PUBLIC SCHOOL RETIREMENT SYSTEM OF THE SCHOOL DISTRICT OF KANSAS CITY, MISSOURI

SCHEDULE OF EMPLOYER ALLOCATIONS AND SCHEDULE OF PENSION AMOUNTS BY EMPLOYER

December 31, 2018

PUBLIC SCHOOL RETIREMENT SYSTEM
OF THE SCHOOL DISTRICT OF KANSAS CITY, MISSOURI

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INDEPENDENT AUDITORS' REPORT

The Board of Trustees
Public School Retirement System of the School District of Kansas City, Missouri

Report on Schedules

We have audited the accompanying schedule of employer allocations of the Public School Retirement System of the School District of Kansas City, Missouri (the "Retirement System") as of and for the year ended December 31, 2018, and the related notes. We have also audited the total for all entities of the columns titled net pension liability, total deferred outflows of resources, total deferred inflows of resources, and total pension expense (specified column totals) as of and for the year ended December 31, 2018 included in the accompanying schedule of pension amounts by employer of the Retirement System, and the related notes.

Management's Responsibility for the Schedules

Management is responsible for the preparation and fair presentation of these schedules 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 the schedules that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express opinions on the schedule of employer allocations and the specified column totals included in the schedule of pension amounts by employer based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer, 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 schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer 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 schedule of employer allocations and specified column totals included in the schedule of pension amounts by employer.

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 schedules referred to above present fairly, in all material respects, the employer allocations and net pension liability, total deferred outflows of resources, total deferred inflows of resources, and total pension expense for the total of all participating entities for the Retirement System as of and for the year ended December 31, 2018, in accordance with accounting principles generally accepted in the United States of America.

Other Matter

We have audited, in accordance with auditing standards generally accepted in the United States of America, the financial statements of the Retirement System as of and for the year ended December 31, 2018, and our report thereon, dated June 6, 2019, expressed an unmodified opinion on those financial statements.

Restriction of Use

Our report is intended solely for the information and use of the Retirement System management, the Board of Trustees of the Retirement System, the Retirement System employers and their auditors and is not intended to be and should not be used by anyone other than these specified parties.

Mayer Hoffman McCann P.C.

Kansas City, Missouri
September 3, 2019

PUBLIC SCHOOL RETIREMENT SYSTEM
OF THE SCHOOL DISTRICT OF KANSAS CITY, MISSOURI

SCHEDULE OF EMPLOYER ALLOCATIONS

As of and for the year ended December 31, 2018

Employer	2018 Actual Employer Contributions	Employer Allocated Proportion
Academie Lafayette	$ 466,254	2.667091%
Academy For Intergrated Arts	90,414	0.517191%
Allen Village Charter School	283,653	1.622567%
Benjamin Banneker Charter Academy	87,743	0.501912%
Brookside Charter School	395,229	2.260810%
Citizens of the World Charter School	123,344	0.705559%
Crossroads Academy of Kansas City	422,869	2.418918%
DeLaSalle Charter School	56,126	0.321055%
DeLaSalle Charter School 2.0	37,152	0.212519%
Ewing Marion Kauffman School	548,970	3.140248%
Frontier School of Innovation	918,812	5.255838%
Genesis School, Inc.	175,599	1.004471%
Gordon Parks Elementary	144,071	0.824123%
Guadalupe Center Schools	584,411	3.342979%
Hogan Preparatory Academy	549,141	3.141226%
Hope Leadership Academy	59,004	0.337518%
Kansas City Neighborhood Academy	141,182	0.807597%
KC Intertional Academy	399,602	2.285825%
KC Library - KCPL	647,906	3.706187%
KIPP Endeavor Academy	315,883	1.806931%
Lee A. Tolbert Community Academy	249,182	1.425384%
Pathway Academy	126,558	0.723944%
School District - KCSD	9,878,602	56.508113%
Scuola Vita Nuova	167,453	0.957874%
University Academy	612,581	3.504119%
Total	$ 17,481,741	100.000000%

NOTE: The Retirement System had contributions of $46,114 for 2018; however, this amount was not used in determining the Schedule of Employer Allocations.

See accompanying notes to schedule of employer allocations and schedule of pension amounts by employer.

PUBLIC SCHOOL RETIREMENT SYSTEM
OF THE SCHOOL DISTRICT OF KANSAS CITY, MISSOURI

SCHEDULE OF PENSION AMOUNTS BY EMPLOYER

As of and for the year ended December 31, 2018

		Deferred Outflows of Resources					Deferred Inflows of Resources				
Employer	12/31/2018 Net Pension Liability	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Earnings on Pension Plan Investments	Changes in Assumptions	Changes in Proportion	Total Deferred Outflows of Resources	Differences Between Expected and Actual Experience	Net Difference Between Projected and Actual Earnings on Pension Plan Investments	Changes in Assumptions	Changes in Proportion	Total Deferred Inflows of Resources
Academie Lafayette	$ 10,673,891	$ 27,479	$ 2,193,086	$ 725,533	$ 34,845	$ 2,980,943	$ 187,940	$ 883,190	$ -	$ -	$ 1,071,130
Academy For Intergrated Arts	2,069,836	5,329	425,274	140,692	46,819	618,114	36,445	171,265	-	-	207,710
Allen Village Charter School	6,493,630	16,718	1,334,199	441,389	-	1,792,306	114,336	537,303	-	255,657	907,296
Benjamin Banneker Charter Academy	2,008,688	5,171	412,710	136,536	-	554,417	35,368	166,205	-	1,003,366	1,204,939
Brookside Charter School	9,047,925	23,293	1,859,011	615,011	353,250	2,850,565	159,311	748,653	-	-	907,964
Citizens of the World Charter School	2,823,698	7,269	580,165	191,934	231,358	1,010,726	49,718	233,641	-	-	283,359
Crossroads Academy of Kansas City	9,680,685	24,922	1,989,019	658,022	648,019	3,319,982	170,452	801,009	-	-	971,461
DeLaSalle Charter School	-	-	-	-	-	-	-	-	-	1,614,555	1,614,555
DeLaSalle Charter School 2.0	2,135,402	5,497	438,745	145,149	851,540	1,440,931	37,599	176,690	-	-	214,289
Ewing Marion Kauffman School	12,567,500	32,354	2,582,152	854,246	885,180	4,353,932	221,282	1,039,873	-	-	1,261,155
Frontier School of Innovation	21,034,244	54,152	4,321,752	1,429,753	1,061,130	6,866,787	370,360	1,740,438	-	-	2,110,798
Genesis School, Inc.	4,019,966	10,349	825,953	273,248	-	1,109,550	70,781	332,624	-	116,143	519,548
Gordon Parks Elementary	3,298,200	8,491	677,657	224,187	-	910,335	58,073	272,903	-	68,231	399,207
Guadalupe Centers Schools	13,378,844	34,443	2,748,853	909,395	591,887	4,284,578	235,567	1,107,006	-	-	1,342,573
Hogan Preparatory Academy	12,571,414	32,364	2,582,956	854,512	93,919	3,563,751	221,351	1,040,197	-	387,306	1,648,854
Hope Leadership Academy	1,350,771	3,477	277,533	91,816	-	372,826	23,784	111,767	-	100,546	236,097
Kansas City Neighborhood Academy	3,232,062	8,321	664,068	219,692	221,635	1,113,716	56,908	267,431	-	-	324,339
KC International Academy	9,148,037	23,551	1,879,580	621,816	172,066	2,697,013	161,074	756,937	-	-	918,011
KC Library - KCPL	14,832,428	38,185	3,047,510	1,008,199	-	4,093,894	261,161	1,227,280	-	196,507	1,684,948
KIPP Endeavor Academy	7,231,469	18,617	1,485,797	491,542	323,684	2,319,640	127,328	598,354	-	-	725,682
Lee A. Tolbert Community Academy	5,704,490	14,686	1,172,060	387,749	-	1,574,495	100,442	472,007	-	98,850	671,299
Pathway Academy	2,897,276	7,459	595,282	196,936	-	799,677	51,014	239,729	-	450,362	741,105
School District - KCSD	226,149,556	582,214	46,465,291	15,371,984	-	62,419,489	3,981,918	18,712,307	-	1,259,150	23,953,375
Scuola Vita Nuova	3,833,481	9,869	787,637	260,572	180,209	1,238,287	67,498	317,194	-		384,692
University Academy	14,023,738	36,103	2,881,355	953,231	-	3,870,689	246,922	1,160,367	-	144,868	1,552,157
Total	$ 400,207,231	$ 1,030,313	$ 82,227,645	$ 27,203,144	$ 5,695,541	$ 116,156,643	$ 7,046,632	$ 33,114,370	$ -	$ 5,695,541	$ 45,856,543

See accompanying notes to schedule of employer allocations and schedule of pension amounts by employer.

PUBLIC SCHOOL RETIREMENT SYSTEM
OF THE SCHOOL DISTRICT OF KANSAS CITY, MISSOURI

SCHEDULE OF PENSION AMOUNTS BY EMPLOYER (continued)

For the year ended December 31, 2018

	Pension Expense				
Employer	Proportionate Share of Plan Pension Expense	Net Recognition of Deferred Amounts from Changes in Proportionate Share	Employer Pension Expense Allocated	Military Service Purchase Payments	Total Employer Pension Expense
Academie Lafayette	$ 2,227,956	$ 7,957	$ -	$ -	$ 2,235,913
Academy For Intergrated Arts	432,036	129,799	-	-	561,835
Allen Village Charter School	1,355,412	(265,358)	-	-	1,090,054
Benjamin Banneker Charter Academy	419,272	(671,003)	-	-	(251,731)
Brookside Charter School	1,888,569	376,613	-	-	2,265,182
Citizens of the World Charter School	589,389	436,624	-	-	1,026,013
Crossroads Academy of Kansas City	2,020,644	930,849	-	-	2,951,493
DeLaSalle Charter School	-	(1,346,900)	-	-	(1,346,900)
DeLaSalle Charter School 2.0	445,721	556,562	-	-	1,002,283
Ewing Marion Kauffman School	2,623,208	960,811	-	-	3,584,019
Frontier School of Innovation	4,390,467	1,344,192	-	-	5,734,659
Genesis School, Inc.	839,085	(106,701)	-	-	732,384
Gordon Parks Elementary	688,432	(87,742)	-	-	600,690
Guadalupe Centers Schools	2,792,559	541,840	-	-	3,334,399
Hogan Preparatory Academy	2,624,025	(111,794)	-	-	2,512,231
Hope Leadership Academy	281,946	(57,273)	-	-	224,673
Kansas City Neighborhood Academy	674,627	472,608	-	-	1,147,235
KC International Academy	1,909,465	92,566	-	-	2,002,031
KC Library - KCPL	3,095,965	(258,519)	-	-	2,837,446
KIPP Endeavor Academy	1,509,421	529,456	-	-	2,038,877
Lee A. Tolbert Community Academy	1,190,695	(162,122)	-	-	1,028,573
Pathway Academy	604,747	(376,303)	-	-	228,444
School District - KCSD	47,204,077	(2,884,074)	-	-	44,320,003
Scuola Vita Nuova	800,160	162,904	-	-	963,064
University Academy	2,927,167	(214,992)	-	-	2,712,175
Total	$ 83,535,045	$ -	$ -	$ -	$ 83,535,045

See accompanying notes to schedule of employer allocations and schedule of pension amounts by employer.

NOTES TO SCHEDULE OF EMPLOYER ALLOCATIONS AND SCHEDULE OF PENSION AMOUNTS BY EMPLOYER

(1) Description of plan

General - The Retirement System is a cost-sharing multiple-employer defined benefit pension plan (the "Plan"), which was established by the General Assembly of the State of Missouri and is exempt from the provisions of the Employee Retirement Income Security Act of 1974. The Board of Trustees of the Retirement System ("Board of Trustees") administers and operates the Plan in accordance with the statutes of the State of Missouri. At December 31, 2018, participating employers consisted of the School District of Kansas City, Missouri; the Kansas City, Missouri Public Library District; the Retirement System; and the following charter schools: Academie LaFayette, Academy for Integrated Arts, Allen Village Charter School, Benjamin Banneker Charter Academy (closed July 24, 2018), Brookside Charter School, Citizens of the World Kansas City, Crossroads Charter Schools, DeLaSalle Charter School 2.0, Ewing Marion Kauffman School, Frontier Schools, Genesis School, Inc., Gordon Parks Elementary, Guadalupe Center Schools, Hogan Preparatory Academy, Hope Leadership Academy, Kansas City International Academy, Kansas City Neighborhood Academy, KIPP Endeavor Academy, Lee A. Tolbert Community Academy, Pathway Academy, Scuola Vita Nuova, and University Academy.

Eligibility - All regular, full-time employees of the participating employers become members of the Plan as a condition of employment if they are in a position requiring at least 25 hours of work per week and nine calendar months per year. Employees who retire after June 30, 1999 and were hired after 1961, but before January 1, 2014 are members of Plan B. Employees hired after January 1, 2014 are members of Plan C. At January 1, 2018, the Plan's membership consisted of:

	2018
Active Plan members	3,760
Retirees and beneficiaries receiving benefits	4,112
Terminated Plan members, vested entitled to but not yet receiving benefits	522
Terminated Plan members, nonvested entitled to a refund of contributions plus accrued interest	2,449
Total Plan membership	10,843

Contributions - For the year beginning January 1, 2018, members were required to contribute 9% of their annual covered salary. Employers were required to match the contributions made by their employees.

During 2018, the Missouri General Assembly passed legislation that increased the employer contribution rate to 10.50% of annual covered salary effective January 1, 2019, and then to 12.00% of annual covered salary effective January 1, 2020. Beginning July 1, 2021, the employer contribution rate will be the greater of (1) the actuarial required contribution rate less the member contribution rate, or (2) 12.00% of annual covered salary, until the Retirement System is fully funded. Once the Retirement System is fully funded, the employer contribution rate may increase or decrease, in subsequent years, depending on valuation results and the employee contribution rate may decrease from 9% depending on valuation results. However, such changes are subject to statutory limitations.

The contribution rate is set each year by the Board of Trustees of the Kansas City Public School Retirement System upon the recommendation of the Retirement System's actuary within the contribution restrictions of RSMo Section 169.350 subsections 5 and 6.

(1) **<u>Description of plan</u> (continued)**

Service - Creditable service is membership service. This is service for which required contributions have been made. Members of Plan B are effectively limited to 30 years of creditable service, regardless of the number of years actually worked, unless the member earned more than 30 years prior to August 28, 1993. Members of Plan C are effectively limited to 34.25 years of creditable service, regardless of the number of years actually worked.

Compensation

Annual compensation - Compensation in excess of the limitations set forth in Section 401(a)(17) of the Internal Revenue Code will be disregarded for purposes of determining contributions and benefits for members of Plan B and C. A member's annual compensation is the member's regular compensation.

Average final compensation - For members of Plan B and C, the average final compensation is the highest average compensation paid during any four consecutive years of creditable service.

Normal retirement

Eligibility - A member of Plan B may retire (a) after the completion of five years of creditable service, provided such member has attained at least the age of 60 or (b) after the member has accumulated a minimum of 75 credits (effective August 28, 1998), where each year of creditable service plus a member's age equals 75 credits. A member of Plan C may retire (a) after the completion of five years of creditable service, provided such member has attained at least the age of 62 or (b) after the member has accumulated a minimum of 80 credits, where each year of creditable service plus a member's age equals 80 credits.

Benefit - For a member of Plan B, the normal monthly retirement benefit equals the product of one-twelfth of 2.00% (1.75% for members who retired prior to June 30, 1999) of the member's average final compensation and years of creditable service, subject to a maximum of 60% of their average final compensation. The normal monthly retirement benefit for a member of Plan B whose years of creditable service exceeded 34.25 years on August 28, 1993, shall equal the product of 1.75% and the member's years of creditable service on August 28, 1993. For a member of Plan C, the normal monthly retirement benefit equals the product of one-twelfth of 1.75% of the member's average final compensation and years of creditable service, subject to a maximum of 60% of their average final compensation.

Minimum benefit - Effective January 1, 1996, any member with at least ten years of service, but less than twenty years, is entitled to a minimum monthly retirement benefit equal to the sum of $150 and $15 for each full year of creditable service in excess of ten years or the actuarial equivalent if an option is elected. Any member with at least twenty years of creditable service at retirement is entitled to a minimum monthly retirement benefit of $300 or the actuarial equivalent of $300 if an option is elected. Beneficiaries of deceased members who retired with at least ten years of creditable service and elected one of the optional plans for payment of benefits may receive the actuarial equivalent of the minimum monthly retirement benefit available for the option chosen.

(1) **<u>Description of plan</u> (continued)**

Early retirement
Eligibility - A member with at least five years of creditable service and a minimum age of fifty-five is eligible for early retirement.

Benefit - A member eligible for early retirement will receive a reduced benefit, calculated as for normal retirement, which recognizes service and compensation to the actual retirement date. The reduction in benefit will provide a benefit which is actuarially equivalent to the normal retirement benefit that would be payable at the member's normal retirement date.

Disability retirement
Eligibility - A member with at least five years of creditable service who is certified to be totally incapacitated for performance of duty by the Medical Board (as designated by the Board of Trustees) is eligible for disability retirement.

Benefit - A disabled member will receive a benefit calculated as for normal retirement, based on credible service and average final compensation at the actual disability retirement date, or the minimum disability benefit whichever is greater. The minimum disability retirement benefit shall be the lesser of:

1. 25% of the member's average final compensation; or

2. The member's service retirement benefit calculated on the member's average final compensation and the maximum number of years of creditable service the member would have earned had the member remained an employee until age 60.

Termination benefits - vested
Eligibility - A member who has at least five years of creditable service earns a vested interest in their accrued benefit, provided the member leaves their contributions in the Plan.

Benefit - The vested benefit is calculated as a normal retirement benefit based on a member's creditable service and average final compensation on the termination date. The benefit is payable, at minimum, on the member's normal retirement date.

Termination benefits - non-vested
If the member's termination is for reasons other than death or retirement, and if the member has not met the vesting or retirement requirements, the member's contributions with interest will be refunded.

Death benefit
Prior to retirement - For a member who passes away while actively employed, the member's accumulated contributions with interest will be paid to the member's beneficiary. Certain beneficiaries of a member of Plan B or C have the option to receive a monthly retirement benefit or a refund of the member's contributions with interest. All beneficiaries are guaranteed to receive at least the member's accumulated contributions at retirement, if a member passes away before electing an option.

(1) <u>Description of plan</u> (continued)

Death benefit (continued)
Post retirement - The optional form of benefit payment selected under either Plan B or Plan C will determine what, if any, benefits are payable upon death after retirement.

Option 1 - The retiree's designated survivor will receive, for life, the same level of monthly retirement benefit. In the event that the retiree's designated survivor predeceases the retiree, the retiree's monthly retirement benefit will be adjusted to the amount it would have been, had the retiree not elected Option 1.

Option 2 - The retiree's designated survivor will receive, for life, a monthly retirement benefit equal to one-half the retiree's benefit. In the event the retiree's designated survivor predeceases the retiree, the retiree's monthly benefit will be adjusted to the amount it would have been, had the retiree not elected Option 2.

Option 3 - No benefits are payable to the retiree's estate or any beneficiary. Retirement benefits payable under this option will be actuarially increased from the normal formula.

If the death of any retiree who has not elected an option occurs before they have received total benefits at least as large as their accumulated contributions and interest, the difference shall be paid to the deceased's beneficiary, if living, or to their estate.

Benefit increase adjustments - The Board of Trustees shall determine annually whether or not the Retirement System can provide an increase in benefits for those retirees who, as of January 1 preceding the date of such increase, have been retired at least one year (three years prior to January 1, 2002). Any increase also applies to optional retirement allowances paid to a retiree's beneficiary. Before any increases are made, the following requirements must be satisfied:

1. The Retirement System funded ratio as of January 1st of the preceding year of the proposed increase must be at least 100% after adjusting for the effect of the proposed increase. The funded ratio is the ratio of assets to the pension benefit obligation.

2. The actuarially required contribution rate, after adjusting for the effect of the proposed increase, may not exceed the statutory contribution rate.

3. The actuary must certify that the proposed increase will not impair the actuarial soundness of the Retirement System.

In accordance with the Benefit Increase Adjustments Policy, if an increase is permissible, the amount of the increase will be equal to the lesser of 3% or the percentage increase in the CPI for the preceding year, subject to a cumulative increase of 100% subsequent to December 31, 2000.

The Board of Trustees reserves the right, at its sole discretion, not to award any Benefit Increase Adjustment or other supplements for any year, even if the statutory requirements for an increase are satisfied, or to provide increases in greater or lesser amounts than prescribed by this policy. For the year ended December 31, 2018, there was no Benefit Increase Adjustment or an extra check issued to eligible retirees.

(1) Description of plan (continued)

Administration of the Retirement System - The Board of Trustees (the "Board") is responsible for the general administration and proper operation of the Retirement System. The Board consists of twelve members: four members appointed by the Board of Education, one member appointed by the Board of Trustees of the Library District, four members elected by and from the members of the Retirement System, two members elected by and from the retirees of the Retirement System, and the Superintendent of Schools of the School District of Kansas City, Missouri. The Board hires an Executive Director to manage the day-to-day operations and implement policies as set by the Board.

(2) Summary of significant accounting policies

Basis of accounting - The schedule of employer allocations and the schedule of pension amounts by employer present amounts that are elements of the financial statements of the Retirement System or of its participating employers. Accordingly, they do not purport to be a complete presentation of the financial position or changes in financial position of either the Retirement System or its participating employers.

Use of estimates - The amounts reported in the schedule of employer allocations and the schedule of pension amounts by employer were prepared in accordance with accounting principles generally accepted in the United States of America. Such preparation requires management to make estimates and assumptions related to the reported amounts. Accordingly, actual results may differ from those estimates.

(3) Net pension liability

The components of the net pension liability of the participating employers as of December 31, 2018 were as follows:

Total pension liability	$ 1,002,969,710
Less: Fiduciary net position	602,762,479
Net pension liability	$ 400,207,231
Plan fiduciary net position as a percentage of total pension liability	60.10%

(4) **Actuarial assumptions**

Valuation Date	January 1, 2018
Actuarial Cost Method	Entry Age Normal
Amortization Method	Level Percent of Pay, Closed Period
Remaining Amortization Period	29 years
Asset Valuation Method	5-year Smoothed Market Value
Actuarial Assumptions:	
Investment Rate of Return	7.75%, including inflation
Projected Salary Increases	5.00%, including inflation
Inflation	2.75%
Mortality:	Pre-retirement mortality rates were based on RP-2014 Healthy Non-Annuitant Blue Collar Table with a one-year setback for females, projected 15 years from the valuation date using Scale MP-2016. Post-retirement mortality rates were based on RP-2014 Healthy Annuitant Blue Collar Table with a one-year setback for females, projected 7 years from the valuation date using Scale MP-2016. Disability mortality rates were based on RP-2014 Disabled Table for Males and Females.

The actuarial assumptions used in the January 1, 2018 valuation were adopted by the Board from the results of an actuarial experience study covering the five-year period ended December 31, 2015 (dated October 3, 2016).

The long-term expected rate of return on pension plan investments is reviewed as part of the regular experience study prepared by the Retirement System. Several factors are considered in evaluating the long-term rate of return assumption, including long-term historical data, estimates inherent in current market data, and an analysis in which best-estimate ranges of expected future real rates of return (expected returns, net of investment expense and inflation), along with estimates of variability and correlations for each asset class, were developed by the Retirement System's investment consultant. These ranges are combined to produce the 10-year 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 for each major asset class included in the Retirement System's target asset allocation as of December 31, 2018 (see the discussion of the pension plan's investment policy) are summarized in the following table:

(4) **Actuarial assumptions (continued)**

Asset Class	Target Allocation	10-Year Long-term Expected Real Rate of Return
US Equity	22.50 %	6.80 %
International Developed Equity	15.00 %	7.50 %
International Emerging Equity	10.00 %	9.90 %
Core Fixed Income	10.00 %	1.80 %
High Yield	2.50 %	5.00 %
International Fixed Income	5.00 %	1.30 %
Real Estate	10.00 %	4.60 %
Commodities	5.00 %	4.30 %
Hedge Fund of Funds	7.50 %	3.80 %
GTAA	7.50 %	4.20 %
Private Equity	5.00 %	11.50 %
	100.00	

Discount rate - The discount rate used to measure the total pension liability as of December 31, 2018 was 7.57%. The System’s fiduciary net position was projected to be depleted in the year 2069, and as a result, the Municipal Bond Index Rate was used in the determination of the discount rate. The long-term assumed rate of return on investments, net of expenses, of 7.75% was applied to years before 2069 and the Municipal Bond Index Rate of 4.13% was applied to years on and after 2069, resulting in a discount rate of 7.57%.

Sensitivity of the net pension liability to changes in the discount rate - The following presents the net pension liability of participating entities calculated using the discount rate of 7.57%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.57%) or 1-percentage-point higher (8.57%) than the current rate:

	Discount Rate	Participating entities' net pension liabilty
1% decrease	6.57%	$499,599,319
Current discount rate	7.57%	400,207,231
1% increase	8.57%	316,062,190

(5) Collective deferred outflows of resources and deferred inflows of resources

A summary of the collective deferred outflows of resources and deferred inflows of resources as of December 31, 2018 are included below. The actual experience and assumption change impacts are recognized over the average expected remaining service life of active and inactive Plan members at the beginning of the measurement period, while investment gains/losses are recognized equally over five years.

	Deferred Outflows of Resources			
	December 31, 2017	Additions	Recognition	December 31, 2018
Differences between expected and actual experience				
2014 Base	$ -	$ -	$ -	$ -
2015 Base	-	-	-	-
2016 Base	-	-	-	-
2017 Base	2,974,302	-	1,943,989	1,030,313
2018 Base	-	-	-	-
Total	2,974,302	-	1,943,989	1,030,313
Changes of assumptions				
2014 Base	$ -	$ -	$ -	$ -
2015 Base	-	-	-	-
2016 Base	325,259	-	325,259	-
2017 Base	47,098,747	-	30,783,494	16,315,253
2018 Base	-	18,004,160	7,116,269	10,887,891
Total	47,424,006	18,004,160	38,225,022	27,203,144
Differences between projected and actual earnings				
2014 Base	$ 6,014,143	$ -	$ 6,014,143	$ -
2015 Base	25,540,869	-	12,770,434	12,770,435
2016 Base	2,777,105	-	925,702	1,851,403
2017 Base	-	-	-	-
2018 Base	-	84,507,259	16,901,452	67,605,807
Total	34,332,117	84,507,259	36,611,731	82,227,645
Changes in proportion				
2014 Base	$ -	$ -	$ -	$ -
2015 Base	-	-	-	-
2016 Base	1,555,128	-	1,555,128	-
2017 Base	3,534,464	-	2,310,107	1,224,357
2018 Base	-	7,393,525	2,922,341	4,471,184
Total	5,089,592	7,393,525	6,787,576	5,695,541
Total	$ 89,820,017	$ 109,904,944	$ 83,568,318	$ 116,156,643

(5) Collective deferred outflows of resources and deferred inflows of resources (continued)

	Deferred Inflows of Resources			
	December 31, 2017	Additions	Recognition	December 31, 2018
Differences between expected and actual experience				
2014 Base	$ -	$ -	$ -	$ -
2015 Base	-	-	-	-
2016 Base	743,127	-	743,127	-
2017 Base	-	-	-	-
2018 Base	-	11,652,274	4,605,642	7,046,632
Total	743,127	11,652,274	5,348,769	7,046,632
Changes of assumptions				
2014 Base	$ -	$ -	$ -	$ -
2015 Base	-	-	-	-
2016 Base	-	-	-	-
2017 Base	-	-	-	-
2018 Base	-	-	-	-
Total	-	-	-	-
Differences between projected and actual earnings				
2014 Base	$ -	$ -	$ -	$ -
2015 Base	-	-	-	-
2016 Base	-	-	-	-
2017 Base	44,152,494	-	11,038,124	33,114,370
2018 Base	-	-	-	-
Total	44,152,494	-	11,038,124	33,114,370
Changes in proportion				
2014 Base	$ -	$ -	$ -	$ -
2015 Base	-	-	-	-
2016 Base	1,555,128	-	1,555,128	-
2017 Base	3,534,464	-	2,310,107	1,224,357
2018 Base	-	7,393,525	2,922,341	4,471,184
Total	5,089,592	7,393,525	6,787,576	5,695,541
Total	$ 49,985,213	$ 19,045,799	$ 23,174,469	$ 45,856,543

(5) Collective deferred outflows of resources and deferred inflows of resources (continued)

The following provides the net deferred outflows/(inflows) of resources as of December 31, 2018, that will be recognized in pension expense in future years:

Year Ending December 31:	Deferred Outflows of Resources	Deferred Inflows of Resources	Net Deferred Outflows (Inflows) of Resources
2019	$ 55,059,424	$ 15,643,766	$ 39,415,658
2020	21,597,775	13,479,114	8,118,661
2021	16,901,452	11,038,122	5,863,330
2022	16,901,451	-	16,901,451
2023	-	-	-
Thereafter	-	-	-

(6) Collective pension expense

Collective pension expense for the year ended December 31, 2018 is as follows:

Service cost	$ 16,982,665
Interest on the total pension liability	73,516,943
Expensed portion of current-period difference between expected and actual experience in the total pension liability	(4,605,642)
Expensed portion of current-period assumption changes	7,116,269
Member contributions	(17,619,145)
Projected earnings of plan investments	(51,256,345)
Expenses portion of current-period difference between projected and actual earnings on plan investments	16,901,452
Administrative expenses	1,499,928
Other	17,150
Recognition of beginning deferred outflows resources	52,763,021
Recognition of beginning deferred inflows resources	(11,781,251)
Total pension expense	$ 83,535,045