

MICHIGAN PUBLIC SCHOOL EMPLOYEES' RETIREMENT SYSTEM

**Comprehensive Annual Financial Report
for the Fiscal Year Ended September 30, 2019**

MPERS

A Pension and Other Postemployment Benefit Trust Fund of the State of Michigan

Prepared by:
Financial Services
For
Office of Retirement Services
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INTRODUCTORY SECTION

Certificate of Achievement
Public Pension Standards Award
Letter of Transmittal
Retirement Board Members
Advisors and Consultants
Organization Chart

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CERTIFICATE OF ACHIEVEMENT



Government Finance Officers Association

Certificate of Achievement for Excellence in Financial Reporting

Presented to

Michigan Public School Employees' Retirement System

For its Comprehensive Annual
Financial Report
For the Fiscal Year Ended

September 30, 2018

Christopher P. Morill

Executive Director/CEO

INTRODUCTORY SECTION

PUBLIC PENSION STANDARDS AWARD



Public Pension Coordinating Council

***Public Pension Standards Award
For Funding and Administration
2019***

Presented to

Michigan Office of Retirement Services

In recognition of meeting professional standards for
plan funding and administration as
set forth in the Public Pension Standards.

Presented by the Public Pension Coordinating Council, a confederation of

National Association of State Retirement Administrators (NASRA)
National Conference on Public Employee Retirement Systems (NCPERS)
National Council on Teacher Retirement (NCTR)

A handwritten signature in black ink, reading 'Alan H. Winkle'.

Alan H. Winkle
Program Administrator

INTRODUCTORY SECTION

LETTER OF TRANSMITTAL

Michigan Public School Employees'
Retirement System
P.O. Box 30171
Lansing, Michigan 48909-7671
Telephone 517- 284-4400
Outside Lansing 1-800-381-5111

STATE OF MICHIGAN

GRETCHEN WHITMER, Governor

DEPARTMENT OF TECHNOLOGY, MANAGEMENT & BUDGET

February 26, 2020

The Honorable Gretchen Whitmer
Governor, State of Michigan,

Members of the Legislature
State of Michigan,

Retirement Board Members
and
Members, Retirees and Beneficiaries

Ladies and Gentlemen:

We are pleased to present the comprehensive annual financial report of the Michigan Public School Employees' Retirement System (System) for fiscal year 2019.

INTRODUCTION TO REPORT

The System was established by legislation under Public Act 136 of 1945, and is administered by the Office of Retirement Services (ORS). The number of active and retired members and beneficiaries of the System is presented in Note 1 of the financial statements in the Financial Section in this report. The purpose of the System is to provide retirement, disability, death, and healthcare benefits for all public school employees. The services performed by ORS staff provide benefits to members, retirees, and beneficiaries.

Responsibility

Responsibility for both the accuracy of the data and the completeness and fairness of the presentation, including all disclosures, rests with the leadership team of the System. To the best of our knowledge and belief, the enclosed data is accurate in all material respects and is reported in a manner designed to present fairly the financial position and results of operations of the System.

Internal Control Structure

The leadership team of the System is responsible for maintaining adequate internal accounting controls designed to provide reasonable assurance that transactions are executed in accordance with management's general or specific authorization, and are recorded as necessary to maintain accountability for assets and to permit preparation of financial statements in accordance with accounting principles generally accepted in the United States of America. The internal control structure is designed to provide reasonable assurance regarding the safekeeping of assets and reliability of all financial records.

The concept of reasonable assurance recognizes that the cost of a control should not exceed the benefits likely to be derived and that the valuation of costs and benefits requires estimates and judgments by management. This

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internal control structure includes maintaining written policies and procedures. Discussion and analysis of fiduciary net position and related additions and deductions are presented in the Management Discussion and Analysis which can be found immediately following the Independent Auditor's Report.

Independent Auditors and Actuary

The Office of the Auditor General (OAG), independent auditors, conducted an annual audit of the System. The independent auditor's report on the System's financial statements is included in the Financial Section in this report.

An actuarial valuation is conducted annually. The purpose of the valuation is to evaluate the mortality, service, compensation, and other financial experience of the System and to recommend employer contribution rates. The annual actuarial valuation was completed by Gabriel Roeder Smith & Company for the fiscal year ended September 30, 2018, and recommends employer contribution rates for the fiscal year ended September 30, 2021. Actuarial certification and supporting statistics are included in the Actuarial Section in this report.

Management's Discussion and Analysis (MD&A)

Generally Accepted Accounting Principles (GAAP) require that management provide a narrative introduction, overview, and analysis to accompany the Basic Financial Statements in the form of an MD&A. This letter of transmittal is intended to complement the MD&A and should be read in conjunction with it. The MD&A can be found immediately following the Independent Auditor's Report.

PROFILE OF THE GOVERNMENT

In accordance with Public Act 300 of 1980, on October 31, 1980, the Public School Employees' Chapter I Retirement Fund merged with the Public School Employees' Chapter II Retirement Fund to establish the Public School Employees' Retirement System. Public Acts 136 of 1945 and 259 of 1974, respectively, created the two original funds. A 12-member board and the director of the Department of Technology, Management, and Budget (DTMB), govern the System. The System serves over 435,000 members from over 680 participating public school employers in Michigan. The System is funded by employer contributions, member contributions, and investment earnings. A detailed plan description is included in Note 1 of the Financial Section in this report.

ECONOMIC CONDITIONS AND OUTLOOK

Despite challenging economic times, the System continues to show steady performance over the long term.

Investments

The State of Michigan Investment Board is the investment fiduciary and custodian of all investments of the System pursuant to State law. The primary investment objective is to maximize the rate of return on the total investment portfolio, consistent with a high degree of prudence and sufficient diversity to eliminate inordinate risks and to meet the actuarial assumption for the investment rate of return. The investment activity for the year produced a total rate of return on the portfolio of 5.1 percent for the pension plan and 5.0 percent for the other postemployment benefits (OPEB) plan. For the last five years, the System has experienced an annualized rate of return of 7.7 percent for the pension plan and 7.7 percent for the OPEB plan. A summary of asset allocation and rates of return is presented in the Investment Section in this report.

Accounting System

Transactions of the System are reported on the accrual basis of accounting. Revenues are recorded when earned, and expenses are recorded when incurred. Participants' benefits are recorded when payable by law. We believe that the accounting and administrative internal controls established by the System provide reasonable assurance the System is carrying out its responsibilities in safeguarding its assets, in maintaining the reliability of the financial records for preparing financial statements, and in maintaining accountability for its assets.

Funding

Funds are derived from the excess of additions to plan fiduciary net position over deductions from plan fiduciary net position. Funds are accumulated by the System to meet future benefit obligations to retirees and beneficiaries. The

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percentage computed by dividing the actuarial value of assets by the actuarial accrued liability is referred to as the “funded ratio.” This ratio provides an indication of the funding status of the System and generally, the greater this percentage, the stronger the System.

Pension – The actuarial value of the assets and actuarial accrued liability for pension benefits of the System were \$50.6 billion and \$83.4 billion, respectively, resulting in a funded ratio of 60.7 percent on September 30, 2018. A historical perspective of funding levels for the Pension Plan is presented on the Schedule of Funding Progress in the Statistical section in this report.

OPEB – Prefunding for OPEB began in fiscal year 2013. The actuarial value of the assets and actuarial accrued liability for OPEB were \$6.1 billion and \$13.7 billion, respectively, resulting in a funded ratio of 44.3 percent as of September 30, 2018. A historical perspective of funding levels is presented on the Schedule of Funding Progress in the Statistical section in this report.

MAJOR GOALS ACCOMPLISHED

Healthcare Strategic Initiative Development – ORS staff worked with vendor partners and industry experts to develop the 2020-2021 Strategic Initiative Package. The package includes benefit changes that are necessary in order to deliver a high quality health care plan and meet the actuarially determined cost goal for the coming years. ORS’s goal is to continue to provide a high-quality plan that is affordable to both the members and the schools who fund the coverage. The changes include expanded coverage for vaccines, offering online physician visits for certain interactions, and increasing the lifetime maximum for outpatient services. Additionally, the changes include an increase to the pharmacy out-of-pocket maximum, which will in turn allow the system to take advantage of increased federal dollars when members reach Medicare’s catastrophic coverage level.

Reduced Pharmaceutical Drug Pricing – ORS staff worked with the Michigan Public School Employees’ Retirement System pharmacy vendor, OptumRx, and industry experts to compare current pharmaceutical drug prices against pricing in the current marketplace. Through negotiations, OptumRx agreed to reduce the plan’s drug pricing in order to provide competitive pricing based on current marketplace rates. This resulted in projected annual savings of \$100,000,000.

Employer E-Newsletter – In February, ORS launched the online newsletter for public school employers, “MPSERS Employer News.” The newsletter was created to improve and consolidate communications from ORS to payroll staff. The e-newsletter format is the source for most news, changes in procedures, legislative updates, tools that make reporting tasks easier, and routine notifications. Regular email messages will still be sent for urgent matters or for information that applies to only one type of employer or a targeted subset of employers. The newsletter has improved routine communications through delivery of a consistent product on schedule, setting communication expectations and significantly reducing the number of overall employer emails.

Telephone System Upgrade – In December 2018, ORS migrated to a new Voice over Internet Protocol (VoIP) phone system that is fully encrypted. VoIP transmits sound over the internet rather than traditional phone lines. This system implementation was the first of its kind for the State of Michigan. A new interactive voice response system (IVR) was introduced that improves the customer experience by reducing time spent navigating the menu and preserves security by automatically authenticating the call against the member’s phone number on record. In many cases, a routine call that would have taken over two minutes to navigate the menu and get in queue now takes less than one minute.

Paperless Options – A new feature was implemented in miAccount that lets customers opt out of receiving paper direct deposit statements as well as paper 1099-R annual statements. Both direct deposit and 1099-R statements are available electronically to view and print in miAccount for current and past years. If customers choose the paperless option, their 1099-R statements are available online a week or two before the printed one is mailed. They can also view their pension payment history on a monthly basis versus receiving a paper statement four to five times a year. In addition to providing the member with more personalized information faster, going paperless helps the environment and reduces print and mailing costs.

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New E-Learning Modules – Customer Service now has online modules available to help train staff members. The training modules use realistic scenarios in simulated environments so staff members can practice completing various transactions and processes. The training helps ensure Customer Service staff members are completing tasks accurately and efficiently, improving customer experiences through consistent account handling. Upon completion of each module, staff members take a quiz to evaluate their learning.

Mailing Security Process Improvement – An information security improvement was implemented in fiscal year 2019 that will improve end-to-end processing of the daily mailings and ensure that ORS customers are getting their mail and only their mail. The solution utilizes 2-D bar coding which are tracked by the automated print and mail equipment to ensure that each printed page is accounted for as it passes through various machines, reducing the risk of mail going to the wrong customer.

Mobile App Launch – ORS released a mobile app, MiORS, for members and retirees of the defined benefit plans. The new app provides account access in a simple, modern format, compatible with all popular mobile devices. One key feature allows users the ability to upload documents directly to ORS by taking a picture of a form, birth certificate, or other insurance proof and sending the document(s) securely to ORS. This eliminates the need to fax or mail them to ORS. In the first year, the app has been downloaded by over 15,500 users who have uploaded more than 700 documents. The app also allows ORS to send custom-crafted alerts and targeted announcements, based on a member's retirement system and account status. Retirees are now able to manage their direct deposit, update tax withholdings, and view their payment history on the app.

Dedicated Gains Policy Successfully Reduces Assumed Rate of Return, Again – For the second year in a row, excess investment returns in fiscal year 2018 resulted in further reductions in the pension and other postemployment benefit (OPEB) assumed rates of return (AROR). Reducing the AROR to reflect today's market conditions protects the long-term security of retirement benefits and ensures greater stability of employer contributions in the future. The policy has resulted in the Michigan Public School Employees' Retirement System's ARORs being reduced up to 70 basis points without increasing unfunded liabilities. The legacy defined benefit pension AROR was reduced to 6.80% from 7.05% the prior year and the OPEB AROR was reduced to 6.95% from 7.15%. For the first time since the policy was adopted in 2017, the Pension Plus AROR was reduced to 6.80% from 7.00%. The new ARORs are well below the 7.25% median public plan AROR found around the country.

HONORS

Signature Award Winner – ORS with Voya Financial won a 2019 Signature Award from the Plan Sponsor Council of America. We took first place in the Overcoming Obstacles category for our Michigan Public School Employees' Retirement System outreach campaign. An annual review of plan data revealed that the approximately 72,000 participants in the Defined Contribution plan in the public school population did not engage with their accounts or online tools as much as their State of Michigan employee counterparts. The outreach campaign used a variety of communication methods to reach public school employees and human resources administrators. These methods included publications, a telephone campaign, meetings for public school employees, emails, and an innovative social media campaign on LinkedIn. Member behaviors exceeded expectations and surpassed industry benchmarks for both click-through rate and engagement rate. The Plan Sponsor Council of America, which is part of the American Retirement Association, is the leading association for sponsors of voluntary, employer-based retirement plans in the U.S.

Public Pension Standards Award – ORS was awarded the 2019 Standards Award from the Public Pension Coordinating Council Standards Program (PPCC) for both funding and administration. ORS has received these awards every year since 2004. The PPCC Standards reflect expectations for public retirement system management and administration and serve as a benchmark for all DB public plans to be measured.

Government Finance Officers Association Award – The Government Finance Officers Association (GFOA) of the United States and Canada awarded the retirement system with the Certificate of Achievement for Excellence in Financial Reporting for the fiscal year 2018 Comprehensive Annual Financial Report (CAFR). This marks the 28th consecutive year ORS has received this prestigious award.

INTRODUCTORY SECTION

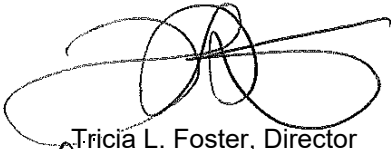
LETTER OF TRANSMITTAL

ACKNOWLEDGEMENTS

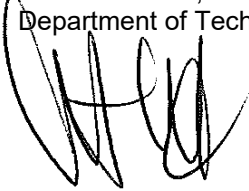
The preparation of this report was accomplished with the dedication and cooperation of many people. It is intended to provide complete and reliable information as a basis for making management decisions, as a means of determining compliance with legal provisions, and as a means for determining responsible stewardship of the funds of the System.

We would, therefore, like to express our appreciation for the assistance given by staff, the advisors, and the many people who contributed to its preparation. We believe their combined efforts have produced a report that will enable employers and plan members to better evaluate and understand the Michigan Public School Employees' Retirement System. Their cooperation contributes significantly to the success of the System.

Sincerely,



Tricia L. Foster, Director
Department of Technology, Management & Budget



Anthony J Estell, Director
Office of Retirement Services

INTRODUCTORY SECTION

ADMINISTRATIVE ORGANIZATION

RETIREMENT BOARD MEMBERS*

As of February 26, 2020

Vacant
Active Classroom Teacher
Term Expires

Jeff Mills
Active Superintendent
Term Expires March 30, 2021

Mike Engle
Active Classroom Teacher
Term Expires March 30, 2021

Timothy Raymer, Vice Chair
Retired Finance/Operations
Term Expires March 30, 2023

Stephen Epstein
General Public – Investments
Term Expires March 30, 2020

Fred Baker
General Public -
Actuary/Health Insurance
Term Expires March 30, 2022

Ann G Kroneman
Community College Trustee
Term Expires March 30, 2020

Kevin Philipps
Active Finance/Operations,
Non-Superintendent
Term Expires March 30, 2020

Charles Christner
Retired Teacher
Term Expires March 30, 2022

Liz Eastway
Retired Non-Certified Support
Term Expires March 30, 2021

Laura Colligan
Reporting Unit Board of Control
Term Expires March 30, 2020

Scott Koenigs knecht, Chair for Dr.
Michael Rice
State Superintendent of Education,
ex officio

* Statute provides that board members may continue to serve after their term expires until they are replaced or reappointed.

ADVISORS AND CONSULTANTS

As of February 26, 2020

Actuaries

Gabriel Roeder Smith & Co.
Mita D. Drazilov
Southfield, Michigan

Independent Auditors

Doug A. Ringler, C.P.A., C.I.A.
Auditor General
State of Michigan

Investment Manager and Custodian

Rachael Eubanks
State Treasurer
State of Michigan

Legal Advisor

Dana Nessel
Attorney General
State of Michigan

Investment Performance Measurement

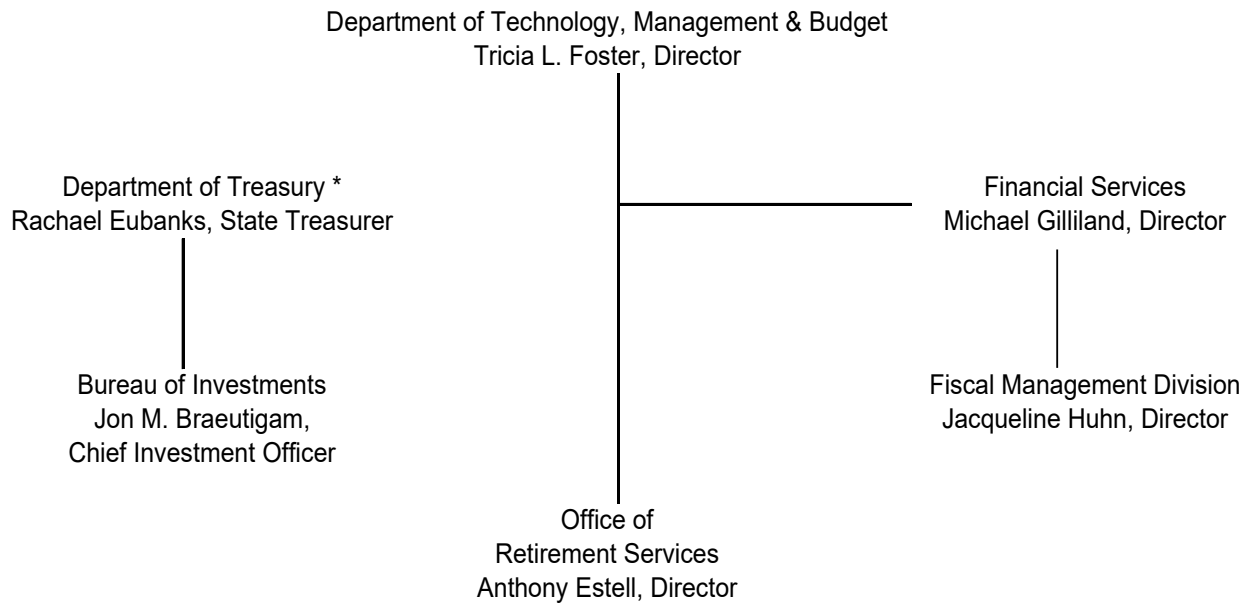
State Street Corporation
State Street Investment Analytics
Boston, MA

INTRODUCTORY SECTION

ADMINISTRATIVE ORGANIZATION

ORGANIZATION CHART

As of February 26, 2020



* The investments of the System are managed by the Michigan Department of Treasury. Information on the investments and the fiduciary, Michigan Department of Treasury, can be found in the Investment Section, Introduction. In addition, see the Investment Section, Schedule of Investment Fees (page 73) and Schedule of Investment Commissions (page 74), for information regarding the investment fees and commissions paid as well as investment professionals utilized by the System.

FINANCIAL SECTION

Independent Auditor's Report
Management's Discussion and Analysis
Basic Financial Statements
Notes to Basic Financial Statements
Required Supplementary Information
Note to Required Supplementary Information
Supporting Schedules



OAG

Office of the Auditor General

201 N. Washington Square, Sixth Floor • Lansing, Michigan 48913 • Phone: (517) 334-8050 • audgen.michigan.gov

Doug A. Ringler, CPA, CIA
Auditor General

Independent Auditor's Report on the Financial Statements
and Other Reporting Required by *Government Auditing Standards*

Mr. Scott Koenigsknecht, Chair
Michigan Public School Employees' Retirement System Board
and
Ms. Tricia L. Foster, Director
Department of Technology, Management, and Budget
and
Mr. Anthony J. Estell, Director
Office of Retirement Services

Dear Mr. Koenigsknecht, Ms. Foster, and Mr. Estell:

Report on the Financial Statements

We have audited the accompanying financial statements of the Michigan Public School Employees' Retirement System as of and for the fiscal year ended September 30, 2019 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 accounting principles generally accepted in the United States of America; 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.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States. 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 entity'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 entity'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 in the first paragraph present fairly, in all material respects, the fiduciary net position of the Michigan Public School Employees' Retirement System as of September 30, 2019 and the changes in fiduciary net position for the fiscal year then ended in accordance with accounting principles generally accepted in the United States of America.



OAG

Office of the Auditor General

Doug A. Ringler, CPA, CIA
Auditor General

Mr. Scott Koenigsknecht, Chair
Ms. Tricia L. Foster, Director
Mr. Anthony J. Estell, Director
Page 2

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis, schedule of changes in net pension liability, schedule of changes in net OPEB liability, schedules of contributions, schedules of investment returns, and related note, as listed in the table of contents, 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 auditing standards generally accepted in the United States of America, 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 supporting schedules and the introductory, investment, actuarial, and statistical sections are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The supporting schedules are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. Such information 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 auditing standards generally accepted in the United States of America. In our opinion, the supporting schedules are 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.

Other Reporting Required by Government Auditing Standards

In accordance with *Government Auditing Standards*, we will also issue a report on our consideration of the System's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the System's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the System's internal control over financial reporting and compliance.

Sincerely,

Doug Ringler
Auditor General
February 26, 2020

FINANCIAL SECTION

MANAGEMENT'S DISCUSSION AND ANALYSIS

Our discussion and analysis of the Michigan Public School Employees' Retirement System's (System) financial performance provides an overview of the System's financial activities for the fiscal year ended September 30, 2019. Please read it in conjunction with the transmittal letter in the Introductory Section on page 4 and the basic financial statements, which follow this discussion.

FINANCIAL HIGHLIGHTS

- System assets exceeded liabilities at the close of fiscal year 2019 by \$57.7 billion (reported as *net position restricted for Pension Benefits and OPEB*). Fiduciary net position is restricted to meet future benefit payments.
- Additions for the year were \$7.1 billion, which are comprised primarily of contributions of \$4.3 billion and investment gains of \$2.9 billion.
- Deductions increased over the prior year from \$5.6 billion to \$5.8 billion or 3.5%. This increase is primarily the result of increased pension benefits.

THE STATEMENT OF PLAN FIDUCIARY NET POSITION AND THE STATEMENT OF CHANGES IN PLAN FIDUCIARY NET POSITION

This Comprehensive Annual Financial Report (CAFR) consists of two financial statements; *The Statement of Pension Plan and Other Postemployment Benefit Plan Fiduciary Net Position* (page 18) and *The Statement of Changes in Pension Plan and Other Postemployment Benefit Plan Fiduciary Net Position* (page 19). These financial statements report information about the System, as a whole, and about its financial condition that should help answer the question: Is the System, as a whole, better off or worse off as a result of this year's activities? These statements include all assets and liabilities using the economic resources measurement focus and the accrual basis of accounting. Under the accrual basis of accounting, all revenues and expenses are taken into account regardless of when cash is received or paid.

The Statement of Pension Plan and Other Postemployment Benefit Plan Fiduciary Net Position presents all of the System's assets and liabilities, with the difference between the two reported as fiduciary net position. Over time, increases and decreases in fiduciary net position measure whether the System's financial position is improving or deteriorating. *The Statement of Changes in Pension Plan and Other Postemployment Benefit Plan Fiduciary Net Position* presents how the System's fiduciary net position changed during the most recent fiscal year. These two financial statements should be reviewed along with the Schedule of Changes in Net Pension Liability (page 50), the Schedule of Changes in Net OPEB Liability (page 51), and Schedules of Contributions (page 52) to determine whether the System is becoming financially stronger or weaker.

FINANCIAL ANALYSIS

System total assets as of September 30, 2019, were \$60.2 billion and were mostly comprised of investments and Securities Lending Collateral. Total assets increased \$1.0 billion or 1.7% between fiscal years 2018 and 2019, due primarily to net investment gains.

Total liabilities as of September 30, 2019, were \$2.5 billion and were comprised of accounts payable, unearned revenue, and obligations under securities lending. Total liabilities decreased \$.3 billion or 9.7% between fiscal years 2018 and 2019 primarily due to obligations under security lending.

System assets exceeded its liabilities at the close of fiscal year 2019 by \$57.7 billion. Total fiduciary net position restricted for pension and OPEB increased \$1.3 billion or 2.3% from the previous year, primarily due to net investment gains.

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MANAGEMENT'S DISCUSSION AND ANALYSIS

PLAN FIDUCIARY NET POSITION

(in thousands)

| | 2019 | 2018 | Increase (Decrease) |
|--|----------------------|----------------------|------------------------|
| Assets | | | |
| Equity in common cash | \$ 117,378 | \$ 104,050 | 12.8 % |
| Receivables | 418,182 | 373,671 | 11.9 |
| Investments | 57,421,253 | 56,180,698 | 2.2 |
| Securities lending collateral | 2,277,910 | 2,549,816 | (10.7) |
| Total assets | 60,234,723 | 59,208,235 | 1.7 |
| Liabilities | | | |
| Unearned revenue | 2,979 | 2,733 | 9.0 |
| Accounts payable and other accrued liabilities | 204,829 | 200,259 | 2.3 |
| Obligations under securities lending | 2,277,647 | 2,550,504 | (10.7) |
| Total liabilities | 2,485,455 | 2,753,495 | (9.7) |
| Net Position Restricted for Pension Benefits and OPEB | \$ 57,749,269 | \$ 56,454,740 | 2.3 % |

ADDITIONS TO PLAN FIDUCIARY NET POSITION

The reserves needed to finance pension and other postemployment benefits are accumulated through the collection of employer and employee contributions and through earnings on investments. Contributions and net investment income for fiscal year 2019 totaled approximately \$7.1 billion.

Total additions for fiscal year 2019 decreased approximately \$2.8 billion or 28.0% from those of fiscal year 2018 due primarily to decreased net investment income. Total member contributions increased between fiscal years 2018 and 2019 by \$7.6 million or 1.3%, while net investment income decreased \$2.9 billion or 50.2%. The Investment Section of this report reviews the results of investment activity for fiscal year 2019.

DEDUCTIONS FROM PLAN FIDUCIARY NET POSITION

The primary expenses of the System include the payment of pension benefits to members and beneficiaries, payment for health, dental and vision benefits, refund of contributions, and the cost of administering the System. Total deductions for fiscal year 2019 were \$5.8 billion, an increase of 3.5% over fiscal year 2018 deductions.

The health, dental and vision care expenses during the year increased \$65.0 million or 13.6%, from \$477.1 million to \$542.0 million. The payment of pension benefits increased \$123.9 million or 2.5% between fiscal years 2018 and 2019. In fiscal year 2019, the increase in pension benefit expenses resulted an increase in benefit payments to retirees.

FINANCIAL SECTION

MANAGEMENT'S DISCUSSION AND ANALYSIS

CHANGES IN PLAN FIDUCIARY NET POSITION

(in thousands)

| | <u>2019</u> | <u>2018</u> | <u>Increase (Decrease)</u> |
|---|----------------------|----------------------|--------------------------------|
| Additions | | | |
| Member contributions | \$ 611,344 | \$ 603,739 | 1.3 % |
| Employer contributions | 3,414,427 | 3,455,217 | (1.2) |
| Other governmental contributions | 233,196 | 96,708 | 141.1 |
| Net investment income (loss) | 2,855,383 | 5,730,759 | (50.2) |
| Miscellaneous income | 277 | 600 | (53.9) |
| Total additions | <u>7,114,627</u> | <u>9,887,023</u> | <u>(28.0)</u> |
| Deductions | | | |
| Pension benefits | 5,058,624 | 4,934,697 | 2.5 |
| Health care benefits | 542,034 | 477,066 | 13.6 |
| Refunds and transfers to other systems | 29,378 | 28,977 | 1.4 |
| Administrative and other expenses | 190,062 | 181,101 | 4.9 |
| Total deductions | <u>5,820,098</u> | <u>5,621,841</u> | <u>3.5</u> |
| Net Increase (Decrease) in Net Position | 1,294,529 | 4,265,182 | (69.6) |
| Net Position Restricted for Pension Benefits and OPEB: | | | |
| Beginning of Year | <u>56,454,740</u> | <u>52,189,558</u> | <u>8.2</u> |
| End of Year | <u>\$ 57,749,269</u> | <u>\$ 56,454,740</u> | <u>2.3 %</u> |

RETIREMENT SYSTEM AS A WHOLE

The System's overall Fiduciary Net Position experienced an increase in fiscal year 2019. The System's rate of return for the Pension Plan's investments decreased an overall 6.5% from a 11.6% return in fiscal year 2018 to a 5.1% return during fiscal year 2019. The System's rate of return for the OPEB Plan's investments decreased an overall 6.5% from a 11.5% return in fiscal year 2019 to a 5.0% return during fiscal year 2019. Management believes that the System remains financially sound and positioned to meet its ongoing benefit obligations due, in part, to a prudent investment program, cost controls, and strategic planning.

CONTACTING SYSTEM FINANCIAL MANAGEMENT

This financial report is designed to provide the Retirement Board, our membership, taxpayers, investors, and creditors with a general overview of the System's finances and to demonstrate the System's accountability for the money it receives. If you have any questions about this report or need additional financial information, contact the Office of Retirement Services, P.O. Box 30171, Lansing, MI 48909-7671.

FINANCIAL SECTION

MANAGEMENT'S DISCUSSION AND ANALYSIS

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FINANCIAL SECTION

BASIC FINANCIAL STATEMENTS

STATEMENT OF PENSION PLAN AND OTHER POSTEMPLOYMENT BENEFIT PLAN FIDUCIARY NET POSITION

As of September 30, 2019
(in thousands)

| | Pension Plan | OPEB Plan | Total |
|---|----------------------|---------------------|----------------------|
| Assets: | | | |
| Equity in common cash | \$ 115,595 | \$ 1,784 | \$ 117,378 |
| Receivables: | | | |
| Amounts due from members | 472 | - | 472 |
| Amounts due from employers | 93,302 | 36,432 | 129,734 |
| Amounts due from other | - | 140,458 | 140,458 |
| Amounts due from employer long term | 102,584 | 31,797 | 134,381 |
| Amounts due from other long term | - | 12,525 | 12,525 |
| Interest and dividends | 538 | 73 | 611 |
| Total receivables | 196,896 | 221,286 | 418,182 |
| Investments: | | | |
| Short term investment pools | 1,681,333 | 220,835 | 1,902,169 |
| Fixed income pools | 6,895,680 | 938,530 | 7,834,211 |
| Domestic equity pools | 11,383,189 | 1,549,249 | 12,932,438 |
| Real estate and infrastructure pools | 4,822,926 | 656,558 | 5,479,484 |
| Private equity pools | 9,419,839 | 1,282,258 | 10,702,097 |
| International equity pools | 8,087,454 | 1,100,557 | 9,188,011 |
| Absolute return pools | 8,258,380 | 1,124,462 | 9,382,842 |
| Total investments | 50,548,803 | 6,872,450 | 57,421,253 |
| Securities lending collateral | 2,006,436 | 271,474 | 2,277,910 |
| Total assets | 52,867,729 | 7,366,994 | 60,234,723 |
| Liabilities: | | | |
| Unearned revenue | 2,844 | 135 | 2,979 |
| Accounts payable and other accrued liabilities | 1,512 | 203,317 | 204,829 |
| Obligations under securities lending | 2,006,204 | 271,443 | 2,277,647 |
| Total liabilities | 2,010,559 | 474,895 | 2,485,455 |
| Net Position Restricted for Pension Benefits and OPEB: | \$ 50,857,170 | \$ 6,892,099 | \$ 57,749,269 |

The accompanying notes are an integral part of these financial statements.

FINANCIAL SECTION

BASIC FINANCIAL STATEMENTS

STATEMENT OF CHANGES IN PENSION PLAN AND OTHER POSTEMPLOYMENT BENEFIT PLAN FIDUCIARY NET POSITION

For Fiscal Year Ended September 30, 2019
(in thousands)

| | Pension Plan | OPEB Plan | Total |
|---|----------------------|---------------------|----------------------|
| Additions: | | | |
| Contributions: | | | |
| Member contributions | \$ 403,147 | \$ 208,197 | \$ 611,344 |
| Employer contributions: | | | |
| Colleges and universities | 220,386 | 56,982 | 277,368 |
| School districts and other | 2,486,326 | 650,732 | 3,137,059 |
| Other governmental contributions | - | 233,196 | 233,196 |
| Total contributions | 3,109,859 | 1,149,108 | 4,258,967 |
| Investment income (loss): | | | |
| Net increase (decrease) in fair value of investments | 1,973,907 | 266,684 | 2,240,591 |
| Interest, dividends, and other | 770,311 | 98,493 | 868,803 |
| Investment expenses: | | | |
| Real estate operating expenses | (1,595) | (209) | (1,804) |
| Other investment expenses | (229,854) | (29,754) | (259,607) |
| Securities lending activities: | | | |
| Securities lending income | 57,884 | 7,805 | 65,689 |
| Securities lending expenses | (51,334) | (6,955) | (58,289) |
| Net investment income (loss) | 2,519,320 | 336,063 | 2,855,383 |
| Miscellaneous income | 202 | 74 | 277 |
| Total additions | 5,629,381 | 1,485,245 | 7,114,627 |
| Deductions: | | | |
| Benefits paid to plan members and beneficiaries: | | | |
| Retirement benefits | 5,058,624 | - | 5,058,624 |
| Health benefits | - | 469,017 | 469,017 |
| Dental/vision benefits | - | 73,017 | 73,017 |
| Refunds of contributions | 29,345 | 34 | 29,378 |
| Administrative and other expenses | 27,741 | 162,321 | 190,062 |
| Total deductions | 5,115,710 | 704,388 | 5,820,098 |
| Net Increase (Decrease) in Net Position | 513,672 | 780,857 | 1,294,529 |
| Net Position Restricted for Pension Benefits and OPEB: | | | |
| Beginning of Year | 50,343,498 | 6,111,242 | 56,454,740 |
| End of Year | \$ 50,857,170 | \$ 6,892,099 | \$ 57,749,269 |

The accompanying notes are an integral part of these financial statements.

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

NOTE 1 – PLAN DESCRIPTION

ORGANIZATION

The Michigan Public School Employees' Retirement System (System) is a cost-sharing, multiple employer, state-wide, defined benefit public employee retirement plan governed by the State of Michigan (State) originally created under Public Act 136 of 1945, recodified and currently operating under the provisions of Public Act 300 of 1980, as amended. Section 25 of this act establishes the board's authority to promulgate or amend the provisions of the System. The board consists of twelve members – eleven appointed by the Governor and the State Superintendent of Instruction, who serves as an ex-officio member. The Governor-appointed board members consist of:

- Two active classroom teachers or other certified school personnel
- One active member or retirant from a non-certified support position
- One active school system superintendent
- One active finance or operations (non-superintendent) member
- One retirant from a classroom teaching position
- One retirant from a finance or operations management position
- One administrator or trustee of a community college that is a reporting unit of the System
- Two from the general public, one with health insurance or actuarial science experience and one with institutional investment experience
- One elected member of a reporting unit's board of control

The System's pension plan was established by the State to provide retirement, survivor and disability benefits to public school employees. In addition, the System's health plan provides all retirees with the option of receiving health, prescription drug, dental and vision coverage under the Michigan Public School Employees' Retirement Act. There are 685 participating employers. A list of employers is provided in the Statistical Section. The System is a qualified pension trust fund under section 401(a) of the Internal Revenue Code. By statute, employees of K-12 public school districts, public school academies, district libraries, tax-supported community colleges and seven universities may be members. The seven universities are: Eastern Michigan, Central Michigan, Northern Michigan, Western Michigan, Ferris State, Michigan Technological and Lake Superior State. Employees, who first become employed by one of the seven universities on or after January 1, 1996, become members of an alternative plan.

The System's financial statements are included as a pension and other employee benefit trust fund in the State of Michigan Comprehensive Annual Financial Report.

The System is administered by the Office of Retirement Services within the Michigan Department of Technology, Management & Budget. The Department Director appoints the Office Director, with whom the general oversight of the System resides. The State of Michigan Investment Board serves as the investment fiduciary and custodian for the System.

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

MEMBERSHIP

At September 30, 2019, the System's pension plan membership consisted of the following:

| | |
|--|-----------------------|
| Inactive plan members or their beneficiaries currently receiving benefits: | |
| Regular benefits | 194,374 |
| Survivor benefits | 18,588 |
| Disability benefits | 5,975 |
| Total | <u>218,937</u> |
| Inactive plan members entitled to but not yet receiving benefits: | <u>18,279</u> |
| Active plan members: | |
| Vested | 96,319 |
| Non-vested | 81,362 |
| Total ^{1,2} | <u>177,681</u> |
| Total plan members | <u><u>414,897</u></u> |

¹ Includes 3,492 people who elected not to continue future accruals in the DB plan as a result of PA 300 of 2012.

² Excludes 5,109 records with both \$0 salary and 0 service credit as of September 30, 2019 with DB benefit plan codes.

Enrollment in the OPEB plan is voluntary. The number of participants is as follows:

Health, Dental and Vision Plan

| | |
|--------------------------------------|------------|
| Eligible participants | |
| Retirees and survivors | 198,380 |
| Inactive vested | 2,458 |
| Active members ¹ | 197,982 |
| Participants receiving benefits: | |
| Health | 152,757 |
| Dental/Vision | 165,542 |
| Expenses for the year (in thousands) | \$ 704,388 |

¹ Active member count includes Personal Healthcare Fund members eligible for the \$1,000/\$2,000 lump sum at termination benefit.

BENEFIT PROVISIONS - PENSION

Introduction

Benefit provisions of the defined benefit pension plan are established by State statute, which may be amended. Public Act 300 of 1980, as amended, establishes eligibility and benefit provisions for the defined benefit (DB) pension plan. Retirement benefits for DB plan members are determined by final average compensation and years of service. DB members are eligible to receive a monthly benefit when they meet certain age and service requirements. The System also provides disability and survivor benefits to DB plan members.

A DB member or Pension Plus member who leaves Michigan public school employment may request a refund of his or her member contributions to the retirement system account. A refund cancels a former member's rights to future benefits. However, returning members who previously received a refund of their contributions may reinstate their service through repayment of the refund upon satisfaction of certain requirements.

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

Pension Reform 2010

On May 19, 2010, the Governor signed Public Act 75 of 2010 into law. As a result, any member of the Michigan Public School Employees' Retirement System (MPERS) who became a member of MPERS after June 30, 2010 is a Pension Plus member. Pension Plus is a hybrid plan that contains a pension component with an employee contribution (graded, up to 6.4% of salary) and a flexible and transferable defined contribution (DC) tax-deferred investment account that earns an employer match of 50% (up to 1% of salary) on employee contributions. Retirement benefits for Pension Plus members are determined by final average compensation and years of service. Disability and survivor benefits are available to Pension Plus members.

Pension Reform 2012

On September 4, 2012, the Governor signed Public Act 300 of 2012 into law. The legislation grants all active members who first became a member before July 1, 2010 and who earned service credit in the 12 months ending September 3, 2012, or were on an approved professional services or military leave of absence on September 3, 2012, a voluntary election regarding their pension. Any changes to a member's pension are effective as of the member's transition date, which is defined as the first day of the pay period that begins on or after February 1, 2013.

Under the reform, members voluntarily chose to increase, maintain, or stop their contributions to the pension fund.

Option 1 – members voluntarily elected to increase their contributions to the pension fund as noted below, and retain the 1.5% pension factor in their pension formula. The increased contribution would begin as of their transition date and continue until they terminate public school employment.

- Basic Plan members: 4% contribution
- Member Investment Plan (MIP)-Fixed, MIP-Graded, and MIP-Plus members: a flat 7% contribution

Option 2 – members voluntarily elected to increase their contribution to the pension fund as stated in Option 1 and retain the 1.5% pension factor in their pension formula. The increased contribution would begin as of their transition date and continue until they reach 30 years of service. If and when they reach 30 years of service, their contribution rates will return to the previous level in place as of the day before their transition date (0% for Basic Plan members, 3.9% for MIP-Fixed, up to 4.3% for MIP-Graded, or up to 6.4% for MIP-Plus). The pension formula for any service thereafter would include a 1.25% pension factor.

Option 3 – members voluntarily elected not to increase their contribution to the pension fund and maintain their current level of contribution to the pension fund. The pension formula for their years of service as of the day before their transition date will include a 1.5% pension factor. The pension formula for any service thereafter will include a 1.25% pension factor.

Option 4 – members voluntarily elected to no longer contribute to the pension fund and therefore are switched to the Defined Contribution plan for future service as of their transition date. As a DC participant they receive a 4% employer contribution to a tax-deferred 401(k) account and can choose to contribute up to the maximum amounts permitted by the IRS to a 457 account. They vest in employer contributions and related earnings in their 401(k) account based on the following schedule: 50% at 2 years, 75% at 3 years, and 100% at 4 years of service. They are 100% vested in any personal contributions and related earnings in their 457 account. Upon retirement, if they meet age and service requirements (including their *total* years of service), they would also receive a pension (calculated based on years of service and final average compensation as of the day before their transition date and a 1.5% pension factor).

Members who did not make an election before the deadline defaulted to Option 3 as described above. Deferred or nonvested public school employees on September 3, 2012, who return to public school employment on or after September 4, 2012, will be considered as if they had elected Option 3 above. Returning members who made the retirement plan election will retain whichever option they chose.

Employees who first work on or after September 4, 2012, choose between two retirement plans: the Pension Plus plan described above and a Defined Contribution (DC) plan that provides a 50% employer match (up to 3% of salary) on employee contributions. New employees are automatically enrolled as members in the Pension Plus plan as of their date of hire. They have 75 days from the last day of their first pay period, as reported to ORS, to elect to opt out of the Pension Plus plan and become a qualified participant in the DC plan; if no election is made they will

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NOTES TO BASIC FINANCIAL STATEMENTS

remain in the Pension Plus plan. If they elect to opt out of the Pension Plus plan, their participation in the DC plan will be retroactive to their date of hire.

Pension Reform of 2017

On July 13, 2017, the Governor signed Public Act 92 of 2017 into law. The legislation closed the Pension Plus plan to newly hired employees as of February 1, 2018 and created a new, optional Pension Plus 2 plan with similar benefit calculations but containing a 50/50 contribution share between the employee and the employer, including the cost of future unfunded liabilities. The assumed rate of return on the Pension Plus 2 plan is 6%. Further, under certain adverse actuarial conditions, the Pension Plus 2 plan will close to new employees if the actuarial funded ratio falls below 85% for two consecutive years. The law included other provisions to the retirement eligibility age, plan assumptions, and unfunded liability payment methods.

Regular Retirement

The pension benefit for DB and Pension Plus members is based on a member's years of credited service (employment) and final average compensation (FAC). The FAC is calculated based on the member's highest total wages earned during a specific period of consecutive calendar months divided by the service credit accrued during that same time period. For a MIP member, who became a member of MPSERS prior to July 1, 2010, the averaging period is 36 consecutive months. For a Pension Plus member, who became a member of MPSERS after June 30, 2010, the averaging period is 60 consecutive months. For a Basic Plan member, this period is the 60 consecutive months yielding the highest total wages. The annual pension is paid monthly for the lifetime of a retiree. The calculation of a member's pension is determined by their pension election under PA 300 of 2012 and is shown below:

Option 1 – $\text{FAC} \times \text{total years of service} \times 1.5\%$

Option 2 – $\text{FAC} \times 30 \text{ years of service} \times 1.5\% + \text{FAC} \times \text{years of service beyond 30} \times 1.25\%$

Option 3 – $\text{FAC} \times \text{years of service as of transition date} \times 1.5\% + \text{FAC} \times \text{years of service after transition date} \times 1.25\%$

Option 4 – $\text{FAC as of transition date} \times \text{years of service as of transition date} \times 1.5\%$

A MIP member who became a member of MPSERS prior to July 1, 2010 may retire at:

- age 46 with 30 or more years of credited service; or
- age 60 with 10 or more years of credited service; or
- age 60 with 5 years of credited service provided the member has worked through his or her 60th birthday and has credited service in each of the five school fiscal years immediately preceding the retirement effective date.

A Pension Plus member may retire at age 60 with 10 or more years of credited service.

A Pension Plus 2 member may retire at age 60 with 10 or more years of credited service. Section 81c(5) of PA 300 as amended requires the regular retirement age to be increased in whole year increments based on the results of mortality analysis five-year actuarial experience studies performed after October 1, 2019 and the actuarial funding status of the plan. If the regular retirement age for Pension Plus 2 members is increased in accordance with this provision, members within five years of retirement from the effective date of the increase are automatically exempted and the retirement board may additionally authorize those between five and eight years of the then current retirement age to be exempted.

A Basic Plan member may retire at:

- age 55 with 30 or more years of credited service; or
- age 60 with 10 or more years of credited service

There is no mandatory retirement age.

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NOTES TO BASIC FINANCIAL STATEMENTS

Early Retirement

A MIP or Basic member may retire with an early permanently reduced pension:

- after completing at least 15 but less than 30 years of credited service; and
- after attaining age 55; and
- with credited service in each of the 5 school years immediately preceding the pension effective date

The early pension is computed in the same manner as a regular pension, but is permanently reduced 0.5% for each full and partial month between the pension effective date and the date the member will attain age 60.

Deferred Retirement

If a member terminates employment before attaining the age qualification, but after accruing 10 or more years of credited service, the member becomes a deferred member and is eligible for a pension at the time the age qualification is attained.

Nonduty Disability Benefit

Any member with 10 or more years of credited service who becomes totally and permanently disabled due to any non-duty related cause, and who has not met the age requirement for a regular pension is eligible for a non-duty disability pension computed in the same manner as an age and service pension, upon recommendation from the member's personal physician and the Retirement Board physician and the approval of the Retirement Board. An Annual Certification of Disability is conducted each January. Upon prior approval, total disability benefits plus authorized outside earnings are limited to 100% of final average compensation (increased by 2% for each year retired; first year 100%, next year 102%, etc.).

Duty Disability Benefit

Any member who becomes totally and permanently disabled as a result of a duty-related cause, who has not met the age and service requirement for a regular pension, and who is in receipt of weekly workers' compensation is eligible for a duty disability pension computed in the same manner as an age and service pension (but based upon a minimum of 10 years of service) upon recommendation from the member's personal physician and the Retirement Board physician and the approval of the Retirement Board. An Annual Certification of Disability is conducted each January. Upon prior approval, total disability benefits plus authorized outside earnings are limited to 100% of final average compensation (increased by 2% for each year retired; first year 100%, next year 102%, etc.).

Pension Payment Options

The election of a pension payment option is made at the time of application. Once a member has retired, the option choice is irrevocable. The pension effective date is the first of the calendar month following the date the member has satisfied the age and service requirements, has terminated public school employment and has the completed application forms on file with the System for a period of 15 days. A retroactive pension can be paid for no more than 12 calendar months. Thus, delay in filing the application can result in a loss of some retroactive pension benefits. An applicant may select only one of the following options.

Straight Life Pension

The Straight Life Pension pays the largest level pension a retiree can receive during his or her lifetime and stops with the month of a retiree's death. There are no monthly benefits for a beneficiary. The pension benefit is computed with no beneficiary rights. If the retiree made contributions while an employee and has not received the total accumulated contributions before death, a refund of the balance of the contributions is made to the beneficiary of record. If the retiree did not make any contributions, there will not be payments to any beneficiaries.

Survivor Options

Under the Survivor Options, 100% Survivor Pension, 100% Equated, 75% Survivor Pension, 75% Equated, 50% Survivor Pension and 50% Equated, the reduction is an actuarial determination dependent upon the combined life expectancies of a retiree and a beneficiary and varies from case to case. A beneficiary may only be a spouse, brother, sister, parent or child (including an adopted child) of a retiring member. If the beneficiary predeceases a retiree, the pension will revert to either the Straight Life or Straight Life Equated amount ("pop-

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

up” provision). If, however, a retiree was single at the time of retirement and subsequently married, the retiree can request to nominate a new spouse if they elected the straight life option at retirement. Also, if a retiree was married at the time of retirement and has since been widowed and remarried, the retiree can request to nominate a new spouse as a pension beneficiary as long as they elected a survivor option for the spouse at the time of retirement.

100% Survivor Pension

Pays a reduced pension to a retiree. The month after a retiree’s death, the same amount will be paid to a designated beneficiary for the remainder of his or her lifetime.

75% Survivor Pension

Pays a reduced pension to a retiree. The month after a retiree’s death, 75% of the pension amount will be paid to a designated beneficiary for the remainder of his or her lifetime.

50% Survivor Pension

Pays a reduced pension to a retiree. The month after a retiree’s death, 50% of the pension amount will be paid to a designated beneficiary for the remainder of his or her lifetime.

Equated Plan

For MIP and Basic members, the Equated plan may be combined with the Straight Life, 100% Survivor, 75% Survivor, or 50% Survivor Pension by any member under age 61, except a disability applicant. The Equated Plan provides a higher pension every month until age 62, at which time the monthly pension is permanently decreased to a lower amount than the Straight Life, 100%, 75%, or 50% Survivor alone would provide.

The intent of the Equated Plan is for the retiree’s pension to decrease at age 62 by approximately the same amount as that person’s Social Security benefit will provide. The System pension until age 62 should be about the same as the combined System pension and Social Security after age 62.

The projected Social Security pension the retiring member obtains from the Social Security Administration and furnishes to the System is used in the Equated Plan calculation. The actual Social Security pension may vary from the estimate.

NOTE: The reduction in the pension at age 62 pertains to the Equated Plan only and affects only the retiree. A beneficiary under 100% Equated, 75% Equated or 50% Equated will receive the 100%, 75%, or 50% Survivor amount the month following the retiree’s death as if the Equated Plan had not been chosen. A beneficiary does not participate in the Equated Plan.

Survivor Benefit

A non-duty survivor pension is available if a MIP member has 10 years of credited service or, if age 60 or older, with five years of credited service; the date they became a MIP member does not matter. The Basic plan provides a survivor pension with 15 years of credited service or, if age 60 or older, with 10 years of credited service. The Pension Plus plan provides for a survivor pension with 10 years of credited service. An active member may nominate as a survivor beneficiary a spouse, child(ren) (including adopted child(ren)), brother, sister, or parent. If other than the spouse is nominated and a spouse exists, the spouse must waive this benefit. If no beneficiary has been nominated, the beneficiary is automatically the spouse; or, if there is no spouse, unmarried children under age 18 share the benefit equally until age 18. The benefit is computed as a regular pension but reduced in accordance with a 100% survivor pension factor. The pension begins the first of the month following the member’s death. In the event of the death of a deferred member, the System begins payment to the nominated beneficiary at the time the member would have attained the minimum age qualification.

A duty survivor pension is payable if weekly workers’ compensation is being paid to the eligible beneficiary due to the member’s death. A spouse receives the benefit (based on a minimum of 10 years of service credit) reduced in accordance with a 100% survivor pension factor. If there is no spouse, unmarried children under age 18 share the benefit equally until age 18; if there is no spouse or child(ren), a disabled and dependent parent is eligible.

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NOTES TO BASIC FINANCIAL STATEMENTS

Postemployment Adjustments

A retiree who became a MIP member prior to July 1, 2010, receives an annual post-retirement non-compounded increase of 3% of the initial pension in the October following twelve months of retirement. Basic plan members do not receive an annual post-retirement increase, but are eligible to receive a supplemental payment in those years when investment earnings exceed actuarial assumptions. Pension Plus members do not receive an annual post-retirement increase.

On January 1, 1990, pre-October 1, 1981 retirees received an increase that ranged from 1% to 22% dependent upon the pension effective date. On October 1, 1990, the base pension of all retirees with an effective pension date of January 1, 1987, or earlier was increased to include all prior post-retirement adjustments.

On January 1, 1986, all recipients through calendar year 1985 received a permanent 8% increase that established the 1986 base pension. In addition, each October, retirees with a pension effective date of January 1, 1987, or earlier receive a fixed increase equal to 3% of the base pension. Both increases are deducted from the distribution of excess investment income, if any. Beginning in 1983, eligible recipients receive an annual distribution of excess investment income, if any.

Member Contributions

Mandatory member contributions were phased out between 1974 and 1977, with the plan remaining noncontributory until January 1, 1987, when the Member Investment Plan (MIP) was enacted. MIP members enrolled prior to January 1, 1990, contribute at a permanently fixed rate of 3.9% of gross wages. The MIP contribution rate was 4.0% from January 1, 1987, the effective date of the MIP, until January 1, 1990, when it was reduced to 3.9%. Members first hired between January 1, 1990 and June 30, 2008, and returning members who did not work between January 1, 1987, through December 31, 1989, contribute at the following graduated permanently fixed contribution rates: 3% of the first \$5,000; 3.6% of \$5,001 through \$15,000; 4.3% of all wages over \$15,000. Members first hired July 1, 2008, or later including Pension Plus plan members, contribute at the following graduated permanently fixed contribution rates: 3% of the first \$5,000; 3.6% of \$5,001 through \$15,000; 6.4% of all wages over \$15,000. Pension Plus 2 plan members contribute a flat 50% of the total calculated contribution rate including the Unfunded Actuarial Accrued Liability (UAAL) contribution rate associated with the Pension Plus 2 plan, if any.

For a limited period ending December 31, 1992, an active Basic plan member could enroll in the MIP by paying the contributions that would have been made had enrollment occurred initially on January 1, 1987, or on the date of hire, plus interest. MIP contributions at the rate of 3.9% of gross wages begin at enrollment. Actuarial rate of interest is posted to member accounts on July 1 on all MIP monies on deposit for 12 months. If a member leaves public school service and no pension is payable, the member's accumulated contributions plus interest, if any, are refundable.

Under Public Act 300 of 2012, eligible members voluntarily chose between increasing, maintaining, or stopping their contributions to the pension fund as of the transition date. Their options are described in detail under Pension Reform 2012 beginning on page 22. Members who elected to increase their level of contribution contribute 4% (Basic plan) or 7% (MIP); by doing so they maintain a 1.5% pension factor in their pension formula. Members who elected to maintain their level of contribution will receive a 1.25% pension factor in their pension formula for their years of service as of their transition date. Their contribution rates are described above. Members who elected to stop their contributions became participants in the Defined Contribution plan as of their transition date.

Employer Contributions

Each school district or reporting entity is required to contribute the full actuarial funding contribution amount to fund pension benefits.

BENEFIT PROVISIONS – OTHER POSTEMPLOYMENT

Introduction

Benefit provisions of the postemployment healthcare plan are established by State statute, which may be amended. Public Act 300 of 1980, as amended, establishes eligibility and benefit provisions. Retirees have the option of health coverage, which, through 2012, was funded on a cash disbursement basis. Beginning fiscal year 2013, it is funded on a prefunded basis. The System has contracted to provide the comprehensive group medical, prescription drug,

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

dental and vision coverage for retirees and beneficiaries. A subsidized portion of the premium is paid by the System with the balance deducted from the monthly pension of each retiree healthcare recipient. For members who first worked before July 1, 2008, (Basic, MIP-Fixed, and MIP-Graded plan members) the subsidy is the maximum allowed by statute. To limit future liabilities of Other Postemployment Benefits, members who first worked on or after July 1, 2008, (MIP-Plus plan members) have a graded premium subsidy based on career length where they accrue credit towards their insurance premiums in retirement, not to exceed the maximum allowable by statute. Public Act 300 of 2012 sets the maximum subsidy at 80% beginning January 1, 2013; 90% for those Medicare eligible and enrolled in the insurances as of that date.

Public Act 75 of 2010 requires each actively employed member of MPSERS after June 30, 2010, to annually contribute 3% of their compensation to offset employer contributions for healthcare benefits of current retirees.

Dependents are eligible for healthcare coverage if they meet the dependency requirements set forth in Public Act 300 of 1980, as amended.

Applications for enrollment after retirement are accepted anytime during the year, with coverage effective six months following the receipt of the application.

Retiree Healthcare Reform of 2012

Public Act 300 of 2012 granted all active members of the Michigan Public School Employees Retirement System, who earned service credit in the 12 months ending September 3, 2012, or were on an approved professional services or military leave of absence on September 3, 2012, a voluntary election regarding their retirement healthcare. Any changes to a member's healthcare benefit are effective as of the member's transition date, which is defined as the first day of the pay period that begins on or after February 1, 2013.

Under Public Act 300 of 2012, members were given the choice between continuing the 3% contribution to retiree healthcare and keeping the premium subsidy benefit described above, or choosing not to pay the 3% contribution and instead opting out of the subsidy benefit and becoming a participant in the Personal Healthcare Fund (PHF), a portable, tax-deferred fund that can be used to pay healthcare expenses in retirement. Participants in the PHF are automatically enrolled in a 2% employee contribution into their 457 account as of their transition date, earning them a 2% employer match into a 401(k) account. Members who selected this option stop paying the 3% contribution to retiree healthcare as of the day before their transition date, and their prior contributions were deposited into their 401(k) account.

Members who did not make an election before the deadline retain the premium subsidy benefit and continue making the 3% contribution toward retiree healthcare. Deferred or nonvested members on September 3, 2012 who are rehired on or after September 4, 2012, will contribute 3% to retiree healthcare and will retain the premium subsidy benefit. Returning members who made the retirement healthcare election will retain whichever option they chose.

Those who elected to retain the premium subsidy continue to annually contribute 3% of compensation into the healthcare funding account. A member or former member age 60 or older, who made the 3% healthcare contributions but who does not meet eligibility requirements may request a refund of their contributions. Similarly, if a retiree dies before the total value of the insurance subsidy paid equals the total value of the contributions the member made, and there are no eligible dependents, the beneficiary may request a refund of unused funds. Refunds of member contributions to the healthcare funding account are issued as a supplemental benefit paid out over a 60-month period.

- Retirees with at least 21 years of service, who terminate employment after October 31, 1980, with vested deferred benefits, are eligible for subsidized employer-paid health benefit coverage.
- A delayed premium subsidy applies to retirees who became a member of the retirement system before July 1, 2008 and who purchased service credit on or after July 1, 2008. Such individuals are eligible for premium subsidy benefits at age 60 or when they would have been eligible to retire without having made a service purchase, whichever comes first. They may enroll in the insurances earlier but are responsible for the full premium until the premium subsidy begins.

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NOTES TO BASIC FINANCIAL STATEMENTS

Under Public Act 300 of 2012, the state no longer offers an insurance premium subsidy in retirement for public school employees who first work on or after September 4, 2012. Instead, all new employees will be placed into the Personal Healthcare Fund where they will have support saving for retirement healthcare costs in the following ways:

- They will be automatically enrolled in a 2% employee contribution into a 457 account as of their date of hire, earning them a 2% employer match into a 401(k) account.
- They will receive a credit into a Health Reimbursement Account (HRA) at termination if they have at least 10 years of service at termination. The credit will be \$2,000 for participants who are at least 60 years of age at termination or \$1,000 for participants who are less than 60 years of age at termination.

Participants in the Personal Healthcare Fund who become disabled for any reason are not eligible for any employer-funded health insurance premium subsidy. If a PHF participant suffers a nonduty-related death, his or her health benefit dependents are not eligible to participate in any employer funded health insurance premium subsidy. If a PHF participant suffers a duty death, the state will pay the maximum health premium allowed by statute for the surviving spouse and health benefit dependents. The spouses' insurance subsidy may continue until his or her death, the dependents' subsidy may continue until their eligibility ends (through marriage, age, or other event). Upon eligibility for a duty death benefit, the 2% employer matching contributions and related earnings in the member's 401(k) are forfeited and the state will pay for the subsidy. The beneficiaries receive the member's personal contributions and related earnings in the member's 457 account.

NOTE 2 – SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

BASIS OF ACCOUNTING AND PRESENTATION

The System's financial statements are prepared using the accrual basis of accounting. Contributions from the members and employers are recognized as revenue when due and payable. Benefits and refunds are recognized when due and payable in accordance with the terms of the System. The reserves are described below, and details are provided in the supporting schedules.

Governmental Accounting Standards Board (GASB) Statement No. 67 and Statement No. 74, which were adopted during the year ended September 30, 2014 and 2017, addresses accounting and financial reporting requirements for pension and other postemployment benefit plans, respectively. The requirements for both GASB Statement No. 67 and 74 require changes in presentation of the financial statements, notes to the financial statements, and required supplementary information. Significant changes include an actuarial calculation of total and net pension and other postemployment benefit liabilities. It also includes comprehensive note disclosures regarding the pension and other postemployment benefit liability, the sensitivity of the net pension and other postemployment benefit liability to the discount rate, and increased investment activity disclosures. The implementation of GASB Statement No. 67 and 74 did not significantly impact the accounting for accounts receivable and investment balances. The total pension and other postemployment benefit liability, determined in accordance with GASB Statement No. 67 and 74, is presented in Note 4 on page 32, Note 5 on page 36, and in the Required Supplementary Information beginning on page 50.

As of September 30, 2016, the System applied GASB Statement No. 72, *Fair Value Measurement and Application*. GASB Statement No. 72 provides guidance for determining a fair value measurement for reporting purposes and applying fair value to certain investments and disclosures related to all fair value measurements.

RESERVES

Reserve for Employee Contributions

This reserve represents active member contributions and interest less amounts transferred to the Reserve for Retired Benefit Payments for regular and disability retirement, amounts refunded to terminated members, and amounts transferred to the Reserve for Employer Contributions representing unclaimed funds. Members no longer contribute to this reserve except to purchase eligible service credit or repay previously refunded contributions. At September 30, 2019, the balance in this reserve was \$1.6 billion.

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NOTES TO BASIC FINANCIAL STATEMENTS

Reserve for Pension Plus Employee Contributions

This reserve represents active member contributions and interest less amounts transferred to the Reserve for Pension Plus Retired Benefit Payments for regular retirement, amounts refunded to terminated members, and amounts transferred to the Reserve for Pension Plus Employer Contributions representing unclaimed funds. This reserve was established under the provisions of Public Act 75 of 2010. At September 30, 2019, the balance in this reserve was \$354.6 million.

Reserve for Pension Plus 2 Employee Contributions

This reserve represents active member contributions and interest less amounts transferred to the Reserve for Pension Plus 2 Retired Benefit Payments for regular retirement, amounts refunded to terminated members, and amounts transferred to the Reserve for Pension Plus Employer II Contributions representing unclaimed funds. This reserve was established under the provisions of Public Act 92 of 2017. At September 30, 2019, the balance in this reserve was \$8.3 million.

Reserve for Member Investment Plan

This reserve represents MIP contributions and interest less refunds and transfers to the Reserve for Retired Benefit Payments. At September 30, 2019, the balance in this reserve was \$7.9 billion.

Reserve for Employer Contributions

This reserve represents all reporting unit contributions, except payments for health benefits. Interest from the Reserve for Undistributed Investment Income is credited annually. Amounts are transferred annually to the Reserve for Retired Benefit Payments to bring the balance of that reserve into balance with the actuarial present value of retirement allowances. At September 30, 2019, the balance in this reserve was (\$25.3) billion.

Reserve for Pension Plus Employer Contributions

This reserve represents all reporting unit contributions for Pension Plus members, except payments for health benefits. Interest from the Reserve for Undistributed Investment Income is credited annually at a rate of 7%. Amounts are transferred annually to the Reserve for Retired Pension Plus Benefit Payments to bring the balance of that reserve into balance with the actuarial present value of retirement allowances. This reserve was established under the provisions of Public Act 75 of 2010. At September 30, 2019, the balance in this reserve was \$243.2 million.

Reserve for Pension Plus 2 Employer Contributions

This reserve represents all reporting unit contributions for Pension Plus 2 members, except payments for health benefits. Interest from the Reserve for Undistributed Investment Income is credited annually at a rate of 7%. Amounts are transferred annually to the Reserve for Retired Pension Plus Benefit Payments to bring the balance of that reserve into balance with the actuarial present value of retirement allowances. This reserve was established under the provisions of Public Act 92 of 2017. At September 30, 2019, the balance in this reserve was \$8.5 million.

Reserve for Retired Benefit Payments

This reserve represents payments of future retirement benefits to current retirees. At retirement, a member's accumulated contributions plus interest are transferred into this reserve. Monthly benefits, which are paid to the retiree, reduce this reserve. At the end of each fiscal year, an amount, determined by an annual actuarial valuation, is transferred from the Reserve for Employer Contributions to bring the balance of this reserve into balance with the actuarial present value of retirement allowances. At September 30, 2019, the balance in this reserve was \$58.5 billion.

Reserve for Pension Plus Retired Benefit Payments

This reserve represents payments of future retirement benefits to current Pension Plus retirees. At retirement, a member's accumulated contributions plus interest are transferred into this reserve. Monthly benefits, which are paid to the retiree, reduce this reserve. At the end of each fiscal year, an amount, determined by an annual actuarial valuation, is transferred from the Reserve for Pension Plus Employer Contributions to bring the balance of this reserve into balance with the actuarial present value of retirement allowances. This reserve was established under the provisions of Public Act 75 of 2010. At September 30, 2019, the balance in this reserve was \$112 thousand.

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NOTES TO BASIC FINANCIAL STATEMENTS

Reserve for Pension Plus 2 Retired Benefit Payments

This reserve represents payments of future retirement benefits to current Pension Plus 2 retirees. At retirement, a member's accumulated contributions plus interest are transferred into this reserve. Monthly benefits, which are paid to the retiree, reduce this reserve. At the end of each fiscal year, an amount, determined by an annual actuarial valuation, is transferred from the Reserve for Pension Plus 2 Employer Contributions to bring the balance of this reserve into balance with the actuarial present value of retirement allowances. This reserve was established under the provisions of Public Act 92 of 2017. At September 30, 2019, the balance in this reserve was \$0.

Reserve for Undistributed Investment Income

This reserve represents all investment earnings. Interest is transferred annually to the other reserves. Administrative expenses of the System are paid from the Reserve for Administrative Expenses, which is credited with amounts from the Reserve for Undistributed Investment Income to cover the expenses. For ease of reporting and understanding, the two reserves are presented as one reserve in the supporting schedules. Public Act 143 of 1997 established a stabilization subaccount within the Reserve for Undistributed Investment Income to which any over funding is credited. As of September 30, 2019, the balance in the subaccount was \$0. At September 30, 2019, the balance in this reserve was \$7.6 billion.

Reserve for Health (OPEB) Related Benefits

This reserve is credited with employee and employer contributions for retirees' health, dental, and vision benefits. Starting in fiscal year 2013, the employer contribution is based on a prefunded basis and represents a level of funding that, if paid on an ongoing basis, is projected to cover normal cost each year and amortize any unfunded actuarial liability (or funding excess) over a period not to exceed 30 years. In addition, in fiscal year 2019, this reserve includes revenue from the federal government for the Employer Group Waiver Plan (EGWP). Premiums for health, dental and vision benefits are paid from this reserve. At September 30, 2019, the balance in this reserve was \$6.9 billion.

REPORTING ENTITY

The System is a pension and other employee benefit trust fund of the State. As such, the System is considered part of the State and is included in the State's Comprehensive Annual Financial Report as a pension and other employee benefit trust fund. The System and its Board are not financially accountable for any other entities or other organizations. Accordingly, the System is the only entity included in this financial report.

BENEFIT PROTECTION

Public Act 100 of 2002 was passed by the Michigan Legislature to protect pension benefits of public employees from alienation (being transferred). Alienation is attachment, garnishment, levy, execution, bankruptcy or other legal process except for divorce orders or eligible domestic relation orders. The statutes governing the System contained an "anti-alienation" clause to provide for this protection; however, many smaller public pension systems did not have the benefit of this protection. Therefore, Public Act 100 of 2002 was passed to establish legal protection of pension assets that encompasses all public employees.

INVESTMENTS

Generally, investments are reported at fair value, consistent with the provisions of GASB Statement No. 72, *Fair Value Measurement and Application*. Short-term, highly liquid debt instruments including commercial paper are reported at amortized cost. Additional disclosures describing investments are provided in Note 6.

INVESTMENT INCOME

Dividend and interest income is recognized on the accrual basis. Fair value changes are recorded as investment income or loss. Purchases and sales of investments are recorded as of the trade date (the date upon which the transaction is initiated), except for purchase and sale of mortgages, real estate, and private equity investments which are recorded as of the settlement date (the date upon which the transaction is ultimately completed). The effect of recording such transactions as of the settlement date does not materially affect the financial statements.

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NOTES TO BASIC FINANCIAL STATEMENTS

COSTS OF ADMINISTERING THE SYSTEM

Each year a restricted general fund appropriation is requested to fund the ongoing business operations of the System. These administrative costs are ultimately funded by the System through the regular transfer of funds from the System to the State's general fund based on either a direct cost or allocation basis depending on the nature of the expense. Costs of administering the System are financed by undistributed investment income of the System.

PROPERTY AND EQUIPMENT

Office space is leased from the State on a year-to-year basis. Office equipment is capitalized if the value exceeds \$5,000. These assets are recorded at cost and are reported net of depreciation in the *Statement of Pension Plan and Other Postemployment Benefit Plan Fiduciary Net Position*. Such assets are depreciated on a straight-line basis over 10 years. As of September 30, 1998, all capitalized equipment was fully depreciated. No additional equipment has been capitalized for the System since that date.

RELATED PARTY TRANSACTIONS

Leases and Services

The System leases operating space and purchases certain administrative, data processing, legal and investment services from the State. The space and services are not otherwise available by competitive bid. The schedule on the next page summarizes costs incurred by the System for such services.

| | 2019 |
|-----------------------|----------------|
| | (in thousands) |
| Building Rentals | \$ 905 |
| Technological Support | 12,996 |
| Attorney General | 318 |
| Investment Services | 13,737 |
| Personnel Services | 10,059 |

Cash

At September 30, 2019, the System had \$117.4 million in a common cash investment pool maintained for various State operating funds. The participating funds in the common cash pool earn interest at various rates depending upon prevailing short-term interest rates. Earnings (Losses) from these activities amounted to \$0.3 million for the year ended September 30, 2019.

NOTE 3 – CONTRIBUTIONS

The majority of the members currently participate in the pension and OPEB plans on a contributory basis. Reporting units are required by Public Act 300 of 1980, as amended, to contribute amounts necessary to finance the coverage of pension benefits and OPEB. Contribution provisions are specified by State statute and may be amended only by action of the State Legislature.

Employer contributions to the System are determined on an actuarial basis using the entry age normal actuarial cost method. Under this method, the actuarial present value of the projected benefits of each individual included in the actuarial valuation is allocated on a level basis over the service of the individual between entry age and assumed exit age. The normal cost is the annual cost assigned under the actuarial funding method, to the current and subsequent plan years. The remainder is called the actuarial accrued liability. Normal cost is funded on a current basis.

Pension and OPEB contributions made in the fiscal year ending September 30, 2019 were determined as of the September 30, 2016 actuarial valuations. The pension and OPEB unfunded (overfunded) actuarial accrued liabilities (UAAL) as of September 30, 2016 are amortized over a 20 year period beginning October 1, 2018 and ending September 30, 2038. The schedules below summarize pension and OPEB contribution rates in effect for fiscal year 2019.

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NOTES TO BASIC FINANCIAL STATEMENTS

PENSION CONTRIBUTION RATES

| Benefit Structure | Member | Employer |
|------------------------|-------------|-----------------|
| Basic | 0.0 - 4.0 % | 13.39 - 25.03 % |
| Member Investment Plan | 3.0 - 7.0 | 13.39 - 25.03 |
| Pension Plus | 3.0 - 6.4 | 16.46 |
| Pension Plus 2 | 6.2 | 19.59 |
| Defined Contribution | 0.0 | 13.39 |

OPEB CONTRIBUTION RATES

| Benefit Structure | Member | Employer |
|--------------------------|--------|---------------|
| Premium Subsidy | 3.0 % | 6.42 - 7.93 % |
| Personal Healthcare Fund | 0.0 | 5.99 - 7.57 |

The System may reconcile with actuarial requirements annually. If the system reconciles in a year, any funding deficiency for pension benefits is smoothed over a maximum of five years, with at least one-fifth (20%) of the funding deficiency included in the subsequent year's contribution. This payment is not recognized as a receivable in the accounting records. If the System does not reconcile in a year, any funding deficiency for pension benefits is accounted for in subsequent required contributions over the remaining amortization period. For fiscal year 2019, the System reconciled.

In May 1996, the Internal Revenue Service issued a private letter ruling allowing the System's members to purchase service credit and repay refunds using tax-deferred (pre-tax) dollars. The program was implemented in fiscal year 1998, and payments began in fiscal year 1999. Public Act 92 of 2017 discontinued the option to initiate a service credit purchase for the majority of service credit types as of September 29, 2017.

The program allowed members to purchase service credit and repay refunds on a tax-deferred basis. Members sign an irrevocable agreement that identifies the contract duration, monthly payment, total contract amount and years of service credit being purchased. The duration of the contract can range from 1 to 20 years. The payment amounts are withheld from members' paychecks and are treated as employer pick-up contributions pursuant to Internal Revenue Code Section 414(h). Contracts entered into prior to the September 29, 2017 deadline remain in effect.

At September 30, 2019, there were 6,105 agreements. The agreements were discounted using the contractual interest rate of 8.00% for September 30, 2019. The average remaining length of a contract was approximately 5.5 years for 2019. The short-term receivable was \$13.0 million, and the discounted long-term receivable was \$30.8 million at September 30, 2019.

NOTE 4 – NET PENSION LIABILITY

MEASUREMENT OF THE NET PENSION LIABILITY

The net pension liability is to be measured as the total pension liability, less the amount of the pension plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the fair value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

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NOTES TO BASIC FINANCIAL STATEMENTS

Net Pension Liability

(in thousands)

| | | |
|--|----|------------|
| Total Pension Liability | \$ | 84,643,399 |
| Plan Fiduciary Net Position | | 50,857,170 |
| Net Pension Liability | \$ | 33,786,229 |
| Plan Fiduciary Net Position as a Percentage of Total Pension Liability | | 60.08% |
| Net Pension Liability as a Percentage of Covered Payroll | | 377.13% |
| Total Covered Payroll | \$ | 8,958,777 |

LONG-TERM EXPECTED RETURN ON PLAN ASSETS

The long-term 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 provided by the Bureau of Investments (BOI) for each major asset class included in the pension plan's portfolio as of September 30, 2019. These best estimates and the plan's target asset allocation are summarized in the following table:

Asset Allocation

| Asset Class | Target Allocation | Long-Term Expected Real Rate of Return* |
|--------------------------------------|-------------------|---|
| Domestic Equity Pools | 28.0 % | 5.5 % |
| Private Equity Pools | 18.0 | 8.6 |
| International Equity Pools | 16.0 | 7.3 |
| Fixed Income Pools | 10.5 | 1.2 |
| Real Estate and Infrastructure Pools | 10.0 | 4.2 |
| Absolute Return Pools | 15.5 | 5.4 |
| Short-Term Investment Pools | 2.0 | 0.8 |
| TOTAL | 100.0 % | |

* Long-term rates of return are net of administrative expenses and 2.3% inflation.

RATE OF RETURN

For the fiscal year ended September 30, 2019, the annual money-weighted rate of return on pension plan investment, net of pension plan investment expense, was 5.14%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

DISCOUNT RATE

A single discount rate of 6.80% was used to measure the total pension liability (6.00% for the Pension Plus 2 Plan) for the fiscal year 2019. In fiscal year 2018, the single discount rate used to measure the pension liability was 7.05% (7.00% for the Pension Plus Plan and 6.00% for the Pension Plus 2 Plan). This single discount rate was based on the expected rate of return on pension plan investments of 6.80% (6.00% for the Pension Plus 2 Plan). The projection of cash flows used to determine this single discount rate was based on the assumption that in the future, 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. Based on these assumptions, the pension plan's fiduciary net position was projected to be available to make all

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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.

SENSITIVITY OF THE NET PENSION LIABILITY TO CHANGES IN THE DISCOUNT RATE

As required by GASB Statement No. 67, we determined the sensitivity of the net pension liability, in thousands, to changes in the single discount rate. The following table presents the plan's net pension liability, calculated using a single discount rate of 6.80% (6.00% for the Pension Plus 2 Plan), 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:

| 1% Decrease | Current Discount Rate Assumption | 1% Increase |
|--------------------|---|--------------------|
| 5.80% / 5.0% | 6.80% / 6.0% | 7.80% / 7.0% |
| \$43,842,151 | \$33,786,229 | \$25,446,801 |

TIMING OF THE VALUATION

An actuarial valuation to determine the total pension liability is required to be performed at least every two years. If the actuarial valuation is not calculated as of the plan's fiscal year end, the total pension liability is required to be rolled forward from the actuarial valuation date to the pension plan's fiscal year end.

The total pension liability as of September 30, 2019, is based on the results of an actuarial valuation date of September 30, 2018 and rolled-forward using generally accepted actuarial procedures.

ACTUARIAL VALUATIONS AND ASSUMPTIONS

Actuarial valuation for the pension plan involves estimates of the value of reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment and mortality. Amounts determined regarding the funded status of the plan and the actuarially determined contributions (ADC) are subject to continual revision as actual results are compared with past expectations and new estimates are made about the future.

The Schedules of Contributions in Required Supplementary Information present trend information about the amounts contributed to the plan by employers in comparison to the ADC, an amount that is actuarially determined in accordance with the parameters of GASB Statement No. 67 for pension.

Projections of benefits for financial reporting purposes are based on the substantive plan (the plan as understood by the employer and plan members) and include the types of benefits provided at the time of each valuation and the historical pattern of sharing of benefit costs between the employer and plan members to that point. The actuarial methods and assumptions used include techniques that are designed to reduce the effects of short-term volatility in actuarial accrued liabilities and the actuarial value of assets, consistent with the long-term perspective of the calculations.

The information presented in the Net Pension Liability schedules and notes was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial valuation follows:

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NOTES TO BASIC FINANCIAL STATEMENTS

Summary of Actuarial Assumptions

| | |
|----------------------------|--|
| Valuation Date | September 30, 2018 |
| Actuarial Cost Method | Entry Age, Normal |
| Asset Valuation Method | Fair Value |
| Actuarial Assumptions | |
| Wage Inflation Rate | 2.75% |
| Investment Rate of Return | |
| - MIP and Basic Plans | 6.80% net of investment expenses |
| - Pension Plus Plan | 6.80% net of investment expenses |
| - Pension Plus 2 Plan | 6.00% net of investment expenses |
| Projected Salary Increases | 2.75% - 11.55%, including wage inflation at 2.75% |
| Cost of Living Adjustment | 3% annual non-compounded for MIP members |
| Mortality | |
| Retirees | RP-2014 Male and Female Healthy Annuitant Mortality Tables scaled by 82% for males and 78% for females and adjusted for mortality improvements using projection scale MP-2017 from 2006. |
| Active | RP-2014 Male and Female Employee Mortality Tables scaled 100% and adjusted for mortality improvements using projection scale MP-2017 from 2006. |
| Disabled Retirees | RP-2014 Male and Female Disabled Annuitant Mortality Tables scaled 100% and adjusted for mortality improvements using projection scale MP-2017 from 2006. |
| Notes | Assumption changes as a result of an experience study for the period 2012 through 2017 have been adopted by the System for use in the determination of the total pension liability beginning with the September 30, 2017 valuations. |

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

NOTE 5 – NET OPEB LIABILITY

MEASUREMENT OF THE NET OPEB LIABILITY

The net OPEB liability is to be measured as the total OPEB liability, less the amount of the OPEB plan's fiduciary net position. In actuarial terms, this will be the accrued liability less the fair value of assets (not the smoothed actuarial value of assets that is often encountered in actuarial valuations performed to determine the employer's contribution requirement).

Net OPEB Liability

(in thousands)

| | | |
|--|----|------------------|
| Total OPEB Liability | \$ | 14,161,627 |
| Plan Fiduciary Net Position | | 6,892,099 |
| Net OPEB Liability | \$ | <u>7,269,528</u> |
| Plan Fiduciary Net Position as a Percentage of Total OPEB Liability | | 48.67% |
| Net OPEB Liability as a Percentage of Covered Payroll | | 81.14% |
| Total Covered Payroll | \$ | 8,958,777 |

LONG-TERM EXPECTED RETURN ON PLAN ASSETS

The long-term expected rate of return on OPEB 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 OPEB 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 provided by the Bureau of Investments (BOI) for each major asset class that is included in the OPEB plan's target asset allocation as of September 30, 2019. These best estimates are summarized in the following table:

Asset Allocation

| <u>Asset Class</u> | <u>Target Allocation</u> | <u>Long-Term Expected Real Rate of Return*</u> |
|--------------------------------------|------------------------------|--|
| Domestic Equity Pools | 28.0 % | 5.5 % |
| Private Equity Pools | 18.0 | 8.6 |
| International Equity Pools | 16.0 | 7.3 |
| Fixed Income Pools | 10.5 | 1.2 |
| Real Estate and Infrastructure Pools | 10.0 | 4.2 |
| Absolute Return Pools | 15.5 | 5.4 |
| Short-Term Investment Pools | <u>2.0</u> | 0.8 |
| TOTAL | <u>100.0 %</u> | |

* Long-term rates of return are net of administrative expenses and 2.3% inflation.

RATE OF RETURN

For the fiscal year ended September 30, 2019, the annual money-weighted rate of return on OPEB plan investment, net of OPEB plan investment expense, was 5.37%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

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NOTES TO BASIC FINANCIAL STATEMENTS

DISCOUNT RATE

A single discount rate of 6.95% was used to measure the total OPEB liability for fiscal year 2019. In fiscal year 2018, the single discount rate used to measure the pension liability was 7.15%. This single discount rate was based on the expected rate of return on OPEB plan investments of 6.95%. The projection of cash flows used to determine this single discount rate was based on the assumption that in the future 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. Based on these assumptions, the OPEB 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 OPEB plan investments was applied to all periods of projected benefit payments to determine the total OPEB liability.

SENSITIVITY OF THE NET OPEB LIABILITY TO CHANGES IN THE DISCOUNT RATE

As required by GASB Statement No. 74, we have determined the sensitivity of the net OPEB liability to changes, in thousands, in the single discount rate. The following table presents the plan's net OPEB liability, calculated using a single discount rate of 6.95%, as well as what the plan's net OPEB liability would be if it were calculated using a single discount rate that is 1 percentage point lower or 1 percentage point higher:

| 1% Decrease | Current Discount Rate Assumption | 1% Increase |
|-------------|-------------------------------------|-------------|
| 5.95% | 6.95% | 7.95% |
| \$8,919,920 | \$7,269,528 | \$5,883,386 |

SENSITIVITY OF THE NET OPEB LIABILITY TO HEALTHCARE COST TREND RATE

As required by GASB Statement No. 74, we have determined the sensitivity of the net OPEB liability to changes, in thousands, in the healthcare cost trend rates. The following table presents the plan's net OPEB liability, calculated using the assumed trend rates as well as what the plan's net OPEB liability would be if it were calculated using a trend rate that is 1 percentage point lower or 1 percentage point higher:

| 1% Decrease | Current Healthcare Cost Trend Rate | 1% Increase |
|-------------|---------------------------------------|-------------|
| \$5,824,117 | \$7,269,528 | \$8,920,697 |

TIMING OF THE VALUATION

An actuarial valuation to determine the total OPEB liability is required to be performed at least every two years. If the actuarial valuation is not calculated as of the plan's fiscal year end, the total OPEB liability is required to be rolled forward from the actuarial valuation date to the OPEB plan's fiscal year end.

The total OPEB liability as of September 30, 2019, is based on the results of an actuarial valuation date of September 30, 2018 and rolled-forward using generally accepted actuarial procedures.

ACTUARIAL VALUATIONS AND ASSUMPTIONS

Actuarial valuations for the OPEB plan involve estimates of the value of reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality and the healthcare cost trend. Amounts determined regarding the funded status of the plan and the actuarially determined contributions (ADC) are subject to continual revision as actual results are compared with past expectations and new estimates are made about the future.

The Schedules of Contributions in Required Supplementary Information present trend information about the amounts contributed to the plan by employers in comparison to the ADC, an amount that is actuarially determined in accordance with the parameters of GASB Statement No. 74 for OPEB.

Projections of benefits for financial reporting purposes are based on the substantive plan (the plan as understood by the employer and plan members) and include the types of benefits provided at the time of each valuation and

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

the historical pattern of sharing of benefit costs between the employer and plan members to that point. The actuarial methods and assumptions used include techniques that are designed to reduce the effects of short-term volatility in actuarial accrued liabilities and the actuarial value of assets, consistent with the long-term perspective of the calculations.

The information presented in the Net OPEB Liability schedules and notes was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial valuation follows:

Summary of Actuarial Assumptions

| | |
|---|--|
| Valuation Date | September 30, 2018 |
| Actuarial Cost Method | Entry Age, Normal |
| Asset Valuation Method | Fair Value |
| Actuarial Assumptions: | |
| Wage Inflation Rate | 2.75% |
| Investment Rate of Return | 6.95% net of investment expenses |
| Projected Salary Increases | 2.75% - 11.55%, including wage inflation at 2.75% |
| Healthcare Cost Trend Rate ² | 7.50% Year 1 graded to 3.50% Year 12 |
| Mortality | |
| Retirees | RP-2014 Male and Female Healthy Annuitant Mortality Tables scaled by 82% for males and 78% for females and adjusted for mortality improvements using projection scale MP-2017 from 2006. |
| Active | RP-2014 Male and Female Employee Mortality Tables scaled 100% and adjusted for mortality improvements using projection scale MP-2017 from 2006. |
| Disabled Retirees | RP-2014 Male and Female Disabled Annuitant Mortality Tables scaled 100% and adjusted for mortality improvements using projection scale MP-2017 from 2006. |
| Other Assumptions: ¹ | |
| Opt Out Assumption | 21% of eligible participants hired before July 1, 2008 and 30% of those hired after June 30, 2008 are assumed to opt out of the retiree health plan. |
| Survivor Coverage | 80% of male retirees and 67% of female retirees are assumed to have coverage continuing after the retiree's death. |
| Coverage Election at Retirement | 75% of male and 60% of female future retirees are assumed to elect coverage for 1 or more dependents. |
| Notes: | Assumption changes as a result of an experience study for the period 2012 through 2017 have been adopted by the System for use in the determination of the total OPEB liability beginning with the September 30, 2017 valuation. |

¹ Applies to individuals hired before September 4, 2012.

² Applies to medical Rx payments

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NOTES TO BASIC FINANCIAL STATEMENTS

NOTE 6 – INVESTMENTS

INVESTMENT AUTHORITY

The State of Michigan Investment Board (Board) was created by Executive Order 2018-10 (Order) and serves as the investment fiduciary over the assets of the State sponsored defined benefit retirement systems. The Board is responsible for investing the System's assets in accordance with the duties and powers enumerated in the Order and with Public Act 380 of 1965, as amended. Investments are made subject to the Public Employee Retirement System Investment Act, Public Act 314 of 1965, as amended. The Public Employee Retirement System Investment Act authorizes, with certain restrictions, the investment of pension fund assets in stocks, corporate and government bonds and notes, mortgages, real estate, and certain short-term and private equity investments. Investments must be made for the exclusive purposes of providing benefits to active members, retired members and beneficiaries, and for defraying the expenses of investing the assets.

DERIVATIVES

The Board employs the use of derivatives in the investment of the pension and other employee benefit trust funds (the trust funds).

Derivatives are used in managing the trust fund portfolios, but uses do not include speculation or leverage of investments. State investment statutes limit total derivative exposure to 15% of a fund's total asset value, and restrict uses to replication of returns and hedging of assets. Swap agreements represent the largest category of derivative investments subject to this limitation. Option and Future contracts traded daily on an exchange and settling in cash daily or having a limited and fully defined risk profile at an identified, fixed cost are not subject to the derivative exposure limitation. Less than 15% of the total trust funds' portfolio has been invested from time to time in future contracts, swap agreements, structured notes, option and forward contracts

The derivative fair values are reported on the Statement of Pension Plan and Other Postemployment Benefit Plan Fiduciary Net Position as of September 30, 2019, in their respective investment pool's fair value. Derivative net increase and decrease are reported on the Statement of Changes in Pension Plan and Other Postemployment Benefit Plan Fiduciary Net Position for fiscal year ended September 30, 2019, under "Investment income (loss)", in "Net increase (decrease) in fair value of investments". Bond interest, swap payments, and dividends are reported under "Investment income (loss)", in "Interest, dividends, and other".

Derivative Investment Table as of September 30, 2019 (in millions):

| Investment and Investment Type | Percentage of Fair Value | Notional Value | Investments at Fair Value | Net Increase (Decrease) in Fair Value | Investment Income | Fair Value Subject to Credit Risk |
|---|--------------------------|----------------|---------------------------|---------------------------------------|-------------------|-----------------------------------|
| Future Contracts Fixed Income and International Equity Investments | 0.0% | \$ 233.2 | \$ 1.4 | \$ (1.8) | \$ - | \$ 0.0 |
| Option Contracts Equity, Fixed Income and International Equity Investments | 0.6 | 23,299.4 | 318.8 | (109.9) | - | 0.0 |
| Swap Agreements Fixed Income and International Equity Investments | 2.5 | 3,272.8 | 1,431.7 | 35.6 | (19.0) | 132.3 |
| Total | | \$ 26,805.4 | \$ 1,751.9 | \$ (76.1) | \$ (19.0) | \$ 132.3 |

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NOTES TO BASIC FINANCIAL STATEMENTS

To diversify the Board has entered into international swap agreements with investment grade counterparties, which are tied to stock market indices in approximately forty-eight foreign countries. Generally, the notional amount of equity swaps tied to foreign stock market indices is executed via a net total return USD index. The swap agreements provide that the System will pay quarterly over the term of swap agreements, interest indexed to the three-month London Inter-Bank Offer Rate (LIBOR), adjusted for an interest rate spread, on the notional amount stated in the agreements. International equity swap agreement maturity dates range from October 2019 to June 2020. U.S. Treasury Bonds, U.S. Corporate Bonds, and other public market fixed income securities, as well as, other investments are held to correspond with the notional amount of the international swap agreements. The value of the international synthetic equity structures is a combination of the value of the swap agreements and the value of the notes and other investments. The book value represents the cost of the bonds, notes, and other investments. The current value represents the current value of the bonds, notes, and other investments and the change in the value of the underlying indices from the inception of the swap agreements. The current value is used as a representation of the fair value based on the intention to hold all swap agreements until maturity. At the maturity of the swap agreements, the trust funds will either receive the increase in the value of the equity indices from the level at the inception of the agreements or pay the decrease in the value of the indices. The combined swap structure generally realizes gains and losses on a rolling basis.

To reduce the risk in the Fixed Income and International Equity portfolios, the Board has entered into FX swap agreements, interest rate swap agreements and credit default swap agreements with investment grade counterparties. The FX swap agreements are tied to foreign currency forward exchange rates and are used to reduce the currency risk within the fixed income portfolio. The swap agreements are entered into on an as-needed basis and are generally tied to the maturity of a foreign government bond indenture denominated in a foreign currency. The purpose of the FX swap agreement that has a final maturity date of less than three months, is to reduce or eliminate the currency risk on foreign bond transactions. US. Domestic LIBOR-based floating rate notes, U.S. Treasury securities, and portfolio cash are held to correspond with the notional amount of FX swap agreements within the Fixed Income and International Equity portfolios. Interest rate swaps are used to adjust interest rate and yield curve exposures and substitute for physical securities. Long swap positions that receive fixed rate, increase exposure to long-term interest rates; short swap positions that pay fixed rate, decrease exposure. Credit default swaps (CDS) are used to manage credit exposure without buying or selling securities outright. Written CDS increase credit exposure, selling protection, obligating the portfolio to buy bonds from counterparties in the event of a default. Purchased CDS decrease exposure, buying protection, providing the right to "Put" bonds to the counterparty in the event of a default.

Counterparty credit risk is the maximum loss amount that would be incurred if the counterparties to the derivative instrument failed to perform according to the terms of the contract, without respect to any collateral or other security, or netting arrangement. For the Over-The-Counter (OTC) derivative investments, the system held collateral of \$37.3 million in cash deposits and \$59.7 million in securities on behalf of counterparties. Collateral securities in the amount of \$0.3 million were held on our behalf by counterparties.

The Board traded bond future contracts to manage duration, yield curve exposure, adjust interest rate exposures and replicate bond positions.

To enhance returns while limiting downside risk, the Board traded equity options in single securities and on indices in the Large Cap Core and All Cap GARP funds. Domestic equity options were used for the purpose of stock replacement, in conjunction with dividend stocks to drive excess returns over the S&P 500, and to provide added exposure to strong equity markets while limiting principal at risk. Put options are used to protect against large negative moves in the market indices. Options traded by the Board in the Fixed Income and International Equity pools are used to manage interest rate and volatility exposures. Written options generate income in expected interest rate scenarios and may generate capital losses, if unexpected interest rate environments are realized. Both written and purchased options will become worthless at expiration if the underlying instrument does not reach the strike price of the option.

SECURITIES LENDING

The System, pursuant to a Securities Lending Authorization Agreement, has authorized State Street Bank and Trust Company ("State Street") to act as the System's agent in lending System's securities to approved borrowers. State Street, as agent, enters into Securities Loan Agreements with borrowers.

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NOTES TO BASIC FINANCIAL STATEMENTS

During the fiscal year, State Street lent, on behalf of the Board, certain securities of the System held by State Street as custodian and received cash or other collateral including securities issued or guaranteed by the United States government. The types of securities lent were equity, and fixed income, which includes government and corporate bonds and notes. State Street does not have the ability to pledge or sell collateral securities delivered absent a borrower default. Borrowers were required to deliver collateral for each loan equal to at least 100% of the fair value of the loaned securities.

Pursuant to the Securities Lending Authorization Agreement, State Street had an obligation to indemnify the System in the event of default by a borrower. There were no failures by any borrowers to return loaned securities or pay distributions thereon during the fiscal year that resulted in a declaration or notice of default of the Borrower.

During the fiscal year, the System and the borrowers maintained the right to terminate securities lending transactions upon notice. The cash collateral received on each loan was invested, together with the cash collateral of other qualified tax-exempt plan lenders, in a collective investment pool. As of September 30, 2019, such investment pool had an average duration of 6 days and an average weighted final maturity of 124 days for USD. Because the loans were terminable at will their duration did not generally match the duration of the investments made with cash collateral. On September 30, 2019, the System had no credit risk exposure to borrowers. The fair value of collateral held and the fair value (USD) of securities on loan for the client as of September 30, 2019, was \$2,277.9 million and \$2,231.8 million, respectively.

RISK

In accordance with GASB Statement No. 40, investments require certain disclosures regarding policies and practices and the risks associated with them. The credit risk, (including custodial credit risk and concentration of credit risk), the interest rate risk, and the foreign currency risk are discussed in the following paragraphs. Amounts represent the pro rata share of the underlying investments as required by GASB Statement No. 40. These investments are held in internal investment pools and reported as such in the financial statements.

Credit Risk

Credit risk is the risk that an issuer will not fulfill its obligations.

- Short-Term Fixed Income Investments – Eligible commercial paper investments must be rated within one of the two highest rating classifications (“1” or “2”) at the time of purchase from one of the nationally recognized ratings organizations (NRSROs) specified in Public Act 314 of 1965, as amended. Borrowers must have at least \$400.0 million in commercial paper outstanding, and the Board may not invest in more than 10% of the borrower’s outstanding debt.
- Long-Term Fixed Income Investments – Investment grade and noninvestment grade securities may be acquired in compliance with the parameters set forth in Public Act 314 of 1965, as amended, and the Board’s Investment Policy Statement for the System. Public Act 314 defines investment grade as investments in the top four major grades, rated by one of the NRSROs. At September 30, 2019, the System was in compliance with Public Act 314 and the Investment Policy Statement in all material aspects.

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NOTES TO BASIC FINANCIAL STATEMENTS

Rated Debt Investments

(in thousands)

As of September 30, 2019

| Investment Type | Fair Value | S&P | Fair Value | Moody's |
|--------------------------------------|----------------------|----------------|----------------------|----------------|
| Short Term | \$ 1,731,548 | A-1 | \$ 1,731,856 | P-1 |
| | 109,214 | A-2 | 109,214 | P-2 |
| | 15,709 | NR | 15,401 | NR |
| Government Securities | | | | |
| U.S. Agencies - Sponsored | 2,112 | AAA | 1,125,196 | Aaa |
| | 1,123,085 | AA | - | Aa |
| Fixed Income | | | | |
| | 487,852 | AAA | 683,718 | Aaa |
| | 210,791 | AA | 301,045 | Aa |
| | 562,274 | A | 867,313 | A |
| | 1,589,702 | BBB | 1,073,609 | Baa |
| | 268,375 | BB | 431,816 | Ba |
| | 205,437 | B | 245,187 | B |
| | 128,206 | CCC | 125,911 | Caa |
| | 62,792 | CC | 88,451 | Ca |
| | - | C | 372 | C |
| | 30,456 | D | - | D |
| | 1,588,785 | NR | 1,317,248 | NR |
| Securities Lending Collateral | | | | |
| Short Term | 351,378 | A-1 | 389,925 | P-1 |
| | 455,737 | NR | 763,157 | NR |
| Corporate | 160,282 | AA | 505,274 | Aa |
| | 1,295,874 | A | 619,554 | A |
| | 14,639 | BBB | - | Baa |
| Mutual Funds | | | | |
| | | | 35,999 | Aaa |
| | 25,669 | BBB | 25,669 | Baa |
| | 7,255 | BB | 7,255 | Ba |
| | 75,078 | B | 75,078 | B |
| | 35,999 | NR | - | |
| Total | \$ 10,538,249 | | \$ 10,538,249 | |

NR – Not Rated

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

Custodial Credit Risk

Custodial credit risk for investments is the risk that, in the event of a failure of the counterparty, the State will not be able to recover the value of the investment or 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 government and are held by either the counterparty or the counterparty's trust department or agent, but not in the government name.

The Board does not have a policy for custodial credit risk. However, the State's custodial bank had a credit rating of A at September 30, 2019. As of September 30, 2019, no securities were exposed to custodial credit risk.

Concentration of Credit Risk

Concentration of credit risk is the risk of loss attributed to the magnitude of a government's investment in a single issuer.

Other than obligations issued, assumed or guaranteed by the United States, its agencies or United States government sponsored enterprises, the System is prohibited by Public Act 314 of 1965, as amended, from investing more than 5% of the outstanding obligations of any one issuer or investing more than 5% of a System's assets in the obligations of any one issuer. When calculating the amount of outstanding obligations, the System includes publicly issued and privately held debt.

At September 30, 2019, there were no investments in any single issuer that accounted for more than 5% of the System's assets. The System held one investment that exceeded the 5% cap in obligations of any one issuer. The System is aware of the breach and in accordance with MCL 38.1133(3)(g), is developing a prudent plan for reallocating assets to comply with the prescribed limitations.

Interest Rate Risk – Fixed Income Investments

Interest rate risk is the risk that changes in interest rates of debt investments will adversely affect the fair value of an investment.

The Board's policy states that cash equivalents are invested in short-term fixed income securities with an average weighted maturity of less than one year to provide liquidity and safety of principal from capital market and default risk. At September 30, 2019, the fair value of the System's prime commercial paper was \$1,791.8 million with the weighted average maturity of 44 days.

The Board does not have a policy regarding interest rate risk for long-term debt investments. However, the trust funds are invested with a long-term strategy. The goal is to balance higher returns while accepting minimum risk for the return. Analyzing the yield curve on individual securities as compared to U.S. Treasuries determines, in part, what is an acceptable risk for the return. Therefore, market conditions such as lower interest rates result in shorter duration and higher interest rates result in longer duration.

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NOTES TO BASIC FINANCIAL STATEMENTS

Debt Securities

(in thousands)

As of September 30, 2019

| | <u>Fair Value</u> | <u>Effective Duration in Years</u> |
|----------------------------|----------------------|--|
| Government | | |
| U. S. Treasury | \$ 2,959,663 | 7.0 |
| U. S. Agencies - Backed | 460,446 | 2.3 |
| U. S. Agencies - Sponsored | 1,125,196 | 2.3 |
| Corporate | 4,618,622 | 2.9 |
| International* | | |
| U. S. Treasury | 589,283 | 1.1 |
| Corporate | <u>724,758</u> | 0.4 |
| Total | <u>\$ 10,477,969</u> | |

* International contains Domestic Government and Corporate Debt Securities as a part of their derivative strategies. The interest rates reset on a quarterly basis for these securities.

Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely affect the fair value of an investment or deposit.

The System invests in various securities denominated in foreign currencies. Authorized global securities include equities, fixed income, mutual funds, real estate, and limited partnerships. These investments are limited to 30% of the total assets of the System with additional limits of not more than 5% of the outstanding global securities of any one issuer and no more than 5% of the System's assets in the global securities of any one issuer. In addition to these limits, the Board cannot acquire securities with companies that have active business operations in the state sponsors of terror as identified by the United States Secretary of State. At September 30, 2019, the total amount of foreign investment subject to foreign currency risk was \$9,115.1 million, which amounted to 15.8% of total investments (exclusive of securities lending collateral) of the System.

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NOTES TO BASIC FINANCIAL STATEMENTS

Foreign Currency Risk

(in thousands)

As of September 30, 2019

| Region | Country | Currency | Equity Fair Value in U.S. \$ * | Fixed Income Fair Value in U.S. \$ | International & Absolute Return in U.S. \$ | Private Equity, Real Estate, & Infrastructure in U.S. \$ |
|--------------------|----------------|----------------|--------------------------------------|---|--|--|
| AMERICA | | | | | | |
| | Brazil | Real | \$ - | \$ 7,906 | \$ 6,365 | \$ 22,406 |
| | Canada | Dollar | - | 6,303 | 31,467 | 27,743 |
| | Mexico | Peso | 431 | 13,910 | - | 92,823 |
| | Peru | Sol | - | 927 | - | - |
| | Uruguay | Peso | - | 466 | - | - |
| | Colombia | Peso | - | 383 | - | - |
| | Chile | Peso | - | 1,876 | - | - |
| | Argentina | Peso | - | - | 1,136 | - |
| PACIFIC | | | | | | |
| | Australia | Dollar | 1,209 | 1,531 | 26,406 | - |
| | Hong Kong | Dollar | 449 | - | 26,749 | - |
| | India | Rupee | - | 1,169 | - | 101,949 |
| | Indonesia | Rupiah | - | 1,112 | - | - |
| | Japan | Yen | - | 6,499 | 88,948 | - |
| | Malaysia | Ringgit | - | 2,877 | - | - |
| | Taiwan | New Dollar | - | - | 9,146 | - |
| | China | Renminbi | 15,040 | - | 5,068 | 4,591 |
| | Singapore | Dollar | 439 | - | 1,523 | - |
| | South Korea | Won | - | 13,454 | - | - |
| | Thailand | Baht | - | 3,675 | - | - |
| | Sri Lanka | Rupee | - | 866 | - | - |
| EUROPE | | | | | | |
| | Denmark | Krone | - | - | 10,164 | - |
| | European Union | Euro | 109,659 | 115,433 | 97,894 | 434,980 |
| | Poland | Zloty | - | 66 | - | - |
| | United Kingdom | Pound Sterling | 65,237 | 7,517 | 49,025 | 51,546 |
| | Romania | Leu | - | 3,111 | - | - |
| | Sweden | Krona | 449 | 2,482 | 35,392 | - |
| | Switzerland | Franc | 16,881 | - | 17,493 | - |
| AFRICA | | | | | | |
| | South Africa | Rand | 1,165 | 5,001 | 14 | - |
| | Egypt | Pound | - | 1,999 | - | - |
| | Liberia | Dollar | 4,005 | - | - | - |
| MIDDLE EAST | | | | | | |
| | Israel | New Shekel | - | 5,850 | - | - |
| OTHER | | | | | | |
| | Various | | - | 80,677 | 5,788,174 | 1,684,051 |
| | Total | | \$ 214,964 | \$ 285,092 | \$ 6,194,965 | \$ 2,420,087 |

* International includes derivatives whose market value exposure to foreign currency risk is the net amount of unrealized gains and unrealized losses. Maturity dates on these investments range from October 2019 through June 2020 with an average maturity of 0.5 years.

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

FAIR VALUE MEASUREMENTS

The Retirement System 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. Not all investments held by the Retirement System are recorded at fair value. GASB 72 allows for certain investments to be recorded at cost (or amortized cost or any other valuation method), and therefore, they are not presented in the fair value hierarchy table. Equity and fixed income securities classified in Level 1 of the fair value hierarchy are valued using prices quoted in active markets for those securities. Equity Swaps and Fixed Income securities classified in Level 2 of the fair value hierarchy are valued using a matrix pricing technique and other significant observable inputs. Equity and fixed income securities classified as Level 3 of the fair value hierarchy are valued using a third party data and reports that are unobservable. Securities reported at Net Asset Value (NAV) are valued using the most recent third party statement adjusted for cash flows as of September 30, 2019. 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 below.

In instances where inputs used to measure fair value fall into different levels in the above fair value hierarchy, fair value measurements in their entirety are categorized based on the lowest level input that is significant to the valuation. The Retirement System's assessment of the significance of particular inputs to these fair value measurements requires judgment and considers factors specific to each asset or liability.

| | Balance at September 30, 2019 | Fair Value Measurement Using | | |
|--|----------------------------------|--|--|--|
| | | Quoted Prices In Active Markets for Identical Assets (Level 1) | Significant Other Observable Inputs (Level 2) | Significant Unobservable Inputs (Level 3) |
| Investments by fair value level: | | | | |
| Total cash and cash equivalents | \$ 74,000 | \$ 5,864 | \$ 68,136 | \$ - |
| Equity | | | | |
| Depository Receipts | 75,437 | 75,437 | - | - |
| Common Stocks | 10,056,869 | 10,055,534 | - | 1,336 |
| Real Estate Investments Trusts | 1,104,548 | 1,104,548 | - | - |
| Swaps | 50,479 | - | 52,288 | (1,808) |
| Commingled Funds, ETF's, and PTP's | 6,913,602 | 6,913,602 | - | - |
| Options | 318,943 | 323,007 | (4,064) | - |
| Total Equity | 18,519,879 | 18,472,127 | 48,224 | (473) |
| Fixed Income | | | | |
| Asset Backed | 1,722,196 | - | 1,707,403 | 14,794 |
| Corporate Bonds | 2,464,017 | - | 2,445,522 | 18,495 |
| Commercial mortgage-backed | 1,444,703 | - | 1,444,317 | 387 |
| Government Issues | 3,775,025 | 3,548,947 | 223,762 | 2,317 |
| Swaps | (2,074) | - | (2,074) | - |
| US Agency Issues | 920,992 | - | 920,992 | - |
| Commingled Funds, ETF's, and PTP's | 108,002 | 108,002 | - | - |
| Options | (145) | - | (145) | - |
| Total Fixed Income | 10,432,717 | 3,656,949 | 6,739,776 | 35,992 |
| Total investments by fair value level | \$ 29,026,596 | \$ 22,134,940 | \$ 6,856,136 | \$ 35,520 |
| Investments measured at the net asset value (NAV) | | | | |
| Private Equity | \$ 10,409,088 | | | |
| Real Estate and Infrastructure | 5,333,804 | | | |
| Absolute Return | 3,150,917 | | | |
| Real Return | 6,114,232 | | | |
| Other Limited Partnerships | 1,519,526 | | | |
| Total investments measured at the NAV | \$ 26,527,567 | | | |
| Total investments measured at fair value | \$ 55,554,163 | | | |

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

Additional disclosures for fair value measurements of investments in certain entities that calculate the Net Asset Value per Share (or its equivalent):

Private Equity Funds

(in thousands)

| | |
|---------------------------------------|---------------|
| Total investments measured at the NAV | \$ 10,409,088 |
| Unfunded commitments | 6,157,418 |

Private Equity funds. These types of investment includes investments in approximately 271 partnerships that invest in leveraged buyouts, venture capital, mezzanine debt, distressed debt, secondary funds and other investments. These type of investments can never be redeemed with the funds, but distributions are received through the liquidation of the underlying assets of the fund. It's expected that the underlying assets of the fund are liquidated over a period of five to eight years. However, as of September 30, 2019, it is probable that all of the investments in this group will be sold at an amount different from the NAV per share (or its equivalent). Therefore, the fair values of the investments in this type have been determined using recent observable transaction information for similar investments and nonbinding bids received from potential buyers of the investments. As of September 30, 2019, a buyer for these investments has not been identified.

Real Estate and Infrastructure

(in thousands)

| | |
|---------------------------------------|--------------|
| Total investments measured at the NAV | \$ 5,333,804 |
| Unfunded commitments | 1,152,975 |

Real Estate and Infrastructure funds include approximately 111 accounts (limited partnerships, limited liability companies, etc.) that invest in real estate or infrastructure related assets. The fair value of the Real Estate and Infrastructure funds have been determined in accordance with generally accepted accounting principles using the NAV per share (or its equivalent) of the Plan's ownership interest in partners' capital. These types of investments cannot be redeemed with the funds. Distributions from these funds will be received as the underlying investments are sold and liquidated over time. It is expected that the underlying assets will be sold over the next 5 – 15 years. However, buyers have not been determined so the fair value has been determined using the NAV per share (or its equivalent) of the Plan's ownership interest in partners' capital.

Absolute Return Portfolio

(in thousands)

| | |
|---------------------------------------|--------------|
| Total investments measured at the NAV | \$ 3,150,917 |
| Unfunded commitments | 46,338 |

This type includes approximately 7 investments in hedge funds and hedge fund of funds that pursue multiple strategies to diversify risks and reduce volatility. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the investments. For 74.3% of the investments, investors may redeem at various dates between October 1, 2019 and January 1, 2021; 13.9% of the investments are redeemable between January 1, 2021 through April 1, 2025; and the remaining 11.8% is not redeemable on demand.

Real Return and Opportunistic Portfolio

(in thousands)

| | |
|---------------------------------------|--------------|
| Total investments measured at the NAV | \$ 6,114,232 |
| Unfunded commitments | 3,027,827 |

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

This type includes approximately 90 funds that invest in private credit, tangible and intangible real assets, or other real return and opportunistic strategies. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the Plan's ownership interest in partners' capital. These investments can never be redeemed with the funds. Distributions from each fund will be received as the underlying investments of the funds are liquidated. It is expected that the underlying assets of the funds will be liquidated over the next 5 to 10 years.

All Other Investments

(in thousands)

| | | |
|---------------------------------------|----|-----------|
| Total investments measured at the NAV | \$ | 1,519,526 |
| Unfunded commitments | | 29,117 |

The balance of plan assets reported at fair value includes:

- A limited partnership (LP) that invests in the equity of Japanese companies. This LP permits partners to withdraw funds quarterly with 180 days of advance notice.
- LPs that invest in fixed income type investment; residential rehabilitation, middle market business loans and senior secured debt financing. These investments cannot be redeemed by limited partners. Distributions are received through the liquidation of the underlying assets of the fund.
- LPs that invest in fixed income type investments permitting partners to request redemption monthly or quarterly, after initial lock up period of 1 year or less, requiring 45 to 65 days' advance notice.
- LPs investing in global investments permitting partners to request partial redemptions quarterly or monthly, with advance notice, subject to the sole discretion of the general partner.

NOTE 7 – COMMITMENTS AND CONTINGENCIES

Under the Administrative Procedures Act, members may appeal a decision made by the Retirement Board. Once the administrative procedure has been exhausted, the decision may be appealed in Michigan's court system. Various cases that have exhausted the administrative procedures have been appealed in the court system. These cases are in the normal course of business and the System does not anticipate any material loss as a result of the contingent liabilities.

FINANCIAL SECTION

NOTES TO BASIC FINANCIAL STATEMENTS

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FINANCIAL SECTION

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN NET PENSION LIABILITY

(in thousands)

| | Fiscal Year | | | | | |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 |
| Total Pension Liability | | | | | | |
| Service Cost | \$ 779,545 | \$ 752,589 | \$ 675,804 | \$ 682,608 | \$ 674,943 | \$ 738,574 |
| Interest | 5,561,469 | 5,352,730 | 5,348,515 | 5,226,021 | 5,137,527 | 4,959,187 |
| Changes of benefit terms | | | | | | |
| Differences between expected and actual experience | 119,391 | (187,289) | (120,998) | 401,202 | (75,932) | - |
| Changes of assumptions | 2,226,621 | 6,588,286 | 3,461,025 | - | - | 1,054,479 |
| Benefit payments, including refunds of member contributions | (5,087,969) | (4,963,271) | (4,833,050) | (4,695,818) | (4,555,349) | (4,417,169) |
| Net Change in Total Pension Liability | 3,599,058 | 7,543,045 | 4,531,295 | 1,614,013 | 1,181,190 | 2,335,070 |
| Total Pension Liability - Beginning | 81,044,341 | 73,501,296 | 68,970,001 | 67,355,988 | 66,174,798 | 63,839,728 |
| Total Pension Liability - Ending (a) | \$ 84,643,399 | \$ 81,044,341 | \$ 73,501,296 | \$ 68,970,001 | \$ 67,355,988 | \$ 66,174,798 |
| Plan Fiduciary Net Position | | | | | | |
| Contributions - Employer | \$ 2,706,713 | \$ 2,791,509 | \$ 2,398,950 | \$ 2,308,657 | \$ 1,967,611 | 1,600,375 |
| Contributions - Member | 403,147 | 393,059 | 427,988 | 398,893 | 395,722 | 405,444 |
| Net Investment Income | 2,519,320 | 5,135,866 | 5,583,469 | 3,095,178 | 938,143 | 6,192,711 |
| Benefit payments, including refunds of member contributions | (5,087,969) | (4,963,271) | (4,833,050) | (4,695,818) | (4,555,349) | (4,417,169) |
| Administrative and Other Expenses | (27,741) | (25,952) | (26,133) | (26,213) | (24,487) | (23,711) |
| Other ¹ | 202 | 504 | (20) | (2,479) | (112,468) | - |
| Net Change in Plan Fiduciary Net Position | 513,672 | 3,331,715 | 3,551,204 | 1,078,218 | (1,390,828) | 3,757,649 |
| Plan Fiduciary Net Position - Beginning | 50,343,498 | 47,011,783 | 43,460,579 | 42,382,361 | 43,773,189 | 40,015,540 |
| Plan Fiduciary Net Position - Ending (b) | \$ 50,857,170 | \$ 50,343,498 | \$ 47,011,783 | \$ 43,460,579 | \$ 42,382,361 | \$ 43,773,189 |
| Net Pension Liability - Ending (a) - (b) | \$ 33,786,229 | \$ 30,700,843 | \$ 26,489,513 | \$ 25,509,422 | \$ 24,973,627 | \$ 22,401,609 |
| Plan Fiduciary Net Position as a Percentage of the Total Pension Liability | 60.08% | 62.12% | 63.96% | 63.01% | 62.92% | 66.15% |
| Covered Payroll | \$ 8,958,777 | \$ 8,583,695 | \$ 8,452,983 | \$ 8,510,200 | \$ 8,426,755 | \$ 8,895,091 |
| Net Pension Liability as a Percentage of Covered Payroll | 377.13% | 357.66% | 313.37% | 299.75% | 296.36% | 251.84% |

¹ University employer contribution refund for fiscal years 2015 and 2016.

FINANCIAL SECTION

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN NET OPEB LIABILITY

(in thousands)

| | Fiscal Year | | |
|--|----------------------|----------------------|----------------------|
| | 2019 | 2018 | 2017 |
| Total OPEB Liability | | | |
| Service Cost | \$ 179,016 | \$ 188,707 | \$ 205,693 |
| Interest | 1,003,488 | 1,050,293 | 1,014,612 |
| Changes of benefit terms | - | - | - |
| Differences between expected and actual experience | (1,835,497) | (1,748,107) | (118,988) |
| Changes of assumptions | 1,102,881 | 1,044,391 | - |
| Benefit payments, including refunds of member contributions | (467,095) | (531,998) | (702,160) |
| Net Change in Total OPEB Liability | (17,207) | 3,286 | 399,157 |
| Total OPEB Liability - Beginning | 14,178,834 | 14,175,547 | 13,776,390 |
| Total OPEB Liability - Ending (a) | \$ 14,161,627 | \$ 14,178,834 | \$ 14,175,547 |
| Plan Fiduciary Net Position | | | |
| Contributions - Employer | \$ 707,714 | \$ 663,708 | \$ 794,667 |
| Contributions - Member | 208,197 | 210,680 | 214,249 |
| Net Investment Income | 336,063 | 594,893 | 595,265 |
| Benefit payments, including refunds of member contributions | (467,095) | (531,998) | (1,255,980) |
| Administrative and Other Expenses | (4,098) | (3,912) | (2,605) |
| Other | 75 | 96 | - |
| Net Change in Plan Fiduciary Net Position | 780,857 | 933,467 | 345,596 |
| Plan Fiduciary Net Position - Beginning | 6,111,241 | 5,177,775 | 4,832,179 |
| Plan Fiduciary Net Position - Ending (b) | \$ 6,892,099 | \$ 6,111,241 | \$ 5,177,775 |
| Net OPEB Liability - Ending (a) - (b) | \$ 7,269,528 | \$ 8,067,592 | \$ 8,997,773 |
| Plan Fiduciary Net Position as a Percentage of the Total OPEB Liability | 48.67% | 43.10% | 36.53% |
| Covered Payroll | \$ 8,958,777 | \$ 8,583,695 | \$ 8,452,983 |
| Net OPEB Liability as a Percentage of Covered Payroll | 81.14% | 93.99% | 106.44% |

FINANCIAL SECTION

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULES OF CONTRIBUTIONS

PENSION BENEFITS

(in thousands)

| Fiscal Year Ended Sept. 30 | Actuarially Determined Contribution (ADC) ¹ | Actual Employer Contribution ² | Contribution Deficiency (Excess) | Covered Payroll | Actual Contribution as a % of Covered Payroll |
|----------------------------|--|---|----------------------------------|-----------------|---|
| 2010 | \$ 1,182,164 | \$ 1,001,252 | \$ 180,912 | \$ 8,845,019 | 11.3 % |
| 2011 | 1,418,355 | 1,156,061 | 262,294 | 9,155,691 | 12.6 |
| 2012 | 1,744,512 | 1,454,439 | 290,073 | 8,649,029 | 16.8 |
| 2013 | 1,931,894 | 1,364,136 | 567,758 | 8,225,140 | 16.6 |
| 2014 | 2,117,097 | 1,600,375 | 516,722 | 8,895,091 | 18.0 |
| 2015 | 2,184,029 | 1,967,611 | 216,418 | 8,426,755 | 23.4 |
| 2016 | 2,312,223 | 2,308,657 | 3,566 | 8,510,200 | 27.1 |
| 2017 | 2,334,212 | 2,398,950 | (64,738) | 8,452,983 | 28.4 |
| 2018 | 2,474,279 | 2,791,509 | (317,230) | 8,583,695 | 32.5 |
| 2019 | 2,712,859 | 2,706,713 | 6,146 | 8,958,777 | 30.2 |

¹ The ADC has been recalculated for all years presented in order to reflect only the employer's share of the annual required contributions and current assumptions.

² Differences between the ADC and the actual contributions are the result of a timing difference between when the actuarial valuation is completed and the contributions are made.

OPEB BENEFITS

(in thousands)

| Fiscal Year Ended Sept. 30 | Actuarially Determined Contribution (ADC) | Actual Employer Contributions ² | Contribution Deficiency (Excess) | Covered Payroll | Actual Contribution as a % of Covered Payroll |
|----------------------------|---|--|----------------------------------|-----------------|---|
| 2010 | \$ 2,363,039 | \$ 675,117 | \$ 1,687,922 | \$ 8,845,019 | 7.6 % |
| 2011 | 2,149,489 | 794,840 | 1,354,649 | 9,155,691 | 8.7 |
| 2012 | 2,038,873 | 795,595 | 1,243,278 | 8,649,029 | 9.2 |
| 2013 ¹ | 1,466,840 | 973,003 | 493,837 | 8,225,140 | 11.8 |
| 2014 | 944,571 | 1,000,032 | (55,461) | 8,895,091 | 11.2 |
| 2015 | 974,957 | 969,419 | 5,538 | 8,426,755 | 11.5 |
| 2016 | 911,687 | 883,943 | 27,744 | 8,510,200 | 10.4 |
| 2017 | 815,985 | 794,667 | 21,318 | 8,452,983 | 9.4 |
| 2018 | 673,996 | 663,708 | 10,288 | 8,583,695 | 7.7 |
| 2019 | 711,059 | 707,714 | 3,345 | 8,958,777 | 7.9 |

¹ Revised investment rate of return from 4% to 8% due to prefunding.

² Differences between the ADC and the actual contributions are the result of a timing difference between when the actuarial valuation is completed and the contributions are made.

FINANCIAL SECTION

REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULES OF INVESTMENT RETURNS

PENSION BENEFITS

| <u>Fiscal Year</u> | <u>Annual Return¹</u> |
|--------------------|----------------------------------|
| 2014 | 12.58 % |
| 2015 | (0.02) |
| 2016 | 5.91 |
| 2017 | 13.24 |
| 2018 | 11.11 |
| 2019 | 5.14 |

¹ Annual money-weighted rate of return, net of investment expenses.

OPEB BENEFITS

| <u>Fiscal Year</u> | <u>Annual Return¹</u> |
|--------------------|----------------------------------|
| 2017 | 11.82 % |
| 2018 | 10.75 |
| 2019 | 5.37 |

¹ Annual money-weighted rate of return, net of investment expenses.

FINANCIAL SECTION

NOTE TO REQUIRED SUPPLEMENTARY INFORMATION

NOTE A – DESCRIPTION

Ten year historical trend information designed to provide information about the System's progress made in accumulating sufficient assets to pay benefits when due is presented in the preceding schedules. Other ten year historical trend information related to the System is presented in the Statistical and Actuarial Sections of the report. This information is presented to enable the reader to assess the progress made by the System in accumulating sufficient assets to pay pension and other postemployment benefits as they become due.

The comparability of trend information is affected by changes in actuarial assumptions, benefit provisions, actuarial funding methods, accounting policies, and other changes. Those changes usually affect trends in contribution requirements and in ratios that use the pension and other postemployment benefit obligations as a factor.

The Schedules of Contributions are presented to show the responsibility of the Employer in meeting the actuarial requirements to maintain the System on a sound financial basis.

The Schedules of Changes in Net Pension and OPEB Liability, Schedules of Contributions, and Schedules of Investment Returns are schedules that are required in implementing GASB Statement No. 67 for pension and No. 74 for OPEB. These schedules are required to show information for ten years; additional years will be displayed as they becomes available. The Schedules of Changes in the Net Pension and Net OPEB Liabilities represents in actuarial terms the accrued liability less the fair value of assets. The Schedule of Contributions is a comparison of the employer's contributions to the actuarially determined contributions. The Schedule of Investment Returns represents a money-weighted rate of return that expresses investment performance, net of pension and OPEB plan investment expense, adjusted for the changing amounts actually invested.

The actuarially determined contributions presented in the Schedule of Contributions for pension and OPEB are calculated as of September 30, three years prior to the end of the fiscal year in which the contributions are reported. The following actuarial methods and assumptions were used to determine the fiscal year 2019 contributions reported in that schedule.

FINANCIAL SECTION

NOTE TO REQUIRED SUPPLEMENTARY INFORMATION

Methods and Assumptions Used to Determine Contributions for Fiscal Year 2019:

Pension and OPEB

| | |
|-------------------------------|--|
| Valuation Date | September 30, 2016 |
| Actuarial Cost Method | Entry Age, Normal |
| Amortization Method | Level percent of payroll, closed period |
| Remaining Amortization Period | 20 years as of October 1, 2018 ending September 30, 2038 |
| Price Inflation | 2.50% |
| Projected Salary Increases | 3.50% - 12.30%, including wage inflation at 3.50% |
| Retirement Age | Experience-based table of rates that are specific to the type of eligibility conditions. |
| Mortality | |
| Retirees | RP-2000 Combined Healthy Mortality Table, adjusted for mortality improvements to 2025 using project scale BB. 100% of the table rates were used for males and females. |
| Active | RP-2000 Combined Healthy Mortality Table, adjusted for mortality improvements to 2025 using project scale BB. 80% of the table rates were used for males and 70% of the table rates were used for females. |

Pension

| | |
|---------------------------|--|
| Asset Valuation Method | 5 year smoothed fair value |
| Investment Rate of Return | 7.50% (7.00% for Hybrid plan), net of investment and administrative expenses |

OPEB

| | |
|---------------------------|---|
| Asset Valuation Method | Fair value |
| Investment Rate of Return | 7.50% net of investment and administrative expenses |
| Health Care Trend Rates | - Medical and prescription drugs: 7.50% trend, gradually decreasing to 3.50% in year 12. Medicare payments: 7.50% trend, gradually decreasing to 3.50% in year 12. - Dental/Vision: 3.50% trend for all years. |
| Aging Factors | Based on an internal GRS study using several pricing manuals from National Health Care Consultant groups and incorporating analysis and data from a SOA survey regarding aging practices used in health care valuations. |
| Notes | Some of the assumptions used to develop the 2019 Total Pension Liability (TPL) and the 2019 Total OPEB Liability (TOL) are different than the assumptions shown above. The assumptions used to develop the TPL are described in Note 4 (Page 32) of this report and the assumptions used to develop the TOL are described in Note 5 (page 36) of this report. |

FINANCIAL SECTION

SUPPORTING SCHEDULES

SUMMARY SCHEDULE OF PENSION PLAN ADMINISTRATIVE AND OTHER EXPENSES

For Fiscal Year Ended September 30, 2019
(in thousands)

Personnel Services:

| | |
|--------------------------------------|--------------|
| Staff Salaries | \$ 4,348 |
| Staff Retirement and Social Security | 2,424 |
| Other Staff Fringe Benefits | 855 |
| Total | 7,627 |

Professional Services:

| | |
|------------------|--------------|
| Accounting | 1,780 |
| Actuarial | 376 |
| Attorney General | 318 |
| Audit | 482 |
| Consulting | 391 |
| Medical | 269 |
| Total | 3,616 |

Building and Equipment:

| | |
|--|------------|
| Building Rentals | 905 |
| Equipment Purchase, Maintenance, and Rentals | 25 |
| Total | 931 |

Miscellaneous:

| | |
|-------------------------------|---------------|
| Travel and Board Meetings | 33 |
| Office Supplies | 28 |
| Postage, Telephone, and Other | 2,207 |
| Printing | 304 |
| Technological Support | 12,996 |
| Total | 15,567 |

| | |
|--|------------------|
| Total Administrative and Other Expenses | \$ 27,741 |
|--|------------------|

SUMMARY SCHEDULE OF OPEB PLAN ADMINISTRATIVE AND OTHER EXPENSES

For Fiscal Year Ended September 30, 2019
(in thousands)

| | |
|--|-------------------|
| Staff Salaries | \$ 1,386 |
| Staff Retirement and Social Security | 773 |
| Other Staff Fringe Benefits | 272 |
| Consulting | 1,584 |
| Postage, Telephone, and Other | 81 |
| Health Fees | 152,860 |
| Dental Fees | 5,147 |
| Vision Fees | 217 |
| Total Administrative and Other Expenses | \$ 162,321 |

FINANCIAL SECTION

SUPPORTING SCHEDULES

SCHEDULE OF INVESTMENT EXPENSES

For Fiscal Year Ended September 30, 2019
(in thousands)

| | |
|--|--------------------------|
| Real Estate Operating Expenses | \$ 1,804 |
| Securities Lending Expenses | 58,289 |
| Other Investment Expenses ¹ | |
| ORS-Investment Expenses ² | 13,737 |
| Custody Fees | 1,307 |
| Management Fees | 240,820 |
| Research Fees | <u>3,743</u> |
| Total Investment Expenses | <u>\$ 319,700</u> |

¹ Refer to the Investment Section for fees paid to investment professionals.

² Does not exclude Treasury Civil Service fees recorded as a pass through in the Schedule of Investment Fee - State Treasurer. As of September 30, 2019, fees totaled \$196,521.

SCHEDULE OF PAYMENTS FOR PROFESSIONAL SERVICES

For Fiscal Year Ended September 30, 2019
(in thousands)

| | |
|-----------------------|------------------------|
| Accounting | \$ 1,780 |
| Actuary | 376 |
| Attorney General | 318 |
| Independent Auditors | 482 |
| Consulting | 1,975 |
| Medical Advisor | <u>269</u> |
| Total Payments | <u>\$ 5,200</u> |

FINANCIAL SECTION

SUPPORTING SCHEDULES

DETAIL OF CHANGES IN PLAN FIDUCIARY NET POSITION

(Pension and other Postemployment Benefits)

For the Fiscal Year Ended September 30, 2019
(in thousands)

| | Employee Contributions | Employee Contributions Pension Plus | Employee Contributions Pension Plus 2 | Member Investment Plan | Employer Contributions |
|---|---------------------------|---|---|------------------------------|---------------------------|
| Additions: | | | | | |
| Contributions: | | | | | |
| Member contributions | \$ 13,045 | \$ 60,840 | \$ 7,488 | \$ 321,773 | \$ - |
| Employer contributions: | | | | | |
| Colleges and universities | - | - | - | - | 213,900 |
| School districts and other | - | - | - | - | 2,442,569 |
| Other governmental contributions | - | - | - | - | - |
| Total contributions | 13,045 | 60,840 | 7,488 | 321,773 | 2,656,469 |
| Investment income (loss): | | | | | |
| Net increase (decrease) in fair value of investments | - | - | - | - | - |
| Interest, dividends, and other | - | - | - | - | - |
| Investment expenses: | | | | | |
| Real estate operating expenses | - | - | - | - | - |
| Other investment expenses | - | - | - | - | - |
| Securities lending activities: | | | | | |
| Securities lending income | - | - | - | - | - |
| Securities lending expenses | - | - | - | - | - |
| Net investment income (loss) | - | - | - | - | - |
| Miscellaneous income | - | - | - | - | - |
| Total additions | 13,045 | 60,840 | 7,488 | 321,773 | 2,656,469 |
| Deductions: | | | | | |
| Benefits paid to plan members and beneficiaries: | | | | | |
| Retirement benefits | - | - | - | - | - |
| Health benefits | - | - | - | - | - |
| Dental/vision benefits | - | - | - | - | - |
| Refund of contributions | 3,794 | 1,830 | 24 | 23,570 | 110 |
| Administrative and other expenses | - | - | - | - | - |
| Total deductions | 3,794 | 1,830 | 24 | 23,570 | 110 |
| Net Increase (Decrease) before other changes | 9,251 | 59,009 | 7,465 | 298,203 | 2,656,359 |
| Other Changes in Net Position: | | | | | |
| Interest allocation | 72,095 | 30,249 | 16 | 772,473 | - |
| Transfers upon retirement | (90,595) | - | - | (413,154) | - |
| Transfers of employer shares | - | - | - | - | (2,781,006) |
| Total other changes in net position | (18,500) | 30,249 | 16 | 359,319 | (2,781,006) |
| Net Increase (Decrease) in Net Position | (9,249) | 89,258 | 7,481 | 657,522 | (124,647) |
| Net Position Restricted for Pension Benefits and OPEB: | | | | | |
| Beginning of Year | 1,559,624 | 265,294 | 849 | 7,202,465 | (25,192,084) |
| End of Year | \$ 1,550,375 | \$ 354,552 | \$ 8,331 | \$ 7,859,987 | \$ (25,316,731) |

FINANCIAL SECTION

SUPPORTING SCHEDULES

| Employer Contributions Pension Plus | Employer Contributions Pension Plus 2 | Retired Benefit Payments | Retired Benefit Payments Pension Plus | Retired Benefit Payments Pension Plus 2 | Undistributed Investment Income | OPEB | Total |
|---|---|--------------------------------|---|---|---------------------------------------|--------------|---------------|
| \$ - | \$ - | \$ - | \$ - | \$ - | \$ - | \$ 208,197 | \$ 611,344 |
| 6,113 | 373 | - | - | - | - | 56,982 | 277,368 |
| 36,848 | 6,909 | - | - | - | - | 650,732 | 3,137,059 |
| - | - | - | - | - | - | 233,196 | 233,196 |
| 42,961 | 7,282 | - | - | - | - | 1,149,108 | 4,258,967 |
| - | - | - | - | - | 1,973,907 | 266,684 | 2,240,591 |
| - | - | - | - | - | 770,311 | 98,493 | 868,803 |
| - | - | - | - | - | (1,595) | (209) | (1,804) |
| - | - | - | - | - | (229,854) | (29,754) | (259,607) |
| - | - | - | - | - | 57,884 | 7,805 | 65,689 |
| - | - | - | - | - | (51,334) | (6,955) | (58,289) |
| - | - | - | - | - | 2,519,320 | 336,063 | 2,855,383 |
| - | - | 201 | - | - | 2 | 74 | 277 |
| 42,961 | 7,282 | 201 | - | - | 2,519,322 | 1,485,245 | 7,114,627 |
| - | - | 5,058,614 | 10 | - | - | - | 5,058,624 |
| - | - | - | - | - | - | 469,017 | 469,017 |
| - | - | - | - | - | - | 73,017 | 73,017 |
| - | - | 17 | - | - | - | 34 | 29,378 |
| - | - | - | - | - | 27,741 | 162,321 | 190,062 |
| - | - | 5,058,631 | 10 | - | 27,741 | 704,388 | 5,820,098 |
| 42,961 | 7,282 | (5,058,430) | (10) | - | 2,491,581 | 780,857 | 1,294,528 |
| 13,101 | 71 | 6,270,156 | 12 | - | (7,158,173) | - | - |
| - | - | 503,749 | - | - | - | - | - |
| (8) | - | 2,781,006 | 8 | - | - | - | - |
| 13,093 | 71 | 9,554,911 | 20 | - | (7,158,173) | - | - |
| 56,054 | 7,353 | 4,496,481 | 10 | - | (4,666,592) | 780,857 | 1,294,529 |
| 187,156 | 1,186 | 54,053,068 | 103 | - | 12,265,837 | 6,111,242 | 56,454,740 |
| \$ 243,210 | \$ 8,540 | \$ 58,549,549 | \$ 112 | \$ - | \$ 7,599,245 | \$ 6,892,099 | \$ 57,749,269 |

FINANCIAL SECTION

SUPPORTING SCHEDULES

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INVESTMENT SECTION

**Prepared by Michigan Department of Treasury, Bureau of Investments
Jon M. Braeutigam, Chief Investment Officer**

Report on Investment Activity
Asset Allocation
Investment Results
Largest Assets Held
Schedule of Investment Fees
Schedule of Investment Commissions
Investment Summary

INVESTMENT SECTION

REPORT ON INVESTMENT ACTIVITY

INTRODUCTION

The State of Michigan Investment Board (Board) was created by Executive Order 2018-10 (Order) and serves as the investment fiduciary over the assets of the State sponsored defined benefit retirement systems (Systems). The Board is responsible for investing the Systems' assets in accordance with the duties and powers enumerated in the Order and State law. Pursuant to powers provided in the Order, the Board duly authorized and delegated duties to the Department of Treasury's Bureau of Investments (BOI) to invest, prudently manage, and oversee the assets of the Systems and to take certain other actions that support the BOI's mandate in this regard. In furtherance of these duties, the BOI delivers quarterly investment activity reports to the Board that detail the investments, goals, and objectives of the Systems.

The Board is comprised of five members: three (3) public members appointed by the Governor with the advice and consent of the Senate and two (2) ex-officio members. The public members serve four (4) year terms and are limited to two (2) such terms. The State Treasurer, as the chair of the Board, and the State Budget Director are the ex-officio members. As of September 30, 2019, members of the Board were as follows: Rachael Eubanks (chair, ex-officio member), Chris Kolb (ex-officio member), James B. Nicholson (public member), Reginald G. Sanders, CFA, CAIA (public member), and Dina L. Richard, CPA (public member). The public members serve without pay but may receive reasonable reimbursement for actual and necessary travel and other expenses to attend official Board meetings.

INVESTMENT POLICY & GOALS

The Board's Investment Policy Statement states that it and the BOI will operate in accordance with Public Employee Retirement System Investment Act (Act No. 314 of 1965) and within standard investment practices of the prudent person. This includes being authorized to invest in government obligations, corporate obligations, various short-term obligations, corporate (domestic and international) stocks, private equity interests, mutual funds, real estate interests, and other investments subject to specific parameters. Above all, Systems' assets are to be invested in a fiduciary capacity for the sole and exclusive benefit of the members of the Systems.

The Systems' Proxy Voting Policy sets forth directives on various issues as holders of publicly traded securities, including but not limited to: Boards of Directors, corporate governance, social issues, and various corporate actions. All proxies are reviewed and voted in accordance with the retirement Systems' policy.

The primary function of the Systems is to provide retirement, survivor and disability benefits along with health and other postemployment benefits to its members. The Board is investment fiduciary and custodian of the Systems' investments pursuant to the Order and other State law. The goals of the Systems are:

1. Maintain sufficient liquidity to pay benefits.
2. Meet or exceed the actuarial assumption over the long term.
3. Perform in the top half of the public plan universe over the long term.
4. Diversify assets to preserve capital and avoid large losses.
5. Exceed individual asset class benchmarks over the long term.

The strategy for achieving these goals is supported by investing the assets of the Systems according to a five-year asset allocation model. The Systems currently invest in seven different asset classes, which provides for a well-diversified portfolio.

INVESTMENT SECTION

REPORT ON INVESTMENT ACTIVITY

ASSET ALLOCATION

(Excludes Collateral on Loaned Securities)

| Investment Category | As of 9/30/19 Actual % | Five-Year Target % |
|---|---------------------------|-----------------------|
| Domestic Equity Pools | 22.5% | 28.0% |
| International Equity Pools | 16.0 | 16.0 |
| Private Equity Pools | 18.6 | 18.0 |
| Real Estate and Infrastructure Pools | 9.5 | 10.0 |
| Fixed Income Pools | 13.6 | 10.5 |
| Absolute Return Pools | 16.3 | 15.5 |
| Short-Term Investment Pools | 3.5 | 2.0 |
| TOTAL | 100.0% | 100.0% |

INVESTMENT AUTHORITY

Pursuant to State law (Executive Order 2018-10, which in part transferred to the Board the powers enumerated in (i) Section 91 of Act No. 380 of the Public Acts of 1965, as amended, and (ii) Section 12c of Act No. 314 of 1965), the Board is the investment fiduciary for the Systems, which is comprised of the State sponsored defined benefit retirement systems: Michigan Public School Employees' Retirement System (System), State Employees' Retirement System, Michigan State Police Retirement System, Michigan Judges' Retirement System, and the Michigan Military Retirement Provisions. The State Treasurer, State of Michigan, is custodian and ex officio treasurer of the retirement system for the Legislators, State of Michigan (Section 47 of Act no. 261 of the Public Acts of 1957, as amended).

Act No. 314 of the Public Acts of 1965, as amended, authorizes the investment of assets of public employee retirement systems or plans created and established by the State or any political subdivision.

INVESTMENT RESULTS

TOTAL PORTFOLIO RESULTS

For the fiscal year ended September 30, 2019, the total System's rate of return was 5.1% for the Pension Plan and 5.0% for the OPEB Plan as compiled by State Street Investment Analytics. Annualized rates of return for the Pension Plan for the three, five, and ten year periods ending September 30, 2019 were: 9.8%, 7.7%, and 9.3% respectively.

Investment return calculations are prepared using a Time-Weighted rate of return.

DOMESTIC EQUITY POOLS

The objective for investments made in domestic equities is to meet or exceed the total return of the S&P 1500 Super Composite for one, three, and five-year periods and a market cycle.

For active management strategies, the objective is to earn returns that exceed the most relevant S&P Index (or the most relevant Russell Index), adjusting for market capitalization and style, for one, three, and five-year periods and a market cycle. Another objective is to rank above median in a universe of managers possessing a similar market cap and style characteristics.

For index, or passive return strategies, the objective is to return within 20 basis points of the S&P 500 Index, 50 basis points for the S&P 400 mid-cap, and 60 basis points for the S&P 600 small-cap over one, three, and five-year periods and a market cycle.

The pools are invested primarily in equities or equity-related securities of U.S. companies through internal and externally managed strategies. The goal is to build a portfolio of strategies that will provide excess returns relative

INVESTMENT SECTION

REPORT ON INVESTMENT ACTIVITY

to the S&P 1500 while providing minimal tracking error to the index. At times a portion of these pools may be invested in exchange traded funds (ETFs) and fixed-income short-term securities with maturities of less than one year.

The pools invest in equities and equity related securities that are listed on U.S. national securities exchanges, including American Depositary Receipts (ADRs). They may also invest in stocks that are traded over-the-counter. The pools diversify their investments by allocating their equity strategies with consideration of the capitalization weightings of the S&P 1500 Index.

The following summarizes the weightings of the pools as of September 30, 2019:

| | |
|--------------|-----------------------|
| Active | 59.4 % |
| Passive | 40.6 |
| Total | <u>100.0 %</u> |

| | |
|--------------|-----------------------|
| Large-Cap | 58.4 % |
| Multi-Cap | 33.3 |
| Mid-Cap | 6.9 |
| Small-Cap | 1.4 |
| Total | <u>100.0 %</u> |

The System's Domestic Equity pools total rate of return was 2.5% for the Pension and OPEB Plans for fiscal year 2019. This compared with 3.4% for the S&P 1500 Index.

At the close of fiscal year 2019, the Domestic Equity pools represented 22.5% of total investments. The following summarizes the System's 77.2% ownership share of the Domestic Equity pools at September 30, 2019:

Domestic Equity Pools

(In thousands)

| | |
|--------------------------------|-----------------------------|
| Short-Term Pooled Investments | \$ 489,237 |
| Equities | 12,416,025 |
| Settlement Principal Payable | (74) |
| Settlement Proceeds Receivable | 6,840 |
| Accrued Dividends | 20,410 |
| Total | <u>\$ 12,932,438</u> |

INTERNATIONAL EQUITY POOLS

The objective for investments made in International Equity pools is to meet or exceed the total return of the MSCI ACWI Ex-US Net for one, three, and five-year periods and a market cycle.

For active management strategies, the objective is to earn returns that exceed the most relevant S&P Index (or the most relevant Russell Index), adjusting for market capitalization, style and geography for one, three, and five-year periods and a market cycle. Another objective is to rank above median in a universe of managers possessing a similar market capitalization, style and geography characteristics.

For index, or passive return strategies, the objective is to return within 250 basis points of the S&P/Citigroup BMI-EPAC Index with 25% of the currency hedged for one, three, and five-year periods and a market cycle. Another objective is to return within 400 basis points of the MSCI Emerging Markets Index, for one, three, and five-year periods and a market cycle.

INVESTMENT SECTION

REPORT ON INVESTMENT ACTIVITY

Active exposure is invested primarily in equities or equity-related securities of non-U.S. companies through externally managed strategies.

Passive exposure to International Equity returns is achieved primarily by investing in a combination of fixed income LIBOR notes, short-term fixed income investments, and equity swap agreements on foreign stock indices in developed markets. Interest on the dedicated notes and short-term fixed income investments is exchanged for international stock returns, and the total notional amount of the swap agreements is invested in the approximate proportions of the S&P Broad Market Index (BMI) Europe and Pacific Composite (EPAC) country weightings in related indices. Use of swap agreements for a core position began in 1993, an American Depositary Receipts (ADR) and index-related security portfolio was added in June of 1999 to increase portfolio management flexibility, and a multiple country fund portfolio with smaller capitalization stocks was added in September of 2002 to improve exposure to the smallest companies in the BMI index. Use of futures as an investment to hedge cash flows and balances began in December of 2008, and this use is expected to continue in the future. The combined Swap agreements, notes and short-term investments together continue to perform like a stock index fund that realizes all gains and losses on a rolling three year basis.

The pools diversify their investments by allocating their equity strategies with consideration of the economic development status weightings of the S&P/Citigroup BMI -World ex-US Index.

The following summarizes the weightings of the pool as of September 30, 2019:

| | |
|--------------|-----------------------|
| Active | 77.8 % |
| Passive | 22.2 |
| Total | <u>100.0 %</u> |

| | |
|--------------|-----------------------|
| Developed | 92.6 % |
| Emerging | 7.4 |
| Total | <u>100.0 %</u> |

The System's International Equity pools total rate of return was (1.4)% for the Pension and OPEB Plans for fiscal year 2019. This compared with (1.2)% for the MSCI ACWI Ex US Net.

At the close of fiscal year 2019, the International Equity pools represented 16.0% of total investments. The following summarizes the System's 76.8% ownership share of the International Equity Pools at September 30, 2019:

International Equity Pools

(in thousands)

| | |
|----------------------------------|----------------------------|
| Short-Term Pooled Investments | \$ 75,342 |
| Equities | 7,698,141 |
| Fixed Income Securities | 1,314,041 |
| Market Value of Equity Contracts | 93,615 |
| Accrued Dividends and Interest | 6,872 |
| Total | <u>\$ 9,188,011</u> |

INVESTMENT SECTION

REPORT ON INVESTMENT ACTIVITY

PRIVATE EQUITY POOLS

The Private Equity pools objective is to meet or exceed the benchmark for all private equity investments over long time periods. The benchmark is a blend of the S&P 500 Index plus 300 basis points and the 10 Year Yield plus 300 basis points using ending weights of equity and fixed income holdings within the portfolio.

Private Equity Investments are investments in the private equity market, primarily through limited partnerships. The following summarizes the weightings of the pools as of September 30, 2019:

| | |
|-------------------------|----------------|
| Buyout Funds | 45.7 % |
| Special Situation Funds | 13.8 |
| Fund of Funds | 19.2 |
| Venture Capital Funds | 11.9 |
| Liquidation Portfolio | 7.2 |
| Mezzanine Funds | 2.2 |
| Total | 100.0 % |

The Private Equity pools had a return of 10.0% for the Pension and OPEB Plans for the fiscal year ended September 30, 2019, versus the benchmark of 13.7%.

At the close of fiscal year 2019, the Private Equity pools represented 18.6% of total investments. The following summarizes the System's 77.9% ownership share of the Private Equity pools at September 30, 2019:

Private Equity Pools

(in thousands)

| | |
|--------------------------------|----------------------|
| Short-Term Pooled Investments | \$ 280,274 |
| Equities | 10,412,200 |
| Settlement Proceeds Receivable | 1,977 |
| Long Term Obligations | 7,026 |
| Accrued Interest | 620 |
| Total | \$ 10,702,097 |

REAL ESTATE AND INFRASTRUCTURE POOLS

The objective of the Real Estate and Infrastructure pools is to provide diversification and favorable risk adjusted returns primarily through income and appreciation of investments. Investments are typically held through investment entities, such as limited partnerships or limited liability companies, established for the specific purpose of owning, leasing, managing, financing, or developing real estate and infrastructure related investments.

The Real Estate and Infrastructure pools diversify its holdings by:

- **Geography** – The pools are invested globally and are diversified geographically so that it is not concentrated in a limited number of markets or geographic areas.
- **Size and Value** – The pools diversify its holdings by size so that it is not concentrated in a limited number of large investments.

INVESTMENT SECTION

REPORT ON INVESTMENT ACTIVITY

- **Investment Type** – The pools are diversified by investment type as summarized below.

| | |
|--------------------------------|-----------------------|
| Multi-family apartments | 39.7 % |
| Hotel | 13.1 |
| Commercial office buildings | 13.1 |
| Infrastructure | 12.1 |
| Industrial warehouse buildings | 10.5 |
| Retail shopping centers | 5.0 |
| For Rent Homes | 1.0 |
| For Sale Homes | 3.1 |
| Land | 1.2 |
| Short Term Investments | 1.2 |
| Total | <u>100.0 %</u> |

The Real Estate and Infrastructure pools generated a return of 6.9% for the Pension and OPEB Plans for fiscal year 2019. The two benchmark returns from the National Council of Real Estate Investment Fiduciaries: the National Property Blended Index (less 130 basis points) was 4.9% and the Open-End Diversified Core Equity Index was 4.6%.

At the close of fiscal year 2019, the Real Estate and Infrastructure pools represented 9.5% of total investments. The following summarizes the System's 77.0% ownership share of the Real Estate and Infrastructure pools at September 30, 2019:

Real Estate and Infrastructure Pools

(in thousands)

| | |
|-------------------------------|----------------------------|
| Short-Term Pooled Investments | \$ 63,337 |
| Real Estate Equities | 4,749,035 |
| Infrastructure Equities | 665,514 |
| Dividend Receivable | 1,598 |
| Total | <u>\$ 5,479,484</u> |

FIXED INCOME POOLS

The objective for investments made in the Fixed Income pools is to meet or exceed the Barclays Aggregate Bond Index over one, three, and five-year periods and market cycles. Another objective is to rank above median in a nationally recognized universe of managers possessing a similar style.

For Fixed Income sub-strategies, the objective return is to meet or exceed the most relevant Barclays benchmark index.

The pools are invested primarily in fixed income securities of U.S. companies through internal and externally managed strategies. The goal is to build a portfolio of strategies that will provide excess returns relative to the blended benchmark while providing minimal tracking error to the index. At times a portion of the pools may be invested in exchange traded funds (ETFs) and fixed-income short-term securities with maturities of less than one year.

The pools invest in fixed income and related securities in a diversified portfolio of investment grade corporate issues, treasuries, agencies, government sponsored enterprises and government guaranteed mortgages. The pools diversify its investments by allocating its strategies with consideration of credit risk.

The System's Fixed Income pools total rate of return was 9.5% for the Pension and OPEB Plans for fiscal year 2019. This compares to 10.3% for the Barclays Aggregate Bond benchmark.

INVESTMENT SECTION

REPORT ON INVESTMENT ACTIVITY

At the close of fiscal year 2019, the Fixed Income pools represented 13.6% of total investments. The following summarizes the System's 76.6% ownership share of the Fixed Income pools at September 30, 2019:

Fixed Income Pools

(In thousands)

| | |
|-------------------------------|---------------------|
| Short-Term Pooled Investments | \$ 29,060 |
| Fixed Income Securities | 7,796,693 |
| Settlement Principal Payable | (10,039) |
| Accrued interest | 18,497 |
| Total | \$ 7,834,211 |

ABSOLUTE RETURN POOLS

The Absolute Return Pools consist of the Absolute Return Strategies Pool and the Real Return and Opportunistic Investment Pool.

The primary investment objective of the Absolute Return Strategies Pool is to generate a rate of return that meets or exceeds T-bills by 400 basis points net of fees over the one, three, and five-year periods and a market cycle. Another objective is to exceed the appropriate HFN Fund of Funds median net of fees over one, three, and five-year periods and a market cycle.

The Absolute Return Strategies pool rate of return for the fiscal year was 3.9% for the Pension and OPEB Plans versus the benchmark's 1.6%.

The primary investment objective of the Real Return and Opportunistic Pool is to generate a rate of return that meets or exceeds the increase in the CPI by at least 4.0% annually net of fees over one, three, and five-year periods and a market cycle. If a peer universe is available, another objective is to rank above median in a nationally recognized universe of managers possessing a similar style.

For sub-strategies targeting a commodities index, the objective is to generate a rate of return that meets or exceeds the Dow Jones-AIG Total Return Commodities Index over one, three, and five year periods and a market cycle. Another objective is to rank above median in a nationally recognized universe of managers possessing a similar style.

The Real Return and Opportunistic Investments pool rate of return for the fiscal year was 9.7% for the Pension and OPEB Plans versus the benchmark's 6.5%.

At the close of fiscal year 2019, the Absolute Return Pools represented 16.3% of total investments. The following summarizes the System's 77.0% ownership share of the Absolute Return Pools at September 30, 2019:

Absolute Return Pools

(in thousands)

| | |
|-------------------------------|---------------------|
| Short-Term Pooled Investments | \$ 104,049 |
| Equities | 9,278,793 |
| Total | \$ 9,382,842 |

INVESTMENT SECTION

REPORT ON INVESTMENT ACTIVITY

SHORT-TERM INVESTMENT POOLS

The objective of the Short Term Investment pools is to closely match the return performance of its benchmark, the 30 day Treasury bill. The Short Term Investment pools return for the fiscal year was 2.6% for the Pension and OPEB plans versus the benchmark's 2.3%.

Potential areas of investment are:

- Obligations of the United States or its agencies
- Banker's acceptances, commercial accounts, certificates of deposit or depository receipts
- Repurchase agreements for the purchase of securities issued by the US government or its agencies
- Commercial paper rated at the time of purchase within the two highest classifications established by not less than two national rating services as determined by the State Treasurer
- Short duration investment grade corporate issues

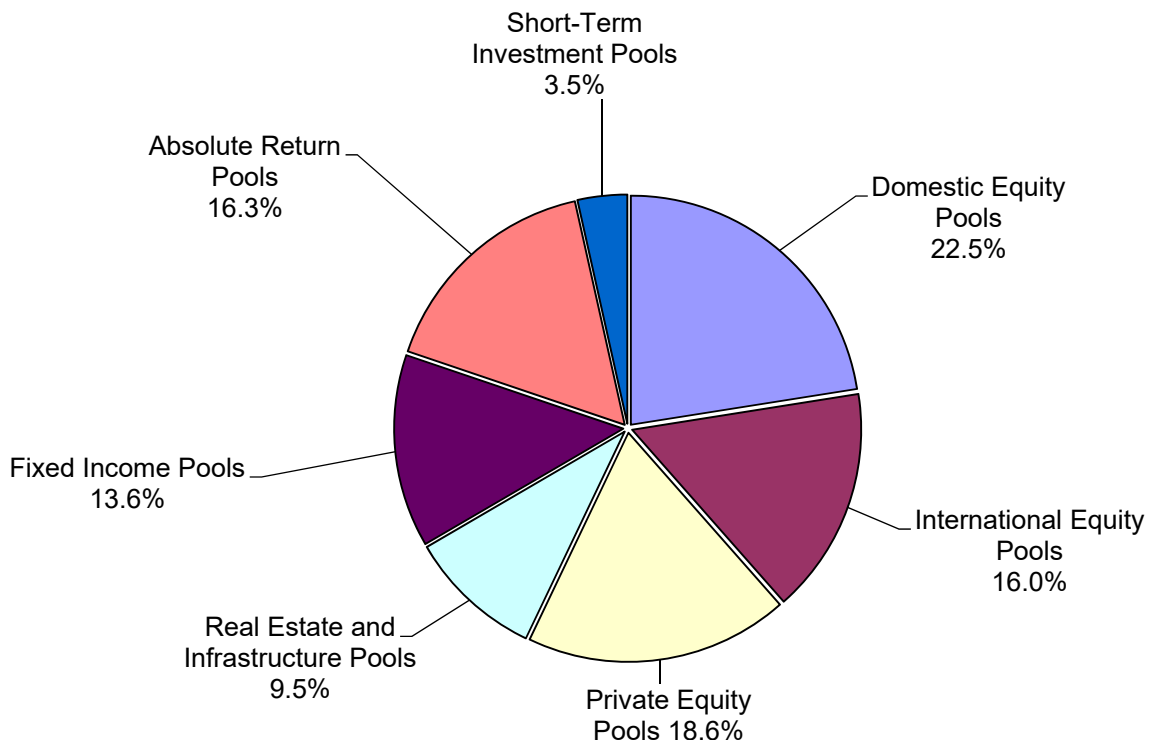
At the close of fiscal year 2019, the Short Term Investment pools represented 3.5% of total investments. The following summarizes the System's 53.1% ownership share of the Short Term Investment pools at September 30, 2019:

Short-Term Investment Pools

(in thousands)

| | |
|-------------------------------|---------------------|
| Short-Term Pooled Investments | \$ 750,466 |
| Fixed Income Securities | 1,290,251 |
| Accrued interest | 1,001 |
| Total | \$ 2,041,718 |

ASSET ALLOCATION – SECURITY TYPE ONLY



INVESTMENT SECTION

INVESTMENT RESULTS

PENSION PLAN INVESTMENT RESULTS

For the Period Ending September 30, 2019

| Investment Category | Current Year | Annualized Rate of Return ¹ | | |
|--|--------------|--|---------|----------|
| | | 3 Years | 5 Years | 10 Years |
| Total Portfolio | 5.1 % | 9.8 % | 7.7 % | 9.3 % |
| Domestic Equity Pools | 2.5 | 14.1 | 10.5 | 13.0 |
| S&P 1500 Index | 3.4 | 13.0 | 10.7 | 13.2 |
| International Equity Pools | (1.4) | 6.6 | 3.9 | 5.3 |
| International Blended Benchmark ² | (1.2) | 6.3 | 2.9 | 4.4 |
| Private Equity Pools | 10.0 | 14.4 | 11.3 | 14.3 |
| Private Equity Blended Benchmark ³ | 13.7 | 17.6 | 14.0 | 18.1 |
| Real Estate and Infrastructure Pools | 6.9 | 8.3 | 9.2 | 7.6 |
| NCREIF Property Blended Index ⁴ | 4.9 | 5.4 | 7.2 | 8.4 |
| Fixed Income Pools | 9.5 | 4.4 | 4.6 | 4.8 |
| Barclays Aggregate Bond | 10.3 | 2.9 | 3.4 | 3.8 |
| Absolute Return Pools | | | | |
| Total Absolute Return | 3.9 | 5.9 | 3.6 | 5.1 |
| HFRI Fund of Funds Cons 1 month lag | 1.6 | 3.3 | 2.1 | 2.9 |
| Total Real Return and Opportunistic | 9.7 | 11.6 | 9.3 | |
| Real Return and Opportunistic Benchmark ⁵ | 6.5 | 7.3 | 7.1 | |
| Short Term Investment Pools | 2.6 | 1.8 | 1.2 | 0.8 |
| 30 Day Treasury Bill | 2.3 | 1.5 | 0.9 | 0.5 |

¹ Calculations used a time-weighted rate of return based on the market rate of return in accordance with industry standards. Excludes income and investment gains and losses from securities lending.

² As of 7/1/14 index is MSCI ACWI Ex-US Net. History 10/1/10 to 6/30/14 is MSCI ACWI Ex US Gross. History 1/1/10 to 9/30/10 is S&P Developed BMI-EPAC Net 75/25. History prior to 1/1/10 is S&P Developed BMI-EPAC Net 50/50.

³ Index is blend of S&P 500 plus 300 bps with a 3 month lag.

⁴ As of 10/1/05, index is NCREIF less 130 bp. History prior to 10/1/05 reflects NCREIF less 75 bp.

⁵ As of 12/1/18 Benchmark is 50% (CPI + 4%) and 50% (actuarial rate 7.05%) History prior to 12/1/18 reflects 50% (CPI + 5%) and 50% (actuarial rate 8%).

INVESTMENT SECTION

INVESTMENT RESULTS

OPEB INVESTMENT RESULTS

For the Period Ending September 30, 2019

| Investment Category | Annualized Rate of Return ¹ | | |
|--|--|---------|---------|
| | Current Year | 3 Years | 5 Years |
| Total Portfolio | 5.0 % | 9.7 % | 7.7 % |
| Domestic Equity Pools | 2.5 | 14.1 | 10.5 |
| S&P 1500 Index | 3.4 | 13.0 | 10.7 |
| International Equity Pools | (1.4) | 6.6 | 3.9 |
| International Blended Benchmark ² | (1.2) | 6.3 | 2.9 |
| Private Equity Pools | 10.0 | 14.4 | 11.3 |
| Private Equity Blended Benchmark ³ | 13.7 | 17.6 | 14.0 |
| Real Estate and Infrastructure Pools | 6.9 | 8.4 | 9.2 |
| NCREIF Property Blended Index ⁴ | 4.9 | 5.4 | 7.2 |
| Fixed Income Pools | 9.5 | 4.4 | 4.6 |
| Barclays Aggregate Bond | 10.3 | 2.9 | 3.4 |
| Absolute Return Pools | | | |
| Total Absolute Return | 3.9 | 5.9 | 3.6 |
| HFRI Fund of Funds Cons 1 month lag | 1.6 | 3.3 | 2.1 |
| Total Real Return and Opportunistic | 9.7 | 11.6 | 9.3 |
| Real Return and Opportunistic Benchmark ⁵ | 6.5 | 7.3 | 7.1 |
| Short-Term Investment Pools | 2.6 | 1.7 | 1.2 |
| 30-Day Treasury Bill | 2.3 | 1.5 | 0.9 |

¹ Calculations used a time-weighted rate of return based on the market rate of return in accordance with industry standards. Excludes income and investment gains and losses from securities lending.

² As of 7/1/14, index is MSCI ACWI Ex-US Net. History 10/1/10 to 6/30/14 is MSCI ACWI Ex-US Gross. History 1/1/10 to 9/30/10 is S&P Developed BMI-EPAC Net 75/25. History prior to 1/1/10 is S&P Developed BMI-EPAC Net 50/50.

³ Index is blend of S&P 500 plus 300 bps with a 3 month lag.

⁴ As of 10/1/05, index is NCREIF less 130 bp. History prior to 10/1/05 reflects NCREIF less 75 bp.

⁵ As of 12/1/18 Benchmark is 50% (CPI + 4%) and 50% (actuarial rate 7.05%). History prior to 12/1/18 reflects 50% (CPI + 5%) and 50% (actuarial rate 8%).

INVESTMENT SECTION

LARGEST ASSETS HELD

LARGEST STOCK HOLDINGS

(By Fair Value)
September 30, 2019

| Rank | Shares | Stocks | Fair Value |
|------|------------|--------------------------------|----------------|
| 1 | 2,551,352 | Microsoft Corp | \$ 354,714,512 |
| 2 | 17,775,203 | AGNC Investment Corp. | 286,003,022 |
| 3 | 1,248,540 | Apple Inc. | 279,635,467 |
| 4 | 124,717 | Amazon.com Inc. | 216,497,112 |
| 5 | 1,415,453 | JPMorgan Chase & Co. | 166,584,688 |
| 6 | 838,639 | Visa Inc. CL A | 144,254,354 |
| 7 | 617,383 | Home Depot Inc. | 143,245,289 |
| 8 | 113,346 | Alphabet Inc. CL A | 138,411,707 |
| 9 | 662,725 | Berkshire Hathaway Inc. CL B | 137,860,120 |
| 10 | 14,702,571 | Annaly Capital Management Inc. | 129,382,621 |

A complete list of holdings is available from the Michigan Department of Treasury.

The System's investments are commingled in various pooled accounts. Amounts, par value and number of shares represent the System's pro-rata share based on its ownership of the investment pools.

LARGEST BOND HOLDINGS

(By Fair Value)
September 30, 2019

| Rank | Par Amount | Bonds & Notes | Fair Value |
|------|-------------|---|----------------|
| 1 | 163,873,219 | US Treasury N/B 2.750% Due 02/15/2028 | \$ 177,917,666 |
| 2 | 123,557,274 | US Treasury N/B 3.000% Due 02/15/2048 | 146,700,131 |
| 3 | 139,940,027 | FNMA TBA 30 YR 4 Single Family Mortgage | 145,275,241 |
| 4 | 132,203,754 | TSY INFL IX N/B .750% 07/15/2028 | 138,701,039 |
| 5 | 134,967,762 | US Treasury N/B 1.500% Due 05/15/2020 | 134,661,976 |
| 6 | 98,517,616 | US Treasury N/B 3.375% Due 11/15/2048 | 125,529,145 |
| 7 | 117,634,425 | US Treasury N/B 2.375% Due 05/15/2029 | 124,922,245 |
| 8 | 111,191,214 | US Treasury N/B 1.875% Due 08/31/2022 | 112,125,046 |
| 9 | 104,923,875 | US Treasury N/B 1.625% Due 02/15/2026 | 104,964,860 |
| 10 | 96,529,120 | US Treasury N/B 1.750% Due 06/30/2024 | 97,347,355 |

A complete list of holdings is available from the Michigan Department of Treasury.

Largest Bond Holdings are exclusive of securities lending collateral.

The System's investments are commingled in various pooled accounts. Amounts, par value and number of shares represent the System's pro-rata share based on its ownership of the investment pools.

INVESTMENT SECTION

SCHEDULE OF INVESTMENT FEES

The State of Michigan Investment Board (Board) is the investment fiduciary and custodian of the System's funds pursuant to State law. Outside advisors are utilized to augment the State of Michigan's internal staff. 71.0% of the total investment portfolio is managed by fully discretionary outside advisors. The Michigan Department of Treasury's cost of operations applicable to the retirement system for the fiscal year end amounted to \$13,737 thousand or eight and one tenth basis points (.081%) of the fair value of the Assets under Management by the Board.

SCHEDULE OF INVESTMENT FEES

Investment Managers' Fees:

| | Assets under Management (in thousands) | Fees (in thousands) | Basis Points* |
|--------------------------------|---|--------------------------------|--------------------------|
| State of Michigan | \$ 16,706,145 | \$ 13,737 | 8.1 |
| Outside Advisors for | | | |
| Fixed Income | 4,168,526 | 11,912 | 28.6 |
| Absolute Return | 9,325,120 | 46,586 | 50.0 |
| International Equity | 7,591,013 | 14,708 | 19.4 |
| Domestic Equity | 3,669,162 | 8,213 | 22.4 |
| Private Equity | 10,702,097 | 105,829 | 98.9 |
| Real Estate and Infrastructure | 5,398,739 | 53,786 | 99.6 |
| Total | \$ 57,560,802 | \$ 254,771 | |

Other Investment Services Fees:

| | | |
|--------------------|---------------|----------|
| Assets in Custody | \$ 57,421,253 | \$ 5,050 |
| Securities on Loan | 2,231,825 | 1,837 |

* Private Equity partnership agreements that define the management fees, the asset management fees range from 0 to 250 basis points of the committed capital. For Real Estate/Infrastructure, the asset management fees range from 40 to 200 basis points. For Absolute Return, the asset management fees range from 0 to 200 basis points. These fees, in most cases, are netted against income.

INVESTMENT SECTION

SCHEDULE OF INVESTMENT COMMISSIONS

Fiscal Year Ended September 30, 2019

| | Actual Commissions Paid ¹ | Actual Number of Shares Traded ¹ | Average Commission Per Share | Estimated Trade Costs Per Share | Estimated Research Costs Per Share | Estimated Trade Costs | Estimated Research Costs |
|--|--|--|------------------------------------|--|---|-----------------------------|--------------------------------|
| Investment Brokerage Firms: | | | | | | | |
| Banc Of America Securities LLC | \$ 30,454 | 1,215,726 | \$ 0.03 | \$ 0.01 | \$ 0.02 | \$ 12,157 | \$ 24,315 |
| BTIG LLC | 393,447 | 45,166,363 | 0.01 | 0.01 | - | 451,664 | - |
| Capital Institutional Services Inc | 383,449 | 72,604,051 | 0.01 | 0.01 | - | 726,041 | - |
| Citigroup Global Markets Inc | 192,893 | 9,411,499 | 0.02 | 0.01 | 0.01 | 94,115 | 94,115 |
| Cowen & Company LLC | 84,261 | 4,225,348 | 0.02 | 0.01 | 0.01 | 42,254 | 42,254 |
| Drexel Hamilton LLC | 13,297 | 2,659,120 | 0.01 | 0.01 | - | 26,591 | - |
| Goldman, Sachs & Co. | 646 | 64,417 | 0.01 | 0.01 | - | 644 | - |
| J P Morgan Securities Inc. | 292,912 | 17,374,277 | 0.02 | 0.01 | 0.01 | 173,743 | 173,741 |
| Merrill Lynch, Pierce, Fenner & Smith Inc. | 17,462 | 525,622 | 0.03 | 0.01 | 0.02 | 5,256 | 10,513 |
| MKM Partners LLC | 108,663 | 5,433,114 | 0.02 | 0.01 | 0.01 | 54,331 | 54,331 |
| Mischler Financial Group Inc. | 14,706 | 1,107,427 | 0.01 | 0.01 | - | 11,075 | - |
| Morgan Stanley & Co Inc. | 86,612 | 4,288,057 | 0.02 | 0.01 | 0.01 | 42,880 | 42,880 |
| National Financial | 63 | 12,551 | 0.01 | 0.01 | - | 125 | - |
| Pershing LLC | 170 | 22,681 | 0.01 | 0.01 | - | 227 | - |
| Raymond James and Associates Inc. | 5,129 | 156,403 | 0.03 | 0.01 | 0.02 | 1,564 | 3,129 |
| RBC Capital Markets | 111 | 11,108 | 0.01 | 0.01 | - | 111 | - |
| Roberts & Ryan Inv. | 38,174 | 2,967,250 | 0.01 | 0.01 | - | 29,672 | - |
| Stifel, Nicolaus & Co Inc. | 3,622 | 106,556 | 0.03 | 0.01 | 0.02 | 1,066 | 2,131 |
| USB Securities LLC | 1,784 | 50,944 | 0.04 | 0.01 | 0.03 | 509 | 1,528 |
| Wayne & Company | 960,598 | 279,550,375 | - | 0.01 | - | 2,795,504 | - |
| Total | \$ 2,628,453 | 446,952,889 | \$ 0.02 ² | \$ 0.01 | \$ 0.01 | \$ 4,469,529 | \$ 448,937 |

¹ Commissions are included in purchase and sale prices of investments. The commissions and shares represent the System's pro-rata share based on ownership of commission and share transactions in the investment pools.

² The average commission per share for all brokerage firms.

INVESTMENT SECTION

INVESTMENT SUMMARY

Fiscal Year Ended September 30, 2019

| | <u>Market Value ¹</u> | <u>Percent of Market Value</u> | <u>Investment & Interest Income²</u> | <u>Percent of Total Investment & Income</u> |
|---|-----------------------------------|------------------------------------|---|---|
| Fixed Income Pools | \$ 7,834,210,579 | 13.6 % | \$ 658,268,913 | 21.2 % |
| Domestic Equity Pools | 12,932,438,258 | 22.5 | 275,878,240 | 8.9 |
| Real Estate and Infrastructure Pools | 5,479,484,340 | 9.5 | 430,695,218 | 13.8 |
| Private Equity Pools | 10,702,097,493 | 18.6 | 1,065,535,457 | 34.3 |
| International Equity Pools | 9,188,010,955 | 16.0 | (83,679,830) | (2.7) |
| Absolute Return Pools | 9,382,842,330 | 16.3 | 718,296,086 | 23.1 |
| Short Term Investment Pools | <u>2,041,718,020 ³</u> | <u>3.5</u> | <u>43,450,351</u> | <u>1.4</u> |
| Total | <u>\$ 57,560,801,975</u> | <u>100.0 %</u> | <u>\$ 3,108,444,435</u> | <u>100.0 %</u> |

¹ Market value excludes \$2,277,909,622 in securities lending collateral for fiscal year 2019.

² Total Investment & Interest Income excludes net security lending income of \$7,400,277 and unrealized gain of \$857,418 for securities lending collateral.

³ Short term investment pools market value includes \$139,549,158 of equity in common cash.

INVESTMENT SECTION

INVESTMENT SUMMARY

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ACTUARIAL SECTION

Actuary's Certification
Summary of Actuarial Assumptions and Methods
Schedules of Active Member Valuation Data
Prioritized Solvency Test
Analysis of System Experience
Summary of Plan Provisions

ACTUARIAL SECTION

ACTUARY'S CERTIFICATION



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October 23, 2019

Ms. Tricia Foster, Director
Department of Technology, Management and Budget
and
The Retirement Board
Michigan Public School Employees' Retirement System
P.O. Box 30171
Lansing, Michigan 48909

Ladies and Gentlemen:

The basic financial objective of the Michigan Public School Employees' Retirement System (MPERS) is to establish and receive contributions which when combined with present assets and future investment return will be sufficient to meet the financial obligations of the System to present and future benefit recipients. The progress toward meeting these financial objectives is illustrated in the Schedules of Funding Progress and the Schedules of Employer Contributions.

We performed actuarial funding valuations and issued actuarial funding reports for the MPERS pension and retiree health (i.e., OPEB) plans as of September 30, 2018. The purpose of the September 30, 2018 annual actuarial valuations was to determine the annual required contributions for the fiscal year ending September 30, 2021, to measure the System's funding progress, and to provide actuarial information in connection with applicable Governmental Accounting Standards Board Statements. The valuations should not be relied upon for any other purpose. The valuation process develops employer contributions that are sufficient to fund the System's normal cost (i.e., the costs assigned by the valuation method to the year of service about to be rendered), as well as to fund any unfunded accrued liabilities over a reasonable period. The valuation was completed based upon population data, asset data and plan provisions in effect on September 30, 2018.

In addition to the funding valuation reports, separate reports are issued to provide financial reporting information for MPERS in accordance with Governmental Accounting Standards Board (GASB) Statement Nos. 67 and 68 (pension benefits) and Nos. 74 and 75 (retiree health benefits, or OPEB). Reports containing the actuarial results of the financial reporting valuations are produced annually after the publication of this letter. The GASB Statement Nos. 67, 68, 74 and 75 financial reporting valuations are based upon a measurement date of September 30, 2019.

The valuations were based upon information provided by the System's administrative staff concerning System benefit provisions, financial transactions, and individual members, terminated members, retirees and beneficiaries. We checked the data for internal and year to year consistency, but did not audit the data. As a result, we do not assume responsibility for the accuracy or completeness of the data provided by the System's administrative staff. The actuary summarizes and tabulates population data in order to analyze long term trends. The System's auditor audits the actuarial data annually.

One Towne Square | Suite 800 | Southfield, Michigan 48076-3723

ACTUARIAL SECTION

ACTUARY'S CERTIFICATION

Ms. Trish Foster
October 23, 2019
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Annual actuarial valuations are based upon assumptions regarding future activity in specific risk areas including the rate of investment return and payroll growth, eligibility for the various classes of benefits and longevity among retired lives. These assumptions are adopted by the Board and the Department after considering the advice of the actuary and other professionals. Each actuarial valuation takes into account all prior differences between actual and assumed experience in each risk area and adjusts the contribution requirements as needed.

The following schedules in the Financial Section, the Actuarial Section, and the Statistical Section of the CAFR were prepared by the Department of Financial Services based upon certain information presented in the previously mentioned funding and financial reporting valuation reports:

Financial Section

- Note 1 - Table of System's Membership
- Note 4 - Net Pension Liability; Summary of Actuarial Assumptions and Methods
- Note 5 - Net OPEB Liability; Summary of Actuarial Assumptions and Methods
- Schedules of Changes in the Net Pension Liability (NPL) and the Net OPEB Liability and Related Ratios
- Schedules of Contributions Multiyear
- Sensitivity of the NPL to Changes in the Discount Rate
- Sensitivity of the Net OPEB Liability to Changes in the Discount Rate
- Sensitivity of the Net OPEB Liability to Changes in the Healthcare Cost Trend Rate Assumption

Actuarial Section

- Summary of Actuarial Assumptions and Methods used in the September 30, 2018 Pension Funding Valuation
- Percent of Eligible Active Members Retiring Within Next Year
- Separation from Active Employment Before Age and Service Retirement and Individual Pay Increase Assumptions
- Schedule of Active Member Pension Valuation Data
- Schedule of Changes in the Retirement Rolls
- Prioritized Solvency Tests
- Analyses of System Experience
- Schedule of Active Member OPEB Valuation Data
- Schedule of Changes in the OPEB Rolls

Statistical Section

- Schedule of Retired Members by Type of Pension Benefit
- Schedule of Retired Members by Type of Health Benefit
- Schedules of Average Benefit Payments – Pension, Medical/Rx and Dental/Vision
- Schedules of Funding Progress



ACTUARIAL SECTION

ACTUARY'S CERTIFICATION

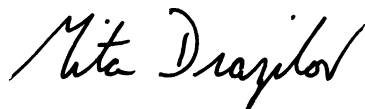
Ms. Trish Foster
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Page 3

The September 30, 2018 funding valuations and the September 30, 2019 financial reporting valuations were based upon assumptions that were recommended in connection with a study of System experience covering the period from October 1, 2012 through September 30, 2017. Future actuarial measurements may differ significantly from those presented in the annual valuations due to such factors as experience differing from that anticipated by actuarial assumptions, or changes in plan provisions, actuarial assumption/methods or applicable law. Due to the limited scope of the assignment, we did not perform an analysis of the potential range of future measurements.

The signing actuaries are independent of the plan sponsor.

The actuarial valuations of MPSERS were performed by qualified actuaries in accordance with standards of practice prescribed by the Actuarial Standards Board and in compliance with applicable State statutes. The assumptions and methods used for funding and financial reporting purposes are in conformity with the Actuarial Standards of Practice issued by the Actuarial Standards Board. Mita D. Drazilov and Louise M. Gates are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. It is our opinion that the calculated employer contribution meets the financial objective of the Retirement System.

Respectfully submitted,



Mita D. Drazilov, ASA, FCA, MAAA



Louise M. Gates, ASA, FCA, MAAA



ACTUARIAL SECTION

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

1. The investment return rate used in the pension valuations of the MIP, Basic and Pension Plus plans was 6.80% per year (6.00% for the Pension Plus 2 plan) net of investment expenses, compounded annually. This rate of return is not the assumed real rate of return. Considering a wage inflation assumption of 2.75%, the nominal rate of investment return translates to a real rate of return of 4.05% for the Basic, MIP and the Pension Plus plan (3.25% for the Pension Plus 2 plan) over wage inflation. Adopted 2018.
2. The healthy life mortality table used in evaluating allowances to be paid was the RP-2014 Male and Female Healthy Annuitant Mortality Tables, scaled by 82% for males and 78% for females, adjusted for mortality improvements using projection scale MP-2017 from 2006. Adopted 2018.
3. Sample probabilities of regular, unreduced retirement are shown in Schedule 1 on the next page. Adopted 2018.
4. Sample probabilities of withdrawal from service and disability, together with individual pay increase assumptions, are shown in Schedule 2 on the next page. Adopted 2018.
5. Total active member payroll is assumed to increase 2.75% per year. This represents the portion of the individual pay increase assumptions attributable to inflation. In effect, this assumes no change in the number of active members. Adopted 2018.
6. An individual entry age actuarial cost method of valuation was used in determining actuarial liabilities and normal cost. Adopted 1975. Unfunded actuarial accrued liabilities are financed over a declining 18-year period ending September 30, 2038. Adopted 2012.
7. The Department of Technology, Management and Budget approved the use of market value of assets as of September 30, 2006 for valuation purposes. For investment gains and losses that occur after that date, a 5-year smoothing technique will be used. Specifically, the excess (shortfall) of actual investment income (including interest, dividends, realized and unrealized gains or losses) over the imputed-income at the valuation interest rate is considered the gain (loss), which is spread over five years. Adopted 2007.
8. The data about persons now covered and about present assets was furnished by MPSERS administrative staff. Although examined for general reasonableness, the data was not audited by the actuary.
9. The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (MAAA). The assumptions used in the actuarial valuations were adopted by MPSERS Board and the Department of Technology, Management and Budget after consulting with the actuary.
10. A 5-year experience investigation, covering the period from October 1, 2012 through September 30, 2017 was completed in 2018. The purpose of the study was to analyze the actual experience of MPSERS versus that anticipated by actuarial assumptions then in use.
11. Gabriel, Roeder, Smith & Company was awarded the actuarial and consulting services contract beginning October 4, 2006.

ACTUARIAL SECTION

SUMMARY OF ACTUARIAL ASSUMPTIONS AND METHODS

SCHEDULE 1

PERCENT OF ELIGIBLE ACTIVE MEMBERS RETIRING WITHIN NEXT YEAR

| Retirement Ages | Basic | | MIP ¹ and Pension Plus | | Years of Service | MIP ² | |
|--------------------|----------|--------------|-----------------------------------|--------------|---------------------|------------------|--------------|
| | Teachers | Non-Teachers | Teachers | Non-Teachers | | Teachers | Non-Teachers |
| 55 | 25 % | 20 % | - % | - % | 30 | 25 % | 25 % |
| 58 | 16 | 18 | - | - | 32 | 20 | 20 |
| 61 | 20 | 18 | 20 | 17 | 34 | 19 | 20 |
| 64 | 25 | 24 | 23 | 20 | 36 | 21 | 20 |
| 67 | 25 | 28 | 25 | 20 | 38 | 24 | 20 |
| 70 | 25 | 20 | 25 | 16 | 40 | 30 | 25 |
| 71 | 21 | 20 | 25 | 16 | 42 | 30 | 30 |
| 72 | 21 | 20 | 25 | 16 | 44 | 30 | 30 |
| 73 | 21 | 20 | 20 | 16 | 46 | 30 | 30 |
| 74 | 21 | 20 | 20 | 16 | 48 | 30 | 30 |
| 75 and over | 100 | 100 | 100 | 100 | 50 and over | 100 | 100 |

¹ Applies to MIP members with fewer than 30 years of service.

² Applies to MIP members with 30 or more years of service.

SCHEDULE 2

SEPARATION FROM ACTIVE EMPLOYMENT BEFORE AGE & SERVICE RETIREMENT & INDIVIDUAL PAY INCREASE ASSUMPTIONS

| Sample Ages | Years of Service | Percent of Active Members Withdrawing Within Next Year | | | | Percent Becoming Disabled Within Next Year | Percent Increase in Pay During Next Year |
|----------------|---------------------|---|--------------|------------------------|--------------|---|---|
| | | Pay More than \$20,000 | | Pay Less than \$20,000 | | | |
| | | Teachers | Non-Teachers | Teachers | Non-Teachers | | |
| All | 0 | 15.00 % | 35.00 % | 30.00 % | 40.00 % | - % | - % |
| | 1 | 10.00 | 14.00 | 25.00 | 26.00 | - | - |
| | 2 | 6.50 | 8.20 | 22.00 | 19.00 | - | - |
| | 3 | 6.00 | 6.80 | 22.00 | 16.00 | - | - |
| | 4 | 4.50 | 5.70 | 22.00 | 14.00 | - | - |
| 25 | 5 & Over | 3.00 | 4.76 | 22.00 | 14.00 | .01 | 11.55 |
| 35 | " | 1.82 | 2.78 | 20.80 | 13.40 | .02 | 5.85 |
| 45 | " | 1.08 | 1.88 | 16.40 | 9.80 | .10 | 3.89 |
| 55 | " | 1.00 | 1.80 | 16.00 | 8.00 | .26 | 2.93 |
| 60 | " | 1.00 | 1.80 | 16.00 | 8.00 | .36 | 2.75 |

ACTUARIAL SECTION

SCHEDULES OF ACTIVE MEMBER VALUATION DATA

SCHEDULE OF ACTIVE MEMBER PENSION VALUATION DATA

| Valuation Date Sept. 30 | Number | Reported Annual Payroll* | Average Annual Pay | Increase (Decrease) | Average Age | Average Service |
|-------------------------------|---------|--------------------------------|--------------------------|------------------------|----------------|--------------------|
| 2009 | 268,208 | \$ 9,883,674 | \$ 36,851 | 3.1 % | 45.4 | 11.4 |
| 2010 | 242,568 | 8,845,019 | 36,464 | (1.1) | 45.2 | 11.1 |
| 2011 | 236,660 | 9,155,691 | 38,687 | 6.1 | 45.3 | 11.3 |
| 2012 | 223,769 | 8,649,029 | 38,652 | (0.1) | 45.7 | 11.9 |
| 2013 | 212,525 | 8,225,140 | 38,702 | 0.1 | 46.0 | 12.3 |
| 2014 | 199,674 | 7,943,922 | 39,784 | 2.8 | 46.1 | 12.7 |
| 2015 | 194,957 | 8,005,009 | 41,060 | 3.2 | 46.1 | 12.8 |
| 2016 | 189,761 | 7,912,565 | 41,698 | 1.6 | 46.2 | 13.0 |
| 2017 | 187,735 | 7,880,041 | 41,974 | 0.7 | 46.2 | 13.0 |
| 2018 | 182,930 | 7,884,550 | 43,101 | 2.7 | 46.4 | 13.1 |

* In thousands of dollars.

SCHEDULE OF ACTIVE MEMBER OPEB VALUATION DATA

| Valuation Date Sept. 30 | Number | Reported Annual Payroll* | Average Annual Pay | Increase (Decrease) | Average Age | Average Service |
|-------------------------------|---------|--------------------------------|--------------------------|------------------------|----------------|--------------------|
| 2012 | 223,769 | \$ 8,649,029 | \$ 38,652 | - % | 45.7 | 11.9 |
| 2013 | 214,906 | 8,273,017 | 38,496 | (0.4) | 46.0 | 12.3 |
| 2014 | 191,551 | 7,618,224 | 39,771 | 3.3 | 45.7 | 12.6 |
| 2015 | 191,403 | 7,780,961 | 40,652 | 2.2 | 45.6 | 12.5 |
| 2016 | 189,458 | 7,745,962 | 40,885 | 0.6 | 45.6 | 12.5 |
| 2017 | 190,537 | 7,778,000 | 40,821 | (0.2) | 45.5 | 12.3 |
| 2018 | 190,291 | 7,873,900 | 41,378 | 1.4 | 45.6 | 12.2 |

* In thousands of dollars.

ACTUARIAL SECTION

SCHEDULES OF ACTIVE MEMBER VALUATION DATA

SCHEDULE OF CHANGES IN RETIREMENT ROLLS

| Year | Added to Rolls | | Removed from Rolls | | Rolls - End of Year | | Increase in Annual Allowances | Average Annual Allowances |
|----------------|----------------|--------------------|--------------------|--------------------|---------------------|--------------------|-------------------------------|---------------------------|
| Ended Sept. 30 | No. | Annual Allowances* | No. | Annual Allowances* | No. | Annual Allowances* | | |
| 2009 | 8,817 | \$ 239,774 | 4,160 | \$ 74,870 | 171,922 | \$ 3,336,165 | 5.2 % | \$ 19,405 |
| 2010 | 19,946 | 553,900 | 4,146 | 75,310 | 187,722 | 3,814,755 | 14.3 | 20,321 |
| 2011 | 9,533 | 256,356 | 4,820 | 83,884 | 192,435 | 3,987,227 | 4.5 | 20,720 |
| 2012 | 9,007 | 236,023 | 4,781 | 89,032 | 196,661 | 4,134,218 | 3.7 | 21,022 |
| 2013 | 9,182 | 244,937 | 4,891 | 89,874 | 200,952 | 4,289,281 | 3.8 | 21,345 |
| 2014 | 8,852 | 241,473 | 5,292 | 99,689 | 204,512 | 4,431,065 | 3.3 | 21,667 |
| 2015 | 8,761 | 244,010 | 5,622 | 106,223 | 207,651 | 4,568,852 | 3.1 | 22,003 |
| 2016 | 8,836 | 248,739 | 5,480 | 107,923 | 211,007 | 4,709,668 | 3.1 | 22,320 |
| 2017 | 8,793 | 247,289 | 5,811 | 117,543 | 213,989 | 4,839,414 | 2.8 | 22,615 |
| 2018 | 8,741 | 254,248 | 6,112 | 126,607 | 216,618 | 4,967,055 | 2.6 | 22,930 |

* In thousands of dollars.

SCHEDULE OF CHANGES IN THE OPEB ROLLS

| Year | Added to Rolls | | Removed from Rolls | | Rolls - End of Year | | Increase in Annual Allowances | Average Annual Allowances |
|----------------|----------------|--------------------|--------------------|--------------------|---------------------|--------------------|-------------------------------|---------------------------|
| Ended Sept. 30 | No. | Annual Allowances* | No. | Annual Allowances* | No. | Annual Allowances* | | |
| 2011 | - | \$ - | - | \$ - | 154,589 | \$ 979,578 | - % | \$ - |
| 2012 | 7,263 | 73,106 | 4,401 | 74,841 | 157,451 | 977,843 | (0.2) | 6,210 |
| 2013 | 6,996 | 59,203 | 4,695 | 156,890 | 159,752 | 880,156 | (10.0) | 5,510 |
| 2014 | 6,634 | 57,331 | 5,042 | 88,058 | 161,344 | 849,429 | (3.5) | 5,265 |
| 2015 | 6,617 | 65,670 | 5,159 | 69,497 | 162,802 | 845,602 | (0.5) | 5,194 |
| 2016 | 6,633 | 74,740 | 5,072 | 68,879 | 164,363 | 851,463 | 0.7 | 5,180 |
| 2017 | 6,572 | 65,051 | 5,382 | 69,797 | 165,553 | 846,717 | (0.6) | 5,114 |
| 2018 | 5,927 | 58,668 | 5,559 | 99,257 | 165,921 | 806,128 | (4.8) | 4,859 |

* In thousands of dollars.

Notes:

No. refers to number of retiree health contracts

Annual allowances added to rolls includes increases due to medical inflation and contract changes.

Annual allowances removed from rolls includes decreases due to contract changes

ACTUARIAL SECTION

PRIORITIZED SOLVENCY TEST

MPERS's funding objective is to meet long-term benefit promises through contributions that remain approximately level from year to year as a percent of member payroll. If the contributions to MPERS are level in concept and soundly executed, MPERS will pay all promised benefits when due, the ultimate test of financial soundness. Testing for level contribution rates is the long-term solvency test.

A prioritized solvency test is another means of checking a system's progress under its funding program. In a short condition test, the plan's present assets (cash and investments) are compared with: (1) active member contributions on deposit; (2) the liabilities for future benefits to present retired lives; and (3) the liabilities for service already rendered by active and inactive members. In a system that has been following the discipline of level percent of payroll financing, the liabilities for active member contributions on deposit (liability 1) and the liabilities for future benefits to present retired lives (liability 2) will be fully covered by present assets (except in rare circumstances). In addition, the liabilities for service already rendered by active members (liability 3) are normally partially covered by the remainder of present assets. Generally, if MPERS has been using level-cost financing, the funded portion of liability 3 will increase over time. Liability 3 being fully funded is not necessarily a by-product of level percent of payroll funding methods.

The schedules that follow illustrate the history of the liabilities of MPERS and are indicative of the MPERS policy of following the discipline of level percent of payroll financing.

PENSION BENEFITS

(\$ in millions)

| Valuation Date | Actuarial Accrued Liability (AAL) | | | Valuation Assets | Portion of AAL Covered by Assets | | | |
|-------------------|-----------------------------------|-----------------------------|---|------------------|----------------------------------|-----|-------|------------------|
| | (1) | (2) | (3) | | (1) | (2) | (3) | (4) ¹ |
| | Active Member Contributions | Retirants and Beneficiaries | Active and Inactive Members (Employer Financed Portion) | | | | | |
| Sept. 30 | | | | | | | | |
| 2009 | \$ 5,449 | \$ 34,159 | \$ 17,077 | \$ 44,703 | 100 | % | 100.0 | % 29.8 |
| 2010 | 5,055 | 38,315 | 15,173 | 43,294 | 100 | | 99.8 | 0.0 74.0 |
| 2010 ² | 5,055 | 38,589 | 16,233 | 43,294 | 100 | | 99.1 | 0.0 72.3 |
| 2010 ³ | 5,055 | 39,639 | 16,233 | 43,294 | 100 | | 96.5 | 0.0 71.1 |
| 2011 | 5,217 | 41,043 | 17,167 | 41,038 | 100 | | 87.3 | 0.0 64.7 |
| 2012 | 5,296 | 42,076 | 16,909 | 38,450 | 100 | | 78.8 | 0.0 59.8 |
| 2012 ² | 5,296 | 42,076 | 15,905 | 38,450 | 100 | | 78.8 | 0.0 60.8 |
| 2012 ³ | 5,296 | 42,076 | 15,344 | 38,450 | 100 | | 78.8 | 0.0 61.3 |
| 2013 | 4,909 | 43,198 | 15,733 | 38,044 | 100 | | 76.7 | 0.0 59.6 |
| 2014 | 5,225 | 44,126 | 15,699 | 39,626 | 100 | | 78.0 | 0.0 60.9 |
| 2014 ² | 5,225 | 45,545 | 15,335 | 39,626 | 100 | | 75.5 | 0.0 59.9 |
| 2015 | 5,738 | 46,538 | 15,452 | 41,006 | 100 | | 75.8 | 0.0 60.5 |
| 2016 | 6,189 | 47,431 | 15,238 | 43,204 | 100 | | 78.0 | 0.0 62.7 |
| 2016 ² | 6,189 | 49,299 | 16,822 | 43,204 | 100 | | 75.1 | 0.0 59.7 |
| 2017 | 6,730 | 50,069 | 16,528 | 45,397 | 100 | | 77.2 | 0.0 61.9 |
| 2017 ² | 6,730 | 51,878 | 18,085 | 47,255 | 100 | | 78.1 | 0.0 61.6 |
| 2018 | 7,479 | 52,633 | 17,753 | 49,313 | 100 | | 79.5 | 0.0 63.3 |
| 2018 ² | 7,479 | 56,834 | 19,062 | 50,630 | 100 | | 75.9 | 0.0 60.7 |

¹ Percent funded on a total valuation asset and total actuarial accrued liability basis

² Revised actuarial assumptions and/or methods.

³ Applies to MIP members with fewer than 30 years of service.

ACTUARIAL SECTION

PRIORITIZED SOLVENCY TEST

OTHER POSTEMPLOYMENT BENEFITS

(\$ in millions)

| Valuation Date | Actuarial Accrued Liability (AAL) | | | Valuation Assets | Portion of AAL Covered by Assets | | | |
|-------------------|-----------------------------------|-----------------------------------|---|---------------------|----------------------------------|-------|-------|------------------|
| | (1) | (2) | (3) | | (1) | (2) | (3) | (4) ¹ |
| | Active Member | Retirants and Beneficiaries | Active and Inactive Members (Employer Financed Portion) | | | | | |
| Sept. 30 | Contributions | | | | | | | |
| 2008 | \$ - | \$ 14,553 | \$ 12,258 | \$ 832 | 0.0 % | 5.7 % | 0.0 % | 3.1 % |
| 2009 | - | 13,805 | 14,490 | 713 | 0.0 | 5.2 | 0.0 | 2.5 |
| 2010 | - | 15,591 | 13,036 | 999 | 0.0 | 6.4 | 0.0 | 3.5 |
| 2011 | - | 14,496 | 12,550 | 1,156 | 0.0 | 8.0 | 0.0 | 4.3 |
| 2012 ² | - | 8,848 | 5,940 | 1,348 | 0.0 | 15.2 | 0.0 | 9.1 |
| 2013 | 691 | 8,766 | 5,077 | 2,041 | 100 | 15.4 | 0.0 | 14.0 |
| 2014 ² | 874 | 8,829 | 4,458 | 2,982 | 100 | 23.9 | 0.0 | 21.1 |
| 2015 | 1,042 | 7,867 | 3,923 | 3,531 | 100 | 31.6 | 0.0 | 27.5 |
| 2016 ² | 1,186 | 8,548 | 5,592 | 4,279 | 100 | 36.2 | 0.0 | 31.1 |
| 2017 | 1,320 | 7,879 | 3,594 | 5,178 | 100 | 49.0 | 0.0 | 40.5 |
| 2017 ² | 1,320 | 8,279 | 3,989 | 5,178 | 100 | 46.6 | 0.0 | 38.1 |
| 2018 | 1,441 | 7,794 | 3,638 | 5,944 | 100 | 57.8 | 0.0 | 46.2 |
| 2018 ² | 1,441 | 8,505 | 3,803 | 6,089 | 100 | 54.7 | 0.0 | 44.3 |

¹ Percent funded on a total valuation asset and total actuarial accrued liability basis

² Revised actuarial assumptions and/or methods.

ACTUARIAL SECTION

ANALYSIS OF SYSTEM EXPERIENCE – PENSION

GAINS/(LOSSES) IN ACCRUED LIABILITIES

During Year Ended September 30, 2018

Resulting from Differences Between Assumed Experience & Actual Experience

| Type of Activity | Gain/(Loss) |
|---|-------------------------|
| 1. Retirements (including Disability Retirement). If members retire at older ages or with lower final average pay than assumed, there is a gain. If younger ages or higher average pays, a loss. | \$ 24,768,963 |
| 2. Withdrawal From Employment (including death-in-service). If more liabilities are released by withdrawals and deaths than assumed, there is a gain. If smaller releases, a loss. | (73,025,810) |
| 3. Pay Increases. If there are smaller pay increases than assumed, there is a gain. If greater increases, a loss. | 241,624,566 |
| 4. Investment Income. If there is greater investment income than assumed, there is a gain. If less income, a loss. | 1,884,670,238 |
| 5. Death After Retirement. If retirants live longer than assumed, there is a loss. If not as long, a gain. | (80,881,851) |
| 6. Rehires. | 7,180,546 |
| 7. Refund of University Employer Contributions. | - |
| 8. Other. Miscellaneous gains and losses resulting from data adjustments, timing of financial transactions, etc. | (141,416,505) |
| 9. Composite Gain (or Loss) During Year. | <u>\$ 1,862,920,147</u> |

ACTUARIAL SECTION

ANALYSIS OF SYSTEM EXPERIENCE – OPEB

GAINS/(LOSSES) IN ACCRUED LIABILITIES

During Year Ended September 30, 2018
Resulting from Differences Between Assumed Experience & Actual Experience

| Type of Activity | Gain/(Loss) |
|---|-------------------------|
| 1. Premiums. Gains and losses resulting from actual premiums in valuation year versus that assumed from prior valuation. | \$ 1,446,425,217 |
| 2. Investment Income. If there is greater investment income than assumed, there is a gain. If less income, a loss. | 186,770,596 |
| 3. Demographic and Other. Gains and losses resulting from demographic experience, data adjustments, timing of financial transactions, etc. | 223,871,984 |
| 4. Composite Gain (or Loss) During Year. | <u>\$ 1,857,067,797</u> |

ACTUARIAL SECTION

SUMMARY OF PLAN PROVISIONS

Our actuarial valuation of MPSERS as of September 30, 2018, is based on the present provisions of the Michigan Public School Employees' Retirement Act (Public Act 300 of 1980, as amended).

REGULAR RETIREMENT

(No reduction factor for age)

- **Eligibility** – Age 55 with 30 years credited service; or age 60 with 10 years credited service. For Member Investment Plan (MIP) members, any age with 30 years credited service; or age 60 with 10 years credited service; or age 60 with 5 years of credited service provided member worked through 60th birthday and has credited service in each of the last 5 years. For Pension Plus members, age 60 with 10 years of credited service
- **Mandatory Retirement Age** – None
- **Transition Date** – February 1, 2013 (Basic and MIP members only)
- **Annual Amount, Basic and MIP** – Total credited service as of the Transition Date \times 1.5% of final average compensation (FAC)

PLUS

An amount determined by the member's election of Option 1, 2, 3, or 4 described below.

Option 1 – Credited Service after the Transition Date \times 1.5% \times FAC

Option 2 – Credited Service after the Transition Date (until total service reaches 30 years) \times 1.5% \times FAC, PLUS Credited Service after the Transition Date and over 30 years \times 1.25% \times FAC

Option 3 – Credited Service after the Transition Date \times 1.25% \times FAC

Option 4 – None (Member will receive benefit through a Defined Contribution plan)

- **Annual Amount, Pension Plus Plan** – Credited service \times 1.5 \times FAC
- **Final Average Compensation** – Average of highest 60 consecutive months (36 months for MIP members). FAC is calculated as of the last day worked unless the member elected option 4, in which case the FAC is calculated at the Transition Date

EARLY RETIREMENT

(Age reduction factor used)

- **Eligibility** – Age 55 with 15 or more years credited service and earned credited service in each of the last 5 years. Pension Plus members are not eligible for early retirements
- **Annual Amount** – Regular retirement benefit reduced by 0.5% for each month by which the commencement age is less than 60

DEFERRED RETIREMENT

(Vested benefit)

- **Eligibility** – 10 years of credited service. Benefit commences at the time age qualification is met
- **Annual Amount** – Regular retirement benefit based on service and final average compensation at time of termination

DUTY DISABILITY RETIREMENT

- **Eligibility** – No age or service requirement; in receipt of workers' disability compensation
- **Annual Amount** – Computed as regular retirement benefit with minimum benefit based on 10 years credited service. Additional limitation such that disability benefits plus authorized outside earnings limited to 100% of final average compensation (increased by 2% each year retired)

ACTUARIAL SECTION

SUMMARY OF PLAN PROVISIONS

NONDUTY DISABILITY RETIREMENT

- **Eligibility** – 10 years of credited service
- **Annual Amount** – Computed as regular retirement benefit based on credited service and final average compensation at time of disability. Additional limitation such that disability benefits plus authorized outside earnings limited to 100% of final average compensation (increased by 2% each year retired)

DUTY DEATH BEFORE RETIREMENT

- **Eligibility** – No age or service requirement. Beneficiary is in receipt of workers' compensation. Also applies to "duty disability" retirees during first three years of disability
- **Annual Amount** – Spouse benefit computed as regular retirement benefit with minimum benefit based on ten years of credited service, reduced for 100% joint and survivor election. If no surviving spouse, children under 18 share in benefit; if no spouse or children, a disabled and dependent parent is eligible

NONDUTY DEATH BEFORE RETIREMENT

- **Eligibility** – For Basic plan members, 15 years of credited service, or age 60 and 10 years of credited service. For MIP members, 10 years of credited service, or age 60 and 5 years of credited service. For Pension Plus members, 10 years of credited service, or age 60 and 10 years of credited service.
- **Annual Amount** – Computed as regular retirement benefit, reduced in accordance with a 100% joint and survivor election, with payments commencing first of month following death. For the beneficiary of a deferred member, benefit commences at the time a member would have attained the minimum age qualification

POSTRETIREMENT COST-OF-LIVING ADJUSTMENTS

One-time upward adjustments have been made in 1972, 1974, 1976 and 1977 for members retired on or after July 1, 1956, and prior to July 1, 1976, who were eligible for Social Security benefits. For members who retired prior to July 1, 1956, and not eligible for Social Security benefits based upon membership service, the minimum base pension was increased in 1965, 1971, 1972, 1974 and 1981, and in 1976 and 1977 one-time upward adjustments were made.

Beginning in 1983, eligible recipients received an annual distribution of investment earnings in excess of 8% (supplemental payment). On January 1, 1986, all members who retired prior to January 1, 1986, were given a permanent 8% increase. On January 1, 1990, a one-time upward adjustment for members who retired prior to October 1, 1981, was made.

Currently members receive annual increases based on the following schedule:

- Retired before January 1, 1987: greater of supplemental payment or automatic 3% increase
- Retired on or after January 1, 1987 under MIP: automatic 3% increase only
- Retired on or after January 1, 1987 not under MIP: supplemental payment only
- Retired under Pension Plus: no increases

POSTRETIREMENT HEALTHCARE BENEFITS

Members hired before July 1, 2008 are eligible for 80% System paid Master Health Plan and Dental and Vision coverage for themselves and their dependents. However, those retirees Medicare eligible at January 1, 2013 receive 90% System-paid coverage.

Members hired before July 1, 2008 who retired from deferred vested status with less than 30 years of service, who terminate employment after October 31, 1980 with vested deferred benefits, are eligible for partially System-paid health benefit coverage (no payment if less than 21 years of service, 10% of maximum employer payment for each year of service over 20 up to 80% for 28 or more years of service).

Members hired after June 30, 2008, but before September 4, 2012, are eligible for 80% System paid Master Health Plan and Dental and Vision coverage for themselves and their dependents, but the premium subsidy is graded based on career length as described below:

- a. Member is age 60 or older at retirement

ACTUARIAL SECTION

SUMMARY OF PLAN PROVISIONS

- If member has 10 or more years of total service, MPSERS pays 30% of the monthly premium for the first 10 years of total service, plus 4% × next 13 years of total service, to a maximum of 80% of the monthly premium if 22.5 years of total service or more
- If a member has fewer than 10 years of total service, there is no System paid coverage
- b. Member is under age 60 at retirement
 - If member has 25 years of actual service, MPSERS pays 80% of the monthly premium
 - If the member has under 25 years of actual service, upon attainment of age 60 the member may apply for System paid coverage (as described by the schedule above in a.)

Dependents are eligible for 80% System paid employer health benefits (partial payments for dependents of deferred vested members who had 21 or more years of service and dependents of members hired on or after July 1, 2008, as per the above schedule).

Members hired on or after September 4, 2012 will become participants of the Personal Healthcare Fund (PHF) and will not be eligible for insurance premium subsidy in retirement. For members hired on or after September 4, 2012, the maximum insurance subsidy is payable to the surviving spouse and health dependents of members who die as a result of injury or illness resulting from job activities. For all other members hired on or after September 4, 2012, the defined benefit portion of their post-retirement health benefits coverage is limited to a credit to a Health Reimbursement Account at termination if they have at least 10 years of service. The credit will be \$2,000 for participants who are at least age 60 at termination or \$1,000 for participants who are less than age 60 at termination.

Public Act 300 of 2012 granted all members of the Michigan Public School Employees Retirement System, who earned service credit in the 12 months ending September 4, 2012 or were on an approved professional services or military leave of absence on September 4, 2012, a voluntary election regarding their retirement healthcare. Any changes to a member's healthcare benefit are effective as of the member's transition date, which is defined as the first day of the pay period that begins on or after February 1, 2013.

Under Public Act 300 of 2012, members were given the choice between i. and ii. below:

- i. Maintaining eligibility for the premium subsidy described above, and contributing 3% of their compensation while still working, or
- ii. Entering the PHF

Members not making an election will default into the premium subsidy arrangement.

If a member who elected the subsidy terminates prior to becoming eligible for the subsidy, dies before the total value of the subsidy received equals the total value of contributions made, or retires and declines coverage, the member or beneficiary may request a refund of unused funds. Refunds of member contributions to the healthcare funding account are issued as a supplemental pension benefit (payable at age 60 and payable from the pension plan) paid out over a 60-month period.

A delayed subsidy applies to retirees who became a member of the retirement system before July 1, 2008 and who purchased service credit on or after July 1, 2008. Such individuals are eligible for premium subsidy benefits at age 60 or when they would have been eligible to retire without having made a service purchase, whichever comes first. They may enroll in the insurances earlier but are responsible for the full premium until the premium subsidy begins.

MEMBER CONTRIBUTIONS BEFORE TRANSITION DATE

(February 1, 2013)

- **Basic Participants** – None
- **MIP Participants hired before January 1, 1990** – 3.9% of pay
- **MIP Participants hired on or after January 1, 1990 and before July 1, 2008** – 3.0% of first \$5,000 of pay, plus 3.6% of next \$10,000 of pay, plus 4.3% pay in excess of \$15,000
- **MIP and PENSION PLUS Participants hired on or after July 1, 2008** – 3.0% of first \$5,000 of pay, plus 3.6% of next \$10,000 of pay, plus 6.4% pay in excess of \$15,000

ACTUARIAL SECTION

SUMMARY OF PLAN PROVISIONS

MEMBER CONTRIBUTIONS ATTRIBUTABLE TO THE RETIREE HEALTH PLANS

Under Public Act 300 of 2012, members were given the choice between i. and ii. below:

- i. Maintaining eligibility for premium subsidy retiree medical coverage, and contributing 3% of their compensation while still working, or
- ii. Entering the Personal Healthcare Fund (PHF)

Members not making an election defaulted into the premium subsidy arrangement.

If a member who elected the subsidy terminates prior to becoming eligible for the subsidy, dies before the total value of the subsidy received equals the total value of contributions made, or retires and declines coverage, the member or beneficiary may request a refund of unused funds. Refunds of member contributions to the healthcare funding account are issued as a supplemental pension benefit (payable at age 60 and payable from the pension plan) paid out over a 60-month period.

MEMBER CONTRIBUTIONS ON OR AFTER TRANSITION DATE

(February 1, 2013)

BASIC AND MIP MEMBERS

Contributions depend on member election of Option 1, 2, or 3. Members electing Option 4 will not contribute to the Plan.

Option 1 – Basic plan members – 4%
All MIP members – 7%

Option 2 – Contributions as in Option 1 until member reaches 30 years of service. At 30 years of service, contribution reverts to pre-transition date level

Option 3 – Post-transition date contribution is the same as the pre-transition date contribution

- **Pension Plus Members** – 3% of first \$5,000 of pay, plus 3.6% of next \$10,000 of pay, plus 6.4% of pay in excess of \$15,000

STATISTICAL SECTION

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| Schedules of Deductions by Type |
| Schedules of Changes in Fiduciary Net Position |
| Schedules of Benefits and Refunds by Type |
| Schedules of Retired Members by Type of Benefit |
| Schedules of Funding Progress |
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| Ten Year History of Membership |
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STATISTICAL SECTION

CONTENTS

This part of the System's comprehensive annual financial report presents detailed information as a context for understanding what the information in the financial statements, note disclosures, and required supplementary information says about the System's overall financial health.

FINANCIAL TRENDS

These schedules contain trend information to help the reader understand how the System's financial performance and fiscal health has changed over time. The schedules are presented for the last ten fiscal years. Schedules included are:

- Schedule of Pension Plan Additions by Source
- Schedule of OPEB Plan Additions by Source
- Schedule of Pension Plan Deductions by Type
- Schedule of OPEB Plan Deductions by Type
- Schedule of Changes in Fiduciary Net Position – Pension Plan
- Schedule of Changes in Fiduciary Net Position – OPEB Plan
- Schedule of Pension Benefit and Refunds by Type
- Schedule of OPEB Benefits and Refunds by Type

OPERATING INFORMATION

These schedules contain contextual information to assist the reader's understanding of how the System's financial information relates to the combination of participating members and the benefits it provides. Schedules are presented for the last ten fiscal years, except where noted. Schedules included are:

- Schedule of Retired Members by Type of Pension Benefit
- Schedule of Retired Members by Type of Other Postemployment Benefits
- Schedule of Funding Progress – Pension Plan
- Schedule of Funding Progress – OPEB Plan
- Schedule of Other Postemployment Benefits
- Schedule of Average Benefit Payments – Pension
- Schedule of Average Benefit Payments – Health
- Schedule of Average Benefit Payments – Dental/Vision
- Schedule of Principal Participating Employers
- Ten Year History of Membership
- Schedule of Participating Employers

STATISTICAL SECTION

SCHEDULES OF ADDITIONS BY SOURCE

SCHEDULE OF PENSION PLAN ADDITIONS BY SOURCE

Last Ten Years

Employer Contributions

| Fiscal Year Ended Sept. 30 | Member Contributions | Dollars | % of Annual Reported Payroll | Net Investment & Other Income | Total |
|----------------------------|----------------------|------------------|------------------------------|-------------------------------|------------------|
| 2010 | \$ 377,748,755 | \$ 1,001,251,673 | 11.32 | % \$ 3,563,042,464 | \$ 4,942,042,892 |
| 2011 | 332,209,134 | 1,156,060,903 | 12.62 | 1,332,452,213 | 2,820,722,250 |
| 2012 | 335,470,879 | 1,454,438,907 | 16.82 | 5,387,076,055 | 7,176,985,841 |
| 2013 | 385,007,587 | 1,364,136,462 | 16.58 | 4,859,919,060 | 6,609,063,109 |
| 2014 | 405,443,771 | 1,600,375,132 | 19.60 | 6,192,710,861 | 8,198,529,764 |
| 2015 | 395,722,292 | 1,967,610,696 | 23.81 | 938,143,040 | 3,301,476,028 |
| 2016 | 398,893,138 | 2,308,657,030 | 28.13 | 3,095,177,500 | 5,802,727,668 |
| 2017 | 427,988,238 | 2,398,950,106 | 28.38 | 5,583,470,138 | 8,410,408,482 |
| 2018 | 393,059,173 | 2,791,508,863 | 32.52 | 5,136,369,857 | 8,320,937,893 |
| 2019 | 403,146,565 | 2,706,712,537 | N/A | 2,519,522,310 | 5,629,381,412 |

SCHEDULE OF OPEB PLAN ADDITIONS BY SOURCE

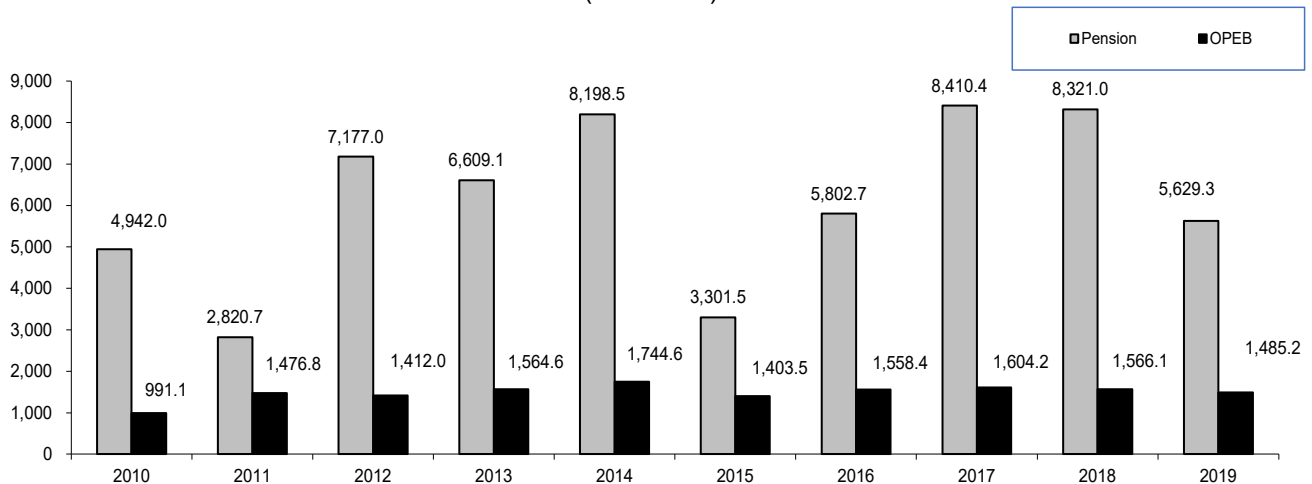
Last Ten Years

Employer Contributions

| Fiscal Year Ended Sept. 30 | Member Contributions | Dollars | % of Annual Reported Payroll | Net Investment & Other Income | Total |
|----------------------------|----------------------|----------------|------------------------------|-------------------------------|----------------|
| 2010 | \$ 125,160,304 | \$ 675,117,153 | 7.63 | % \$ 190,860,064 | \$ 991,137,521 |
| 2011 | 384,978,107 | 794,839,611 | 8.68 | 297,025,962 | 1,476,843,680 |
| 2012 | 387,566,872 | 795,595,368 | 9.20 | 228,838,969 | 1,412,001,209 |
| 2013 | 394,839,047 | 973,002,719 | 11.76 | 196,731,989 | 1,564,573,755 |
| 2014 | 390,844,206 | 1,000,031,808 | 12.24 | 353,732,646 | 1,744,608,660 |
| 2015 | 381,630,848 | 969,418,632 | 11.73 | 52,443,410 | 1,403,492,890 |
| 2016 | 382,257,166 | 883,943,202 | 10.77 | 292,214,037 | 1,558,414,405 |
| 2017 | 214,248,867 | 794,661,944 | 9.40 | 595,269,533 | 1,604,180,344 |
| 2018 | 210,679,842 | 663,708,218 | 7.73 | 691,696,835 | 1,566,084,896 |
| 2019 | 208,197,137 | 707,714,340 | N/A | 569,334,003 | 1,485,245,480 |

TOTAL ADDITIONS

Year Ended September 30
(in millions)



STATISTICAL SECTION

SCHEDULES OF DEDUCTIONS BY TYPE

SCHEDULE OF PENSION PLAN DEDUCTIONS BY TYPE

Last Ten Years

| Fiscal Year Ended Sept. 30 | Benefit Payments | Refunds and Transfers | Administrative and Other Expenses | Total |
|----------------------------------|---------------------|--------------------------|--------------------------------------|------------------|
| 2010 | \$ 3,525,020,341 | \$ 33,923,570 | \$ 26,000,699 | \$ 3,584,944,610 |
| 2011 | 3,942,027,101 | 36,591,206 | 22,926,393 | 4,001,544,700 |
| 2012 | 4,082,242,506 | 31,865,139 | 37,119,630 | 4,151,227,275 |
| 2013 | 4,238,482,066 | 30,451,235 | 25,002,153 | 4,293,935,454 |
| 2014 | 4,388,328,517 | 28,840,650 | 23,711,249 | 4,440,880,415 |
| 2015 | 4,530,914,738 | 136,902,057 | 24,487,325 | 4,692,304,120 |
| 2016 | 4,671,299,698 | 26,996,969 | 26,213,125 | 4,724,509,792 |
| 2017 | 4,806,958,754 | 26,112,046 | 26,133,359 | 4,859,204,159 |
| 2018 | 4,934,638,368 | 28,632,230 | 25,951,960 | 4,989,222,559 |
| 2019 | 5,058,624,097 | 29,344,631 | 27,740,993 | 5,115,709,721 |

SCHEDULE OF OPEB PLAN DEDUCTIONS BY TYPE

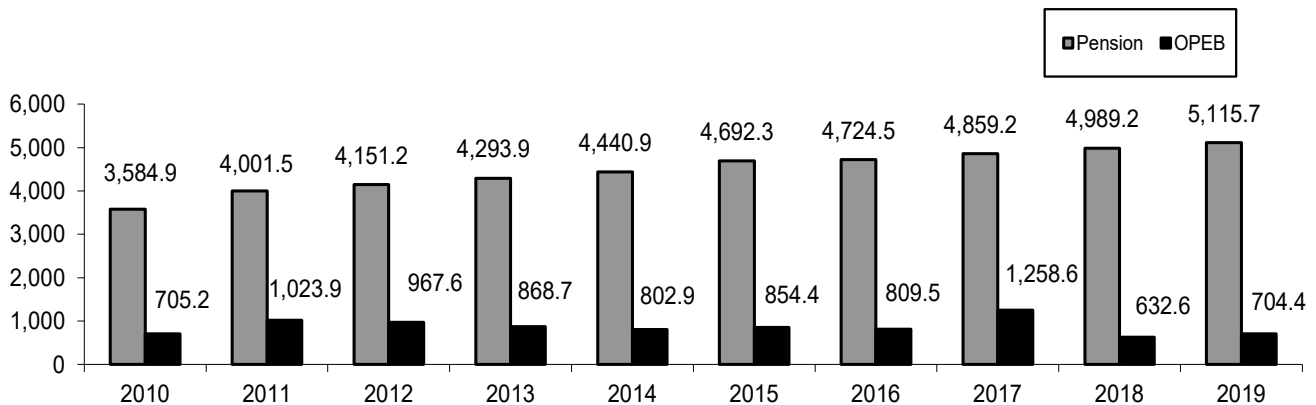
Last Ten Years

| Fiscal Year Ended Sept. 30 | Benefit Payments | Refunds and Transfers | Administrative and Other Expenses | Total |
|----------------------------------|---------------------|--------------------------|--------------------------------------|----------------|
| 2010 | \$ 650,677,457 | \$ 52,545 | \$ 54,431,010 | \$ 705,161,012 |
| 2011 | 910,023,134 | 39,133 | 113,790,777 | 1,023,853,044 |
| 2012 | 785,896,356 | 2,461,527 | 179,259,224 | 967,617,107 |
| 2013 | 711,578,683 | 9,177,658 | 147,972,842 | 868,729,183 |
| 2014 | 669,240,164 | 68,930 | 133,623,320 | 802,932,413 |
| 2015 | 700,904,663 | 95,860 | 153,410,971 | 854,411,494 |
| 2016 | 653,086,198 | 93,387 | 156,358,057 | 809,537,642 |
| 2017 | 548,269,421 | 553,960,659 | 156,354,596 | 1,258,584,675 |
| 2018 | 477,124,380 | 344,297 | 155,149,286 | 632,617,963 |
| 2019 | 542,033,925 | 33,591 | 162,320,970 | 704,388,486 |

TOTAL DEDUCTIONS

Year Ended September 30

(in millions)



STATISTICAL SECTION

SCHEDULES OF DEDUCTIONS BY TYPE

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STATISTICAL SECTION

SCHEDULES OF CHANGES IN FIDUCIARY NET POSITION

SCHEDULE OF CHANGES IN FIDUCIARY NET POSITION – PENSION PLAN

Last Ten Years
(in thousands)

| | Fiscal Year | | | |
|--------------------------------------|---------------------|-----------------------|---------------------|---------------------|
| | 2010 | 2011 | 2012 | 2013 |
| Member contributions | \$ 377,749 | \$ 332,209 | \$ 335,471 | \$ 385,008 |
| Employer contributions | 1,001,252 | 1,156,061 | 1,454,439 | 1,364,136 |
| Net investment income | 3,562,452 | 1,331,744 | 5,386,497 | 4,858,463 |
| Transfer from other systems | 16 | 5 | - | - |
| Miscellaneous income | 574 | 704 | 579 | 1,356 |
| Total Additions | 4,942,042 | 2,820,722 | 7,176,986 | 6,609,063 |
| Pension benefits | 3,525,020 | 3,942,027 | 4,082,243 | 4,238,482 |
| Refunds of contributions | 33,873 | 36,591 | 31,865 | 30,450 |
| Transfer to other systems | 50 | 2 | - | 1 |
| Administrative and Other Expenses | 26,001 | 22,926 | 37,120 | 25,002 |
| Total Deductions | 3,584,944 | 4,001,546 | 4,151,228 | 4,293,935 |
| Changes in net position | \$ 1,357,099 | \$ (1,180,823) | \$ 3,025,758 | \$ 2,315,128 |

SCHEDULE OF CHANGES IN FIDUCIARY NET POSITION – OPEB PLAN

Last Ten Years
(in thousands)

| | Fiscal Year | | | |
|--------------------------------------|-------------------|-------------------|-------------------|-------------------|
| | 2010 | 2011 | 2012 | 2013 |
| Member contributions | | | | |
| Employer contributions | \$ 125,160 | \$ 384,978 | \$ 387,567 | \$ 394,839 |
| Other governmental contributions | 675,117 | 794,840 | 795,595 | 973,303 |
| Net investment income | 39,980 | 163,949 | 17,406 | 9 |
| Miscellaneous income | 150,686 | 132,993 | 210,642 | 196,646 |
| Total Additions | 195 | 85 | 790 | 77 |
| | 991,138 | 1,476,844 | 1,412,001 | 1,564,574 |
| Health care benefits | 650,677 | 910,023 | 785,896 | 711,579 |
| Refunds of contributions | 53 | 39 | 2,462 | 1,095 |
| Transfers to other systems | - | - | - | 8,083 |
| Uncollectible receivables | - | - | 37,551 | - |
| Administrative and Other Expenses | 54,431 | 113,791 | 141,708 | 147,973 |
| Total Deductions | 705,161 | 1,023,853 | 967,617 | 868,729 |
| Changes in net position | \$ 285,977 | \$ 452,991 | \$ 444,384 | \$ 695,845 |

STATISTICAL SECTION

SCHEDULES OF CHANGES IN FIDUCIARY NET POSITION

| Fiscal Year (continued) | | | | | |
|-------------------------|----------------|--------------|--------------|--------------|------------|
| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| \$ 405,444 | \$ 395,722 | \$ 398,893 | \$ 427,988 | \$ 393,059 | \$ 403,147 |
| 1,600,375 | 1,967,611 | 2,308,657 | 2,398,950 | 2,791,509 | 2,706,713 |
| 6,190,449 | 937,663 | 3,094,694 | 5,582,660 | 5,135,866 | 2,519,320 |
| - | - | - | - | - | - |
| 2,262 | 480 | 484 | 811 | 504 | 202 |
| 8,198,530 | 3,301,476 | 5,802,728 | 8,410,408 | 8,320,938 | 5,629,381 |
| 4,388,329 | 4,530,915 | 4,671,300 | 4,806,959 | 4,934,638 | 5,058,624 |
| 28,841 | 136,901 | 26,994 | 26,092 | 28,632 | 29,345 |
| - | 1 | 3 | 20 | - | - |
| 23,711 | 24,487 | 26,213 | 26,133 | 25,952 | 27,741 |
| 4,440,880 | 4,692,304 | 4,724,510 | 4,859,204 | 4,989,223 | 5,115,710 |
| \$ 3,757,650 | \$ (1,390,828) | \$ 1,078,218 | \$ 3,551,204 | \$ 3,331,715 | \$ 513,672 |

| Fiscal Year (continued) | | | | | |
|-------------------------|------------|------------|------------|------------|------------|
| 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| \$ 390,844 | \$ 381,631 | \$ 382,257 | \$ 214,249 | \$ 210,680 | \$ 208,197 |
| 1,000,032 | 969,419 | 883,943 | 794,662 | 663,708 | 707,714 |
| 138 | 213 | 2,411 | 5 | 96,708 | 233,196 |
| 353,064 | 52,064 | 289,644 | 595,089 | 594,893 | 336,063 |
| 531 | 166 | 159 | 176 | 96 | 74 |
| 1,744,609 | 1,403,493 | 1,558,414 | 1,604,180 | 1,566,085 | 1,485,245 |
| 669,240 | 700,904 | 653,086 | 548,269 | 477,124 | 542,034 |
| 68 | 96 | 93 | 553,961 | 344 | 34 |
| 1 | - | - | - | - | - |
| - | - | - | - | - | - |
| 133,623 | 153,411 | 156,358 | 156,355 | 155,149 | 162,321 |
| 802,932 | 854,411 | 809,538 | 1,258,585 | 632,618 | 704,388 |
| \$ 941,676 | \$ 549,081 | \$ 748,877 | \$ 345,596 | \$ 933,467 | \$ 780,857 |

STATISTICAL SECTION

SCHEDULES OF BENEFITS AND REFUNDS BY TYPE

SCHEDULE OF PENSION BENEFITS AND REFUNDS BY TYPE

Last Ten Years

| Fiscal Year Ended Sept. 30 | Regular Benefits* | Disability Benefits | Survivor Benefits | Refunds | | Retired Benefits | Total |
|----------------------------------|----------------------|------------------------|----------------------|-------------|---------------|---------------------|------------------|
| | | | | Employer | Employee | | |
| 2010 | \$ 3,254,752,971 | \$ 58,015,212 | \$ 212,252,158 | \$ 507,347 | \$ 33,364,256 | \$ 1,755 | \$ 3,558,893,699 |
| 2011 | 3,655,588,461 | 60,232,300 | 226,200,505 | 1,311,729 | 35,249,374 | 29,934 | 3,978,612,303 |
| 2012 | 3,779,064,349 | 62,414,881 | 240,763,276 | 98,202 | 31,720,355 | 46,582 | 4,114,107,645 |
| 2013 | 3,919,541,949 | 65,421,037 | 253,519,080 | 96,131 | 30,340,582 | 13,507 | 4,268,932,286 |
| 2014 | 4,052,801,025 | 68,329,595 | 267,197,897 | 459,114 | 28,380,803 | 732 | 4,417,169,166 |
| 2015 | 4,179,445,527 | 70,240,170 | 281,229,041 | 112,468,242 | 24,416,139 | 17,016 | 4,667,816,135 |
| 2016 | 4,303,690,804 | 71,924,352 | 295,684,541 | 2,478,596 | 24,507,177 | 7,771 | 4,698,293,241 |
| 2017 | 4,422,445,301 | 73,317,357 | 311,196,097 | 126,312 | 25,971,639 | 14,096 | 4,833,070,801 |
| 2018 | 4,532,304,321 | 74,811,652 | 327,522,395 | 217,568 | 28,375,762 | 38,900 | 4,963,270,599 |
| 2019 | 4,642,670,631 | 74,985,320 | 340,968,146 | 109,747 | 29,218,328 | 16,556 | 5,087,968,728 |

* Includes prior post retirement adjustments

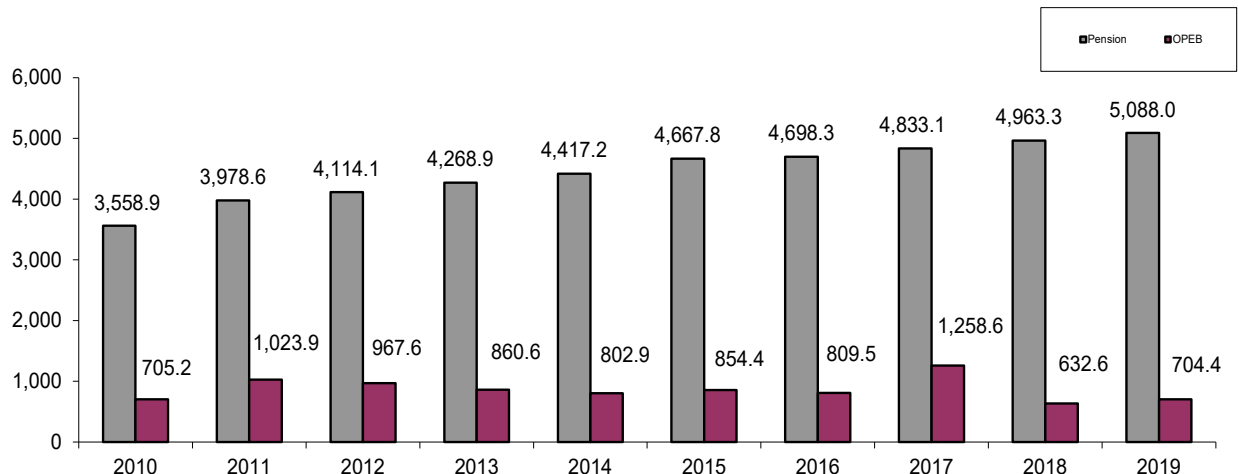
SCHEDULE OF OPEB BENEFITS AND REFUNDS BY TYPE

Last Ten Years

| Ended Sept. 30 | Health Benefits | Dental/Vision Benefits | Administrative Expenses | OPEB Refunds | Total |
|-------------------|--------------------|---------------------------|----------------------------|-----------------|----------------|
| 2010 | \$ 566,550,299 | \$ 84,127,158 | \$ 54,431,010 | \$ 52,545 | \$ 705,161,012 |
| 2011 | 815,311,950 | 94,711,184 | 113,790,777 | 39,133 | 1,023,853,044 |
| 2012 | 690,268,502 | 95,627,854 | 179,259,224 | 2,461,527 | 967,617,107 |
| 2013 | 612,955,516 | 98,623,167 | 147,972,842 | 1,095,145 | 860,646,670 |
| 2014 | 582,398,966 | 86,841,198 | 133,623,320 | 68,141 | 802,931,624 |
| 2015 | 617,493,539 | 83,411,124 | 153,410,971 | 95,860 | 854,411,494 |
| 2016 | 567,230,086 | 85,856,112 | 156,358,057 | 93,387 | 809,537,642 |
| 2017 | 474,032,868 | 74,236,553 | 156,354,596 | 553,960,659 | 1,258,584,675 |
| 2018 | 402,747,129 | 74,377,251 | 155,149,286 | 344,297 | 632,617,963 |
| 2019 | 469,017,033 | 73,016,892 | 162,320,970 | 33,591 | 704,388,486 |

TOTAL BENEFIT DEDUCTIONS

Year Ended September 30
(in millions)



STATISTICAL SECTION

SCHEDULES OF RETIRED MEMBERS BY TYPE OF BENEFIT

SCHEDULE OF RETIRED MEMBERS BY TYPE OF PENSION BENEFITS

September 30, 2018

| Monthly Pension Benefit Amt | Number of Retirees | Type of Retirement * | | | | | | Selected Option** | | | | Opt.1E 2E,3E,4E |
|-----------------------------|--------------------|----------------------|--------|-----|-------|----|-------|-------------------|--------|--------|--------|--------------------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | Opt. 1 | Opt. 2 | Opt. 3 | Opt. 4 | |
| \$ 1 - 200 | 11,564 | 10,073 | 1,103 | 61 | 222 | 3 | 102 | 6,115 | 2,875 | 1,634 | 222 | 718 |
| 201 - 400 | 23,028 | 20,084 | 1,424 | 103 | 1,121 | 3 | 293 | 12,379 | 5,076 | 3,874 | 598 | 1,101 |
| 401 - 600 | 18,164 | 15,421 | 1,168 | 89 | 1,145 | 1 | 340 | 9,414 | 3,884 | 3,353 | 596 | 917 |
| 601 - 800 | 13,993 | 11,687 | 920 | 69 | 994 | 1 | 322 | 7,031 | 2,882 | 2,689 | 566 | 825 |
| 801 - 1,000 | 11,652 | 9,744 | 781 | 47 | 773 | 2 | 305 | 5,634 | 2,345 | 2,375 | 542 | 756 |
| 1,001 - 1,200 | 10,195 | 8,544 | 804 | 25 | 542 | - | 280 | 4,640 | 2,165 | 2,085 | 506 | 799 |
| 1,201 - 1,400 | 8,857 | 7,311 | 843 | 14 | 469 | 1 | 219 | 3,829 | 1,922 | 1,787 | 494 | 825 |
| 1,401 - 1,600 | 8,266 | 6,802 | 845 | 12 | 379 | 2 | 226 | 3,355 | 1,759 | 1,683 | 530 | 939 |
| 1,601 - 1,800 | 7,993 | 6,741 | 748 | 9 | 297 | - | 198 | 3,113 | 1,676 | 1,663 | 495 | 1,046 |
| 1,801 - 2,000 | 7,847 | 6,738 | 654 | 7 | 270 | 1 | 177 | 2,958 | 1,679 | 1,485 | 561 | 1,164 |
| over 2,000 | 95,059 | 89,151 | 4,206 | 9 | 827 | 3 | 863 | 41,684 | 18,410 | 19,039 | 7,780 | 8,146 |
| Totals | 216,618 | 192,296 | 13,496 | 445 | 7,039 | 17 | 3,325 | 100,152 | 44,673 | 41,667 | 12,890 | 17,236 |

* Type of Retirement

- 1 – Normal retirement for age and service
- 2 – Survivor payment – normal retirement
- 3 – Duty disability retirement (including survivors)
- 4 – Nonduty disability retirement (including survivors)
- 5 – Survivor payment – duty death in service
- 6 – Survivor payment – nonduty death in service

** Selected Option

- Opt. 1 – Straight life allowance
- Opt. 2 – 100% survivor option
- Opt. 3 – 50% survivor option
- Opt. 4 – 75% survivor option
- Opt. 1E, 2E, 3E, 4E – Equated retirement plans

Source: Gabriel Roeder Smith & Co.

SCHEDULE OF RETIRED MEMBERS BY TYPE OF OTHER POSTEMPLOYMENT BENEFITS

September 30, 2018

| Monthly Pension Benefit Amt | Number of Retirees | Type of Other Postemployment Benefits | |
|-----------------------------|--------------------|---------------------------------------|---------------|
| | | Medical/Rx | Dental/Vision |
| \$ 1 - 200 | 11,564 | 4,623 | 5,649 |
| 201 - 400 | 23,028 | 10,858 | 12,946 |
| 401 - 600 | 18,164 | 10,106 | 11,723 |
| 601 - 800 | 13,993 | 8,746 | 10,002 |
| 801 - 1,000 | 11,652 | 7,694 | 8,632 |
| 1,001 - 1,200 | 10,195 | 7,174 | 7,899 |
| 1,201 - 1,400 | 8,857 | 6,463 | 7,070 |
| 1,401 - 1,600 | 8,266 | 6,214 | 6,752 |
| 1,601 - 1,800 | 7,993 | 6,193 | 6,674 |
| 1,801 - 2,000 | 7,847 | 6,156 | 6,628 |
| Over 2,000 | 95,059 | 78,707 | 82,776 |
| Totals | 216,618 | 152,934 | 166,751 |

Source: Gabriel Roeder Smith & Co.

STATISTICAL SECTION

SCHEDULES OF FUNDING PROGRESS

SCHEDULE OF FUNDING PROGRESS – PENSION PLAN

Last Ten Years
(\$ in millions)

| Valuation Date Sept. 30 | Actuarial Value of Assets (a) | Actuarial Accrued Liability (AAL) Entry Age (b) | Unfunded (Overfunded) Accrued Liability (UAAL) (b-a) | Funded Ratio (a/b) | Covered Payroll (c) | UAAL as a % of Covered Payroll ((b-a)/c) |
|----------------------------|----------------------------------|--|---|-----------------------|------------------------|---|
| 2009 | \$ 44,703 | \$ 56,685 | \$ 11,982 | 78.9 % | \$ 9,884 | 121.2 % |
| 2010 | 43,294 | 58,543 | 15,250 | 74.0 | 8,845 | 172.4 |
| 2010 ¹ | 43,294 | 59,877 | 16,583 | 72.3 | 8,845 | 187.5 |
| 2010 ² | 43,294 | 60,927 | 17,633 | 71.1 | 8,845 | 199.4 |
| 2011 | 41,038 | 63,427 | 22,389 | 64.7 | 9,156 | 244.5 |
| 2012 | 38,450 | 62,716 | 24,266 | 61.3 | 8,649 | 280.6 |
| 2013 | 38,044 | 63,840 | 25,796 | 59.6 | 8,273 | 311.8 |
| 2014 | 39,626 | 65,050 | 25,424 | 60.9 | 8,167 | 311.3 |
| 2014 ¹ | 39,626 | 66,105 | 26,479 | 59.9 | 8,167 | 324.2 |
| 2015 | 41,006 | 67,728 | 26,721 | 60.5 | 8,264 | 323.3 |
| 2016 | 43,204 | 68,858 | 25,654 | 62.7 | 8,206 | 312.6 |
| 2016 ¹ | 43,204 | 72,310 | 29,107 | 59.7 | 8,206 | 354.7 |
| 2017 | 45,397 | 73,327 | 27,930 | 61.9 | 8,221 | 339.7 |
| 2017 ² | 47,255 | 76,693 | 29,438 | 61.6 | 8,221 | 358.1 |
| 2018 | 49,313 | 77,865 | 28,552 | 63.3 | 8,300 | 344.0 |
| 2018 ² | 50,630 | 83,375 | 32,745 | 60.7 | 8,300 | 394.5 |

¹ Revised actuarial assumptions and/or methods

² Revised benefit provisions

Source: Gabriel Roeder Smith & Co.

SCHEDULE OF FUNDING PROGRESS – OPEB PLAN

Last Ten Years
(\$ in millions)

| Valuation Date Sept. 30 | Actuarial Value of Assets (a) | Actuarial Accrued Liability (AAL) Entry Age (b) | Unfunded (Overfunded) Accrued Liability (UAAL) (b-a) | Funded Ratio (a/b) | Covered Payroll (c) | UAAL as a % of Covered Payroll ((b-a)/c) |
|----------------------------|----------------------------------|--|---|-----------------------|------------------------|---|
| 2009 | \$ 713 | \$ 28,295 | \$ 27,582 | 2.5 % | \$ 9,884 | 279.1 % |
| 2010 | 999 | 28,627 | 27,627 | 3.5 | 8,845 | 312.4 |
| 2011 | 1,156 | 27,046 | 25,890 | 4.3 | 9,156 | 282.8 |
| 2012 ¹ | 1,348 | 14,788 | 13,440 | 9.1 | 8,649 | 155.4 |
| 2013 | 2,041 | 14,534 | 12,493 | 14.0 | 8,273 | 151.0 |
| 2014 ² | 2,982 | 14,161 | 11,180 | 21.1 | 8,167 | 136.9 |
| 2015 | 3,531 | 12,832 | 9,302 | 27.5 | 8,264 | 112.6 |
| 2016 ² | 4,279 | 13,776 | 9,497 | 31.1 | 8,206 | 115.7 |
| 2017 | 5,178 | 13,116 | 7,938 | 39.5 | 8,221 | 96.6 |
| 2017 ² | 5,178 | 13,588 | 8,410 | 38.1 | 8,221 | 102.3 |
| 2018 | 5,944 | 12,873 | 6,928 | 46.2 | 8,300 | 83.4 |
| 2018 ² | 6,089 | 13,749 | 7,659 | 44.3 | 8,300 | 92.3 |

¹ Revised investment rate of return from 4% to 8% due to prefunding

² Revised actuarial assumptions and/or methods

Source: Gabriel Roeder Smith & Co.

STATISTICAL SECTION

SCHEDULE OF OTHER POSTEMPLOYMENT BENEFITS

For Year Ended September 30, 2019

Claims

| | |
|------------------|-------------------|
| Health Insurance | \$ 297,252,392 |
| Vision Insurance | 4,242,274 |
| Dental Insurance | <u>66,889,566</u> |

Total Claims

368,384,232

Estimated Claims Liability

| | |
|------------------|------------------|
| Health Insurance | 171,764,641 |
| Vision Insurance | 345,239 |
| Dental Insurance | <u>1,539,813</u> |

Total Estimated Claims Liability

173,649,693

Administrative Fees

| | |
|--------------------------------|----------------|
| Staff Salaries | 1,386,462 |
| Retirement and Social Security | 772,932 |
| Other Fringe Benefits | 272,369 |
| Consulting | 1,584,353 |
| Printing | - |
| Postage, Telephone, and Other | 81,441 |
| Health Insurance | 152,859,897 |
| Vision Insurance | 5,146,530 |
| Dental Insurance | <u>216,986</u> |

Total Administrative Fees

162,320,970

Subtotal

704,354,895

| | |
|---------------------|---------------|
| Refunds | 3,550 |
| Retirement Benefits | <u>30,041</u> |

Grand Total

\$ 704,388,486

STATISTICAL SECTION

SCHEDULES OF AVERAGE BENEFIT PAYMENTS

SCHEDULE OF AVERAGE BENEFIT PAYMENTS – PENSION

| Payment Periods | Last Ten Years | | | | | | | Total |
|------------------------------|---|--------|---------|---------|----------|----------|----------|----------|
| | Credited Service (Years) as of September 30 | | | | | | | |
| | 0 - 5 | 5 - 10 | 10 - 15 | 15 - 20 | 20 - 25 | 25 - 30 | 30+ | |
| Period 10/1/08 to 9/30/09: | | | | | | | | |
| Average Monthly Benefit | \$ 1,095 | \$ 201 | \$ 337 | \$ 606 | \$ 994 | \$ 1,494 | \$ 2,590 | \$ 1,617 |
| Average Final Average Salary | 32,482 | 19,036 | 19,343 | 25,731 | 32,097 | 37,379 | 56,113 | 40,843 |
| Number of Active Retirants | 1,515 | 5,875 | 19,988 | 24,746 | 23,314 | 17,912 | 78,572 | 171,922 |
| Period 10/1/09 to 9/30/10: | | | | | | | | |
| Average Monthly Benefit | \$ 1,205 | \$ 209 | \$ 351 | \$ 630 | \$ 1,039 | \$ 1,561 | \$ 2,669 | \$ 1,693 |
| Average Final Average Salary | 37,222 | 19,559 | 20,269 | 26,822 | 33,777 | 40,271 | 57,785 | 42,731 |
| Number of Active Retirants | 1,909 | 6,421 | 20,817 | 25,838 | 25,368 | 20,058 | 87,311 | 187,722 |
| Period 10/1/10 to 9/30/11: | | | | | | | | |
| Average Monthly Benefit | \$ 1,296 | \$ 219 | \$ 363 | \$ 647 | \$ 1,068 | \$ 1,602 | \$ 2,720 | \$ 1,727 |
| Average Final Average Salary | 38,093 | 20,161 | 21,020 | 27,580 | 34,720 | 41,391 | 58,505 | 43,471 |
| Number of Active Retirants | 2,389 | 6,632 | 21,460 | 26,403 | 25,886 | 20,654 | 89,011 | 192,435 |
| Period 10/1/11 to 9/30/12: | | | | | | | | |
| Average Monthly Benefit | \$ 1,385 | \$ 226 | \$ 375 | \$ 667 | \$ 1,096 | \$ 1,639 | \$ 2,766 | \$ 1,752 |
| Average Final Average Salary | 39,388 | 20,586 | 21,774 | 28,601 | 35,728 | 42,408 | 59,109 | 44,113 |
| Number of Active Retirants | 2,941 | 6,824 | 22,030 | 27,276 | 26,604 | 21,049 | 89,937 | 196,661 |
| Period 10/1/12 to 9/30/13: | | | | | | | | |
| Average Monthly Benefit | \$ 1,266 | \$ 234 | \$ 390 | \$ 687 | \$ 1,122 | \$ 1,671 | \$ 2,808 | \$ 1,779 |
| Average Final Average Salary | 35,857 | 21,024 | 22,588 | 29,490 | 36,703 | 43,385 | 59,676 | 44,771 |
| Number of Active Retirants | 832 | 7,145 | 22,991 | 28,363 | 27,684 | 21,754 | 92,183 | 200,952 |
| Period 10/1/13 to 9/30/14: | | | | | | | | |
| Average Monthly Benefit | \$ 141 | \$ 219 | \$ 396 | \$ 699 | \$ 1,139 | \$ 1,689 | \$ 2,846 | \$ 1,806 |
| Average Final Average Salary | 10,750 | 20,617 | 23,263 | 30,235 | 37,612 | 44,258 | 60,156 | 45,423 |
| Number of Active Retirants | 200 | 6,971 | 23,668 | 29,017 | 28,219 | 22,022 | 94,415 | 204,512 |
| Period 10/1/14 to 9/30/15: | | | | | | | | |
| Average Monthly Benefit | \$ 140 | \$ 223 | \$ 405 | \$ 715 | \$ 1,162 | \$ 1,718 | \$ 2,891 | \$ 1,834 |
| Average Final Average Salary | 10,985 | 20,900 | 23,773 | 30,934 | 38,452 | 45,125 | 60,759 | 46,045 |
| Number of Active Retirants | 187 | 7,021 | 24,081 | 29,535 | 28,853 | 22,465 | 95,509 | 207,651 |
| Period 10/1/15 to 9/30/16: | | | | | | | | |
| Average Monthly Benefit | \$ 126 | \$ 228 | \$ 414 | \$ 729 | \$ 1,183 | \$ 1,741 | \$ 2,933 | \$ 1,860 |
| Average Final Average Salary | 11,346 | 21,161 | 24,205 | 31,512 | 39,139 | 45,895 | 61,328 | 46,613 |
| Number of Active Retirants | 178 | 7,100 | 24,401 | 30,106 | 29,407 | 22,989 | 96,826 | 211,007 |
| Period 10/1/16 to 9/30/17: | | | | | | | | |
| Average Monthly Benefit | \$ 129 | \$ 233 | \$ 423 | \$ 743 | \$ 1,203 | \$ 1,762 | \$ 2,974 | \$ 1,885 |
| Average Final Average Salary | 11,825 | 21,365 | 24,663 | 32,032 | 39,890 | 46,663 | 61,894 | 47,166 |
| Number of Active Retirants | 176 | 7,163 | 24,784 | 30,551 | 29,998 | 23,461 | 97,856 | 213,989 |
| Period 10/1/17 to 9/30/18: | | | | | | | | |
| Average Monthly Benefit | \$ 127 | \$ 237 | \$ 432 | \$ 756 | \$ 1,222 | \$ 1,785 | \$ 3,013 | \$ 1,911 |
| Average Final Average Salary | 12,020 | 21,612 | 25,128 | 32,528 | 40,512 | 47,435 | 62,500 | 47,754 |
| Number of Active Retirants | 170 | 7,172 | 25,043 | 30,860 | 30,559 | 23,873 | 98,941 | 216,618 |

Source: Gabriel Roeder Smith & Co.

STATISTICAL SECTION

SCHEDULES OF AVERAGE BENEFIT PAYMENTS

SCHEDULE OF AVERAGE BENEFIT PAYMENTS – HEALTH*

| Payment Periods | Last Ten Years | | | | | | | Total |
|------------------------------|---|--------|---------|---------|----------|----------|----------|----------|
| | Credited Service (Years) as of September 30 | | | | | | | |
| | 0 - 5 | 5 - 10 | 10 - 15 | 15 - 20 | 20 - 25 | 25 - 30 | 30+ | |
| Period 10/1/08 to 9/30/09: | | | | | | | | |
| Average Monthly Benefit | \$ 1,230 | \$ 216 | \$ 376 | \$ 647 | \$ 1,039 | \$ 1,782 | \$ 2,683 | \$ 1,757 |
| Average Final Average Salary | 38,012 | 19,252 | 20,328 | 26,525 | 32,575 | 42,936 | 56,446 | 42,631 |
| Number of Active Retirants | 1,053 | 4,212 | 10,757 | 16,602 | 17,376 | 21,419 | 56,377 | 127,796 |
| Period 10/1/09 to 9/30/10: | | | | | | | | |
| Average Monthly Benefit | \$ 1,318 | \$ 227 | \$ 395 | \$ 673 | \$ 1,087 | \$ 1,825 | \$ 2,767 | \$ 1,841 |
| Average Final Average Salary | 39,573 | 19,994 | 21,582 | 27,699 | 34,383 | 44,302 | 58,280 | 44,642 |
| Number of Active Retirants | 1,423 | 4,527 | 11,064 | 17,419 | 19,071 | 23,284 | 63,983 | 140,771 |
| Period 10/1/10 to 9/30/11: | | | | | | | | |
| Average Monthly Benefit | \$ 1,407 | \$ 238 | \$ 412 | \$ 693 | \$ 1,119 | \$ 1,860 | \$ 2,825 | \$ 1,890 |
| Average Final Average Salary | 40,812 | 20,557 | 22,546 | 28,618 | 35,375 | 45,063 | 59,127 | 45,605 |
| Number of Active Retirants | 1,810 | 4,551 | 10,939 | 17,498 | 19,279 | 23,591 | 65,246 | 142,914 |
| Period 10/1/11 to 9/30/12: | | | | | | | | |
| Average Monthly Benefit | \$ 1,476 | \$ 247 | \$ 430 | \$ 716 | \$ 1,149 | \$ 1,898 | \$ 2,875 | \$ 1,925 |
| Average Final Average Salary | 41,556 | 21,162 | 23,562 | 29,744 | 36,497 | 45,793 | 59,805 | 46,394 |
| Number of Active Retirants | 2,248 | 4,625 | 11,007 | 17,996 | 19,835 | 23,855 | 66,308 | 145,874 |
| Period 10/1/12 to 9/30/13: | | | | | | | | |
| Average Monthly Benefit | \$ 1,430 | \$ 257 | \$ 452 | \$ 738 | \$ 1,178 | \$ 1,931 | \$ 2,921 | \$ 1,968 |
| Average Final Average Salary | 41,834 | 21,668 | 24,615 | 30,728 | 37,590 | 46,550 | 60,458 | 47,289 |
| Number of Active Retirants | 534 | 4,677 | 11,071 | 18,375 | 20,387 | 24,342 | 67,874 | 147,260 |
| Period 10/1/13 to 9/30/14: | | | | | | | | |
| Average Monthly Benefit | \$ 137 | \$ 242 | \$ 459 | \$ 750 | \$ 1,201 | \$ 1,964 | \$ 2,965 | \$ 2,009 |
| Average Final Average Salary | 19,937 | 21,414 | 25,426 | 31,541 | 38,682 | 47,376 | 61,032 | 48,129 |
| Number of Active Retirants | 180 | 4,477 | 10,953 | 18,562 | 20,546 | 24,482 | 69,273 | 148,473 |
| Period 10/1/14 to 9/30/15: | | | | | | | | |
| Average Monthly Benefit | \$ 143 | \$ 247 | \$ 472 | \$ 769 | \$ 1,229 | \$ 1,997 | \$ 3,013 | \$ 2,049 |
| Average Final Average Salary | 20,324 | 21,674 | 26,017 | 32,333 | 39,632 | 48,032 | 61,695 | 48,900 |
| Number of Active Retirants | 173 | 4,379 | 10,840 | 18,687 | 20,835 | 24,764 | 70,063 | 149,741 |
| Period 10/1/15 to 9/30/16: | | | | | | | | |
| Average Monthly Benefit | \$ 138 | \$ 253 | \$ 485 | \$ 787 | \$ 1,256 | \$ 2,026 | \$ 3,057 | \$ 2,088 |
| Average Final Average Salary | 19,783 | 22,021 | 26,590 | 33,032 | 40,491 | 48,659 | 62,296 | 49,636 |
| Number of Active Retirants | 168 | 4,304 | 10,690 | 18,791 | 21,025 | 24,987 | 71,001 | 150,966 |
| Period 10/1/16 to 9/30/17: | | | | | | | | |
| Average Monthly Benefit | \$ 142 | \$ 259 | \$ 499 | \$ 805 | \$ 1,278 | \$ 2,056 | \$ 3,100 | \$ 2,124 |
| Average Final Average Salary | 20,030 | 22,248 | 27,216 | 33,716 | 41,304 | 49,312 | 62,902 | 50,339 |
| Number of Active Retirants | 162 | 4,255 | 10,581 | 18,890 | 21,292 | 25,221 | 71,753 | 152,154 |
| Period 10/1/17 to 9/30/18: | | | | | | | | |
| Average Monthly Benefit | \$ 146 | \$ 265 | \$ 513 | \$ 819 | \$ 1,300 | \$ 2,088 | \$ 3,143 | \$ 2,161 |
| Average Final Average Salary | 20,088 | 22,594 | 27,854 | 34,257 | 41,980 | 49,988 | 63,534 | 51,048 |
| Number of Active Retirants | 161 | 4,166 | 10,442 | 18,843 | 21,521 | 25,389 | 72,412 | 152,934 |

* Average monthly benefits shown are pension benefits

Source: Gabriel Roeder Smith & Co.

STATISTICAL SECTION

SCHEDULES OF AVERAGE BENEFIT PAYMENTS

SCHEDULE OF AVERAGE BENEFIT PAYMENTS – DENTAL/VISION*

| Payment Periods | Last Ten Years | | | | | | | Total |
|------------------------------|---|--------|---------|---------|----------|----------|----------|----------|
| | Credited Service (Years) as of September 30 | | | | | | | |
| | 0 - 5 | 5 - 10 | 10 - 15 | 15 - 20 | 20 - 25 | 25 - 30 | 30+ | |
| Period 10/1/08 to 9/30/09: | | | | | | | | |
| Average Monthly Benefit | \$ 1,194 | \$ 215 | \$ 372 | \$ 639 | \$ 1,027 | \$ 1,779 | \$ 2,673 | \$ 1,726 |
| Average Final Average Salary | 37,407 | 19,216 | 20,292 | 26,357 | 32,340 | 42,861 | 56,379 | 42,185 |
| Number of Active Retirants | 1,143 | 4,665 | 12,170 | 18,337 | 18,816 | 22,872 | 59,118 | 137,121 |
| Period 10/1/09 to 9/30/10: | | | | | | | | |
| Average Monthly Benefit | \$ 1,281 | \$ 225 | \$ 389 | \$ 662 | \$ 1,072 | \$ 1,816 | \$ 2,754 | \$ 1,804 |
| Average Final Average Salary | 38,901 | 19,894 | 21,438 | 27,429 | 34,054 | 44,112 | 58,156 | 44,062 |
| Number of Active Retirants | 1,526 | 5,047 | 12,555 | 19,237 | 20,621 | 24,738 | 66,628 | 150,352 |
| Period 10/1/10 to 9/30/11: | | | | | | | | |
| Average Monthly Benefit | \$ 1,373 | \$ 236 | \$ 405 | \$ 681 | \$ 1,103 | \$ 1,850 | \$ 2,809 | \$ 1,846 |
| Average Final Average Salary | 40,098 | 20,552 | 22,297 | 28,253 | 35,020 | 44,819 | 58,936 | 44,916 |
| Number of Active Retirants | 1,943 | 5,143 | 12,672 | 19,538 | 21,050 | 25,226 | 68,305 | 153,877 |
| Period 10/1/11 to 9/30/12: | | | | | | | | |
| Average Monthly Benefit | \$ 1,449 | \$ 244 | \$ 421 | \$ 703 | \$ 1,131 | \$ 1,887 | \$ 2,858 | \$ 1,879 |
| Average Final Average Salary | 40,959 | 21,086 | 23,246 | 29,330 | 36,063 | 45,532 | 59,582 | 45,648 |
| Number of Active Retirants | 2,407 | 5,217 | 12,781 | 20,098 | 21,642 | 25,426 | 69,194 | 156,765 |
| Period 10/1/12 to 9/30/13: | | | | | | | | |
| Average Monthly Benefit | \$ 1,350 | \$ 253 | \$ 441 | \$ 724 | \$ 1,159 | \$ 1,918 | \$ 2,904 | \$ 1,917 |
| Average Final Average Salary | 40,355 | 21,515 | 24,190 | 30,282 | 37,083 | 46,244 | 60,205 | 46,448 |
| Number of Active Retirants | 597 | 5,363 | 13,021 | 20,696 | 22,399 | 26,065 | 71,011 | 159,152 |
| Period 10/1/13 to 9/30/14: | | | | | | | | |
| Average Monthly Benefit | \$ 136 | \$ 238 | \$ 449 | \$ 737 | \$ 1,181 | \$ 1,948 | \$ 2,948 | \$ 1,955 |
| Average Final Average Salary | 20,147 | 21,195 | 24,997 | 31,104 | 38,155 | 47,009 | 60,778 | 47,262 |
| Number of Active Retirants | 220 | 5,161 | 12,983 | 20,960 | 22,660 | 26,333 | 72,599 | 160,916 |
| Period 10/1/14 to 9/30/15: | | | | | | | | |
| Average Monthly Benefit | \$ 141 | \$ 244 | \$ 461 | \$ 755 | \$ 1,208 | \$ 1,981 | \$ 2,995 | \$ 1,994 |
| Average Final Average Salary | 20,322 | 21,538 | 25,579 | 31,868 | 39,101 | 47,659 | 61,425 | 48,020 |
| Number of Active Retirants | 208 | 5,090 | 12,883 | 21,114 | 23,037 | 26,641 | 73,532 | 162,505 |
| Period 10/1/15 to 9/30/16: | | | | | | | | |
| Average Monthly Benefit | \$ 144 | \$ 250 | \$ 473 | \$ 773 | \$ 1,233 | \$ 2,009 | \$ 3,038 | \$ 2,030 |
| Average Final Average Salary | 20,388 | 21,837 | 26,085 | 32,530 | 39,877 | 48,255 | 62,021 | 48,717 |
| Number of Active Retirants | 206 | 5,025 | 12,743 | 21,322 | 23,304 | 26,977 | 74,629 | 164,206 |
| Period 10/1/16 to 9/30/17: | | | | | | | | |
| Average Monthly Benefit | \$ 149 | \$ 256 | \$ 486 | \$ 790 | \$ 1,256 | \$ 2,037 | \$ 3,081 | \$ 2,065 |
| Average Final Average Salary | 20,719 | 22,078 | 26,677 | 33,178 | 40,686 | 48,880 | 62,629 | 49,409 |
| Number of Active Retirants | 201 | 4,958 | 12,655 | 21,460 | 23,578 | 27,235 | 75,445 | 165,532 |
| Period 10/1/17 to 9/30/18: | | | | | | | | |
| Average Monthly Benefit | \$ 154 | \$ 262 | \$ 499 | \$ 805 | \$ 1,276 | \$ 2,067 | \$ 3,121 | \$ 2,101 |
| Average Final Average Salary | 21,083 | 22,461 | 27,269 | 33,734 | 41,325 | 49,520 | 63,233 | 50,095 |
| Number of Active Retirants | 199 | 4,880 | 12,520 | 21,459 | 23,884 | 27,482 | 76,327 | 166,751 |

*Average monthly benefits shown are pension benefits

Source: Gabriel Roeder Smith & Co.

STATISTICAL SECTION

SCHEDULE OF PRINCIPAL PARTICIPATING EMPLOYERS

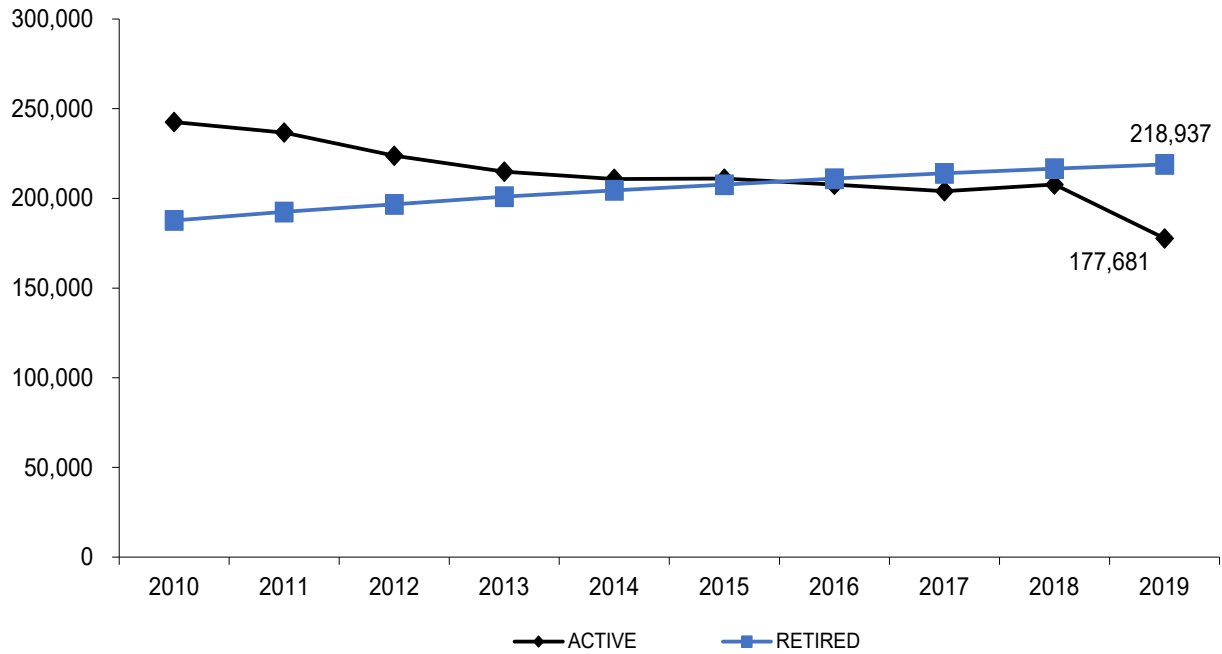
For Fiscal Years Ending September 30, 2018 and 2009

| Participating Employer | 2018 | | 2009 | |
|---|----------------|----------------------------|----------------|----------------------------|
| | Employees | Percentage of Total System | Employees | Percentage of Total System |
| Detroit Public Schools Community District | 7,721 | 3.34 % | 13,817 | 5.15 % |
| Dearborn Public Schools | 3,268 | 1.41 | 2,688 | 1.00 |
| Ann Arbor Public Schools | 2,964 | 1.28 | 3,107 | 1.16 |
| Grand Rapids Public Schools | 2,801 | 1.21 | 3,280 | 1.22 |
| Utica Community Schools | 2,789 | 1.21 | 3,942 | 1.47 |
| Kalamazoo Public Schools | 2,235 | 0.97 | 2,571 | 0.96 |
| Macomb Community College | 2,138 | 0.92 | 2,529 | 0.94 |
| Plymouth-Canton Community SD | 2,100 | 0.91 | 2,497 | 0.93 |
| Chippewa Valley Schools | 2,053 | 0.89 | 1,921 | 0.72 |
| Oakland Community College | 2,015 | 0.87 | 2,504 | 0.93 |
| All other | 201,234 | 86.99 | 229,352 | 85.51 |
| Total | 231,318 | 100.00 % | 268,208 | 100.00 % |

STATISTICAL SECTION

TEN YEAR HISTORY OF MEMBERSHIP

Fiscal Year Ended September 30



Source: Gabriel Roeder Smith & Co.

STATISTICAL SECTION

TEN YEAR HISTORY OF MEMBERSHIP

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STATISTICAL SECTION

SCHEDULE OF PARTICIPATING EMPLOYERS

At 9/30/2019

Universities:

Central Michigan University
Eastern Michigan University
Ferris State University
Lake Superior State University
Michigan Technological University
Northern Michigan University
Western Michigan University

Community Colleges:

Alpena Community College
Bay De Noc Community College
Charles S Mott Community College
Delta College
Glen Oaks Community College
Gogebic Community College
Grand Rapids Community College
Henry Ford College
Jackson College
Kalamazoo Valley Community College
Kellogg Community College
Kirtland Community College
Lake Michigan College
Lansing Community College
Macomb Community College
Mid-Michigan Community College
Monroe County Community College
Montcalm Community College
Muskegon Community College
North Central Michigan College
Northwestern Michigan College
Oakland Community College
Schoolcraft Community College
Southwestern Michigan College
St Clair County Community College
Washtenaw Community College
Wayne County Community College
West Shore Community College

Intermediate School Districts:

Allegan Area Educational Service Agency
Alpena-Montmorency-Alcona ESD
Barry Intermediate School District
Bay-Arenac Intermediate School District
Berrien RESA
Branch Intermediate School District
Calhoun Intermediate School District
Charlevoix-Emmet Intermediate School District
Cheboygan-Otsego-Presque Isle ESD
Clare-Gladwin Intermediate School District
Clinton County RESA
COOR Intermediate School District
Copper Country Intermediate School District

Delta-Schoolcraft Intermediate School District
Dickinson-Iron Intermediate School District
Eastern U P Intermediate School District
Eaton Intermediate School District
Genesee Intermediate School District
Gogebic-Ontonagon Intermediate School District
Gratiot-Isabella RESD
Hillsdale Intermediate School District
Huron Intermediate School District
Ingham Intermediate School District
Ionia Intermediate School District
Iosco RESA
Jackson Intermediate School District
Kalamazoo RESA
Kent Intermediate School District
Lapeer Intermediate School District
Lenawee Intermediate School District
Lewis Cass Intermediate School District
Livingston ESA
Macomb Intermediate School District
Manistee Intermediate School District
Marquette-Alger Intermediate School District
Mecosta-Osceola Intermediate School District
Menominee Intermediate School District
Midland County Educational Service Agency
Monroe Intermediate School District
Montcalm Area Intermediate School District
Muskegon Area Intermediate School District
Newaygo County RESA
Oakland Intermediate School District
Ottawa Area Intermediate School District
Saginaw Intermediate School District
Sanilac Intermediate School District
Shiawassee Regional Educational Service District
St Clair County RESA
St Joseph Intermediate School District
Traverse Bay Area Intermediate School District
Tuscola Intermediate School District
Van Buren Intermediate School District
Washtenaw Intermediate School District
Wayne RESA
West Shore Educational Service District
Wexford-Missaukee Intermediate School District

STATISTICAL SECTION

SCHEDULE OF PARTICIPATING EMPLOYERS

K-12 School Districts:

| | |
|-----------------------------------|--|
| Adams Township School District | Big Bay De Noc School District |
| Adams-Sigel #3 School | Big Burning-Colfax School District #1F |
| Addison Community Schools | Big Jackson School District |
| Adrian Public Schools | Big Rapids Public Schools |
| Airport Community Schools | Birch Run Area Schools |
| Akron-Fairgrove Schools | Birmingham Public Schools |
| Alanson Public Schools | Blissfield Community School District |
| Alba Public Schools | Bloomfield Hills School District |
| Alcona Community Schools | Bloomington Public Schools |
| Algonac Community Schools | Bois Blanc Pines School District |
| Allegan Public Schools | Boyne City Public Schools |
| Allen Park Public Schools | Boyne Falls Public Schools |
| Allendale Public Schools | Brandon School District |
| Alma Public Schools | Brandywine Public Schools |
| Almont Community Schools | Breckenridge Community Schools |
| Alpena Public Schools | Breitung Township Schools |
| Anchor Bay School District | Bridgeport-Spaulding Community School District |
| Ann Arbor Public Schools | Bridgman Public Schools |
| Arenac-Eastern High School | Brighton Area Schools |
| Armada Area Schools | Brimley Public Schools |
| Arvon Township Schools | Britton-Deerfield Schools |
| Ashley Community Schools | Bronson Community Schools |
| Athens Area Schools | Brown City Community Schools |
| Atherton Community Schools | Buchanan Community Schools |
| Atlanta Community Schools | Buckley Community Schools |
| Au Gres-Sims School District | Bullock Creek School District |
| Autrain-Ontario Public Schools | Burr Oak Community Schools |
| Avondale School District | Burt Township School District |
| Bad Axe Public Schools | Byron Area Schools |
| Baldwin Community Schools | Byron Center Public Schools |
| Bangor Public Schools | Cadillac Area Public Schools |
| Bangor Township Schools | Caledonia Community Schools |
| Baraga Township Schools | Calumet Public Schools |
| Bark River-Harris Schools | Camden-Frontier School |
| Bath Community Schools | Capac Community Schools |
| Battle Creek Public Schools | Carman-Ainsworth Community School District |
| Bay City Public Schools | Carney-Nadeau Public Schools |
| Beal City Schools | Caro Community Schools |
| Bear Lake School District | Carrollton School District |
| Beaver Island Community Schools | Carson City-Crystal Area Schools |
| Beaverton Rural School District | Carsonville-Port Sanilac School |
| Bedford Public Schools | Caseville Public Schools |
| Beecher Community School District | Cass City Public Schools |
| Belding Area Schools | Cassopolis Public Schools |
| Bellaire Public Schools | Cedar Springs Public Schools |
| Bellevue Community Schools | Center Line Public Schools |
| Bendle Public Schools | Central Lake-Antrim County Public Schools |
| Bentley Community Schools | Central Montcalm Public Schools |
| Benton Harbor Area Schools | Centreville Public Schools |
| Benzie County Central Schools | Charlevoix Public Schools |
| Berkley School District | Charlotte Public Schools |
| Berrien Springs Public Schools | Chassell Township Schools |
| Bessemer Area School District | Cheboygan Area School District |
| | Chelsea School District |
| | Chesaning-Union Schools |

STATISTICAL SECTION

SCHEDULE OF PARTICIPATING EMPLOYERS

K-12 School Districts (continued):

| | |
|---|---|
| Chippewa Hills School District | Edwardsburg Public Schools |
| Chippewa Valley Schools | Elk Rapids Schools |
| Church School | Ellsworth Community Schools |
| Clare Public Schools | Elm River Township Schools |
| Clarenceville School District | Engadine Consolidated School District #4 |
| Clarkston Community Schools | Escanaba Area Public Schools |
| Clawson City School District | Essexville-Hampton Public Schools |
| Climax-Scotts Community Schools | Evart Public Schools |
| Clinton Community Schools | Ewen-Trout Creek Consolidated School District |
| Clintondale Community Schools | Fairview Area Schools |
| Clio Area School District | Farmington Public Schools |
| Coldwater Community Schools | Farwell Area Schools |
| Coleman Community Schools | Fennville Public Schools |
| Coloma Community Schools | Fenton Area Public Schools |
| Colon Community School | Ferndale City School District |
| Columbia School District | Fitzgerald Public Schools |
| Comstock Park Public Schools | Flat Rock Community Schools |
| Comstock Public Schools | Flint Community Schools |
| Concord Community Schools | Flushing Community Schools |
| Constantine Public Schools | Forest Area Schools |
| Coon-Berlin Township School District #3 | Forest Hills Public Schools |
| Coopersville Public Schools | Forest Park School District |
| Corunna Public Schools | Fowler Public Schools |
| Covert Public Schools | Fowlerville Community Schools |
| Crawford-AuSable School District | Frankenmuth School District |
| Crawford-Excelsior School District #1 | Frankfort-Elberta Area Schools |
| Crestwood School District | Fraser Public Schools |
| Croswell-Lexington Schools | Freeland Community Schools |
| Dansville Schools | Fremont Public Schools |
| Davison Community Schools | Fruitport Community Schools |
| Dearborn Heights School District #7 | Fulton Schools |
| Dearborn Public Schools | Galesburg-Augusta Community School District |
| Decatur Public Schools | Garden City Public Schools |
| Deckerville Community School District | Gaylord Community Schools |
| Delton-Kellogg Schools | Genesee School District |
| DeTour Area Schools | Gibraltar School District |
| Detroit Public Schools Community District | Gladstone Area Schools |
| Dewitt Public Schools | Gladwin Community Schools |
| Dexter Community Schools | Glen Lake Community Schools |
| Dollar Bay-Tamarack School District | Glenn-Ganges School District #4 |
| Dowagiac-Union School District | Gobles Public Schools |
| Dryden Community Schools | Godfrey-Lee Public Schools |
| Dundee Community Schools | Godwin Heights Public Schools |
| Durand Area Schools | Goodrich Area Schools |
| East China School District | Grand Blanc Community Schools |
| East Grand Rapids Public Schools | Grand Haven Public Schools |
| East Jackson Public Schools | Grand Ledge Public Schools |
| East Jordan Public Schools | Grand Rapids Public Schools |
| East Lansing Public Schools | Grandville Public Schools |
| Eastpointe Community Schools | Grant Public Schools |
| Eaton Rapids Public Schools | Grant Township School |
| Eau Claire Public Schools | Grass Lake Community Schools |
| Eccles-Sigel #4 School | Greenville Public Schools |
| Ecorse Public Schools | Grosse Ile Township Schools |
| | Grosse Pointe Public Schools |

STATISTICAL SECTION

SCHEDULE OF PARTICIPATING EMPLOYERS

K-12 School Districts (continued):

| | |
|---|---------------------------------------|
| Gull Lake Community Schools | Kelloggsville Public Schools |
| Gwinn Area Community Schools | Kenowa Hills Public Schools |
| Hale Area Schools | Kent City Community Schools |
| Hamilton Community Schools | Kentwood Public Schools |
| Hamtramck Public Schools | Kingsley Area Schools |
| Hancock Public Schools | Kingston Community Schools |
| Hanover Horton School District | Laingsburg Community Schools |
| Harbor Beach Community School District | Lake City Area Schools |
| Harbor Springs Public Schools | Lake Fenton Community School District |
| Harper Creek Community Schools | Lake Linden-Hubbell Public Schools |
| Harper Woods Public Schools | Lake Orion Community School #3 |
| Harrison Community Schools | Lake Shore Public Schools |
| Hart Public Schools | Laker Schools |
| Hartford Public Schools | Lakeshore Public Schools |
| Hartland Consolidated Schools | Lakeview Community Schools |
| Haslett Public Schools | Lakeview Public Schools |
| Hastings Area School District | Lakeview School District |
| Haynor Easton Township School District #6 | Lakeville Community Schools |
| Hazel Park Public Schools | Lakewood School District |
| Hemlock Public Schools | Lamphere Public Schools |
| Hesperia Community Schools | L'Anse Creuse Public Schools |
| Hillman Community Schools | L'Anse Public Schools |
| Hillsdale Community Schools | Lansing Public Schools |
| Holland Public Schools | Lapeer Public Schools |
| Holly Area Schools | Lawrence Public Schools |
| Holt Public Schools | Lawton Community Schools |
| Holton Public Schools | Leland Public Schools |
| Homer Community Schools | Les Cheneaux Community Schools |
| Hopkins Public Schools | Leslie Public Schools |
| Houghton Lake Community Schools | Lincoln Consolidated Schools |
| Houghton-Portage Township School District | Lincoln Park Public Schools |
| Howell Public Schools | Linden Community Schools |
| Hudson Area Schools | Litchfield Community Schools |
| Hudsonville Public Schools | Livonia Public Schools |
| Huron School District | Lowell Area Schools |
| Huron Valley School District | Ludington Area Schools |
| Ida Public Schools | Mackinaw City Public Schools |
| Imlay City Community Schools | Mackinac Island Public Schools |
| Inland Lakes Schools | Madison District Public Schools |
| Ionia Public Schools | Madison School District #2 |
| Iron Mountain Public Schools | Mancelona Public Schools |
| Ironwood-Gogebic City Area Schools | Manchester Community Schools |
| Ishpeming Public Schools | Manistee Public Schools |
| Ithaca Public Schools | Manistique Area Schools |
| Jackson Public Schools | Manton Consolidated School District |
| Jefferson Schools | Maple Valley Schools |
| Jenison Public Schools | Mar Lee School District |
| Johannesburg-Lewiston Area Schools | Marcellus Community Schools |
| Jonesville Community Schools | Marion Public Schools |
| Kalamazoo Public Schools | Marlette Community Schools |
| Kaleva Norman Dickson School District | Marquette Area Public Schools |
| Kalkaska Public Schools | Marshall Public Schools |
| Kearsley Community Schools | Martin Public Schools |
| | Marysville Public Schools |

STATISTICAL SECTION

SCHEDULE OF PARTICIPATING EMPLOYERS

K-12 School Districts (continued):

| | |
|--|---|
| Mason Co.-Eastern-Custer #5 School District | Northwest School District |
| Mason Consolidated Schools | Norway-Vulcan Area Schools |
| Mason County Central School District | Nottawa Community Schools |
| Mason Public Schools | Novi Community School District |
| Mattawan Consolidated Schools | Oak Park School District |
| Mayville Community Schools | Oakridge Public Schools |
| McBain Rural Agricultural School | Okemos Public Schools |
| Melvindale-Northern Allen Park School District | Olivet Community Schools |
| Memphis Community Schools | Onaway Area Community Schools |
| Mendon Community School | Onkama Consolidated Schools |
| Menominee Area Public Schools | Onsted Community Schools |
| Meridian Public Schools | Ontonagon Area School District |
| Merrill Community Schools | Orchard View Schools |
| Mesick Consolidated Schools | Oscoda Area Schools |
| Michigan Center School District | Otsego Public Schools |
| Mid Peninsula Schools | Ovid-Elsie Area Schools |
| Midland City Schools | Owendale-Gagetown Area Schools |
| Milan Area Schools | Owosso Public Schools |
| Millington Community School District | Oxford Area Community Schools |
| Mio-AuSable Schools | Parchment School District |
| Mona Shores School District #29 | Paw Paw Public Schools |
| Monroe Public Schools | Peck Community Schools |
| Montabella Community Schools | Pellston Public Schools |
| Montague Area Public Schools | Pennfield Public Schools |
| Montrose Community Schools | Pentwater Public Schools |
| Moran Township School District | Perry Public Schools |
| Morenci Area Schools | Petoskey Public Schools |
| Morley-Stanwood Community Schools | Pewamo-Westphalia Community School District |
| Morrice Area Schools | Pickford Public Schools |
| Mt Clemens Community Schools | Pinckney Community Schools |
| Mt Morris Consolidated Schools | Pinconning Area Schools |
| Mt Pleasant Public Schools | Pine River Area Schools |
| Munising Public Schools | Pittsford Area Schools |
| Muskegon City Public Schools | Plainwell Community Schools |
| Muskegon Heights City Public Schools | Plymouth-Canton Community School District |
| Napoleon Community School District | Pontiac City School District |
| Negaunee Public Schools | Port Huron Area Schools |
| New Buffalo Area Schools | Portage Public Schools |
| New Haven Community Schools | Portland Public Schools |
| New Lothrop Area Public Schools | Posen Consolidated Schools |
| Newaygo Public Schools | Potterville Public Schools |
| Nice Community Schools | Powell Township School District |
| Niles Public Schools | Quincy Community Schools |
| North Adams-Jerome Public Schools | Rapid River Public Schools |
| North Branch Area Schools | Ravenna Public Schools #24 |
| North Central Area Schools | Reading Community Schools |
| North Dickinson School | Redford-Union School District #1 |
| North Huron Schools | Reed City Public School District |
| North LeValley School #2 | Reese Public Schools |
| North Muskegon Public Schools | Reeths-Puffer Schools |
| Northport Public Schools | Republic-Michigamme Schools |
| Northview Public Schools | Richmond Community Schools |
| Northville Public Schools | River Rouge Public Schools |
| | River School |
| | River Valley School District |

STATISTICAL SECTION

SCHEDULE OF PARTICIPATING EMPLOYERS

K-12 School Districts (continued):

| | |
|---|--|
| River Valley School District | Thornapple-Kellogg School |
| Riverside-Hagar School District #6 | Three Rivers Community Schools |
| Riverview Public Schools | Traverse City Public Schools |
| Rochester Community Schools | Trenton Public Schools |
| Rockford Public Schools | Tri-County Area Schools |
| Rogers City Area Schools | Troy City School District |
| Romeo Community Schools | Ubly Community Schools |
| Romulus Community Schools | Union City Community Schools |
| Roscommon Area Public Schools | Unionville-Sebewaing Area Schools |
| Roseville Community Schools | Utica Community Schools |
| Royal Oak City School District | Van Buren Public Schools |
| Rudyard Public Schools | Vanderbilt Area Schools |
| Saginaw City Schools | Vandercook Lake Public Schools |
| Saginaw Township Community Schools | Van Dyke Public Schools |
| Saline Area Schools | Vassar Public Schools |
| Sand Creek Community Schools | Verona Mills School |
| Sandusky Community Schools | Vestaburg Community Schools |
| Saranac Community Schools | Vicksburg Community Schools |
| Saugatuck Public Schools | Wakefield-Marenisco School District |
| Sault Ste Marie Public Schools | Waldron Area Schools |
| Schoolcraft Community Schools | Walkerville Public Schools |
| Shelby Public Schools | Walled Lake Consolidated Schools |
| Shepherd Public Schools | Warren Consolidated Schools |
| South Haven Public Schools | Warren Woods Public Schools |
| South Lake Public Schools | Waterford School District |
| South Lyon Community Schools | Watersmeet Township School District |
| South Redford School District | Watervliet Public Schools |
| Southfield Public Schools | Waverly Community Schools |
| Southgate Community School District | Wayland Union Schools |
| Sparta Area Schools | Wayne-Westland Community Schools |
| Spring Lake Public Schools | Webberville Community Schools |
| Springport Public Schools | Wells Township School #18 |
| St Charles Community Schools | West Bloomfield Schools |
| St Ignace Public Schools | West Branch-Rose City Area Schools |
| St Johns Public Schools | West Iron County Public Schools |
| St Joseph Public Schools | West Ottawa Public Schools |
| St Louis Public Schools | Western School District |
| Standish-Sterling Community School District | Westwood Community Schools |
| Stanton Township Public Schools | Westwood Heights Schools |
| Stephenson Area Public Schools | White Cloud Public Schools |
| Stockbridge Community Schools | White Pigeon Community Schools |
| Strange-Oneida School #3 | Whitefish Township School |
| Sturgis Public Schools | Whiteford Agricultural School |
| Summerfield Schools | Whitehall District Schools |
| Superior Central School District | Whitmore Lake Public Schools |
| Suttons Bay Public Schools | Whitemore-Prescott Area Schools |
| Swan Valley School District | Williamston Community Schools |
| Swartz Creek Community Schools | Wolverine Community Schools |
| Tahquamenon Area School District | Wood School District #8, Bangor Township |
| Tawas Area Schools | Woodhaven-Brownstown School District |
| Taylor School District | Wyandotte Public Schools |
| Tecumseh Public Schools | Wyoming Public Schools |
| Tekonsha Community Schools | Yale Public School District |
| | Ypsilanti Community Schools |
| | Zeeland Public Schools |

STATISTICAL SECTION

SCHEDULE OF PARTICIPATING EMPLOYERS

Libraries:

Ann Arbor District Library
Bacon Memorial District Library
Cheboygan Area Public Library
Flint Public Library
Grosse Pointe Public Library
Hackley Public Library
Kalamazoo Public Library
Mt Clemens Public Library
Public Libraries of Saginaw
Willard District Library

West Village Academy
Woodland Park Academy

Public School Academies:

AGBU Alex & Marie Manoogian School
Arts Academy in the Woods
Battle Creek Area Learning Center
Bay-Arenac Community High School
Blue Water Middle College Academy
Central Academy
Countryside Charter School
Covenant House Academy Grand Rapids
Creative Technologies Academy
Crescent Academy
Da Vinci Institute
Dearborn Academy
Edison Public School Academy
El-Hajj Malik El-Shabazz Academy
Flat River Academy
Flint Cultural Center Academy
George Washington Carver Academy
Grand Rapids Child Discovery Center
Greater Heights Academy
Henry Ford Academy
Holly Academy
Honey Creek Community School
Joseph K. Lumsden Public School Academy
Macomb Academy
Martin Luther King, Jr. Public School Academy
Muskegon Heights Public School Academy
Nah Tah Wahsh Public School Academy
New High School
North Star Academy
Outlook Academy
Presque Isle Academy II
Relevant Academy of Eaton County
Richfield Public School Academy
Rising Stars Academy
Summit Academy
Summit Academy North
Three Lakes Academy
Virtual Learning Academy of St Clair
Walden Green Day School
Washtenaw Technical Middle College
Waterford Montessori Academy
West Michigan Aviation Academy

ACKNOWLEDGMENTS

ACKNOWLEDGMENTS

The *Michigan Public School Employees' Retirement System Comprehensive Annual Financial Report* is prepared by Financial Services, Fiscal Management Division. Staff of the division for the fiscal year 2019 report included:

Management:

Jacqueline Huhn, Director
Aver Hamilton, Accounting Manager

Accountants:

Dan Harry
Rick Legal
Cindy Molzan
Hope Richardson
Paula Webb
Carol Wheaton

Technical and Support Staff:

Jamin Schroeder

Special thanks are also extended to the Office of Retirement Services personnel, accounting and support personnel throughout Financial Services, Investments Division of Treasury, Department of Community Health cashiering personnel, Office of the Auditor General, Gabriel Roeder Smith & Co., and the staff at the Office of Financial Management. Preparation of this report would not have been possible without the efforts of these individuals.

This report may be viewed online at: www.michigan.gov/ors