases; also, credit will be received for the unused sick leave balance as of the date of retirement.

The life income annuity payment option (which contains no provision for survivorship) and the life income with 60 or 120 month guaranteed payment options are available to all members. Joint and 50% or 100% survivor options are available if married at the time of retirement. In the Closed Plan, the reduction for the joint & 100% survivor option is based on the difference between the age of the member and the survivor. There is no reduction for the joint and 50% survivor option.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse as beneficiary if:

- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect a payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving normal or work-related disability benefits, on or after September 28, 1985, are provided a $5,000 death benefit payable to designated beneficiaries.

<u>Year 2000 Plan Description</u>

Employees covered by the Year 2000 Plan are fully vested for benefits upon earning 5 years of creditable service. Under the Year 2000 Plan, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:

- Age 62 and with 5 or more years of creditable service (active or terminated & vested);
- "Rule of 80" - at least age 48 with sum of member's age and service equaling 80 or more (active).

The following provisions apply for uniformed patrol members of the Year 2000 Plan:

- "Rule of 80" - at least age 48 with sum of member's age and service equaling 80 or more (active);
- Mandatory retirement at age 60 (active only).

All members may retire early with reduced benefits at age 57 with at least 5 years of creditable service.

The base benefit in the Year 2000 Plan is equal to 1.7% multiplied by the final average pay multiplied by years of creditable service. Members retiring under the Rule of 80, and uniform patrol members retiring at the mandatory retirement age (currently 60), receive an additional temporary benefit until age 62. The temporary benefit is equivalent to 0.8% multiplied by final average pay multiplied by years of creditable service.

COLAs are provided annually based on 80% of the increase in the CPI-U, up to a maximum rate of 5%.

The BackDROP is a payment option that may be available to members upon retirement. This option provides for a monthly benefit to be calculated as if the member elected to retire at a previous date. If the BackDROP is elected, the monthly benefit payable on the actual retirement date is based on the benefit that would have been received by the member had he/she left employment and retired on the BackDROP date. In addition, the member will receive a lump sum payment equal to 90% of the life income annuity amount the member would have received during the BackDROP period. This lump sum amount includes any temporary benefits, COLAs and other benefit increases; also, credit will be received for the unused sick leave balance as of the date of retirement.

The life income annuity payment option (with no provision for survivorship) and the life income with 120 or 180 months guaranteed payment options are available to all members. Joint and 50% or 100% survivorship options are available if married at the time of retirement. The reduction for the joint and 50% or 100% survivor options is based on the member's age at retirement, as well as the age difference between the member and the survivor.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse for survivor benefits if:

- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect the payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving work-related disability benefits, on or after July 1, 2000, are provided a $5,000 death benefit payable to designated beneficiaries.

<u>Year 2000 Plan-2011 Tier Description</u>

Employees covered by the 2011 Tier are fully vested for benefits upon earning 5 years of creditable service if they were active on or after January 1, 2018. Under the 2011 Tier, MoDOT and civilian employees may retire with full benefits upon the earliest of attaining:

- Age 67 and with 5 or more years of creditable service (active or terminated & vested);
- "Rule of 90" - at least age 55 with sum of member's age and service equaling 90 or more (active only).

Active MoDOT and civilian employees may retire early with reduced benefits at age 62 with at least 5 years of creditable service.

The following provisions apply for uniformed patrol members of the 2011 Tier:

- Age 55 and with 5 or more years of creditable service (active only);
- Mandatory retirement at age 60 with no minimum service amount (active only).

Terminated and vested uniformed patrol employees may retire at age 67 with 5 or more years of creditable service.

The base benefit in the 2011 Tier is equal to 1.7% multiplied by the final average pay multiplied by years of creditable service. Members retiring under the Rule of 90, and uniform patrol members retiring at the mandatory retirement age (currently 60) or at age 55 with 5 years of creditable service, receive an additional temporary benefit until age 62. The temporary benefit is equivalent to 0.8% multiplied by final average pay multiplied by years of creditable service.

COLAs are provided annually based on 80% of the change in the CPI-U, up to a maximum rate of 5%.

The life income annuity payment option (with no provision for survivorship) and the life income with 120 or 180 months guaranteed payment options are available to all members. Joint and 50% or 100% survivorship options are available if married at the time of retirement. The reduction for the joint and 50% or 100% survivor options is based on the member's age at retirement, as well as the age difference between the member and the survivor.

If a reduced joint and survivor option is chosen at the time of retirement and the spouse precedes the member in death, the benefit will revert back (pop-up) to a normal annuity, upon appropriate notification to MPERS.

Members may name a new spouse for survivor benefits if:

- They were single at retirement and since married;
- They elected a spouse option at the time of retirement, the spouse preceded the member in death, and then a remarriage occurred.

The member has 1 year from the date of marriage to re-elect the payment option and name a new spouse.

All members who retire from active employment or long-term disability, or begin receiving work-related disability benefits, on or after January 1, 2011, are provided a $5,000 death benefit payable to designated beneficiaries.

Contributions

Beginning January 1, 2011, employee contributions of 4% of gross pay are required for those covered by the Year 2000 Plan-2011 Tier.

Employer contributions are determined through annual actuarial valuations. Administrative expenses are financed through contributions from participating employers and investment earnings.

Participating employers are required to make contributions to the plan based on the actuarially determined rate. Prior to August 13, 1976, contributions by all plan members were required. Accumulated employee contributions made prior to that time, plus interest, were refunded to applicable members. Maximum contribution rates were eliminated August 13, 1976. Detailed information regarding contributions can be found in Note 5.

NOTE 3 - DEPOSITS AND INVESTMENTS

The Board of Trustees has established policies and procedures by which funds are invested. Section 104.150, RSMo., provides the authority for the Board to invest MPERS funds. Plan assets are invested in a diversified portfolio following prudent standards for preservation of capital, with the goal of achieving the highest possible rate of return consistent with MPERS' tolerance for risk. The Board of Trustees establishes MPERS' asset allocation policy, and may amend the policy. The following is MPERS' current asset allocation policy:

Asset Class	Target Allocation
Global Equity	30.0%
Private Equity	15.0%
Fixed Income	20.0%
Real Assets	7.5%
Real Estate	10.0%
Hedge Funds	10.0%
Opportunistic Debt	7.5%
Cash	0.0%

Note 3 (a) - Deposit and Investment Risk Policies

Concentration of Credit Risk

Concentration of credit risk is the risk of loss attributed to the magnitude of the System's investment in a single issuer. Within the traditional asset classes (equities and fixed income), the consultant will aggregate exposures across asset classes to create measures of concentration including industries, countries and security issuer for Investment staff review.

Investment Custodial Credit Risk

Custodial credit risk is an investment risk that, in the event of the failure of the counterparty to a transaction, the System will not be able to recover the value of its investment or the collateral securities that are in the possession of an outside party. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System, and are held by either: a) the counterparty or b) the counterparty's trust department or agent but not in the System's name. It is the policy of the System to require that all investments be clearly marked as to ownership and, to the extent possible, shall be registered in the name of the System.

Cash Deposit Custodial Credit Risk

Cash deposit custodial credit risk is the risk that, in the event of the failure of depository financial institution, the System will not be able to recover deposits or will not be able to recover collateral securities that are in the possession of an outside party. Missouri state law requires that all public funds must be collateralized with acceptable securities having fair values of at least 100% of the amount of funds on deposit (less any amount covered by FDIC insurance).

Market Risk

Market risk is the risk that the fair value of an investment will be adversely impacted due to a change in value of the underlying market. The three primary market risks prevalent in the System's investment portfolio are equity prices, interest rates, and foreign currencies. Equity risk is the risk that stock prices fall and/or the volatility in the equity market increases. Interest rate risk is the risk that fixed income securities (or any investment primarily valued on a yield basis) will drop in value due to an increase in interest rates. Currency risk is the risk that changes to foreign exchange rates will adversely impact the fair value of non-U.S. Dollar denominated assets. The System protects the portfolio against market risks by adopting a diversified asset allocation that limits the amount of exposure to each underlying market risk. Market risks are also controlled by monitoring the types, amounts, and degree of risk that each investment manager takes for their specific mandate.

Investment Credit Risk

Investment credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations. Unless authorized under a separate Investment Management Agreement or operating agreement, it is the policy of the System to limit fixed income managers to purchasing securities that possess a minimum credit rating of "Baa" by Moody's and "BBB" by Standard & Poor's. Issues subsequently downgraded below these ratings must be brought to the attention of the Chief Investment Officer. Where counterparty risk is present, the System's investment managers seek to control credit risk through counterparty credit evaluations and approvals, counterparty credit limits and exposure monitoring procedures.

Note 3 (b) – Cash Deposits

Cash balances include short-term securities held by the custodial bank to meet future obligations and operating balances held by the depository bank. As of June 30, 2018, MPERS had a carrying amount of deposits of ($137,891), and a bank balance of $137. The FDIC covered the bank balances. To maximize investment income, cash is invested in overnight repurchase agreements, thus causing the negative cash amount disclosed above. The balances in these repurchase agreements at June 30, 2018 totaled $677,387. As of June 30, 2018, no investments were held as repurchase agreements that were uninsured or unregistered, with securities held by the counterparty or by its trust department or agent but not in MPERS' name.

Note 3 (c) – Concentrations

No investments in any one organization (other than those issued or sponsored by the U.S. government and those in pooled investments) represent 5% of plan net position.

Note 3 (d) – Rate of Return

For the year ended June 30, 2018, the annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was 9.45%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

Note 3 (e) – Investments

The following table shows MPERS' investments by type.

Summary of Investments by Type as of June 30, 2018

	Carrying Amount	Fair Value
Equities	$341,507,917	$470,017,822
Fixed Income	670,903,954	656,008,238
Limited partnerships	911,393,303	981,543,412
Hedge	102,421,176	147,595,231
Short Term Securities	52,431,117	52,455,334
Securities Lending Collateral	133,616,408	133,616,408
Total Investments	**$2,212,273,875**	$2,441,236,445
Reconciliation to Statement of Fiduciary Net Position:		
Less: Repurchase Agreements		(677,387)
Less: Securities Lending Collateral		(133,616,408)
Investments per Statement of Fiduciary Net Position		**$2,306,942,650**

Certain investments are not listed on national exchanges, over-the-counter markets, nor do they have quoted market prices. Their valuation is based on the most current net asset values, independent appraisals, and/or good faith estimates of the investment's fair value provided by the general partner or portfolio manager, cash flow adjusted through fiscal year end. The estimated fair value of these investments may differ significantly from values that would have been used had a ready market existed. The following investments were priced using those methods and comprised 49% of the total fair value of the System's investments as of June 30, 2018:

Hedge Funds	$147,595,231
Limited Partnerships	981,543,412
	$1,129,138,643

Note 3 (f) – Fair Value Measurements

MPERS categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The hierarchy is based on the valuation inputs used to measure the fair value of the asset and give the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (level 1 measurements) and the lowest priority to unobservable inputs (level 3 measurements).

Level 1: Unadjusted quoted prices for identical instruments in active markets.

Level 2: Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations in which all significant inputs are observable.

Level 3: Values derived from valuation techniques in which significant inputs are unobservable.

Investments that are measured at fair value using the net asset value per share (or its equivalent) as a practical expedient are not classified in the fair value hierarchy.

Investments Measured at Fair Value as of June 30, 2018

Investments by Fair Value Level	**Fair Value**	**Level 1**	**Level 2**	**Level 3**
Short Term Securities	$51,348,199	$51,348,199	$0	$0
Debt Securities				
Collateralized Debt Obligations	198,036,405	0	72,058,584	125,977,821
Commercial Mortgage-Backed Securities	38,856,126	0	38,856,126	0
Corporate Bonds	1,202,264	0	1,202,264	0
Government Commercial Mortgage-Backed Securities	13,442,192	0	1,488,279	11,953,913
Government Mortgage-Backed Securities	44,301,223	0	37,620,579	6,680,644
Municipal Bonds	186,266,807	0	177,952,607	8,314,200
U.S. Government Agencies	122,291,780	0	122,291,780	0
U.S. Treasury Securities	55,738,067	0	55,738,067	0
Total Debt Securities	660,134,863	0	507,208,286	152,926,577
Equity Securities				
Consumer Discretionary	5,506,050	5,506,050	0	0
Conumer Staples	1,281,098	1,281,098	0	0
Energy	68,163,792	68,163,792	0	0
Equity Other	50,910,935	50,910,935	0	0
Financials	44,759,252	44,088,248	671,004	0
Health Care	1,044,692	1,044,692	0	0
Industrials	7,082,695	7,082,695	0	0
Information Technology	3,947,220	3,947,220	0	0
Materials	648,716	648,716	0	0
Real Estate	13,636,777	13,636,777	0	0
Telecommunication Services	589,709	589,709	0	0
Utilities	426,055	426,055	0	0
Total Equity Securities	197,996,991	197,325,987	671,004	0
Private Markets				
Private Equity	369,745,317	0	0	369,745,317
Real Estate	97,659,278	0	0	97,659,278
Real Assets	256,324,056	0	0	256,324,056
Opportunistic Debt	188,086,676	0	0	188,086,676
Total Private Markets	911,815,327	0	0	911,815,327
Investment Derivative Instruments				
Equity Swaps	(2,387,100)	0	(2,387,100)	0
FX Forwards (assets)	751,213	0	751,213	0
FX Forwards (liabilities)	(78)	0	(78)	0
Total Investment Derivative Instruments	(1,635,965)	0	(1,635,965)	0
Total Investments by Fair Value Level	1,819,659,415	**$248,674,186**	**$506,243,325**	**$1,064,741,904**
Investments Measured at Net Asset Value				
Equity Long/Short	14,518,959			
Multi-Strategy	21,848,037			
In Liquidation	619,179			
Commodity Trading Advisors	8,833,223			
Activist Equity	29,983,817			
Event	13,617,625			
Fundamental Equity Market Nuetral	15,590,670			
Global Asset Allocation	30,780,122			
Structured Credit-Relative Value	11,803,599			
Commingled International Equity Funds	345,718,594			
Total Investments Measured at Net Asset Value	493,313,825			
Total Investments	**$2,312,973,240**			
Reconciliation to Statement of Fiduciary Net Position				
Total Investments Measured at Fair Value and Derivatives	$2,312,973,240			
Investment Sales Receivable	(6,843,573)			
Investment Purchases Payable	7,057,400			
Accrued Interest and Income	(6,383,098)			
Accrued Expenses	138,681			
Total Investments per Statement of Fiduciary Net Position	**$2,306,942,650**			

Investments listed as level 1 include equity securities and futures contracts where the price comes from an exchange.

Investments listed as level 2 include debt securities where an independent pricing evaluator had direct observable information including: trading volume, multiple sources of market data and benchmark spreads. FX forwards are included due to the valuation coming from observable forward rates on the underlying currencies. The equity index swap is included because the valuation inputs include an observable interest rate and the underlying index.

Investments listed as level 3 include debt securities where an independent pricing evaluator did not have direct observable information and had limited market information for comparable securities. Significant inputs used in the valuation are not available aside from the evaluator providing the price. Direct investments in private equity, real estate, credit, and real assets are included because the valuation techniques utilize discounted cash flows or other non-observable market information by manager.

Investments Measured at Net Asset Value as of June 30, 2018

Investments by Fair Value Level	Fair Value	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period
Hedge Funds				
Equity Long/Short	$14,518,959	$0	Quarterly	45 Days
Multi-Strategy	21,848,037	0	Quarterly	60-90 Days
In Liquidation	619,179	0	n/a	n/a
Commodity Trading Advisors	8,833,223	0	Monthly	30 Days
Activist Equity	29,983,817	0	Yearly, Every 3 Years	90 Days
Event	13,617,625	0	Monthly	90 Days
Fundamental Equity Market Neutral	15,590,670	0	Monthly	90 Days
Global Asset Allocation	30,780,122	0	Monthly	5-60 Days
Structured Credit - Relative Value	11,803,599	0	Quarterly	60 Days
Total Hedge Funds	147,595,231	0		
Commingled International Equity Funds	240,669,843	0	Daily, Monthly	0-30 Days
Commingled International Equity Funds	105,048,751	0	Daily	90 Days
Total Commingled International Equity Funds	345,718,594	0		
Total Investments at Net Asset Value	**$493,313,825**	**$0**		
Private Markets				
Private Equity	$369,745,317	$111,409,163		
Real Estate	97,659,278	109,971,670		
Real Assets	256,324,056	95,104,227		
Opportunistic Debt	188,086,676	89,752,990		
Total Private Markets	$911,815,327	$406,238,050		

Hedge Funds

Equity Long/Short: Consisting of one fund, this strategy invests in both long and short in Asia Pacific equity securities, with a goal of adding growth and minimizing market exposure. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next six months.

Multi-Strategy: The two funds that make up this group aim to pursue varying strategies in order to diversify risks and reduce volatility. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next six months.

Hedge Funds in Liquidation: MPERS currently has a small investment in two hedge funds that are in liquidation. These funds have closed and MPERS is awaiting the sale of final assets.

Commodity Trading Advisors: MPERS currently has one fund focusing on a systematic strategy that follows medium-term trends. The value of this investment is eligible for redemption in the next two months.

Activist Equity: Consisting of two funds, this strategy focuses on obtaining publicly traded shares of companies and effecting changes within the companies that it owns whether that be value creation through operational, financial or corporate governance changes. One fund's focus is on North American companies and the other fund's focus is on European and Nordic companies. Due to contractual lock-up restrictions and the necessity for activist managers to retain capital in order to realize the desired company changes, 50% of this strategy's investments are eligible for redemption on a rolling three-year basis. The remaining 50% are eligible for redemption on a rolling one-year basis.

Event Driven: Consisting of one fund, this strategy seeks to gain an advantage from pricing inefficiencies that may occur at the onset or aftermath of a merger, corporate action or related event. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next four months.

Fundamental Equity Market Neutral: Consisting of one fund, this strategy invests in both long/short equities capturing price differences and seeks to maintain a neutral exposure to the market by having no sector, industry, market capitalization, or country biases. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next four months.

Global Asset Allocation: Consisting of one fund, this strategy is highly diversified and uses fundamental research to develop systematic rules for trading positions. Due to contractual lock-up restrictions, the value of these investments is eligible for redemption in the next 35 days.

Structural Credit Relative Value: Consisting of one fund, this strategy's main focus is to benefit from valuation discrepancies that may be present in related financial instruments by simultaneously purchasing or selling these instruments. Due to contractual lock-up restrictions, all funds are eligible for redemption within the next six months.

Commingled International Equity Funds

MPERS invests in three international equity funds that are considered to be commingled in nature. Due to contractual lock-up restrictions, 70% of this capital is eligible for redemption in one month; the remaining 30% has daily liquidity.

Private Markets

Private equity, real estate, real assets and opportunistic debt are the four asset classes that fall into the category of private market funds. These funds invest in the equity or debt of private companies.

Private Equity: The private equity portfolio includes 19 direct fund investments and two fund of fund investments. These funds invest in private companies adding value through operational or industry expertise and vast networks. The majority of the private equity allocation is in buyout funds with a smaller portion in venture capital funds. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of six to ten years.

Real Estate: The real estate portfolio consists of 20 real estate funds. The noncore real estate book includes 17 real estate funds and invests in value-add or opportunistic strategies. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of six to ten years. The remaining three investments are in core real estate funds. These funds are open-ended and are eligible for redemption on a daily basis.

Real Assets: The real asset portfolio contains 22 funds that invest in private energy, aviation, mining and shipping companies. The timber portfolio, which includes both ownership in timber funds and direct timber investments, is also within the real assets portfolio. The timber portfolio has 10 direct timber investments. These funds and investments are not eligible for redemption. Distributions are received as underlying investments and investments within the funds are liquidated, which on average can occur over the span of six to ten years.

Opportunistic Debt: The opportunistic debt portfolio, comprised of 24 funds, provide financing to private companies. While this portfolio has a U.S. bias, some funds invest internationally with exposures in Europe and Asia. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which on average can occur over the span of three to five years.

Note 3 (g) – Investment Interest Rate Risk

The following table summarizes the maturities of government obligations, corporate bonds, convertible corporate bonds, mortgages, and asset-backed securities which are exposed to interest rate risk.

Summary of Weighted Average Maturities as of June 30, 2018

	Fair	**Investment Maturities (in years)**			
Investment Type	**Value**	**less than 1**	**1 - 5**	**6 - 10**	**more than 10**
Asset-Backed Securities	$207,670,958	$0	$12,500,856	$42,122,916	$153,047,186
Commercial Mortgage-Backed Securities	25,455,642	0	495,297	0	24,960,345
Corporate Bonds	8,720,277	0	45,892	0	8,674,385
Government Agencies	110,130,922	0	2,315,921	14,777,634	93,037,367
Government Bonds	46,971,373	0	0	0	46,971,373
Government Mortgage-Backed Securities	28,162,644	0	921,757	454,140	26,786,747
Government-issued Commercial Mortgage-Backed	3,737,155	0	577,263	0	3,159,892
Index Linked Govt Bonds	34,913,353	0	16,244,783	7,841,663	10,826,907
Municipal/Provincial Bonds	174,926,678	0	2,908,857	30,393,019	141,624,802
Non-Govt Backed C.M.O.s	14,341,734	0	0	0	14,341,734
Fixed Income Bank Loans	977,500	0	0	977,500	0
Short Term Bills and Notes	7,452,728	7,452,728	0	0	0
Total	**$663,460,964**	$7,452,728	$36,010,626	$96,566,872	$523,430,738

Note 3 (h) – Investment Credit Ratings

The following table summarizes the credit ratings of the government obligations, corporate bonds, mortgages, and asset-backed securities.

Summary of Credit Ratings as of June 30, 2018

Investment Type	**AAA**	**AA**	**A**	**BBB**	**BB**	**B**	**CCC**	**CC**	**D**	**Not Rated**	**US Govt Guar**	**Total**
Asset Backed Securities	$34,898,635	$49,672,687	$15,052,100		$5,977,747					$102,069,789		$207,670,958
Commercial Mortgage-Backed	8,566,525									16,431,428	457,689	25,455,642
Corporate Bonds		1,119,580		188,811						7,368,316		8,676,707
Corporate Convertible Bonds										43,570		43,570
Government Agencies		99,683,171									10,447,751	110,130,922
Government Bonds											46,971,373	46,971,373
Government Mortgage Backed Securities										738,120	27,424,524	28,162,644
Gov't-issued Commercial Mortgage-Backed											3,737,155	3,737,155
Index Linked Government Bonds											34,913,353	34,913,353
Municipal/Provincial Bonds	61,896,861	91,108,098	2,044,314							19,877,405		174,926,678
Non-Government Backed C.M.O.s		138,966	444,198	210,408	105,915	366,732	625,770	305,852	899,085	11,244,808		14,341,734
Fixed Income Bank Loans										977,500		977,500
Short Term Bills and Notes											7,452,728	7,452,728
Total	$105,362,021	$241,722,502	$17,540,612	$399,219	$6,083,662	$366,732	$625,770	$305,852	$899,085	$158,750,936	$131,404,573	$663,460,964

Note 3 (i) – Investment Foreign Currency Risk

Currency risk is the risk that changes to foreign exchange rates will adversely impact the fair value of non-U.S. Dollar denominated assets. The following table summarizes MPERS' exposure to foreign currencies for all assets that are held in custody at the System's custodial bank. MPERS' has exposure to foreign currencies in other areas of the portfolio, such as commingled international funds, hedge funds and private partnerships, which are held in the custody of other banks acting as administrators for the funds.

Exposure to Foreign Currency Risk as of June 30, 2018

Foreign Currency	Equities	Real Estate/ Partnerships	Total
Australian Dollar	$820,941	$0	$820,941
British Pound Sterling	958,437	10,400,386	11,358,823
Canadian Dollar	262,519	0	262,519
Euro	1,337,479	21,539,154	22,876,633
Hong Kong Dollar	867,351	0	867,351
Japanese Yen	1,632,030	0	1,632,030
Norwegian Krone	85,436	0	85,436
Singapore Dollar	444,696	0	444,696
Swedish Krona	519,464	0	519,464
Total Exposure Risk	**$6,928,353**	**$31,939,540**	**$38,867,893**

Note 3 (j) – Securities Lending

In accordance with the Board of Trustees' investment policy, MPERS participates in a securities lending program. The Northern Trust Company administers the program. There are no restrictions on the amount of securities that may be lent.

Securities that may be loaned include U.S. government and agency securities, corporate equity, and fixed income securities. Collateral may include cash, U.S. government securities and irrevocable letters of credit. U.S. securities are loaned in exchange for collateral valued at 102% of the fair value of the securities, plus any accrued interest. Non-U.S. securities are loaned in exchange for collateral valued at 105% of the fair value of the securities, plus any accrued interest. On June 30, 2018, MPERS had no credit risk exposure to borrowers, since the amount of collateral exceeded the amount of the loans.

Non-cash collateral cannot be pledged or sold unless the borrower defaults. The average term of the System's loans was approximately 118 days as of June 30, 2018. Cash open collateral is invested in a short-term investment pool, which had an interest sensitivity of 29 days as of June 30, 2018. Cash collateral may also be invested separately in "term loans", in which case the investments match the loan term. These loans can be terminated on demand by either lender or borrower. There were no known violations of legal or contractual provisions, or borrower or lending agent default losses. There were no dividends or coupon payments owing on the securities lent. Securities lending earnings are credited on approximately the fifteenth day of the following month.

Indemnification deals with a situation in which a client's securities would not be returned due to the insolvency of a borrower and Northern Trust would fail to live up to its contractual responsibilities relating to the lending of those securities. Northern Trust's responsibilities include performing appropriate borrower and collateral investment credit analyses and demanding adequate types and levels of collateral.

The collateral held (including both cash collateral recognized in the Statement of Fiduciary Net Position and non-cash collateral) is:

Collateral Held as of June 30, 2018

Investment Type	
Equities	$76,637,366
Government & government sponsored securities	62,203,491
Total	**$138,840,857**

Note 3 (k) – Derivatives

A derivative financial instrument is an investment whose value depends on the values of one or more underlying assets, financial indexes, or commodity prices. These investments include futures contracts, options contracts, and forward foreign currency exchange. Derivative financial instruments involve credit risk and market risk, as described in Note 3 (a), in varying levels.

Through MPERS' external managers, MPERS holds investments in futures contracts, swap contracts, options contracts, and forward foreign currency exchange contracts. MPERS enters futures and swaps contracts to gain exposure to certain markets and enters into forward foreign exchange contracts primarily to hedge foreign currency exposure.

The notional value related to these derivative instruments is generally not recorded on the financial statements; however, the change in fair value of these instruments is incorporated in performance. The notional/fair value of $263,770,311 for the various contracts in MPERS' portfolio as of June 30, 2018, is recorded in investments on the Statement of Fiduciary Net Position. The change in fair value of ($973,308) for the year ended June 30, 2018, is recorded in investment income on the Statement of Changes in Fiduciary Net Position.

Investment Derivatives as of June 30, 2018

Type	**Classification**	**Notional/ Fair Value**	**Unrealized Gain (Loss)**
Futures Contracts	Investments, at fair value	$193,829,266	($415,381)
Swap Contracts	Investments, at fair value	89,654,390	(142,547)
Foreign Currency Forward Contracts	Investments, at fair value	(19,713,345)	(415,380)
Total		**$263,770,311**	**($973,308)**

Through the use of derivatives, MPERS is exposed to risk that the counterparties involved in the contracts are unable to meet the terms of their obligation. MPERS' investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, and exposure monitoring procedures. MPERS anticipates the counterparties will be able to satisfy their obligations under the contracts. The associated counterparty's credit rating is an A-.

NOTE 4 – RECEIVABLES

Receivables as of June 30, 2018

Type	
Contributions-MoDOT	$5,355,406
Contributions-MSHP Non-Uniformed	1,166,334
Contributions-MSHP Uniformed	1,967,305
Contributions-Retirement System	197,581
Investment Interest & Income	6,383,098
Investment Sales	6,843,573
Total	**$21,913,297**

NOTE 5 – CONTRIBUTIONS

MoDOT, MSHP, and MPERS make contributions to the System, as do employees covered under the Year 2000 Plan-2011 Tier. MPERS permanent funding policy provides for actuarially determined employer contributions using the entry-age normal cost method on a closed group basis (consisting of normal cost and amortization of any unfunded accrued liabilities over a 30-year period, beginning July 1, 2006). (The objective is to reduce the period by one year each year.) A temporary accelerated policy has been adopted where the total contribution is based on entry-age normal cost plus a 15-year amortization period for unfunded retiree liabilities and a 30-year amortization period for other unfunded liabilities. Both amortization periods are closed periods starting July 1, 2010. This temporary accelerated policy was adopted by the MPERS' Board of Trustees on September 17, 2009, and will remain in effect until such time as the retiree liability becomes 100% funded or the permanent policy produces a higher contribution rate. Actuarially determined rates, expressed as percentages of annual covered payroll, provide for amounts sufficient to fund those benefits designated by state statute to be funded in advance. Actuarial assumptions used to compute contribution requirements are the same as those used to compute the pension benefit obligation. The employee contribution rate for members of the Year 2000 Plan-2011 Tier is set by statute.

Required employer contributions totaling $204,955,180 for fiscal year 2018, represent funding of normal costs and amortization of the unfunded accrued liability. Actual contributions made were 100% of required contributions. Contribution rates as determined by the System's actuary for the year ended June 30, 2018, are shown in the following table. The Board established actual rates to be the same as the actuarially determined rates.

Contribution Rates

MoDOT, MPERS & Civilian Patrol	Uniformed Patrol	2011 Tier Employee
58.00%	58.00%	4.00%

At the September 26, 2014 Board meeting, the Board adopted the use of a contribution rate stabilization reserve that would result in an MPERS employer contribution rate similar to the fiscal year

2015 rates. The reserve is intended to keep the contribution relatively level over time and may be used if the investment market experiences a downturn in the future. The Board further adopted (in February 2015) that the employer contribution rate would not fall below 58% unless 1) the fund became fully funded or 2) the contribution stabilization reserve reached $250 million. The balance of the reserve as of June 30, 2018, was $157,556,374.

NOTE 6 – DEFERRED RETIREMENT OPTION PROGRAM

MPERS currently provides a BackDROP option. This is an election made at the time of actual retirement. In effect, it provides members an option to elect to receive a portion of their benefits as cash. Since the election is not made until the member actually retires, the option is not treated as a DROP provision in accordance with generally accepted accounting principles.

NOTE 7– NET PENSION LIABILITY OF EMPLOYERS

The components of the net pension liability of the employers at June 30, 2018, were as follows:

Total pension liability	$3,981,838,941
Plan fiduciary net position	(2,314,530,148)
Employers' net pension liability	$1,667,308,793

Plan fiduciary net position as a percentage of the total pension liability	58.13%
Covered Payroll	$353,751,292
Employers' net pension liability as a percentage of covered payroll	471.32%

Actuarial Assumptions

The total pension liability amounts were determined by actuarial valuations as of June 30, 2018, using the following actuarial assumptions, applied to all prior periods included in the measurement:

Inflation	3.0%
Salary Increases	3.0% to 12.45%
Investment Rate of Return	7.00%

The Board formally adopted these new assumptions based on the July 1, 2012 through June 30, 2017 experience study, effective for the June 30, 2018 valuation. The significant change to note is a decrease in the investment rate of return from 7.75% to 7.00%. Salary increases expanded by just under 2% going from a range of 3.5% – 11% to 3% – 12.45% and inflation remained the same.

The mortality tables, for post-retirement mortality, used in evaluating allowances to be paid to non-disabled pensioners were the RP-2014 Healthy Mortality Tables projected to 2022 using projection scale MP-2017. Pre-retirement mortality used were the RP-2014 Employee Mortality Table projected to 2022 using projection scale MP-2017 and multiplied by a factor of 65%. Disabled pension mortality was based on RP-2014 Disabled Retiree Annuitant Mortality Tables projected to 2022 using projection scale MP-2017.

The long-term (30 year) expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return were adopted by the plan's trustees after considering input from the plan's investment consultants and actuary. These estimates for each major asset class included in MPERS' target asset allocation as of June 30, 2018, (see Note 3) are summarized in the following table:

Asset Class	Long-Term Expected Real Rate of Return
Global Equity	4.75%
Private Equity	6.50%
Fixed Income	0.25%
Opportunistic Debt	4.00%
Real Assets	4.75%
Real Estate	2.75%
Hedge Funds	2.75%

Discount Rate

A single discount rate of 7.00% was used to measure the total pension liability. This single discount rate was based on the expected rate of return on pension plan investments of 7.00%. The projection of cash flows used to determine this single discount rate assumed that plan member contributions will be made at the current contribution rate and that employer contributions will be made at rates equal to the difference between actuarially determined contribution rates and the member rate. The employers pay the same contribution rate for each employee regardless of the plan the employee was hired under. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

Regarding the sensitivity of the net pension liability to changes in the single discount rate, the following presents the plan's June 30, 2018 net pension liability, calculated using a single discount rate of 7.00%, as well as what the plan's net pension liability would be if it were calculated using a single discount rate that is 1-percentage-point lower or 1-percentage-point higher:

Current Single Discount	1% Decrease 6.00%	Rate Assumption 7.00%	1% Increase 8.00%
Net Pension Liability	$2,140,629,340	$1,667,308,793	$1,272,455,084

NOTE 8 – EMPLOYER PROPORTIONATE SHARE

MPERS, as the administrative agent for the pension system, is also an employer of the pension system. The administrative expenses of the pension system are included in the deductions to the pension system's fiduciary net position. While the employer contributions of the other participating employers are funded from outside revenue sources, the employer contributions of MPERS are funded from sources already recognized as revenues, such as earnings on plan investments or contributions paid by the other participating employers. Attempting to allocate a portion of the net pension liability to MPERS as an employer would result in an allocation of the net pension liability to the other participating employers. Accordingly, MPERS excludes its contributions from the employer proportionate share calculation for the reporting of a net pension liability, by assigning itself a proportionate share of 0%. This exclusion, in essence, shifts the portion of the net pension liability that would accrue to MPERS to the other participating employers.

NOTE 9 – PERSONAL SERVICES AND RETIREMENT PLAN

MPERS employed 16 full-time employees and 1 part-time employee on June 30, 2018. Seven former MPERS employees have retired. Full-time employees are members of the System (see Note 8). For these employees, MPERS accrued 58.00% of payroll during fiscal year 2018, amounting to $1,127,506. The amounts for fiscal year 2018 and the three preceding years are shown below. These amounts are recorded as both a contribution and administrative expense. Information regarding the retirement plans can be found in Notes 2 and 5.

Net Obligations

Year Ended June 30	Annual Contribution Accrual	
	Percent	Dollars
2015	58.76	907,064
2016	58.05	996,378
2017	58.00	1,087,268
2018	58.00	1,127,506

NOTE 10 – OTHER POST-EMPLOYMENT BENEFITS (OPEB)

In addition to the retirement benefits described previously, MPERS provides a portion of health care insurance through the MoDOT and MSHP Medical and Life Insurance Plan (Insurance Plan) in accordance with Missouri State statutes. The Insurance Plan is considered an agent multiple-employer defined benefit plan and is administered by MoDOT. The Insurance Plan is financed on a pay-as-you-go basis and is an internal service fund of MoDOT. At June 30, 2018, there were 8 inactive (retired) members and 16 active employees participating in the Insurance Plan.

Medical insurance benefits are established by the Insurance Plan's Board of Trustees and are approved by the Missouri Highways and Transportation Commission. Benefits include general inpatient and outpatient medical services; mental, nervous and substance abuse care; and prescriptions. Eligible members are employees who retired from the System with a minimum of 5 years of service and who participate in the Insurance Plan. MoDOT issues a publicly available financial report that includes financial statements and required supplementary information for the Insurance Plan. Requests for this report should be addressed to MoDOT, Financial Services Division, P.O. Box 270, Jefferson City, MO 65102.

Employer and member contributions are established by the Insurance Plan's Board of Trustees and are approved by the Missouri Highways and Transportation Commission. Premiums vary by coverage categories, which include retirees, certain disabled employees, spouses, certain dependents, and survivors of deceased employees and retirees.

Changes in Total OPEB Liability

MPERS' proportionate share (0.14%) of the Insurance Plan's net OPEB liability is $1,545,180 which was measured as of July 1, 2017 and the total OPEB liability used to calculate the net OPEB liability was determined by an actuarial valuation as of that date.

Summary of Changes in Net OPEB Liability for the Year Ended June 30, 2018

	Total
Beginning Balance	$1,689,435
Changes for the year:	
Service Cost	81,000
Interest Cost	49,929
Changes of benefit terms	---
Differences between expected and actual experience	---
Changes in assumptions	(238,129)
Benefit payments	(37,055)
Net changes	(144,255)
Balance at June 30, 2018	$1,545,180

Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB

For the year ended June 30, 2018, MPERS recognized net OPEB expense of $92,019. MPERS reported deferred outflows of resources and deferred inflows of resources related to OPEB from the following sources:

Deferred Outflows/Inflows

	Deferred Outflows	Deferred Inflows
Changes of assumptions or other inputs	$0	($199,219)
Contributions subsequent to measurement date	34,090	0
Total	$34,090	($199,219)

Deferred outflows resulting from contributions subsequent to the measurement date will be recognized as a change to the net pension liability in each subsequent year. Other deferred amounts related to OPEB will be recognized in expenses as follows:

Amortization of Deferred Inflows/Outflows

Fiscal year	Deferred Outflows	Deferred Inflows
2019	$0	($38,910)
2020	0	(38,910)
2021	0	(38,910)
2022	0	(38,910)
2023	0	(38,910)
Total Thereafter	0	(4,669)

Actuarial Assumptions

The following actuarial assumptions and other inputs, applied to all periods included in the measurement:

Actuarial Methods and Assumptions

Cost method	Entry Age Normal based upon salary
Inflation	2.00%
Salary increases	2.50%
Discount rate	3.58%
Investment rate of return	n/a; the plan is unfunded
Health care cost trend rates	8.4%, decreasing to 4.9% in 2025
Retirees' share of benefit-related costs	43% - 60%
Admin Expense Trend (Inflation) Rate	4%

- The inflation rate was based on the actuary's long-term estimate of inflation as of July 1, 2017.
- The salary increases were based on projected salaries, which include COLAs, provided by MoDOT.
- The discount rate was based on Bond Buyer General Obligation 20-Bond Municipal Bond Index.
- Mortality rates were based on the RP 2014 Employees and Health Annuitants Mortality table, headcount weighted, fully generational projected by Scale MP-2016.
- The actuarial assumptions used in the June 30, 2017 valuation were based on the results of an actuarial experience study for the period July 1, 2016-June 30, 2017.
- It is assumed the current employer and member contributions will continue as approved by the Commission.

Changes of assumptions and other inputs reflect a change in the discount rate from 2.85 percent in 2017 to 3.58 percent in 2018.

The following table illustrates the impact of interest rate sensitivity on the Net OPEB Liability as of June 30, 2018:

	1% Decrease	Current Discount Rate	1% Increase
Net OPEB Liability	$1,884,246	$1,545,180	$1,285,951

The following table illustrates the impact of healthcare cost trend sensitivity on the Net OPEB Liability as of June 30, 2018:

	1% Decrease	Current Discount Rate	1% Increase
Net OPEB Liability	$1,252,599	$1,545,180	$1,938,914

NOTE 11 – CAPITAL ASSETS

Summary of Changes in Capital Assets

	6/30/2017 Balance	Additions	Deletions/ Retirements	6/30/2018 Balance
Land	$84,000	$0	$0	$84,000
Building	581,619	0	0	581,619
Furniture, Equipment and Software	3,514,780	0	(10,562)	3,504,218
Less: Accumulated Depreciation	(2,976,082)	(345,771)	10,562	(3,311,291)
Total	**$1,204,317**	**($345,771)**	**$0**	**$858,546**

NOTE 12 – RISK MANAGEMENT

MPERS is exposed to various risks of loss related to natural disasters, asset theft or damage, errors and omissions, torts, and employee injuries. MPERS has purchased commercial insurance related to capital asset loss and damage. Ancillary coverage provided through the property policy includes coverage for accounts receivable, loss of money and securities, employee dishonesty, and forgery and alterations. MPERS carries a $2 million umbrella liability policy. MPERS has coverage through Missouri Highway and Transportation Commission's Self-Insurance Fund related to workers' compensation. MPERS' has also purchased a directors and officers liability policy with $1 million aggregate coverage. This coverage is inclusive of legal defense costs and carries a $35,000 deductible. The State's Legal Expense Fund covers all state employees and officers, and MPERS has purchased surety bonds for the executive director and staff. Settlements have not exceeded coverages for each of the past three fiscal years.

MPERS has a disaster recovery plan that provides for continued computer operations at a remote location should the retirement office be unavailable for normal operations.

REQUIRED SUPPLEMENTARY INFORMATION

Schedule of Changes in the Employers' Net Position Liability
Year Ended June 30,

	2018	2017	2016	2015	2014	2013
Total Pension Liability						
Service Cost	$ 46,621,377	$ 45,713,403	$ 45,441,305	$ 45,358,095	$ 44,739,603	$ 44,446,279
Interest on the Total Pension Liability	286,457,436	283,568,441	280,432,068	275,284,910	270,525,608	265,339,848
Benefit Changes	(7,684)	0	0	0	0	0
Difference Between Expected and Actual Experience	(37,173,164)	(37,286,966)	(39,810,009)	(13,324,219)	(17,614,321)	(13,690,794)
Assumption Change	142,556,109	0	0	0	0	204,396,180
Benefit Payments	(254,131,209)	(246,617,775)	(236,488,629)	(236,905,323)	(227,958,108)	(220,623,394)
Refunds	(503,007)	(321,328)	(198,106)	(107,395)	(18,686)	(29,300)
Disability Premiums	(1,601,605)	(1,620,418)	(1,567,825)	(1,554,676)	(1,531,578)	(1,512,685)
Transfers to Other Retirement Systems	(2,823,042)	(2,724,631)	(1,921,451)	(3,147,482)	(1,876,336)	(629,246)
Net Change in Total Pension Liability	**179,395,211**	**40,710,726**	**45,887,353**	**65,603,910**	**66,266,182**	**277,696,888**
Total Pension Liability - Beginning	3,802,443,730	3,761,733,004	3,715,845,651	3,650,241,741	3,583,975,559	3,306,278,671
Total Pension Liability - Ending (a)	**$ 3,981,838,941**	**$ 3,802,443,730**	**$ 3,761,733,004**	**$ 3,715,845,651**	**$ 3,650,241,741**	**$ 3,583,975,559**
Plan Fiduciary Net Position						
Contributions - Employer	$ 204,955,180	$ 206,562,924	$ 199,609,396	$ 200,638,571	$ 183,353,841	$ 170,836,117
Contributions - Employee	5,001,418	4,891,932	3,482,513	3,294,162	2,260,563	1,139,450
Pension Plan Net Investment Income	197,619,838	220,301,741	21,432,095	92,645,571	319,445,780	198,141,088
Benefit Payments	(254,131,209)	(246,617,775)	(236,488,629)	(236,905,323)	(227,958,108)	(220,619,035)
Refunds	(503,007)	(321,328)	(198,106)	(107,395)	(18,686)	(29,300)
Disabilty Premiums	(1,601,605)	(1,620,418)	(1,567,825)	(1,554,676)	(1,531,578)	(1,512,685)
Pension Plan Administrative Expense	(4,693,492)	(4,515,458)	(4,370,860)	(4,066,944)	(3,736,355)	(2,997,225)
Net Transfers	(955,597)	(980,524)	808,228	(2,033,045)	(91,954)	(629,246)
Net Change in Plan Fiduciary Net Position	**145,691,526**	**177,701,094**	**(17,293,188)**	**51,910,921**	**271,723,503**	**144,329,164**
Plan Fiduciary Net Position - Beginning	**2,168,838,622**	**1,992,073,946**	**2,009,367,134**	**1,957,456,213**	**1,685,732,710**	**1,541,403,546**
Plan Fiduciary Net Position - Ending (b)	**$ 2,314,530,148**	**$ 2,169,775,040**	**$ 1,992,073,946**	**$ 2,009,367,134**	**$ 1,957,456,213**	**$ 1,685,732,710**
Adjustment - GASB 75 Implementation		**(936,418)**				
Plan Fiduciary Net Position - Ending as Restated		**$ 2,168,838,622**				
Employers' Net Pension Liability - Ending (a) - (b)	**$ 1,667,308,793**	**$ 1,632,668,690**	**$ 1,769,659,058**	**$ 1,706,478,517**	**$ 1,692,785,528**	**$ 1,898,242,849**
Plan Fiduciary Net Position as a % of Total Pension Liability	58.13%	57.06%	52.96%	54.08%	53.63%	47.04%
Covered Payroll	$353,751,292	$356,515,416	$344,635,441	$342,264,593	$336,590,797	$323,205,767
Employers' Net Pension Liability as a % of Covered Payroll	471.32%	457.95%	513.49%	498.58%	502.92%	587.32%

Note: These schedules are intended to present information for 10 years, but may be built prospectively. Additional years will be displayed as they become available.

Schedule of Employers' Contributions
Last 10 Fiscal Years

	Actuarially Determined Contribution	Actual Contributions	Contribution Deficiency (Excess)	Covered Payroll*	Contributions as a Percentage of Covered Payroll
2009	$ 122,613,975	$ 122,613,975	$ 0	$ 379,140,306	32.34%
2010	124,052,534	124,052,534	0	376,258,823	32.97
2011	149,952,750	149,952,750	0	363,345,651	41.27
2012	164,884,467	164,884,467	0	344,514,139	47.86
2013	170,836,117	170,836,117	0	329,863,134	51.79
2014	183,353,841	183,353,841	0	336,799,855	54.44
2015	200,638,571	200,638,571	0	342,211,446	58.63
2016	199,609,396	199,609,396	0	344,154,131	58.00
2017	206,562,924	206,562,924	0	356,142,972	58.00
2018	204,955,180	204,955,180	0	353,371,000	58.00

*Values are estimated from contribution rate and actual contribution amount.

REQUIRED SUPPLEMENTARY INFORMATION

Schedule of Investment Returns
Last 10 Fiscal Years

Fiscal Year Ended June 30	Annual Money-Weighted Rate of Return
2009	-24.88%
2010	12.72%
2011	21.57%
2012	2.80%
2013	13.37%
2014	17.58%
2015	6.62%
2016	1.02%
2017	11.22%
2018	9.20%

Notes to Required Supplementary Information

The information presented in the required supplementary schedules was determined as part of the actuarial valuation at the dates indicated. Additional information as of the latest actuarial valuation follows:

Valuation Date .... June 30, 2018
Actuarial Cost Method .... Entry Age
Amortized Method .... Level Percentage of Payroll, Closed
Remaining Amortization Period .... 14 Years (single equivalent period)
Asset Valuation Method .... 3-Year Smoothed Market: 20% Corridor
Inflation .... 2.25% (price inflation)
Actuarial Assumptions:
    Investment Rate of Return 7.0%
    Projected Salary Increase .... 3.0% to 12.45% (including 3.0% wage inflation)
    Cost-of-Living Adjustments .... 1.8% Compound

REQUIRED SUPPLEMENTARY INFORMATION

Other Post-Employment Benefit Plan (OPEB)
Schedule of Changes in Net OPEB Liability and Related Ratios
for MoDOT and MSHP Medical and Life Insurance Plan

	2018
Total OPEB Liability	
Service Cost	$ 81,000
Interest Cost	49,929
Changes of benefit terms	0
Differences between expected and actual experience	0
Changes in assumptions	(238,129)
Benefit payments	(37,055)
Net Change in total OPEB Liability	(144,255)
Total OPEB Liability (Beginning)	1,689,435
Total OPEB Liability (Ending)	1,545,180
Plan Fiduciary Net Position	
Contributions	37,055
Benefit Payments	(37,055)
Net Change in Plan Fiduciary Net Position	0
Plan Fiduciary Net Position (Beginning)	0
Plan Fiduciary Net Position (Ending)	0
Net OPEB Liability (Ending)	$ 1,545,180
Net Position as a Percentage of OPEB Liability	N/A
Covered-Employee Payroll	$ 790,000
Net OPEB Liability as a Percentage of Payroll	195.59%

Other Post-Employment Benefit Plan (OPEB)
Schedule of MPERS' Proportionate Share of Net OPEB Liability
for MoDOT and MSHP Medical and Life Insurance Plan

Year Ended June 30	Proportion of Net OPEB Liability	Proportionate Share of Net OPEB Liability	Covered Employee Payroll	Net OPEB Liability as % of Covered Employee Payroll	Net Position as % of Total OPEB Liability
2018	0.14%	$1,545,180	$790,000	195.59%	N/A

Note: These schedules are intended to present information for 10 years, but may be built prospectively. Additional years will be displayed as they become available.

Supplementary Information

Schedule of Administrative Expenses

For The Year Ended June 30, 2018

Personnel Services:	
Salary Expense	$1,997,282
Employee Benefit Expense	1,522,818
Total Personnel Services	**3,520,100**
Professional Services:	
Actuarial Services	82,052
Audit Services	46,700
Legislative Consultant	30,000
Investment Special Consulting	15,000
Insurance Consultant	6,000
Other Consultant Fees	29,424
Fiduciary Insurance	19,507
IT Hosting and Support	279,900
Other	17,671
Total Professional Services	**526,254**
Miscellaneous:	
Depreciation	345,772
Meetings/Travel/Education	89,265
Equipment/Supplies	74,228
Printing/Postage	32,881
Bank Service Charge	9,093
Building Expenses	33,884
Other	62,015
Total Miscellaneous	**647,138**
Total Administrative Expenses	**$4,693,492**

Supplementary Information

Schedule of Investment Expenses

For the Year Ended June 30, 2018

Investment Income Expenses:	
Management and Performance Fees	
Management and Performance Fees by Asset Class	
Equities	$2,881,024
Fixed Income Core	116,880
Opportunistic Debt	5,574,299
Real Estate	4,039,716
Private Equity	4,777,339
Real Assets	4,761,485
Hedge Funds	6,856,482
Cash	206,176
Total Management and Performance Fees	**29,213,401**
Investment Custodial Fee	56,314
Performance Management	189,650
General Consultant (Monitoring) Fee	327,212
Professional Fees	533,074
Other Fees/Expenses	167,255
Total Investment Income Expenses	**$30,486,906**

Securities Lending Expenses:	
Borrower Rebates (Refunds)	$711,091
Bank Fees	82,336
Total Securities Lending Expenses	**$793,427**

Supplementary Information

Schedule of Consultant and Professional Expenses

For the Year Ended June 30, 2018

Professional/Consultant	Nature of Service	
Gabriel, Roeder, Smith & Co.	Actuarial	$82,052
LexisNexis Risk Data Management	Death Audit Services	816
MO Dept. of Health & Senior Services	Death Audit Services	630
MO Division of Employment Security	Death Audit Services	320
Pension Benefit Information	Death Audit Services	3,869
The Berwyn Group	Death Audit Services	1,751
Alliant Insurance Services, Inc.	Director's & Officer's Insurance	2,272
Naught-Naught	Director's & Officer's Insurance	16,117
Alliant Insurance Services, Inc.	Employee Crime Bond	1,118
Williams-Keepers, LLC	Financial Audit Services	46,700
Huber & Associates	Information Technology	45,980
Levi, Ray & Shoup, Inc.	Information Technology	203,840
Sikich, LLP	Information Technology	29,456
World Wide Technology	Information Technology	624
Thompson Coburn, LLP	Legal Consulting	29,424
Michael G. Winter Consultants, LLC	Legislative Consulting	30,000
Evercore Group LLC	Market Research	15,000
Charlesworth Benefits	Risk Management Consulting	6,000
Other	Archive scanning	10,285
Total Operating Consultant and Professional Expenses		**$526,254**
New England Pension Consultants	General Consulting/Monitoring	$327,212
The Northern Trust Company	Performance Management	189,650
The Northern Trust Company	Investment Custodian	56,314
Total Investment Consultant and Professional Expenses		**$573,176**

MISSOURI DEPARTMENT OF TRANSPORTATION AND HIGHWAY PATROL EMPLOYEES' RETIREMENT SYSTEM

MANAGEMENT LETTER

JUNE 30, 2018

WILLIAMS KEEPERS LLC
CERTIFIED PUBLIC ACCOUNTANTS & CONSULTANTS

2005 West Broadway, Suite 100, Columbia, MO 65203
OFFICE (573) 442-6171 FAX (573) 777-7800
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November 9, 2018

To the Board of Trustees and Management of the
Missouri Department of Transportation and
Highway Patrol Employees' Retirement System

In planning and performing our audit of the financial statements of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (the System) for the year ended June 30, 2018, in accordance with U.S. generally accepted auditing standards, we considered the System's internal control over financial reporting (internal control) as a basis for designing our auditing procedures for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of the System's internal control. Accordingly, we do not express an opinion on the effectiveness of the System's internal control.

A deficiency in internal control exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A material weakness is a deficiency, or combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the Systems' financial statements will not be prevented, or detected and corrected, on a timely basis. A significant deficiency is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph and was not designed to identify all deficiencies in internal control that might be material weaknesses. In addition, because of inherent limitations in internal control, including the possibility of management override of controls, misstatements due to error or fraud may occur and not be detected by such controls. Given these limitations, we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

In prior audits, we became aware of a deficiency in internal control that we considered to be a significant deficiency. The following item summarizes our comments and suggestions regarding the deficiency.

PRIOR YEAR RECOMMENDATION IMPLEMENTED

3rd PARTY INFORMATION TECHNOLOGY (IT) PROVIDER CONTROLS

During the 2014 fiscal year, the System contracted with a 3rd party IT provider to host the System's pension administration system and associated lines of business applications. We noted the System had not received a Service Organization Controls (SOC) 2 report from this IT provider. SOC 2 reports are examination engagements undertaken by a service auditor to report on controls at an organization that provides services to user entities when those controls are likely to be relevant to user entities' internal control over financial reporting. These reports specifically address controls related to security, availability, processing integrity, confidentiality, and privacy. As such, we were unable to determine if the controls in place at the 3rd party IT provider adequately address risks related to physical security, change management, and backup & recovery. The System could be putting its information at risk if the IT provider has not implemented proper controls.

We recommended the System request the IT provider make available a SOC 2, Type 2 report. The System can then use this information to assess the adequacy of controls in place at the IT provider as well as determine the extent of controls the System should implement to minimize its risk in this area.

Status: A SOC 2, Type 2 audit report for the period August 1, 2017 to July 31, 2018 was completed and distributed by the 3rd party IT provider on September 19, 2018.

We will be pleased to discuss these or any other matters deemed appropriate at your convenience. This report is intended solely for the information and use of the Board of Trustees, management, and others within the System and is not intended to be and should not be used by anyone other than these specified parties.

Sincerely,

Williams-Keepers LLC

WILLIAMS- KEEPERS LLC

MISSOURI DEPARTMENT OF TRANSPORTATION AND HIGHWAY PATROL EMPLOYEES' RETIREMENT SYSTEM

COMMUNICATION OF AUDIT RELATED MATTERS

JUNE 30, 2018

WILLIAMS KEEPERS LLC
CERTIFIED PUBLIC ACCOUNTANTS & CONSULTANTS

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November 9, 2018

To the Audit Committee of the Board of Trustees of the
Missouri Department of Transportation and
Highway Patrol Employees' Retirement System

We have audited the financial statements of the Missouri Department of Transportation and Highway Patrol Employees' Retirement System (the System) for the year ended June 30, 2018, and have issued our report thereon dated November 9, 2018. Professional standards require that we provide you with information about our responsibilities under generally accepted auditing standards, as well as certain information related to the planned scope and timing of our audit. We have communicated such information to the System's Chairman of the Audit Committee of the Board of Trustees in a letter dated August 27, 2018. Professional standards also require that we communicate to you the following information related to our audit.

Significant Audit Findings

Qualitative Aspects of Accounting Practices

Management is responsible for the selection and use of appropriate accounting policies. In accordance with the terms of our engagement letter, we will advise management about the appropriateness of accounting policies and their application. The significant accounting policies used by the Plan are described in Note 1 to the financial statements. Except as noted below, no new accounting policies were adopted and the application of existing policies was not changed during the year ended June 30, 2018. We noted no transactions entered into by the System during the year for which there is a lack of authoritative guidance or consensus. All significant transactions have been recognized in the financial statements in the proper period.

For the year ended June 30, 2018, the System implemented Governmental Accounting Standards Board (GASB) Statement No. 75, *Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions*. This Statement established standards for recognizing and measuring liabilities, deferred outflows and inflows of resources, and expenses/expenditures. This Statement identified the methods and assumptions that are required to be used to project benefit payments, discount projected benefit payments to their actuarial present value, and attribute that present value to periods of employee service. In general, this Statement required the System to record and report the net OPEB liability, along with deferred outflows of resources, deferred inflows of resources, and expenses/expenditures. It also required significant changes to the footnote disclosures and required supplementary information.

Accounting estimates are an integral part of the financial statements prepared by management and are based on management's knowledge and experience about past and current events and assumptions about future events. Certain accounting estimates are particularly sensitive because of their significance to the financial statements and because of the possibility that future events affecting them may differ significantly from those expected. The most sensitive estimates affecting the financial statements were: fair value of investments, useful lives of capital assets, and employers' total pension liability and related disclosures.

Management's estimate of the fair value of investments is based on quoted market prices; input from outside investment managers, consultants, and general partners; and current economic conditions. The estimated fair values of alternative investments represent particularly sensitive accounting estimates. Estimated useful lives of capital assets are generally based on past experience with similar assets. Employers' total pension liability and related disclosures are based on actuarial methods and assumptions determined in consultation with the System's actuary. We evaluated the key factors and assumptions used to develop those estimates in determining that they are reasonable in relation to the financial statements taken as a whole.

Certain financial statement disclosures are particularly sensitive because of their significance to the financial statement users. The most sensitive disclosures affecting the financial statements were investments and the net pension liability of employers.

The disclosures in the financial statements are neutral, consistent and clear.

Difficulties Encountered in Performing the Audit

We are pleased to report that we encountered no difficulties in dealing with management in performing and completing our audit. All system personnel cooperated with us fully during the conduct of our audit.

Corrected and Uncorrected Misstatements

Professional standards require us to accumulate all known and likely misstatements identified during the audits, other than those that are trivial, and communicate them to the appropriate level of management. For purposes of this letter, professional standards define a significant audit adjustment as a proposed correction to the financial statements that, in our judgment, may not have been detected except through our auditing procedures. These adjustments may include those proposed by us but not recorded by the System that potentially cause future financial statements to be materially misstated, even though we have concluded that such an adjustment is not material to the current financial statements. We proposed no audit adjustments that could, in our judgment, either individually, or in the aggregate, have a significant effect on the System's financial reporting process.

Disagreements with Management

For purposes of this letter, professional standards define a disagreement with management as a financial accounting, reporting, or auditing matter, whether or not resolved to our satisfaction, that could be significant to the financial statements or the auditor's report. We are pleased to report that no such disagreements arose during the course of our audit.

Management Representations

We have requested certain representations from management that are included in the management representation letter issued in connection with our audit.

Management Consultations with Other Independent Accountants

In some cases, management may decide to consult with other accountants about auditing and accounting matters, similar to obtaining a "second opinion" on certain situations. If a consultation involves application of an accounting principle to the System's financial statements or a determination of the type of auditor's opinion that may be expressed on those statements, our professional standards require the consulting accountant to check with us to determine that the consultant has all the relevant facts. To our knowledge, there were no such consultations with other accountants.

Other Audit Findings or Issues

We generally discuss a variety of matters, including the application of accounting principles and auditing standards, with management each year prior to retention as the System's auditors. This included discussions of the accounting, as well as the need for a valuation policy, for the System's Natural Resources investment portfolio. However, these discussions occurred in the normal course of our professional relationship and our responses were not a condition to our retention.

Other Matters

We applied certain limited procedures to the management's discussion and analysis and the schedules of changes in the employers' net pension liability, employers' contributions, investment returns, changes in net OPEB liability and related ratios, and the System's proportionate share of net OPEB liability, which are required supplementary information (RSI) that supplements the basic financial statements. Our procedures consisted of inquiries of management regarding the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We did not audit the RSI and do not express an opinion or provide any assurance on the RSI.

We were engaged to report on the schedules of administrative expenses, investment expenses, and professional/consultant expenses, which accompany the basic financial statements but are not RSI. With respect to this supplementary information, we made certain inquiries of management and evaluated the form, content, and methods of preparing the information to determine the information complies with U.S. generally accepted accounting principles, the method of preparing it has not changed from the prior period, and the information is appropriate and complete in relation to our audit of the basic financial statements. We compared and reconciled the supplementary information to the underlying accounting records used to prepare the financial statements or to the financial statements themselves.

We were not engaged to report on the introductory, investment, actuarial and statistical sections, which accompany the basic financial statements but are not RSI. Such information has not been subjected to the auditing procedures applied in the audit of the basic financial statements and, accordingly, we do not express an opinion or provide any assurance on it.

We thank System management and staff for their assistance during the course of our audit. We will be pleased to discuss these or any other matters at your convenience. This information is intended solely for the use of the Board of Trustees and management of the System and is not intended to be, and should not be, used by anyone other than these specified parties.

Sincerely,

Williams-Keepers LLC

WILLIAMS-KEEPERS LLC