



CONSULTING GROUP



A DEFINED BENEFIT ACTUARIAL VALUATION

For:

Knox County Employee Benefit System Knox County Board of Education Retirement Plan

As of:

January 1, 2019

Prepared by:
USI Consulting Group



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April 9, 2019

CONFIDENTIAL

Ms. Kim Bennett
Executive Director
Knox County Retirement and Pension Board
City-County Bldg, Room 371
400 Main Street
Knoxville, TN 37902-2409

Re: Knox County Board of Education Retirement Plan

Dear Kim:

We are pleased to present our Actuarial Valuation Report for the Plan Year beginning January 1, 2019. A summary of the principal results of the report is provided for your convenience on pages one through five. Details supporting the GASB cost calculations will be included in a separate report that will be issued later this year.

The Actuarially Determined Contribution for the fiscal year ending June 30, 2020 is \$754,318, calculated as payable on July 1, 2019.

New for 2019, this report includes information related to Actuarial Standard of Practice No. 51 (**ASOP 51**), Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Contributions, as required for plan years starting after Oct. 31, 2018.

We would be happy to answer any questions you may have regarding this report.

Sincerely,
USI CONSULTING GROUP

A handwritten signature in black ink, appearing to read "Bob Cross".

Bob Cross, ASA, MAAA, FCA
President, Southeast and Midwest

KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN

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**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

VALUATION AS OF 1/1/2019

PRINCIPAL RESULTS OF THE VALUATION

Below is a summary of the principal results of this year's valuation compared with the previous valuation. Amounts for each valuation period reflect the actuarial cost method, assumptions and plan benefits in effect at that time.

	<u>As of January 1, 2018</u>	<u>As of January 1, 2019</u>
<u>CONTRIBUTION LIMITATIONS</u>		
Actuarially Determined Contribution	\$ 475,234	\$ 754,318
Expected Employee Contribution	\$ 0	\$ 0
<u>SUPPORTING INFORMATION</u>		
Market Value of Assets	\$ 59,949,534	\$ 50,487,546
Actuarial Value of Assets	\$ 57,828,525	\$ 54,125,329
Entry Age Normal Accrued Liability	\$ 67,176,971	\$ 66,008,487
Present Value of Accumulated Benefits	\$ 67,176,971	\$ 66,008,487
Funding Ratio – Actuarial Value of Assets as a Percentage of Present Value of Accumulated Benefits	86.1%	82.0%
Funding Ratio – Market Value of Assets as a Percentage of Present Value of Accumulated Benefits	89.2%	76.5%
Funding Ratio Discount Rate	7.0%	7.0%
Number of Lives Included in the Valuation	425	410
Present Value of All Future Benefits	\$ 67,176,971	\$ 66,008,487

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

VALUATION AS OF 1/1/2019

EXECUTIVE SUMMARY

Purpose and Scope

The principal purposes of this actuarial valuation report are:

1. To present our calculation of the Plan contributions under the Knox County Employee Benefit System Knox County Board of Education funding policy,
2. To review Plan experience during the year ended December 31, 2018 and the funded status of the Plan as of January 1, 2019,
3. To determine the funded status of accumulated plan benefits in accordance with FASB ASC 960,
4. To provide an assessment and disclosure of risk with respect to pension obligations and contributions.

The valuation is based upon employee data and financial information provided by Knox County. This data was not audited or otherwise verified by us other than for tests of reasonable consistency with prior year data.

Risk Assessment

This report includes information related to Actuarial Standards of Practice Number 51 (ASOP 51), Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Contributions.

Traditionally, the focus of valuation reports has centered around the current funded status of the Plan, experience during the prior year, and contribution requirements for the current year. This is now supplemented with additional information regarding risks that plan sponsors face as well as more historical information and measurements. The report does not provide: risk assessments related to potential legislative and regulatory changes, investment advice, or assessments of the ability or willingness of plan sponsors to make contributions to the Plan.

Actuarial Methods, Assumptions, and Provisions

This valuation report is based on the cost method, assumptions, and plan provisions outlined on pages 12 through 17. The Plan's mortality assumption was changed to the RP-2014 Blue Collar table with 102% adjustment for Males and 97% adjustment for Females, with mortality improvement scale MP-2018 and six years projection beyond each valuation date. The Plan's annual assumed benefit increase (COLA) assumption was changed to 2.5% per annum.

The Actuarially Determined Contribution is calculated in accordance with the Knox County Board of Education Retirement Plan's funding policy.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

VALUATION AS OF 1/1/2019

**EXECUTIVE SUMMARY
(Continued)**

In our opinion, all costs, liabilities, rates of interest and other factors under the Plan have been determined on the basis of actuarial assumptions and methods, which are each reasonable, taking into account the experience of the Plan in addition to future expectations and which, when combined, represent our best estimate of anticipated experience under the Plan.

Plan Experience

During 2018, the market value of Plan assets decreased from \$59,949,534 to \$50,487,546 with a net investment return of approximately -5.94%. This investment performance is below the 7.0% assumption, creating a market value loss of about \$7,388,000. On a gross return basis, there is a loss of approximately \$7,114,000 and this loss is used in the asset smoothing calculation.

The actuarial value of Plan assets decreased from \$57,828,525 to \$54,125,329 with a net investment return of approximately 4.35%. This resulted in an asset loss of about \$1,458,000.

The Plan also experienced a liability gain of approximately \$834,000, mostly a result of the actual cost of living adjustment for the past year (2.3% increase) being less than the 3% assumption.

Assumption changes created an aggregate liability loss of about \$1,749,000. The mortality assumption change caused a loss of about \$3,347,000 while the annual assumed benefit increase assumption change caused a gain of about \$1,598,000.

Recall that the asset smoothing method recognizes each year's investment gains and losses over a five-year period. See page 7 for more details of the method. In this way, the actuarial value of assets methodology smoothes out much of the volatility of annual changes in the market value of assets. Note that this year, the actuarial value of assets is greater than the market value of assets.

Contribution Requirements

The actuarially determined contribution for the 2019 fiscal year is \$754,318, calculated as payable on July 1, 2019. Please see page 10 for more details.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

VALUATION AS OF 1/1/2019

**EXECUTIVE SUMMARY
(Continued)**

Funding Policy

Actuarially determined contributions to the Plan are determined each year as part of the Actuarial Valuation process. These contributions are determined according to the following funding policy:

Actuarial Cost Method: Entry Age Normal

Asset Valuation Method: The asset smoothing method utilized for the BOE Plan shall be that investment gains or losses will be recognized over (5) years, providing that the actuarial value of assets shall not be greater than 110% of market value, nor less than 90% of market value.

Amortization Method: The amortization policy shall be that the UAAL, as of January 1, 2014 and any changes thereafter as a result of a change in assumptions or methods or benefit or Plan changes, shall be amortized over a fixed period of 19 years beginning January 1, 2014. The amortization period for experience gains and losses shall be 10 years from the date of the actuarial valuation.

Funding Status

The Plan's funding ratio, on an actuarial value of assets basis, as shown on page 1 decreased from 86.1% in 2018 to 82.0% in 2019. The funding ratio on a market value basis decreased from 89.2% in 2018 to 76.5% in 2019.

The funded ratio is appropriate for assessing the need for or the amount of future contributions, based on the assumptions stated in this report.

Future measurements may differ significantly from the information contained within this report. These measurements will be based on the market value of assets, which varies based on the underlying portfolio experience, as well as plan sponsor contributions, benefit payments and expenses paid from Plan assets. Liability calculations will be produced in accordance with current census data, as well as the interest rates and mortality tables in effect at that time. There has been no analysis of potential future impacts associated with this report.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

VALUATION AS OF 1/1/2019

**EXECUTIVE SUMMARY
(Continued)**

This report has been prepared in accordance with generally accepted actuarial standards and procedures, and conforms to the Guidelines for Professional Conduct of the American Academy of Actuaries. It is based upon the employee and financial data submitted to USI Consulting Group by the plan sponsor and the retirement plan provisions as outlined herein.

The undersigned actuary is a member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

USI CONSULTING GROUP



Jaime Packer, ASA, EA, MAAA
Associate Vice President & Actuary



Diane Padernacht
Associate Vice President and Actuarial Manager



Dan Grosso
Actuarial Consultant and Team Leader

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

FINANCIAL STATEMENT AS OF 1/1/2019

ASSETS	<u>1/1/2018</u>	<u>1/1/2019</u>
Cash and Cash Equivalent	(1,753,182)	394,162
Settlement Receivable	0	22,797
Interest Receivable	1,140	0
Receivable for Investments Sold	289,499	0
Investment Securities	3,778,685	(7,129,703)
Mutual Funds	3,067,790	57,200,290
Common Collective Trust	<u>54,565,602</u>	<u>0</u>
Total Assets	59,949,534	50,487,546
 LIABILITIES AND NET ASSETS		
Payables	0	0
Acquisition Indebtedness	0	0
Other Liabilities	<u>0</u>	<u>0</u>
Total Liabilities	0	0
 NET ASSETS	 59,949,534	 50,487,546
 STATEMENT OF RECEIPTS AND DISBURSEMENTS		
Net Assets at Beginning of Year		59,949,534
Contributions Received or Receivable		
Employer	475,234	
Employees	0	
Other	0	
Total Contributions		475,234
Dividends and Income		2,838,752
Correction		(344,645)
Net Realized Gain (Loss)		20,084,648
Net Unrealized Gain (Loss)		<u>(25,714,271)</u>
Total Income		(2,660,282)
Distribution of Benefits		
Directly to Participants or Beneficiaries	6,559,418	
Other	0	6,559,418
Administrative and Professional Fees		182,475
Other Expenses		82,610
Settlement Reimbursement		<u>(22,797)</u>
Total Expenses		6,801,706
Net Income (loss)		(9,461,988)
NET ASSETS AT END OF YEAR		50,487,546
 Net Investment Return		 -5.94%
Gross Investment Return		-5.52%

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

DETERMINATION OF VALUATION ASSETS AS OF 1/1/2019

1. ASSET GAIN/(LOSS) AS OF 1/1/2019

(1) Expected market value of assets as of 1/1/2019:	\$	
(a) Market value of assets as of 1/1/2018	\$	59,949,534
(b) Expected return on assets at 7.0%	\$	4,196,467
(c) Contributions	\$	475,234
(d) Benefit Payments and Expenses, excluding settlement receivable	\$	(6,824,503)
(e) Net interest on (c) - (d), weighted for timing	\$	<u>(218,466)</u>
(f) Total: (a) + (b) + (c) + (d) + (e)	\$	57,578,266
(2) Actual Market value of assets, prior to receivables, as of 1/1/2019:	\$	50,464,749
(3) Asset gain/(loss) as of 1/1/2019: (2) - (1)(f)	\$	(7,113,517)

2. DETERMINATION OF VALUATION ASSETS AS OF 1/1/2019

(1) Market value of assets as of 1/1/2019:	\$	50,464,749	
(2) Recognition of asset gain/(loss) over a five year period:			
Year Ending	Asset	Portion Not	Amount
<u>December 31</u>	<u>Gain/(Loss)</u>	X <u>Yet Recognized</u>	= <u>Deferred</u>
2018	\$ (7,113,517)	4/5	\$ (5,690,814)
2017	\$ 4,720,363	3/5	\$ 2,832,218
2016	\$ 178,810	2/5	\$ 71,524
2015	\$ (4,253,553)	1/5	\$ (850,711)
Total:			\$ (3,637,783)
(3) Accrued contributions as of 1/1/2019:	\$	0	
(4) Settlement Receivable as of 1/1/2019:	\$	22,797	
(5) Valuation assets as of 1/1/2019: (1) - (2) + (3) + (4)	\$	54,125,329	

3. VALUATION ASSETS AS OF 1/1/2019

(1) Valuation assets as of 1/1/2018: (1) + (2) + (3) + (4) + (5)	\$	57,828,525
(2) Contributions, including receivables:	\$	475,234
(3) Benefit payments:	\$	(6,559,418)
(4) Plan expenses:	\$	(242,288)
(5) Return on assets:	\$	<u>2,623,276</u>
(6) Valuation assets as of 1/1/2019: (1) + (2) + (3) + (4) + (5)	\$	54,125,329
(7) 110% of Market Value	\$	55,536,300
(8) Final Actuarial Value of Assets, no more than (7)	\$	54,125,329

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

VALUATION RESULTS AS OF 1/1/2019

1. PRESENT VALUE OF FUTURE BENEFITS

The value of all projected retirement, death, disability, and vested termination benefits expected to be paid to all current plan participants, discounted to the valuation date with interest, mortality, withdrawal, and disability decrements.

	<u>Lives</u>	<u>Retirement</u>	<u>Death</u>	<u>Withdrawal</u>	<u>Disability</u>	<u>Total</u>
Active	0	0	0	0	0	0
Terminated	0	0	0	0	0	0
Retired	<u>410</u>	<u>66,008,487</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>66,008,487</u>
Totals	410	66,008,487	0	0	0	66,008,487

2. ENTRY AGE ACCRUED LIABILITY

The portion of the present value of future benefit attributable to prior normal costs.

Active	0
Terminated	0
Retired	<u>66,008,487</u>
Total	66,008,487

3. ACTUARIAL VALUE OF ASSETS

54,125,329

4. UNFUNDED ACCRUED LIABILITY (2 - 3)

11,883,158

5. ENTRY AGE NORMAL COST

The amount required to fund the present value of benefits as a level percent of pay from entry age to retirement age.

A. Total Normal Cost	0
B. Expected Employee Contributions	<u>0</u>
C. Employer Normal Cost	0

The Normal Cost is zero because there are no active participants in the plan.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

DETERMINATION OF GAIN/LOSS AS OF 1/1/2019

1. ASSET GAIN/(LOSS) AS OF 1/1/2019

(1) Expected valuation assets as of 1/1/2019:	
(a) Valuation assets as of 1/1/2018	\$ 57,828,525
(b) Expected return on assets at 7.0%	\$ 4,047,997
(c) Contributions	\$ 475,234
(d) Benefit Payments	\$ (6,559,418)
(e) Net interest on (c) - (d), weighted for timing	<u>\$ (209,345)</u>
(f) Total: (a) + (b) + (c) + (d) + (e)	\$ 55,582,993
(2) Actual valuation assets as of 1/1/2019:	\$ 54,125,329
(3) Asset gain/(loss) as of 1/1/2019: (2) - (1)(f)	\$ (1,457,664)

2. LIABILITY GAIN/(LOSS) AS OF 1/1/2019

(1) Expected EAN accrued liability as of 1/1/2019:	
(a) EAN accrued liability as of 1/1/2018	\$ 67,176,971
(b) Total normal cost	\$ 0
(c) Expected increase in liability at 7.0%	\$ 4,702,388
(d) Benefit Payments	\$ (6,559,418)
(e) Net interest on (c) - (d), weighted for timing	<u>\$ (225,697)</u>
(f) Total: (a) + (b) + (c) + (d) + (e)	\$ 65,094,244
(2) Actual EAN accrued liability as of 1/1/2019:	\$ 66,008,487
(3) Liability gain/(loss) as of 1/1/2019: (1)(f) - (2)	\$ (914,243)
(4) Liability gain/(loss) due to assumption change:	\$ (1,748,646)
(5) Liability gain/(loss) as of 1/1/2019: (3) - (4)	\$ 834,403

3. TOTAL GAIN/(LOSS) AS OF 1/1/2019

(1) Expected Unfunded Accrued Liability (UAL) as of 1/1/2019:	
(a) UAL as of 1/1/2018	\$ 9,348,446
(b) Total normal cost	\$ 0
(c) Expected increase in UAL at 7.0%	\$ 654,391
(d) Contributions	\$ (475,234)
(e) Net interest on (c) - (d), weighted for timing	<u>\$ (16,352)</u>
(f) Total: (a) + (b) + (c) + (d) + (e)	\$ 9,511,251
(2) Actual UAL accrued liability as of 1/1/2019:	\$ 11,883,158
(3) Total gain/(loss) as of 1/1/2019: (1)(f) - (2)	\$ (2,371,907)
(4) Gain/(loss) due to assumption change:	\$ (1,748,646)
(5) Total experience gain/(loss) as of 1/1/2019: (3) - (4)	\$ (623,261)

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

CONTRIBUTION REQUIREMENTS FOR PLAN YEAR ENDING DECEMBER 31, 2019

The Plan has an Unfunded Accrued Liability using the Individual Entry Age Normal cost method. The Actuarially Determined Contribution will be the Plan's Normal Cost reduced by Expected Employee Contributions (see pg. 8) plus the sum of the amortization bases calculated below.

ACTUARIALLY DETERMINED EMPLOYER CONTRIBUTION

CHARGES:

(1) Employer Normal Cost		0
(2) Outstanding Charge Base	11,883,158	
(3) Amortization of Outstanding Charge Base		<u>729,227</u>
(4) Total Charges = (1) + (3)		729,227
(5) Interest Charge on (1) and (3)		25,091

Annual Contributions

	<u>2018</u>	<u>2019</u>
Total Actuarially Determined Employer Contribution as of Beginning of the Plan Year	459,426	729,227
Total Actuarially Determined Employer Contribution as of Beginning of fiscal year starting July 1	475,234	754,318
Expected Employee Contributions for the Plan Year	0	0

AMORTIZATION SCHEDULE

Description

	Year	Initial	Outstanding	Amortization	Years
	Est.	Amount	Balance	Payment	Remaining
Past Service Base	2013	18,652,856	15,368,074	1,642,300	14.0
(Gain)/Loss Base	2014	(4,106,438)	(2,397,239)	(546,415)	5.0
(Gain)/Loss Base	2015	(2,191,686)	(1,487,386)	(291,633)	6.0
(Gain)/Loss Base	2016	(743,453)	(570,461)	(98,926)	7.0
Balancing Base	2016	(19,079)	(14,641)	(2,539)	7.0
(Gain)/Loss Base	2017	(1,271,575)	(1,081,066)	(169,200)	8.0
Balancing Base*	2017	(2,016)	(1,714)	(268)	8.0
Assumption Change	2018	860,918	826,659	88,340	14.0
(Gain)/Loss Base	2018	(1,219,216)	(1,130,975)	(162,233)	9.0
Assumption Change	2019	1,748,646	1,748,646	186,868	14.0
(Gain)/Loss Base	2019	623,261	<u>623,261</u>	<u>82,933</u>	10.0
			11,883,158	729,227	

* The excess contributions (plus interest) of \$2,016 creates a 'gain' that lowers the amortization base and therefore decreases the Actuarially Determined Contribution for the current plan year.

Note: The 2013 Past Service Base was refreshed in 2014.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

PARTICIPANT DATA AS OF 1/1/2019

Active employees under assumed retirement age	
Number	0
Expected total annual compensation	N/A
Average accrued benefit	N/A
Average projected benefit	N/A
Average attained age	N/A
Average prior service	N/A
Other active and inactive employees	
Number	0
Average accrued benefit	N/A
Average attained age	N/A
Terminated deferred vested, deceased and disabled employees	
Number	0
Average accrued benefit	N/A
Average attained age	N/A
Retired employees, beneficiaries and contingent annuitants	
Number	410
Average monthly benefit	1,336.78
Average attained age	74.86

RECONCILIATION OF PARTICIPANT STATUS

	<u>Active</u>	<u>Inactive</u>	<u>Deferred Vested</u>	<u>Pay Status</u>	<u>Total</u>
Prior Valuation	0	0	0	425	425
Terminated - vested	0	0	0	0	0
Cashed Out	0	0	0	0	0
Death	0	0	0	(18)	(18)
Entered as Beneficiary	0	0	0	3	3
Retired	0	0	0	0	0
Rehired	0	0	0	0	0
Beneficiary Payments Cease	0	0	0	0	0
Data Corrections	0	0	0	0	0
Current Valuation	0	0	0	410	410

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

SUMMARY OF PLAN PROVISIONS

Effective Date Shall mean for credited service July 1, 1987 and for all other purposes June 26, 1990.

Eligibility
Participation Any person who is a “teacher” as defined by the Court of Appeals in its opinion of December 30, 1987 in the case of Knox County v. The City of Knoxville, et al, and who is entitled to maintain membership in a local pension system as a result of their membership in any applicable plan of the City of Knoxville Pension System on June 30, 1987, and who thereafter is employed as a result of the City of Knoxville ceasing to operate a separate school system and is so regularly employed by the Knox County Board of Education.

Normal Retirement
Eligibility Each member shall be eligible to retire at age 62 or on the first day of any of the thirty-five months next following age 62.

Benefit A monthly benefit payable for life, computed as of normal retirement date as one-twelfth of credited service multiplied by the sum of (A) and (B):

(A) Benefit Rate A times average base earnings

(B) Benefit Rate B times average excess earnings

Benefit Rate A and Benefit Rate B shall vary according to the member’s last birthday at time benefit payments are to commence, as follows:

Age	Benefit Rate A	Benefit Rate B
62 or earlier	0.75%	1.50%
63	0.78%	1.58%
64	0.84%	1.66%
65 or later	0.88%	1.76%

This amount is then reduced by the benefit accrued under the applicable City of Knoxville Retirement Plan as of June 30, 1987.

Minimum Benefit The monthly benefit, including 50% of the primary Social Security benefit, shall not be less than \$10 per year of credited service, with a maximum of \$250.

Earnings Total compensation

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

**SUMMARY OF PLAN PROVISIONS
(Continued)**

Base Earnings	That part of earnings in any calendar year which does not exceed \$4,800.00 per annum.
Excess Earnings	That part of earnings in any calendar year which are in excess of base earnings.
Credited Service	Years and completed calendar months of service as an employee of either the City of Knoxville or Knox County.
Average Earnings	A 3-year arithmetic average determined for the number of full calendar years of credited service during which the earnings were the highest, or number of full calendar years actually completed if less than 3.
Accrued Benefit	Normal retirement benefit based on service and compensation up to the determination date less that benefit accrued under the applicable City of Knoxville Retirement Plan as of June 30, 1987.
Early Retirement	
Eligibility	Completion of 25 years of credited service.
Benefit	Upon early retirement, a member may elect to receive either (a) a deferred monthly benefit equal to his accrued benefit commencing at normal retirement date, or (b) a reduced benefit equal to the actuarially equivalent benefit described in (a) above, commencing immediately.
Disability Not In Line of Duty	
Eligibility	Completion of 15 years of credited service.
Benefit	Accrued benefit, based on credited service at time of disablement, payable immediately, plus a lump sum equal to six times the accrued monthly benefit.
Disability in Line of Duty	
Eligibility	Disablement in the course of performance of duty as an employee.
Benefit	Accrued benefit, based on credited service projected to age 62, payable immediately and reduced by any workers' compensation benefits paid.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

**SUMMARY OF PLAN PROVISIONS
(Continued)**

Death Benefit

Eligibility

Completion of 15 years of credited service.

Benefit

50% of the monthly benefit that the participant would have been entitled to if he/she had elected the 50% joint and survivor form of payment, payable at the earliest time benefits could have commenced to the participant.

Deferred Vested

Eligibility

Completion of 10 years of credited service.

Benefit

A deferred monthly benefit equal to the accrued benefit commencing at normal retirement date, determined as of the date of termination, provided the member leaves his contributions in the fund.

**Return of Employee
Contribution**

A minimum of employee contributions with interest is paid on death, termination, or retirement.

**Normal Form
of Annuity**

Life Annuity

**Optional Forms
of Annuity**

Certain and Life, Joint and Survivor, Cash Refund. Such options will be actuarially equivalent to a life annuity.

Employee Contributions

Each employee who is a member shall contribute to the fund an amount equal to (a) plus (b) where:

(a) The contribution rate shall be 3 percent of base earnings, and

(b) The contribution rate shall be 5 percent of excess earnings.

Cost of Living Increase

Currently the Plan provides for increases to the monthly benefit amounts paid to retirees. The Plan provides for annual increases to the monthly benefit, effective January 1 of the following year, equal to the percentage increase (or decrease) in the Consumer Price Index for the 12 months ending with the September 30th preceding the year of adjustment. The adjustment is made to the participant's original benefit (i.e. simple interest cola). The City Board votes on the adjustment and then informs the County.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS

ACTUARIAL COST METHOD

Individual Entry Age Normal Cost.

Under this method, the annual cost is equal to the normal cost, plus amortization of unfunded accrued liabilities over a fixed period of years selected within the minimum (10 years) and maximum (5 to 30 years) periods permitted by law.

The normal cost is the sum of individual normal costs, determined as a level percentage of compensation which would have been necessary to fund the employee's projected retirement, death and withdrawal benefits, from entry age (the age at which the employee would have entered the Plan had it been in effect on his employment date), to his retirement age. Thus, the dollar normal cost is expected to increase with the salary projection assumption. The normal cost for this Plan is \$0 as there are no active employees.

The actuarial accrued liability is the accumulation, based on the actuarial assumptions, of all assumed prior normal costs. Thus, it represents the amount of reserves, which would be held by the Plan, had it always been in effect for the present group of participants and had Plan experience followed that predicted by the actuarial assumptions. The unfunded accrued liability is the excess, if any, of the accrued liability over the Plan assets.

Actuarial gains and losses arising from differences between Plan experience and that predicted by the actuarial assumptions, as measured by the difference between actual and expected unfunded accrued liabilities, are amortized over 10 years.

ATTRIBUTION PARAMETERS

The Plan has no active participants.

ACCRUED AND VESTED BENEFITS

Vested benefits are based on the Plan Document's vesting schedule based on years of service. Please refer to the Summary of Plan Provisions section of this report for requirements for particular benefits.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

**SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS
(Continued)**

ACTUARIAL ASSUMPTIONS

Pre-Retirement

There are no pre-retirement assumptions as all participants are retired.

Post-Retirement

Mortality –

Prior Year: Base Table: 2008-2012 TCRS Experience
Improvement Scale: Scale AA
Projection Period: 2 years

Current Year: Base Table: RP-2014 Blue Collar table with 102% adjustment for
Males and 97% adjustment for Females
Improvement Scale: Scale MP-2018
Projection Period: 6 years beyond each valuation date

Investment Return –

Prior Year: 7.00% per annum
Current Year: 7.00% per annum

Assumed benefit increases –

Prior Year: 3.00% per annum on the participant's original benefit
Current Year: 2.50% per annum on the participant's original benefit

Expense loading – None

Long-Term Inflation – This assumption is an underlying component of a number of these economic assumptions. This assumption reflects consumer price indices, forecasts of inflation, yields on government securities of various maturities, and yields on nominal and inflation-indexed debt.

RATIONALE FOR ASSUMPTIONS

The actuarial assumptions used in the January 1, 2019 valuation were based on the results of an actuarial experience study prepared in 2017 based on data from January 1, 2007 through December 31, 2016, however adjustments have been made this year. The conservative 3.00% assumed benefit increase assumption was lowered to 2.50% to bring the assumption more in line with inflation. The mortality assumption was also updated to reflect the table in use by the State Retirement System.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

**SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS
(Continued)**

ASSET VALUATION

Each plan year's investment gain or loss is recognized over five years, subject to a 10% corridor around the market value of assets.

Investment Return – 7.0% per annum. The return reflects the anticipated gross long-term rate of return on Plan assets based on the Plan's current and expected future asset portfolio, as supported by the Plan's investment manager. The following was the Board's adopted asset allocation policy as of January 1, 2019:

<u>Fund Name</u>	<u>Target Allocation</u>
Large Cap	24%
Small/Mid Cap	16%
Non-US Equity - Developed	12%
Non-US Equity – Emerging	3%
US Corporate Bonds - Core	18%
US Corporate Bonds – High Yield	4%
Non-US Debt – Developed	6%
US Treasuries (Cash Equivalent)	4%
Real Estate	5%
Hedge Funds	8%

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

ACCUMULATED PLAN BENEFITS UNDER FASB ASC 960

Actuarial Present Values of Accumulated Plan Benefits (Accumulated Benefit Obligation):	<u>1/1/2018</u>	<u>1/1/2019</u>
Vested Benefits		
Participants currently receiving payments	67,176,971	66,008,487
Other Participants		
Active Employees	0	0
Deceased and Disabled Employees	0	0
Deferred Vested Terminated Employees	<u>0</u>	<u>0</u>
Total - Other Participants	<u>0</u>	<u>0</u>
Total Vested Benefits	67,176,971	66,008,487
Nonvested Benefits	<u>0</u>	<u>0</u>
Total Actuarial Present Values of Accumulated Plan Benefits	67,176,971	66,008,487
Statement of Changes in Actuarial Present Value of Accumulated Plan Benefits		
Actuarial Present Value of Accumulated Plan Benefits - 1/1/2018		67,176,971
Increase (Decrease) Attributable to:		
Interest Due to Change in the Discount Period		4,476,692
Benefits Paid		(6,559,418)
Assumption Change		1,748,646
Plan Amendment		0
Benefits Accumulated and Actuarial Experience Different From That Assumed		<u>(834,404)</u>
Actuarial Present Value of Accumulated Plan Benefits - 1/1/2019		66,008,487
Discount Rate	7.00%	7.00%

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

ASOP 51 - ASSESSMENT AND DISCLOSURE OF RISK

Additional Information Regarding Assessment and Disclosure of Risks

The valuation of pension liabilities requires the use of certain assumptions to estimate events that are expected to occur in the future. These events can be economic, non-economic or demographic in nature. When actual experience in the future differs from the expected experience there is a direct effect on future pension liabilities. This in turn can impact both the funded position of the pension plan as well as the actuarially determined contribution (“ADC”).

Certain variables carry more risk than others. Included below is a brief explanation of those variables that can potentially have a significant effect on the Plan’s future financial condition.

Actuarially Determined Contribution Compared to Actual Contribution

The ADC is calculated using an actuarial funding method. The ADC can vary from year to year as actual experience differs from that expected. The funding method’s intent is that if the ADC is deposited by the plan sponsor each year, then the Plan would be sufficiently funded over the life of the Plan so that promised benefits could be paid to all participants. A 3-year comparison of the ADC vs. contribution deposited by the plan sponsor for each plan year is as follows:

Fiscal Year	ADC	Contribution Deposited
7/1/2017 – 6/30/2018	\$475,234	\$475,234
7/1/2016 – 6/30/2017	\$551,669	\$551,669
7/1/2015 – 6/30/2016	\$726,969	\$726,969

The Sponsor currently contributes at least 100% of the ADC. If actual contributions deposited are consistently lower than the ADCs then, barring unexpected actuarial gains, future contributions will need to be greater. If actual contributions exceed the ADC, then the Plan’s funded status will improve.

Risk Assessments

Investment volatility risk. There is an expectation that the assets of the pension plan will return an average long-term rate each year. If the actual annual net return on Plan assets is consistently below the expected return then both the funded ratio and ADC would be negatively impacted – the funded ratio would be lower than expected and the ADC would be higher. For example, an asset “loss” (where loss is the value relative to expected growth) of 10% (about \$5,995,000 based on current values) in a given year would hypothetically cause the amortization portion of the ADC to increase on average by about \$825,000 for each of the next 10 years. Also, the funded ratio would decrease by about 9.1 percentage points. An asset “gain” of 10% would result in a decrease in the amortization of \$825,000 for 10 years and the funded ratio would increase by 9.1 percentage points. The impact, in either case, is smoothed out due to the use of asset averaging.

KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN

ASOP 51 - ASSESSMENT AND DISCLOSURE OF RISK (continued)

Investment return risk. The interest rate (which is equal to the Plan's expected return on assets rate) is used to discount the projected benefit payments from the Plan to calculate the present value of the liabilities (Accrued Liability). Decreases in the interest rate (as noted above) will lead to increases in the Accrued Liability, which may increase contribution requirements. As an example, a decrease of 25 basis points would lead to an increase in Accrued Liability of about 1.9%, yielding an increase in the ADC of about \$114,000. An increase of 25 basis points decreases the Accrued Liability by 1.8%, yielding a decrease in the ADC of about \$113,000.

Longevity risk. To the extent participants live longer than expected relative to the mortality assumptions, liabilities (and, thus, the ADC) will increase. We have updated the post-retirement mortality assumption to the RP-2014 Blue Collar table with 102% adjustment for Males and 97% adjustment for Females with MP-2018 improvement scale projected six years beyond the valuation date. Since the entire population is "in-pay", there is no pre-retirement mortality. The increased longevity under this new assumption versus the assumption used in the 2018 valuation report increased the accrued liability of the Plan by \$3,347,000, or 5.2%.

Demographic risk. As this Plan consists only of retired lives, the only other assumption that is made with respect to anticipated Plan experience is the annual assumed benefit increase. To the extent actual experience differs from expected, Plan liabilities can vary up or down.

The Plan provides for annual increases to the monthly benefit, effective January 1 of the following year, equal to the percentage increase (or decrease) in the Consumer Price Index for the 12 months ending with the September 30th preceding the year of adjustment. The adjustment is made to the participant's original benefit (i.e. simple interest cola). The City Board votes on the adjustment and then informs the County. Over the past ten years, the actual increase has averaged about 1.5%. Annual COLA increases in excess of the assumed 2.50% will increase liabilities and the ADC, whereas annual COLA increases less than the assumed 2.50% will lower liabilities and the ADC.

For example, an increase of 25 basis points to the COLA assumption would lead to an increase in the Accrued Liability of about 1.2%, yielding an increase in ADC of about \$110,000. A decrease in the COLA of 25 basis points would lead to a decrease in the Accrued Liability of about 1.2%, yielding a decrease in the ADC of about \$110,000.

Expense Load. Certain expenses related to the administration of the Plan are often paid out of Plan assets (to the extent allowed by law). As a way to ensure Plan assets are not depleted over time due to administrative costs, an expense load (usually a flat dollar amount or a small percent of Plan assets) may be added to the Plan's normal cost, which is part of the contribution made by the Plan sponsor each year. When actual administrative expenses for a given year are different from the assumed load amount, the Plan will experience gains or losses that will be factored into the following year's contribution levels. Given the relatively small amount of administrative expenses paid from Plan assets (\$182,000 or 0.3% of Plan Assets), there is no current explicit Expense Load at this time.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

ASOP 51 - ASSESSMENT AND DISCLOSURE OF RISK (continued)

Plan Maturity Measures

Certain statistics can help to gauge the financial strength of the pension plan as well as to help identify risk that the plan might be subject to as it matures over time. Certain plan maturity statistics for the current valuation year are included below for your review and analysis.

Ratio of Retiree Liability to Total Plan Liability

Ratio = \$66,008,487 / \$66,008,487 = 100.0%

A pension plan with a high ratio (for example, more than 50%) is considered to be a relatively mature plan since the primary liability is associated with former employees who are now in pay status. For this plan, all liability is associated with former employees who are no in pay status. As a result, a large amount of plan assets is disbursed to retired participants to satisfy the monthly payments due to this group. Plan sponsors should consult with the investment advisors to the pension plan to determine whether plan assets are invested accordingly to account for the benefit outflows.

Duration of the Actuarial Accrued Liability

The duration for your pension plan is: 7.4

Duration is a measure used to indicate the sensitivity of the pension plan liability to a change in interest rates. In general, pension plans with a younger participant group tend to have a longer duration than pension plans with an older population. Plans with a longer duration are impacted more than pension plans with a shorter duration when interest rates change. For example, based on the duration of 7.4 shown above for your pension plan, for every 100-basis point increase in interest rates you could expect the pension plan liability to decrease by approximately 7.4%.

Ratio of Expected Outflows to Plan Assets

Ratio = \$6,755,000 / \$50,488,000 = 13.4%

Outflows are defined as: Benefit Payments + Expenses. This ratio measures the liquidity and time-horizon of the plan's assets. It can be used as one of the considerations of how much of the plan's assets should be allocated to short-term fixed income (or cash). Having sufficient amounts of cash on-hand within plan assets better allows for monthly benefit payments (and expenses, if applicable) to be made throughout the year without having to liquidate funds for cash flow at unexpected points in time.

Ratio of Expected NET Outflows to Plan Assets

Ratio = \$(6,001,000) / \$50,488,000 = -11.9%

Net Outflows are defined as: Contributions – Outflows. This ratio represents the net cash flow of the plan. A positive ratio means more cash is coming into plan assets than being paid out during the plan year, which is referred to as positive cash flow. Thus, the opposite is true – a negative ratio means negative cash flow. As a defined benefit plan matures, it (by its nature) becomes a negative net cash flow vehicle, so this ratio can be a measure of plan maturity.

**KNOX COUNTY EMPLOYEE BENEFIT SYSTEM
KNOX COUNTY BOARD OF EDUCATION RETIREMENT PLAN**

ASOP 51 - ASSESSMENT AND DISCLOSURE OF RISK (continued)

GASB Funded Status

Ratio = \$50,488,000 / \$66,008,000 = 76.5%

This statistic measures how well funded the pension plan is as of January 1, 2019 and is based on the ratio of the plan's market value of assets to the actuarial accrued liability. The funded status is impacted primarily by investment returns, interest rate changes, and pension plan funding policies. Additional factors, such as plan benefit or assumption changes, plan demographics and actual experiences, can also impact the funded status from year to year. Investment returns lower than expected may result in a ratio decrease. A drop in the interest rate would result in liability increases and the opposite occurs when interest rates increase. To the extent that more or less than the actuarially determined contribution is deposited to Plan assets during the year, then the plan would be better or worse funded than expected.

Summary of Risk Assessments and Maturity Measures

While the risk due to some variables may easily be understood or predictable, there are many risks that are much more variable in nature, making it quite difficult to hedge against drastic changes in the plan's funded status. While past actuarial and demographic experience is not a perfect indicator of what the future will bring, it does provide a strong foundation for setting assumptions related to risk.