231 South Bemiston
Suite 400
Clayton, MO 63105

July 21, 2023

Board of Trustees
City of University City
University City, MO 63130

RE: City of University City Non-Uniformed Employees' Retirement System – Section 105.665 Cost Statement

Dear Members of the Board:

The purpose of this letter is to provide the City of University City Non-Uniformed Employees' Retirement System with a cost statement required under the Missouri Revised Statute Section 105.665 in connection with any proposed plan provisions containing the changes to plan funding described below.

A summary of the proposed changes in plan provisions are as follows:

- Under this proposal, if implemented, a participant who has completed five years of vesting service will have a 100% Vested Interest in their accrued benefit instead of the current 10-year requirement

For purposes of the cost statement, we have assumed that such plan provision changes described above were implemented retroactive to January 1, 2023. The projections use census data and assets as of January 1, 2023 and do not take into account change in population or market conditions after that date. Actual results may differ as no gains or losses were assumed to occur on assets or liabilities after January 1, 2023.

In Exhibit I of the attached, current and proposed plan provisions assume that the actual return on assets is 6.8% in 2023 and later years through the projection period. The 6.8% interest rate was approved by the Board of Trustees on April 25, 2023, and is effective for the January 1, 2023, actuarial valuation.

Our cost statement, numbered to correspond with Section 105.665, follows below:

1. The level normal cost of plan benefits, less expected employee contributions, currently in effect is $546,302 as of January 1, 2023, or 7.1% of expected covered payroll, as calculated in our January 1, 2023 actuarial valuation.

2. The contribution amount for the Plan's unfunded accrued liability is $167,961 as of January 1, 2023, or 2.2% of expected covered payroll. The amortization period used to determine this amount is 13 years.

3. The total required contribution amount from items one and two above is $714,263 as of January 1, 2023, or 9.3% of expected covered payroll.

4. The total contribution rate defined in item 3 is being contributed in a timely manner.

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5. As of January 1, 2023, the plan's actuarial value of assets is $29,702,960, the market value of assets is $27,399,920, the actuarial accrued liability under the Entry Age Normal cost method is $31,219,316, and the funded ratio on that basis is 95.1%.

6. The total required post-change contribution amount is $732,726 as of January 1, 2023, or 9.6% of expected covered payroll under the proposed provisions. For cost purposes, we assumed the proposed plan provisions were implemented retroactively to January 1, 2023.

7. A 10-year projection of annual plan costs and funded ratios is presented in Exhibit I. The projections under both current and proposed plan provisions assume that the actual return on assets is 6.8% in 2023 and later years.

8. The proposed provisions would result in additional contributions in the year of implementation.

9. Though the changes increase required employer contributions, the actuarial funding method still ensures the Pension Plan is soundly financed and able to meet the obligation to pay benefits to its members, retirees and beneficiaries under the proposed provisions. Under the current provisions, cumulative contributions received from 2023 through 2033 is approximately $11.39 million compared to $11.57 million under the proposed provisions.

10. The actuarial assumptions used in the January 1, 2023 actuarial valuation are presented in Exhibit II. Any assumptions used for the projections that are not listed in Exhibit II are included in Exhibit III.

11. The Actuary's certification is below.

12. The actuarial funding method used in preparing the valuation along with the method applied in amortizing the Unfunded Actuarial Accrued Liability is described in Exhibit II.

Assumptions and Methods

In preparing the January 1, 2023, actuarial valuation, which is the basis for this cost statement, we have employed generally accepted actuarial methods and assumptions, in conjunction with employee data and financial information provided to us by the Plan, to determine a sound value for the Plan liability. The employee data has not been audited, but it has been reviewed and found to be consistent, both internally and with prior years' data. The validity of the funding analysis results is dependent upon the accuracy of the data and financial information provided.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the Plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the Plan. The actuary performs an analysis of Plan experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. A summary of all assumptions and methods used are as described in Exhibit II. Unless otherwise specified in this study, all data, methods, assumptions, and provisions were provided in the January 1, 2023 Valuation dated July 2023.

With any change to the provisions of a Plan, experience must be monitored to adjust the new assumptions. Assumptions would be studied within a reasonable time of three to five years to evaluate the reasonableness when compared to the actual demographic experience. Withdrawal rates were not adjusted to reflect changes in participant behavior.

In selecting economic assumptions, the interest rate of 6.8% is based upon a review of the existing portfolio structure, a review of recent experience, and information provided by the Plan's investment consultant regarding anticipated

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rates of return. The salary increase assumption is based on actual experience and future expectations of inflation, merit, and productivity components.

Where presented, references to "funded ratio" and "unfunded accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Where presented, references to "accumulated benefit funded ratio" is measured on a market value of assets basis. Moreover, the funded ratios presented are appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Future actuarial measurements and contribution requirements may differ from those determined in the valuation because of:

(1) differences between actual experience and anticipated experience based on the assumptions;

(2) changes in actuarial assumptions or methods;

(3) changes in statutory provisions;

(4) differences between actuarially required contributions and actual contributions.

Buck prepared this cost statement for use by the Plan in reviewing the financial condition of the Plan, including the determination of implementing the proposed provisions. Use of this cost statement by other parties or for any other purpose may not be appropriate and may result in mistaken conclusions due to failure to understand applicable assumptions, methodologies, or the inapplicability of the cost statement for that purpose. Because of the risk of misinterpretation of actuarial results, Buck recommends requesting its advance review of any statement, document, or filing to be based on information contained in this cost statement. Buck will accept no liability for any such statement, document or filing made without its prior review.

The actuarial assumptions and methods used to value the plan are individually and in the aggregate reasonable and, in combination, represent a reasonable estimate of anticipated experience under the plan. The cost and actuarial exhibits presented in this cost statement were determined in accordance with actuarial procedures consistent with the Actuarial Standards of Practice (ASOPs) and appropriately disclose the actuarial position of the plan.

Actuarial Standards of Practice ("ASOPs") 27 and 35 ask the actuary to disclose the information and analysis used to support the actuary's determination that the assumptions selected by the Board do not significantly conflict with what, in the actuary's professional judgment, are reasonable for the purpose of the measurement. In the case of the Board's selection of expected return on assets ("EROA"), the signing actuaries have used economic information and tools provided by Buck's Financial Risk Management ("FRM") practice. A spreadsheet tool created by the FRM team converts averages, standard deviations, and correlations from Buck's Capital Markets Assumptions ("CMA") that are used for stochastic forecasting into approximate percentile ranges for the arithmetic and geometric average returns. It is intended to suggest possible reasonable ranges for EROA without attempting to predict or select a specific best estimate rate of return. It takes into account the duration (horizon) of investment and the target allocation of assets in the portfolio to various asset classes. Based on the actuary's analysis, including consistency with other assumptions used in the valuation and the percentiles generated by the spreadsheet described above, the actuary believes the EROA does not significantly conflict with what, in the actuary's professional judgment, is reasonable for the purpose of the measurement.

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Use of Models

Actuarial Standard of Practice No. 56 provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the plan using data and assumptions as of the measurement date under the funding rules specified in this memorandum. The output from the third-party vendor software is used as input to an internally developed model that applies applicable funding rules to the derived liabilities and other inputs, such as plan assets and contributions, to generate many of the exhibits found in this memorandum. Buck has an extensive review process in which the results of the liability calculations are checked using detailed sample life output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other funding outputs and the internal model are similarly reviewed in detail and at a higher level for accuracy, reasonability, and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software. This review is performed by experts within Buck who are familiar with applicable funding rules, as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within Buck who are familiar with the details of the required changes.

Assessment of Risks

Information about current plan risk can be found in the 2023 Actuarial Valuation Report for the City of University City Non-Uniformed Employees' Retirement System dated July 2023. However, providing the benefit enhancements may increase risk to the plan beyond what is stated in such report. Below is a list of risks to consider with the addition of the benefit enhancements:

- Behavioral risk may increase with a change in the vesting requirement. This could create more uncertainty in withdrawal patterns until actual experience can be examined. For example, terminations for members between five and ten years of service may increase after this change.

Actuarial Certification

The undersigned are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this memorandum. This memorandum has been prepared in accordance with all Applicable Actuarial Standards of Practice and we are available to answer any questions on the material contained in the memorandum, or to provide explanations or further details as may be appropriate.

Sincerely,

Michael A. Ribble, FSA, EA, MAAA, FCA
Principal, Wealth Consulting

Duncan Reynolds, ASA, EA, MAAA
Senior Consultant, Wealth Consulting

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Exhibit I

City of University City Non-Uniformed Employees' Retirement System
January 1, 2023 Projections
Current Plan Provisions

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
A.	Number of Participants											
	Active	122	122	122	122	122	122	122	122	122	122	122
	Retired & Beneficiaries	67	68	71	73	76	79	79	80	84	87	90
	Vested Terminations	52	53	55	56	57	58	59	60	61	62	62
	Total	241	243	248	251	255	259	260	262	267	271	274
B.	Covered Payroll	$7,662,553	$7,813,331	$7,987,547	$8,190,605	$8,337,645	$8,503,589	$8,706,923	$8,919,716	$9,086,746	$9,275,264	$9,514,480
C.	Annual Benefits Payable to Retired Participants and Beneficiaries	$1,652,575	$1,686,176	$1,719,351	$1,789,238	$1,906,161	$2,017,691	$2,138,033	$2,286,654	$2,502,988	$2,694,642	$2,831,675
D.	Actuarial Liability - Entry Age Normal											
	Active	$14,343,376	$14,954,139	$15,759,097	$16,377,020	$16,334,830	$16,323,419	$16,434,631	$16,429,762	$15,853,689	$14,875,287	$14,141,281
	Retired & Beneficiaries	13,682,028	13,779,278	13,739,907	13,864,559	14,666,316	15,409,809	15,985,047	16,661,907	17,951,820	19,499,633	20,681,521
	Vested Terminations	3,193,912	3,549,251	3,932,262	4,327,713	4,723,829	5,101,834	5,471,546	5,816,710	6,127,610	6,387,245	6,618,514
	Total	$31,219,316	$32,282,668	$33,431,266	$34,569,292	$35,724,975	$36,835,062	$37,891,224	$38,908,379	$39,933,119	$40,762,165	$41,441,316
E.	Plan Assets - Actuarial Value	$29,702,960	$30,751,899	$31,163,134	$31,706,709	$31,788,675	$33,227,044	$34,658,187	$36,076,532	$37,451,116	$38,709,420	$39,871,369
F.	Unfunded Actuarial Liability	$1,516,356	$1,530,769	$2,268,132	$2,862,583	$3,936,300	$3,608,017	$3,233,037	$2,831,846	$2,482,003	$2,052,745	$1,569,947
G.	Funded Ratio (E. / D.)	95.1%	95.3%	93.2%	91.7%	89.0%	90.2%	91.5%	92.7%	93.8%	95.0%	96.2%
H.	Total Normal Cost	$588,777	$592,554	$590,030	$600,563	$607,640	$616,690	$633,604	$651,065	$653,030	$666,979	$687,462
I.	Expected Employee Contributions	$229,877	$234,400	$239,626	$245,718	$250,129	$255,108	$261,208	$267,591	$272,602	$278,258	$285,434
	As a Percentage of Covered Payroll	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
J.	Administrative Expenses	$187,402	$193,024	$198,815	$204,779	$210,923	$217,250	$223,768	$230,481	$237,395	$244,517	$251,853
K.	Employer Normal Cost (H. - I. + J.)	$546,302	$551,178	$549,219	$559,624	$568,434	$578,832	$596,164	$613,955	$617,823	$633,238	$653,881
	As a Percentage of Covered Payroll	7.1%	7.1%	6.9%	6.8%	6.8%	6.8%	6.8%	6.9%	6.8%	6.8%	6.9%
L.	Amortization of Unfunded Actuarial Liability (13 years closed as of 2023)	$167,961	$178,537	$280,398	$378,097	$560,898	$561,378	$557,794	$552,852	$563,763	$564,882	$558,096
M.	Total Employer Cost as of January 1st (K. + L.)	$714,263	$729,715	$829,617	$937,721	$1,129,332	$1,140,210	$1,153,958	$1,166,807	$1,181,586	$1,198,120	$1,211,977
N.	Total Employer Cost As a Percentage of Covered Payroll	9.3%	9.3%	10.4%	11.4%	13.5%	13.4%	13.3%	13.1%	13.0%	12.9%	12.7%

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Exhibit I

City of University City Non-Uniformed Employees' Retirement System
January 1, 2023 Projections
Proposed Plan Provisions

		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
A.	Number of Participants											
	Active	122	122	122	122	122	122	122	122	122	122	122
	Retired & Beneficiaries	67	68	71	73	76	79	79	80	84	87	90
	Vested Terminations	52	55	59	62	64	67	70	74	78	81	85
	Total	241	245	252	257	262	268	271	276	284	290	297
B.	Covered Payroll	$7,662,553	$7,813,331	$7,987,547	$8,190,605	$8,337,645	$8,503,589	$8,706,923	$8,919,716	$9,086,746	$9,275,264	$9,514,480
C.	Annual Benefits Payable to Retired Participants and Beneficiaries	$1,635,963	$1,666,753	$1,700,559	$1,769,424	$1,883,667	$1,987,167	$2,106,412	$2,253,773	$2,466,211	$2,652,975	$2,792,072
D.	Actuarial Liability - Entry Age Normal											
	Active	$14,246,457	$14,852,062	$15,654,270	$16,274,644	$16,243,433	$16,236,514	$16,349,306	$16,351,642	$15,784,724	$14,814,045	$14,088,242
	Retired & Beneficiaries	13,682,028	13,779,278	13,739,907	13,864,559	14,666,316	15,409,809	15,985,047	16,661,907	17,951,820	19,499,633	20,681,521
	Vested Terminations	3,193,912	3,590,184	4,015,592	4,453,067	4,890,122	5,321,417	5,759,062	6,173,125	6,561,258	6,909,207	7,239,433
	Total	$31,122,397	$32,221,524	$33,409,769	$34,592,270	$35,799,871	$36,967,740	$38,093,415	$39,186,674	$40,297,802	$41,222,885	$42,009,196
E.	Plan Assets - Actuarial Value	$29,702,960	$30,788,785	$31,242,131	$31,829,579	$31,959,106	$33,450,315	$34,945,472	$36,432,911	$37,882,107	$39,223,532	$40,479,288
F.	Unfunded Actuarial Liability	$1,419,437	$1,432,739	$2,167,638	$2,762,692	$3,840,765	$3,517,426	$3,147,943	$2,753,762	$2,415,695	$1,999,353	$1,529,908
G.	Funded Ratio (E. / D.)	95.4%	95.6%	93.5%	92.0%	89.3%	90.5%	91.7%	93.0%	94.0%	95.1%	96.4%
H.	Total Normal Cost	$617,976	$622,274	$620,319	$631,294	$638,111	$646,972	$664,090	$681,663	$682,891	$696,453	$716,858
I.	Expected Employee Contributions	$229,877	$234,400	$239,626	$245,718	$250,129	$255,108	$261,208	$267,591	$272,602	$278,258	$285,434
	As a Percentage of Covered Payroll	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
J.	Administrative Expenses	$187,402	$193,024	$198,815	$204,779	$210,923	$217,250	$223,768	$230,481	$237,395	$244,517	$251,853
K.	Employer Normal Cost (H. - I. + J.)	$575,501	$580,898	$579,508	$590,355	$598,905	$609,114	$626,650	$644,553	$647,684	$662,712	$683,277
	As a Percentage of Covered Payroll	7.5%	7.4%	7.3%	7.2%	7.2%	7.2%	7.2%	7.2%	7.1%	7.1%	7.2%
L.	Amortization of Unfunded Actuarial Liability (13 years closed as of 2023)	$157,225	$167,104	$267,974	$364,903	$547,285	$547,283	$543,113	$537,608	$548,702	$550,190	$543,862
M.	Total Employer Cost as of January 1st (K. + L.)	$732,726	$748,002	$847,482	$955,258	$1,146,190	$1,156,397	$1,169,763	$1,182,161	$1,196,386	$1,212,902	$1,227,139
N.	Total Employer Cost As a Percentage of Covered Payroll	9.6%	9.6%	10.6%	11.7%	13.7%	13.6%	13.4%	13.3%	13.2%	13.1%	12.9%

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Actuarial Assumptions and Methods

Interest Rate

6.8% compounded annually (net of investment expenses).

Mortality

Pub-2010 General Amount-Weighted Mortality Tables, with separate rates for employees and retirees, and projected generationally using scale MP-2021.

Withdrawal Rates

Following are sample withdrawal rates per 100 lives.

Age	Withdrawal
25	20.0
30	20.0
35	17.0
40	12.0
45	8.5
50	6.0
55	3.5
60+	1.5

Disability Rates

Following are sample disability rates per 100 lives.

Age	Male	Female
25	0.07	0.02
30	0.10	0.03
35	0.13	0.06
40	0.18	0.09
45	0.25	0.15
50	0.37	0.22
55	0.57	0.32
60	0.86	0.45

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Exhibit II

Actuarial Assumptions and Methods (continued)

Assumed Retirement Age

Age 60 – 64	10%
Age 65 - 69	40%
Age 70+	100%

Salary Increases

3.75% compounded annually.

Optional Forms of Payment

Single Life Annuity	80%
Joint and Survivor 100%	20%

Expenses

The normal cost was increased for expected Administrative Expenses of $168,849 (City) and $18,553 (Library), which is derived from the 2022 expenses paid plus 3.00%.

Actuarial Cost Method

Entry Age Actuarial Cost Method, with normal cost expressed as a level percentage of covered compensation

Asset Valuation Method

The Actuarial Value of Assets is market value as of the valuation date, including the value of accrued contributions, reduced by:

1. 80% of the gain/(loss) for the first year preceding the valuation date,
2. 60% of the gain/(loss) for the second year preceding the valuation date,
3. 40% of the gain/(loss) for the third year preceding the valuation date,
4. 20% of the gain/(loss) for the fourth year preceding the valuation date.

The gain/(loss) for each period is determined as the actual return on market value during the period less the expected return on market value based on an assumed earnings rate. The resulting value is constrained to be within a corridor of 80% to 120% of market value, including receivable contributions.

Amortization Method

Closed amortization as a level dollar of the unfunded accrued liability with 13 years remaining for 2023.

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Projection Assumptions

(1) New Entrants:	Active membership assumed to stay at the January 1, 2023 level throughout projection (122 active members). New active members entering the Plan are based on the average characteristics of new active members over the last five years. The expected salary in 2023 for a new entrant is $50,000. New entrants are 50% males and 50% females. New entrants are hired 88% by the City and 12% by the Library, reflecting the current composition of actives.
(2) Expenses:	Plan administrative expenses in 2022 ($181,944) are assumed to increase by 3.00% per year.
(3) Actual Return on Assets:	Under current and proposed provisions, the actual return on assets is 6.8% in 2023 and later years through the projection.
(4) Employee Contributions:	Employee contributions are assumed to be 3% per year.
(5) Employer Contributions:	Employer contributions are assumed to be paid mid-year with a half year interest adjustment applied by the City of University City at the time of payment.
(6) Interest Rate	6.8%, net of investment expenses.

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