



September 9, 2019

Board of Directors
Kentucky's Affordable Prepaid Tuition
100 Airport Road
Frankfort, KY 40601

Attention: David Lawhorn, 529 Program Manager

Re: Kentucky's Affordable Prepaid Tuition Actuarial Valuation as of June 30, 2019

Dear Directors:

Gabriel, Roeder, Smith & Company ("GRS") has performed an actuarial valuation of Kentucky's Affordable Prepaid Tuition program ("KAPT" or "the program") as of June 30, 2019. The purpose of this actuarial valuation is to evaluate the financial status of the program as of June 30, 2019.

This report presents the principal results of the actuarial valuation of KAPT including the following:

- a) A comparison of the actuarial present value of the obligations for prepaid tuition contracts purchased through December 13, 2004 (the most recent ending date for contract sales), with the value of the assets associated with the program as of June 30, 2019;
- b) An analysis of the factors which caused the deficit/margin to change since the prior actuarial valuation; and
- c) A summary of the member data, financial data, program provisions, and actuarial assumptions and methods utilized in the actuarial calculations.

The main conclusion of the valuation is that the fund is expected to become depleted in 3-4 years. We understand that the liabilities of the fund are backed by the full faith and credit of the Commonwealth of Kentucky, who will be responsible for satisfying the liabilities not covered by the assets of the fund.

Our valuation results show estimates of the depletion date and present value of the unfunded liabilities under the glide path adopted by the Board (and resulting expected rates of return provided by Graystone Consulting) in Appendix A. In addition, we show the sensitivity of the depletion date and unfunded liabilities to changes in certain assumptions about future activity affecting KAPT in Section G.

Mr. David Lawhorn
September 9, 2019
Page 2

This valuation reflects two program changes. The first is the legislated changes in program provisions. This change affected valuation results. The second is an administrative change that resulted in the data being provided by Staff this year instead of the third party administrator. This second change is not believed to have had a direct effect on valuation results. However, it may have had an indirect effect on liabilities, to the extent that this year's data differs from last year's data. Both changes are discussed on page 6 of the report.

This report was prepared at the request of the program and is intended for use by the Board of Directors ("the Board") and those designated or approved by the Board. This report may be provided to parties other than the Board only in its entirety. This report should not be relied on for any purpose other than the purpose described above. GRS is not responsible for unauthorized use of this report.

The valuation results set forth in this report are based upon data and information, furnished by KAPT, concerning program benefits, financial transactions, and beneficiaries of KAPT. We reviewed this information for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by KAPT. Further, the data and information provided is through June 30, 2019, and does not reflect subsequent market or membership experience.

There are currently no Actuarial Standards of Practice that specifically refer to prepaid tuition plans. We have followed the guidance from the Actuarial Standards of Practice on pensions due to their similar nature.

The valuation results summarized in this report involve actuarial calculations that require assumptions about future events. The major actuarial assumptions used in this analysis were adopted by, and are the responsibility of the program and the program's Board. We have not performed an experience study, but have reviewed the assumptions. Based on our limited review, we believe these assumptions are within a reasonable range and are in compliance with actuarial standards regarding pension calculations.

We have prepared this valuation with the understanding the program is closed to new participants.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: Program experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in program provisions or applicable law. We have performed an analysis of the sensitivity of certain changes in future assumptions. See Section G of this report for additional details. In addition, because it is not possible or practical to consider every possible contingency, we may use estimates or simplifications of calculations to facilitate the modeling of future events. We may also exclude factors or data that are deemed to be immaterial.

GRS makes no representations or warranties to any person participating in or considering participation in the program.

To the best of our knowledge, the information contained in this report is accurate and fairly presents the actuarial position of Kentucky's Affordable Prepaid Tuition program as of June 30, 2019.



Kentucky's Affordable Prepaid Tuition Table of Contents

		<u>Page</u>
Section A	Executive Summary	
	Summary of Results	1
	Discussion.....	5
Section B	Program Description	
	Summary of Program Description.....	10
Section C	Detailed Change in Margin/(Deficit)	
	Detailed Change in Margin/(Deficit)	12
Section D	Program Assets	
	Statement of Total KAPT Assets (at Market Value)	13
	Reconciliation of Total KAPT Assets (at Market Value)	14
Section E	Contract Data	
	Member Matriculation Summary	15
	Member Payment Option Summary.....	16
Section F	Methods and Assumptions	
	Valuation Methods and Assumptions.....	17
Section G	Projection Results	
	Sensitivity Testing Results	19
	Projection Results	21
Appendix A	Glide Path	
	Glide Path.....	28
Appendix B	Discussion of Selling New Contracts	
	Discussion of Selling New Contracts	29

Kentucky's Affordable Prepaid Tuition Summary of Results

Valuation Date:	Valuation Results [#]	
	June 30, 2019	June 30, 2018
Membership Summary:		
Accounts		
8 or More Years Beyond Projected College Entrance Year (PCEY)	567	562
1-7 Years Beyond PCEY	2,046	2,247
At or Before PCEY	641	922
Total	3,254	3,731
Average Years until PCEY (Negative if Past PCEY)	(3.2)	(2.6)
Assets		
Market Value of Assets	\$ 58,157,726	\$ 69,982,608
Present Value of Future Contract Payments	\$ 298,780	\$ 575,230
Fees Receivable	\$ 10,027	\$ 195,828
Total	\$ 58,466,533	\$ 70,753,666
Annual Return on Market Value of Assets*	6.11%	5.81%
Actuarial Liabilities (Present Value of Future Tuition Payments, Refunds, Fees, and Administrative Expenses)	\$ 96,203,553	\$ 108,131,117
Margin/(Deficit)	\$ (37,737,020)	\$ (37,377,451)
Funded Ratio (Total Assets ÷ Actuarial Liabilities)	60.8%	65.4%
Estimated Fiscal year Fund Depleted	2023	2023

* Net of fees. Reported to GRS by KAPT's prior investment consultant for 2018.

Note 2019 results are after program and assumption changes.

Kentucky's Affordable Prepaid Tuition Summary of Assets and Liabilities as of June 30, 2019

(\$ in Millions)



Assets		Liabilities	
	PV Future Contributions		PV Admin & Investment Expenses
	Market Value of Assets		PV Cancellations/Refunds
			PV Tuition Payments

PV – Present Value

Numbers may not add due to rounding.

Kentucky's Affordable Prepaid Tuition Discussion

Financial Status of Program

Program Status

As of June 30, 2019, the present value of all future tuition obligations under contracts outstanding (and including estimated future administrative and investment expenses) is \$96.2 million. Program assets as of June 30, 2019, including the Market Value of Assets and the present value of installment contract receivables, are \$58.5 million.

The difference between the assets of \$58.5 million and future obligations of \$96.2 million represents a program deficit of \$37.7 million. The program is 60.8% funded. This compares to 65.4% as of the prior actuarial valuation. The funded status is not appropriate for measuring the settlement cost of the program. A funded status less than 100% is an indication that additional contributions (in other words, contributions from sources other than contract payments) will be needed in the program to satisfy all the program liabilities.

We understand that the program is backed by the full faith and credit of the Commonwealth of Kentucky. The deficit of \$37.7 million is one estimate of the present value of the contributions the Commonwealth will need to make in order to satisfy its obligation under the program, if future activity is exactly as assumed.

Other Measurements to Consider

This report is intended to measure the obligations of the Program. Since the Program obligations will become Commonwealth obligations upon asset depletion, the unfunded obligation of the Program of \$37.7 million is one measure of the obligation of the Commonwealth. However, there are other measures. For example, if the expected payment obligations were summed from the date of depletion, to the date of termination, the sum would total approximately \$44.7 million in tuition, refund payments and expenses.

Fiscal Year	Projected Tuition		Projected Admin		Total Obligations
	Payments*	Projected Refunds	Expenses		
2023	\$ 1,506,687	\$ -	\$ -		\$ 1,506,687
2024	6,890,557	5,486,713	295,000		12,672,270
2025	4,185,643	5,065,458	262,500		9,513,601
2026	1,867,504	5,289,388	230,000		7,386,892
2027	621,836	1,358,861	197,500		2,178,197
2028	69,466	1,389,435	165,000		1,623,901
2029	17,978	1,174,750	132,500		1,325,228
2030	-	8,386,891	100,000		8,486,891
TOTAL	\$ 15,159,671	\$ 28,151,497	\$ 1,382,500		\$ 44,693,667

* Net of remaining program assets in Fiscal Year 2023.

Management's Discussion and Analysis Language Describing Financial Status for Financial Statements

The following language was specifically requested by Fund Management:

As of June 30, 2019, the Program had a deficit of \$37.7 million. This represents a \$0.3 million increase over the previous year's deficit. Based on actuarial estimates, the Program's assets will be exhausted in fiscal year 2023, at which time the liability of the Program becomes a General Obligation of the Commonwealth of Kentucky. Per KRS 164A.708, once a real liability is expected to accrue, the General Assembly shall appropriate the necessary funds to meet the liability. Over the remaining estimated life of the program, through fiscal year 2030, actuarial estimates show the Commonwealth of Kentucky will need to transfer approximately \$44.7 million, as shown above.

Kentucky's Affordable Prepaid Tuition Discussion (Continued)

Valuation Assumptions

Changes from Prior Valuation

Tuition Increase Assumption

The assumed rate of future tuition increases was lowered from 6.00% to 5.75% for this valuation. This resulted in a decrease in liabilities of approximately \$1.4 million (measured after all other changes).

Asset Allocation Glide Path and Assumed Rate of Investment Return

At the May 2019 Board meeting the following target asset allocation was adopted:

Asset Classes	Proposed Target	Proposed Range
US Large Cap Equities	24%	21% to 27%
US Mid Cap Equities	3%	1% to 5%
US Small Cap Equities	3%	1% to 5%
Non-US Equities	6%	4% to 8%
Inflation Indexed Bonds (TIPS)	6%	4% to 8%
US Fixed-Income	33%	30% to 36%
Short Duration US Fixed Income	15%	12% to 18%
Cash Equivalents	10%	8 to 12%

In addition, the Board adopted the following Glide Path asset allocation:

Asset Classes	2019	2020	2021	2022	2023*
Large Cap US Equity	30%	24%	12%	0%	0%
Small/Mid Cap US Equity	9%	6%	4%	0%	0%
International Equity	9%	6%	3%	0%	0%
US Fixed Income	44%	33%	11%	0%	0%
TIPS	7%	6%	0%	0%	0%
Short Duration US Fixed Income	0%	15%	40%	50%	0%
Cash Equivalents	1%	10%	30%	50%	100%
Totals	100%	100%	100%	100%	100%

* Not expected to have significant assets to invest. Any remaining assets will be in cash equivalents until depletion.

Kentucky's Affordable Prepaid Tuition Discussion (Concluded)

Program Status

The program has a closure date of June 30, 2030, at which point any remaining contract values will be refunded or rolled over to individual 529 College Savings Plans. The Board could elect to start selling contracts again and is charged with annually making that decision. However, if new contracts were to be sold, they would be part of a different plan and would not be backed by the full faith and credit of the Commonwealth. See page 29 for a discussion regarding the sales of new contracts.

Future Outlook

The program is expected to become insolvent in 3-4 years.

Kentucky's Affordable Prepaid Tuition

Summary of Program Description Evaluated June 30, 2019

Purchasing Contracts – KAPT is currently closed to new participants. Current members purchased from three types of contracts with the following benefits:

- **Value Plan** – Provides in-state tuition and mandatory fees at Kentucky Community and Technical College System (KCTCS). KCTCS tuition price for full-time enrollment will be guaranteed. Depending on tuition rates; any money left over can cover qualified educational expenses.
- **Standard Plan** – Provides in-state undergraduate tuition and mandatory fees at Kentucky's eight public universities. Guarantees tuition price for full-time enrollment at the Commonwealth's most expensive public university (currently University of Kentucky). Depending on tuition rates, any money left over can cover qualified educational expenses such as books, room, and board.
- **Premium Plan** – Provides tuition at Kentucky's private colleges and universities. While no particular school's tuition is guaranteed, your value of the plan grows at the same rate as the University of Kentucky's tuition. Depending on tuition rates, any money left over can cover qualified educational expenses such as books, room, and board.

Contract Payments – Contract holders may agree to pay-off their contracts in a variety of ways:

- Lump-Sum Payment (Full Contract paid-in-full at time of enrollment to the program)
- 3-Year Monthly Payments (36 monthly payments after purchase of contract)
- 5-Year Monthly Payments (60 monthly payments after purchase of contract)
- 7-Year Monthly Payments (96 monthly payments after purchase of contract)
- Extended Monthly Payments (Monthly payments after purchase of contract for defined period up to and including the year of high school matriculation)
- Custom Monthly Payments (Monthly payments based upon a custom determined schedule)

SECTION C

DETAILED CHANGE IN MARGIN/(DEFICIT)

SECTION D

PROGRAM ASSETS

Kentucky's Affordable Prepaid Tuition Reconciliation of Total Assets (at Market Value)

	FY 2019	FY 2018
Total Market Value of Assets at the beginning of the Fiscal Year	\$ 70,178,436	\$ 81,997,536
Additions:		
Contract Payments	\$ 202,217	\$ 163,440
Investment Revenues:		
a. Net unrealized gain on investments	\$ (1,687,283)	\$ (1,553,769)
b. Interest and investment income	\$ 5,503,155	\$ 6,182,090
Total Investment Revenues	\$ 3,815,872	\$ 4,628,321
Deductions:		
a. Administrative expenses	\$ 41,028	\$ 40,548
b. Personnel and professional expenses	\$ 381,401	\$ 334,678
c. Refunds	\$ 2,452,259	\$ 2,638,957
d. Trustee fee expense	\$ 133,662	\$ 56,159
e. Tuition benefits expense, net	\$ 13,203,867	\$ 13,813,548
Total Deductions	\$ 16,212,217	\$ 16,883,890
Change in Net Position	\$ (12,194,128)	\$ (12,092,129)
Change in Net Receivables	\$ 500,087	\$ 273,029
Total Market Value of Assets at the end of the Fiscal Year	\$ 58,484,395	\$ 70,178,436

Total asset value shown above excludes any receivables for future contract payments.

Kentucky's Affordable Prepaid Tuition Member Matriculation Summary as of June 30, 2019

Projected Matriculation Year	Type of Contract														Total
	Value Plan 1 Year	Value Plan 2 Years	Standard Plan 1 Year	Standard Plan 2 Years	Standard Plan 3 Years	Standard Plan 4 Years	Standard Plan 5 Years	Premium Plan 1 Year	Premium Plan 2 Years	Premium Plan 3 Years	Premium Plan 4 Years	Premium Plan 5 Years	Total		
2004	-	2	3	3	1	7	1	-	-	-	-	1	-	18	0.6%
2005	-	2	2	3	3	15	1	-	-	-	-	2	-	28	0.9%
2006	-	2	2	5	5	28	4	-	-	-	-	1	-	47	1.4%
2007	2	1	5	16	3	30	3	-	-	-	-	1	-	61	1.9%
2008	1	2	4	11	-	45	4	-	1	-	-	4	2	74	2.3%
2009	2	5	9	17	3	62	9	-	-	-	-	1	1	109	3.3%
2010	1	1	7	15	7	63	11	1	-	-	-	2	-	108	3.3%
2011	2	4	10	12	5	80	7	-	-	-	-	1	1	122	3.8%
2012	1	3	6	18	5	73	8	-	-	-	-	3	-	117	3.6%
2013	2	3	10	18	4	108	11	-	-	-	-	-	3	159	4.9%
2014	-	6	13	34	6	137	8	-	1	-	-	5	2	213	6.6%
2015	2	5	13	25	7	151	17	-	-	-	-	3	2	225	6.9%
2016	2	11	14	43	16	207	26	-	-	-	-	6	-	325	10.0%
2017	4	6	19	37	8	222	32	-	2	-	-	2	2	335	10.3%
2018	4	21	26	49	15	253	22	1	2	-	-	2	-	395	12.1%
2019	2	12	25	45	7	169	12	-	1	-	-	2	1	277	8.5%
2020	4	9	28	40	9	166	16	-	1	-	-	1	-	274	8.4%
2021	2	8	27	29	5	127	16	-	1	-	-	2	-	217	6.7%
2022	3	4	11	12	5	64	9	1	1	1	1	1	-	112	3.4%
2023	-	-	4	6	-	21	3	-	-	-	-	1	-	35	1.1%
2024	-	-	-	-	-	1	-	-	-	-	-	-	-	1	0.0%
2025	-	-	-	1	-	-	-	-	-	-	-	-	-	1	0.0%
2026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%
2027	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%
2028	-	-	1	-	-	-	-	-	-	-	-	-	-	1	0.0%
Total	34	107	239	439	114	2,029	220	3	10	4	41	14	14	3,254	100.0%
	1.0%	3.3%	7.3%	13.5%	3.5%	62.4%	6.8%	0.1%	0.3%	0.1%	1.3%	0.4%	0.4%	100.0%	

SECTION F

METHODS AND ASSUMPTIONS

Kentucky's Affordable Prepaid Tuition Valuation Methods and Assumptions

Cancellations: It is assumed contracts which have not yet reached their PCEY will cancel and refund based upon the rates below. It is assumed the amount refunded equals the amount of money the contract has paid into the program towards their contract.

Years Since Purchase	Contract Payment Plan					
	Lump-Sum	36 Monthly Payments	60 Monthly Payments	84 Monthly Payments	Extended Payments	Custom Payments
0	1.50%	3.00%	5.00%	6.00%	8.00%	8.00%
1	1.00%	2.00%	4.00%	4.00%	7.00%	7.00%
2	0.75%	1.00%	3.00%	3.00%	5.00%	5.00%
3	0.75%	1.00%	2.00%	2.00%	4.00%	4.00%
4	0.50%	0.75%	1.00%	1.00%	3.00%	3.00%
5	0.50%	0.75%	0.75%	1.00%	2.00%	2.00%
6	0.50%	0.75%	0.75%	1.00%	1.00%	1.00%
7+	0.50%	0.75%	0.75%	0.75%	0.75%	0.75%

The assumptions were adopted by and provided by the Board either through Staff or through the prior Actuary's valuation report. Where the application of certain assumptions in the prior valuation was not completely clear (such as timing of refunds for participants more than 2 years past the expected utilization period), we worked with Staff to determine a clear application and/or showed a range of results.

We have reviewed the assumptions for reasonableness and believe the rationale for the assumptions is based on past program experience (for demographic assumptions) or future expectations (for economic assumptions). We believe the assumptions are reasonable.

Kentucky's Affordable Prepaid Tuition Sensitivity Testing Results

The actuarial assumptions regarding future increases in tuition costs and fees and the future rate of investment return were adopted by KAPT. In our opinion, the adopted assumptions are reasonable for the purpose of the measurement. However, no one knows with certainty what the future holds with respect to economic and other contingencies. For example, while it is assumed that the assets of the Program will earn 4.40% gross of investment expenses during the 2019 Fiscal Year; actual return is expected to vary from year to year. Therefore, we have projected the program's results under alternative assumptions for future investment income and tuition increases, as follows:

<u>Pg.</u>	<u>Description</u>
21	Current valuation assumptions – Projection based upon the valuation assumptions and the current program assets plus the deficit of \$37.7 as a lump-sum contribution to the program as of the valuation date to display solvency for the remainder of the program.
22	Current valuation assumptions – Projection based upon the valuation assumptions and current program assets for computation of the depletion date.
23	The investment return assumption is 200 basis points higher than assumed in each of the next 4 years.
24	Tuition increases are 100 basis points higher in each future year than assumed.
25	Tuition increases are 100 basis points lower in each future year than assumed.
26	Contracts which, as of the valuation date, are more than 8 years past their Projected College Entrance Year (PCEY) but have not refunded yet are assumed to refund immediately in the next fiscal year.
27	Contracts once beyond the Projected College Entrance Year (PCEY) are assumed to not refund their contracts until program closure in 2030.

The summary of the impact of each of these scenarios on the principal valuation results is presented on the following page. See pages 21 through 27 for detailed projection results of each scenario.

Kentucky's Affordable Prepaid Tuition

June 30, 2019 Projection Based on Valuation Results

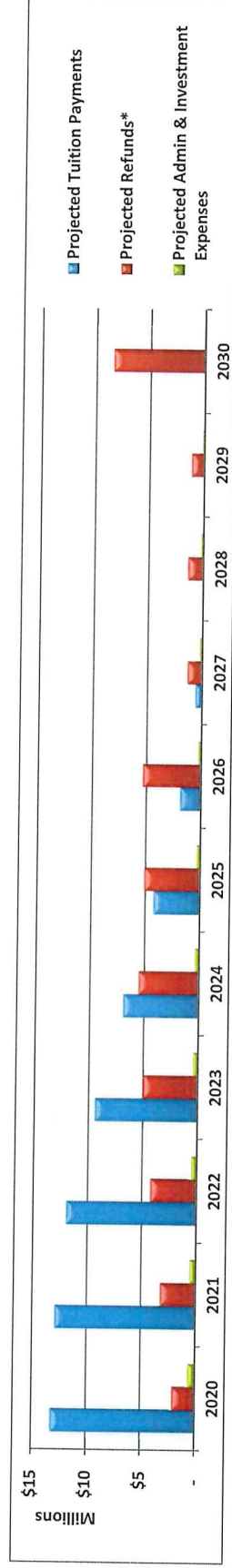
Projection of Lump-Sum Contribution for Program Solvency

Inputs	
Investment Expenses:	% of BOY Assets: 0.20%
Admin Expenses:	2019: \$425,000 2030: \$100,000
Closure of Program:	2030

Valuation Results	
Present Value of Future Tuition and Fees \$	96,203,553
Present Value of Future Contract Payments \$	298,780
June 30, 2019 Assets \$	58,167,753
(Margin)/Deficit \$	37,737,020
Funded Status	60.8%

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KCTCS	Solvent Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin & Investment Expenses	Projected Contract Payments	Solvent Market Value of Assets End of Fiscal Year	Lump-Sum Contribution
2019										
2020	4.10%	N/A	N/A	\$ 95,904,773	\$ 13,250,540	\$ 2,050,363	\$ 646,739	\$ 181,607	\$ 58,167,753	\$ 37,737,020
2021	3.30%	5.75%	5.75%	83,659,555	12,910,773	3,197,010	559,819	92,050	83,659,555	
2022	2.50%	5.75%	5.75%	69,501,936	11,943,034	4,152,024	499,004	31,577	69,501,936	
2023	2.50%	5.75%	5.75%	54,421,161	9,392,642	4,966,488	436,342	5,316	54,421,161	
2024	2.50%	5.75%	5.75%	40,768,363	6,890,557	5,486,713	376,537	-	40,768,363	
2025	2.50%	5.75%	5.75%	28,846,348	4,185,643	5,065,458	320,193	-	28,846,348	
2026	2.50%	5.75%	5.75%	19,859,659	1,867,504	5,289,388	269,719	-	19,859,659	
2027	2.50%	5.75%	5.75%	12,829,324	621,836	1,358,861	223,159	-	12,829,324	
2028	2.50%	5.75%	5.75%	10,916,181	69,466	1,389,435	186,832	-	10,916,181	
2029	2.50%	5.75%	5.75%	9,522,576	17,978	1,174,750	151,545	-	9,522,576	
2030	2.50%	5.75%	5.75%	8,399,558	-	8,386,891	116,799	-	8,399,558	0

* Assumed all maximized refunds as of 6/30/2019 are paid upon termination of the Program (2030). All other contracts are assumed to refund 8 years after Projected College Entrance Year (time at which contract value is maximized).



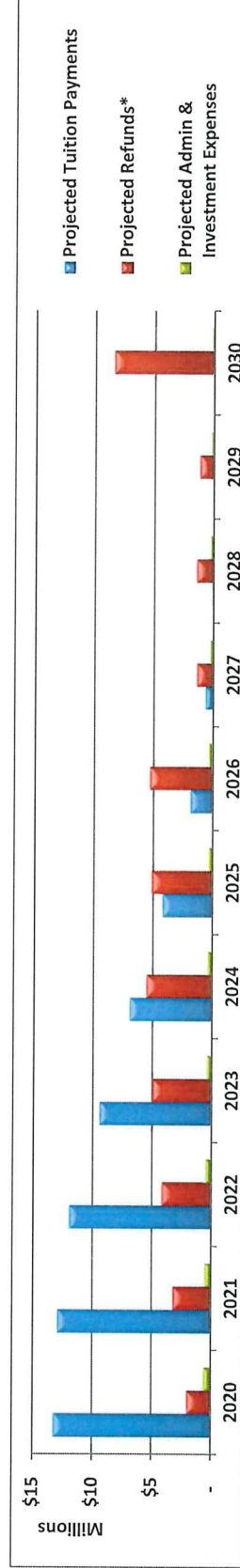
Kentucky's Affordable Prepaid Tuition June 30, 2019 Projection Based on Investment Return +200 Basis Points for 4 Years

Inputs	
Investment Expenses:	% of BOY Assets: 0.20%
Admin Expenses:	2019: \$425,000 2030: \$100,000
Closure of Program:	2030

Solvency Results	
Year	Insolvent
2024	

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KCTCS	Assumed Tuition	Solvent Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin & Investment Expenses	Projected Contract Payments	Market Value of Assets End of Fiscal Year
2019										\$ 58,167,753
2020	6.10%	N/A	N/A	\$	58,167,753	\$ 13,250,540	\$ 2,050,363	\$ 571,550	\$ 181,607	\$ 45,417,254
2021	5.30%	5.75%	5.75%		45,417,254	12,910,773	3,197,010	483,335	92,050	30,778,291
2022	4.50%	5.75%	5.75%		30,778,291	11,943,034	4,152,024	421,557	31,577	15,220,844
2023	4.50%	5.75%	5.75%		15,220,844	9,392,642	4,966,488	357,942	5,316	795,257
2024	2.50%	5.75%	5.75%		795,257	6,890,557	5,486,713	296,591	-	(12,045,145)
2025	2.50%	5.75%	5.75%		(12,045,145)	4,185,643	5,065,458	262,500	-	(21,995,709)
2026	2.50%	5.75%	5.75%		(21,995,709)	1,867,504	5,289,388	230,000	-	(30,032,215)
2027	2.50%	5.75%	5.75%		(30,032,215)	621,836	1,358,861	197,500	-	(32,990,918)
2028	2.50%	5.75%	5.75%		(32,990,918)	69,466	1,389,435	165,000	-	(35,460,096)
2029	2.50%	5.75%	5.75%		(35,460,096)	17,978	1,174,750	132,500	-	(37,688,399)
2030	2.50%	5.75%	5.75%		(37,688,399)	-	8,386,891	100,000	-	(47,223,149)

* Assumed all maximized refunds as of 6/30/2019 are paid upon termination of the Program (2030). All other contracts are assumed to refund 8 years after Projected College Entrance Year (time at which contract value is maximized).



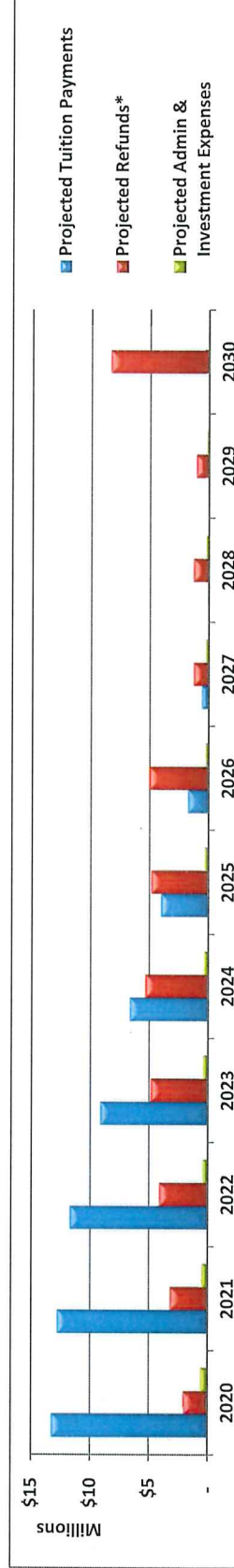
Kentucky's Affordable Prepaid Tuition June 30, 2019 Projection Based on Tuition Increases -100 Basis Points

Inputs	
Investment Expenses:	% of BOY Assets: 0.20%
Admin Expenses:	2019: \$425,000 2030: \$100,000
Closure of Program:	2030

Solvency Results	
Year Insolvent	2023

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KCTCS	Solvent Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin & Investment Expenses	Projected Contract Payments	Market Value of Assets End of Fiscal Year
2019	4.10%	N/A	N/A	\$ 58,167,753	\$ 13,250,540	\$ 2,050,363	\$ 571,265	\$ 181,607	\$ 58,167,753
2020	3.30%	4.75%	4.75%	44,452,328	12,788,685	3,167,284	481,405	92,050	44,452,328
2021	2.50%	4.75%	4.75%	29,235,548	11,718,228	4,074,299	418,471	31,577	29,235,548
2022	2.50%	4.75%	4.75%	13,536,880	9,128,697	4,827,090	354,574	5,316	13,536,880
2023	2.50%	4.75%	4.75%	(645,776)	6,633,595	5,282,109	295,000	-	(645,776)
2024	2.50%	4.75%	4.75%	(13,052,214)	3,991,448	4,830,448	262,500	-	(13,052,214)
2025	2.50%	4.75%	4.75%	(22,592,599)	1,764,020	4,996,288	230,000	-	(22,592,599)
2026	2.50%	4.75%	4.75%	(30,242,076)	581,824	1,271,427	197,500	-	(30,242,076)
2027	2.50%	4.75%	4.75%	(33,076,826)	64,382	1,287,740	165,000	-	(33,076,826)
2028	2.50%	4.75%	4.75%	(35,440,023)	16,505	1,078,471	132,500	-	(35,440,023)
2029	2.50%	4.75%	4.75%	(37,568,849)	-	8,307,410	100,000	-	(37,568,849)
2030	2.50%	4.75%	4.75%	-	-	-	-	-	(47,020,140)

* Assumed all maximized refunds as of 6/30/2019 are paid upon termination of the Program (2030). All other contracts are assumed to refund 8 years after Projected College Entrance Year (time at which contract value is maximized).



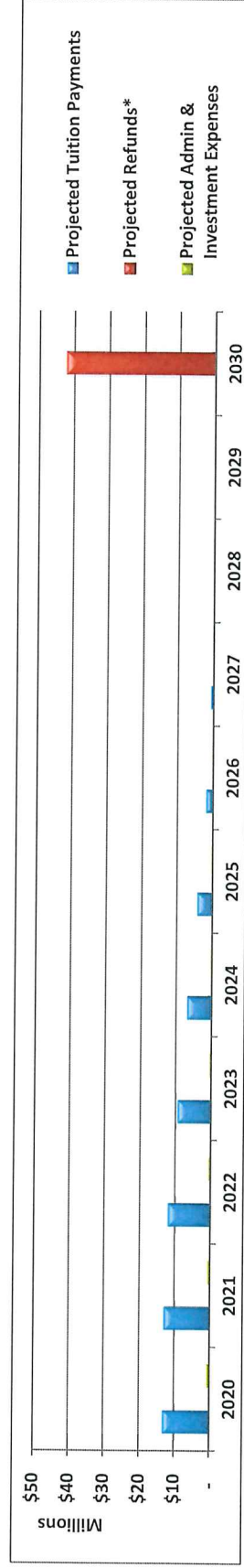
Kentucky's Affordable Prepaid Tuition June 30, 2019 Projection Based on Maximized Refunds Paid Upon Program Closure

Inputs	
Investment Expenses:	0.20%
Admin Expenses:	2019: \$425,000 2030: \$100,000
Closure of Program:	2030

Solvency Results	
Year Insolvent	2026

Fiscal Year	Assumed Investment Return During Year	Assumed Tuition Increase for UK	Assumed Tuition Increase for KCTCS	Solvent Market Value of Assets Beginning of Fiscal Year	Projected Tuition Payments	Projected Refunds*	Projected Admin & Investment Expenses	Projected Contract Payments	Market Value of Assets End of Fiscal Year
2019									
2020	4.10%	N/A	N/A	\$ 58,167,753	\$ 13,250,540	\$ 87,944	\$ 571,265	\$ 181,607	\$ 46,454,708
2021	3.30%	5.75%	5.75%	46,454,708	12,910,773	53,416	485,409	92,050	34,340,142
2022	2.50%	5.75%	5.75%	34,340,142	11,943,034	22,793	428,680	31,577	22,632,155
2023	2.50%	5.75%	5.75%	22,632,155	9,392,642	5,938	372,764	5,316	13,271,303
2024	2.50%	5.75%	5.75%	13,271,303	6,890,557	161	321,543	-	6,272,391
2025	2.50%	5.75%	5.75%	6,272,391	4,185,643	84	275,045	-	1,895,495
2026	2.50%	5.75%	5.75%	1,895,495	1,867,504	28	233,791	-	(192,364)
2027	2.50%	5.75%	5.75%	(192,364)	621,836	28	197,500	-	(1,029,323)
2028	2.50%	5.75%	5.75%	(1,029,323)	69,466	28	165,000	-	(1,292,758)
2029	2.50%	5.75%	5.75%	(1,292,758)	17,978	-	132,500	-	(1,477,502)
2030	2.50%	5.75%	5.75%	(1,477,502)	-	42,346,961	100,000	-	(44,489,805)

* Assumed all refunds after Projected Contract Enrollment Year are paid at closure of Program (2030).



Kentucky's Affordable Prepaid Tuition Glide Path

Graystone
Consulting

Allocations and Expected Performance

	Secular Forecasts		Strategic Forecasts		Source: Global Investment Committee Feb 28, 2019. Annual return is the forecasted arithmetic average annual return. Annualized volatility, skewness and kurtosis estimates are based on the longest available data through Feb 28, 2019. Strategic Forecasts are calibrated to a 7 year investment horizon. Secular Forecasts are calibrated to a 20+ year horizon. Forecast estimates are for illustrative purposes only, are based on proprietary models and are not indicative of the future performance of any specific investment, index or asset class. Actual performance may be more or less than the estimates shown in this table. Estimates of future performance are based on assumptions that may not be realized. * The GIC applies significant statistical adjustments to correct for distortions typically associated with hedge fund, private equity and private real estate index returns. For more information, see the 'Return Series Adjustments' section on Appendix page 18. Investor Suitability: Morgan Stanley recommends that investors independently evaluate each asset class, investment style, issuer, security, instrument or strategy discussed. Legal accounting and tax restrictions, transaction costs and changes to any assumptions may significantly affect the economics and results of any investment. Investors should consult their own tax, legal or other advisors to determine suitability for their specific circumstances. Investments in private funds (including hedge funds, managed futures funds and private-equity funds) are speculative and include a high degree of risk. All figures annualized. Asset class returns are assumed to be serially independent. In some cases, the asset classes in the forgoing presentation are aggregations of the asset classes listed above, as per the mapping detailed on page 2 of the Appendix. Assumptions for aggregated asset class are simply aggregates of the above assumptions with weights as per the Granular Portfolio Allocations on Page 1 of the Appendix and Model Allocations on page 3 of the Appendix respectively. Please refer to the end of this Appendix for important disclosures about this presentation.
	Return	Volatility	Return	Volatility	
Cash & Bonds					
Ultra-Short Fixed Income	2.9%	0.9%	2.3%	0.9%	
Short Term Fixed Income	3.3%	1.4%	2.7%	1.4%	
US Fixed Income	3.9%	5.3%	3.4%	5.3%	
International Fixed Income	3.6%	4.1%	0.5%	4.1%	
Inflation-Linked Securities	4.9%	7.3%	1.7%	7.3%	
High Yield	5.8%	8.2%	3.6%	8.2%	
Emerging Markets Fixed Income	7.2%	12.1%	7.1%	12.1%	
Convertible Bond	7.1%	10.9%	5.5%	10.9%	
Equities					
US Large Cap Growth Equity	8.6%	16.8%	5.2%	15.8%	
US Large Cap Value Equity	8.9%	14.4%	6.1%	13.7%	
US Mid Cap Growth Equity	9.7%	19.8%	4.1%	18.4%	
US Mid Cap Value Equity	9.7%	15.5%	7.0%	14.8%	
US Small Cap Growth Equity	8.5%	22.3%	7.0%	21.0%	
US Small Cap Value Equity	9.7%	17.2%	8.7%	16.7%	
Europe Equity	8.2%	17.2%	7.4%	16.5%	
Japan Equity	8.1%	20.6%	8.0%	19.0%	
Asia Pacific ex Japan Equity	11.0%	22.9%	8.1%	21.3%	
Emerging Markets Equity	11.0%	22.5%	9.5%	21.0%	
Non-Traditional Asset Classes*					
Real Estate Investment Trusts	8.1%	16.7%	7.7%	16.7%	
Commodities	5.0%	15.9%	4.3%	15.9%	
Master Limited Partnerships	8.3%	16.6%	8.4%	16.6%	
Natural Resources	11.3%	19.9%	7.7%	19.9%	
Absolute Return Assets	5.3%	3.9%	3.8%	3.9%	
Equity Hedge Assets	5.8%	8.2%	4.5%	8.2%	
Equity Return Assets	7.0%	8.1%	5.1%	8.1%	
Private Credit	5.9%	6.9%	5.5%	6.9%	
Private Equity	13.6%	13.2%	9.7%	13.2%	
Private Real Estate Funds	10.0%	16.8%	8.4%	16.8%	
Core Private Real Estate Funds	6.8%	9.5%	7.6%	9.5%	

Asset Classes	Recommended Glide Path							
	2018	2019	2020	2021	2022	2023	2024	2025
Large Cap US Equity	30	30	24	12	0	0	0	0
Small/Mid Cap US Equity	9	9	6	4	0	0	0	0
International Equity	9	9	6	3	0	0	0	0
US Fixed Income	44	44	33	11	0	0	0	0
TIPS	7	7	6	0	0	0	0	0
Short Duration US Fixed Income	0	0	15	40	50	0	0	0
Cash Equivalents	1	1	10	30	50	0	0	0
Totals	100	100	100	100	100	0	0	0
2019 Annual Returns (%)		4.60	4.10	3.30	2.50	0.00	0.00	0.00
2019 Standard Deviations (%)		7.20	5.50	2.80	0.09	0.00	0.00	0.00
Change in Expected Return			-11%	-20%	-24%	-100%	0%	0%
Change in Expected Risk			-24%	-49%	-97%	-100%	0%	0%

The projections and other information generated by the Morgan Stanley Asset Allocation Center regarding likelihood of various investment outcomes are hypothetical in nature, they do not reflect actual investment results and are not a guarantee of future results.

From May 9, 2019 Glide Path Presentation from Graystone Consulting.

Kentucky's Affordable Prepaid Tuition Discussion on Selling New Contracts

Background

The Board must annually consider the selling of new contracts. Contracts were last sold in 2004.

Long Term Growth of Contracts

Under the original program, Participants could leave their contracts in the program (unused) for as long as they desired and the contract value would continue to grow at the rate of the increase in tuition growth (primarily at the University of Kentucky). Since pricing is based on a present value of expected payments, appropriate pricing under a program design, such as this, cannot be determined when the value of the contract can grow forever and the rate of increase in value (assumed tuition increases) exceeds the discount rate (assumed rate of investment return).

However, the legislated program changes in 2014 limited the growth of unused contracts to 6 years beyond the expected utilization period. Legislated changes in 2019 modified that limit to 8 years past the Projected College Entrance year (PCEY). Under either the 2014 limit or the 2019 limit, an appropriate pricing can be determined. If the limit is changed in the future, we would need to assess whether appropriate prices could still be determined.

Separation of Programs

We understand that if the Board were to re-open sales of new contracts, a separate program would be created (such as a KAPT II). We further understand that contracts under the new program would not be backed by the full faith and credit of the Commonwealth and the assets of the new program would not be used to pay the benefits of the old program. We further understand that there would be a time limit on the growth of the contract value (similar or the same as under the current KAPT program).

Development of Pricing

Under these parameters, we believe that appropriate pricing can be developed. The pricing would be dependent on the following:

- The age of the participant at contract purchase;
- Expected matriculation date;
- Assumptions regarding:
 - Rates of utilization
 - Rates of future tuition increases (or growth of contract value)
 - Rates of assumed investment return
 - Timing of expected tuition payments (or refunds)
 - Rates of cancellation
 - Rates of administrative expenses paid by the contract holder
- Risk margin; and
- Board's funding and pricing policy/guidelines.

Kentucky's Affordable Prepaid Tuition Discussion on Selling New Contracts (Concluded)

Program size is also a consideration when determining if the program is an appropriate use of resources. This is a policy decision, not an actuarial decision. However, the issue is essentially, the expected size of the Program (once it matures) sufficient to justify allocating Commonwealth resources to the maintenance of the Program. A side concern is whether or not the Program is being utilized by the intended population.

Final Thoughts

Should the Board wish to explore opening a new program and selling new contracts, we would be happy to work with the Board to develop a funding policy, initial pricing assumptions and contract pricing.