East Bay Municipal Utility District Employees' Retirement System

Actuarial Valuation and Review of Pension Plan as of June 30, 2019

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January 8, 2020

Ms. Sophia Skoda
Director of Finance
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607-4240

Dear Sophia:

We are pleased to submit this Actuarial Valuation and Review as of June 30, 2019 for only the pension plan. The Review of Contribution Rates and Funding Status for the health insurance benefit (HIB) plan is provided in a separate report. This report summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for fiscal year 2020/2021.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Plan. The census information and financial information on which our calculations were based was prepared by the East Bay Municipal Utility District Employees' Retirement System (EBMUDERS). That assistance is gratefully acknowledged.

The actuarial calculations were directed under my supervision. I am a member of the American Academy of Actuaries and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Plan.

We look forward to reviewing this report at your next meeting and to answering any questions.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By: Andy Yeung
_____
Andy Yeung, ASA, EA, MAAA, FCA
Vice President and Actuary

JRC/mv

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East Bay Municipal Utility District Employees' Retirement System Actuarial Valuation and Review as of June 30, 2019

Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal Consulting ("Segal") to present a valuation of the East Bay Municipal Utility District Employees' Retirement System ("the System") as of June 30, 2019. The valuation was performed to determine whether the assets and contribution rates are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of current Plan assets to cover the estimated cost of settling the Plan's accrued benefit obligations.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

The contribution requirements presented in this report are based on:

- The benefit provisions of the pension plan, as administered by the Board;
- The characteristics of covered active members, inactive vested members, and retired members and beneficiaries as of June 30, 2019, provided by EBMUDERS;
- The assets of the Plan as of June 30, 2019, provided by EBMUDERS;
- Economic assumptions regarding future salary increases and investment earnings adopted by the Board for the June 30, 2019 valuation;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc., adopted by the Board for the June 30, 2019 valuation; and
- The funding policy adopted by the Board.

One of the general goals of an actuarial valuation is to establish contributions which fully fund the System's liabilities, and which, as a percentage of payroll, remain as level as possible for each generation of active members. Annual actuarial valuations measure the progress toward this goal, as well as test the adequacy of the contribution rates.

In preparing this valuation, we have employed generally accepted actuarial methods and assumptions to evaluate the System's liabilities and future contribution requirements. Our calculations are based upon member data and financial information provided to us by the System's staff. This information has not been audited by us, but it has been reviewed and found to be consistent, both internally and with prior year's information.

The contribution requirements are determined as a percentage of payroll. The System's employer rates provide for both Normal Cost and a contribution to amortize any unfunded or overfunded actuarial accrued liabilities. In this valuation, we have applied the funding policy adopted by the Board on September 20, 2012.[1] Details of the funding policy are provided in *Section 4, Exhibit I* on page 64.

A schedule of current amortization balances and payments may be found in *Section 3, Exhibit G – Table of Amortization Bases* on pages 51-52. A graphical projection of the Unfunded Actuarial Accrued Liability (UAAL) amortization balances and payments has been included in *Section 3, Exhibit H* on pages 53-54.

The rates calculated in this report may be adopted by the Board for the fiscal year that extends from July 1, 2020 through June 30, 2021.

[1] The individual elements to be included in a formal funding policy were approved by the Board at the September 20, 2012 meeting. A draft of a formal Actuarial Funding Policy was presented by Segal at the March 19, 2015 Board meeting, and we understand that the policy was adopted at the May 21, 2015 Board meeting.

Significant Issues

Ref: Pgs. 27, 34

1. The funded ratio measured on a valuation value of assets basis increased from 75.6% at June 30, 2018 to 75.9% at June 30, 2019. The funded ratio if measured on a market value of assets basis decreased from 77.3% to 76.6%. The UAAL increased from $542.6 million as of June 30, 2018 to $563.7 million as of June 30, 2019. The increase in the UAAL is primarily due to (a) the lower than expected return on the valuation value of assets (after smoothing), (b) higher than expected salary increases for continuing actives, (c) higher than expected current and future COLA increases for retirees and beneficiaries, and (d) other actuarial losses, offset somewhat by (e) actual contributions more than expected as a result of the Board's action to carry over the higher total employer contribution rates as originally determined in the June 30, 2016 valuation. A reconciliation of the System's UAAL is provided in *Section 2, Subsection E*.

2. The employer contribution rates that Segal recommended for the 2019/2020 Fiscal Year ("recommended rates") were provided in the June 30, 2018 valuation report. However, the Board decided to carry over unchanged for the 2019/2020 Fiscal Year ("adopted rates") the higher total (Pension and HIB Plans) employer contribution rates previously adopted by the Board for the 2018/2019 Fiscal Year, as originally determined in the June 30, 2016 valuations. That action was based on the concern that the reduction in the employer contribution rates as developed in the June 30, 2018 valuation may be temporary, since asset values from June 30, 2018 through December 31, 2018[2] had declined relative to the assumed value based on 7.0% per annum. Therefore, maintaining the 2018/2019 employer contribution rates for 2019/2020 would have the indirect impact of stabilizing the contribution rates should an increase in the contribution rates materialize for 2020/2021.

   While the Board decided to carry over the higher total (Pension and HIB Plans) employer contribution rates as originally determined in the June 30, 2016 valuations, both the employer and the member Normal Cost rates for the 2019/2020 Fiscal Year were nonetheless those calculated in the June 30, 2018 valuation in order to reflect the latest demographic information available for determining those rates. After adjusting for the Normal Cost rates, there was a higher amount left toward paying off the UAAL relative to the UAAL rates originally calculated in our June 30, 2018 Pension Plan valuation.

Ref: Pg. 29

3. The adopted and recommended aggregate employer rates from the June 30, 2018 valuation are 35.77% and 34.53%, respectively. The aggregate employer rate calculated in this valuation has increased from the recommended rate of 34.53% of payroll to 35.15% of payroll. The increase in the employer rate was primarily due to (a) the lower than expected return on the valuation value of assets (after smoothing), (b) higher than expected salary increases for continuing actives, (c) higher than expected current and future COLA increases for retirees and beneficiaries, and (d) other actuarial losses, offset somewhat by (e) amortizing the prior year's UAAL over a larger than expected projected total payroll and (f) actual contributions more than

[2] The contribution rates in the June 30, 2018 valuation were developed during the stated timeframe.

expected as a result of the Board's action to carry over the higher total employer contribution rates as originally determined in the June 30, 2016 valuation.

Ref: Pg. 30

4. The aggregate member rate calculated in this valuation has remained unchanged at 8.69% of payroll. A reconciliation of the System's aggregate member rate is provided in *Section 2, Subsection F*.

Ref: Pg. 19

5. As indicated in *Section 2, Subsection B* of this report, the total net unrecognized investment gain as of June 30, 2019 is $15.4 million for the assets for the pension and HIB plans (note that in the previous valuation, this amount was a net deferred gain of $38.9 million). This net investment gain will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years. This implies that earning the assumed rate of investment return of 7.00% per year (net of expenses) on a market value basis will produce investment gains on the actuarial value of assets after June 30, 2019.

   The net deferred gain of $15.4 million represents 0.8% of the market value of assets as of June 30, 2019. Unless offset by future investment losses or other unfavorable experience, the recognition of the net $15.4 million market gain is expected to have an impact on the System's future funded percentage and contribution rate requirements. This potential impact may be illustrated as follows:

   - If the pension plan portion of the net deferred gain were recognized immediately and entirely in the valuation value of assets, the funded percentage would increase from 75.9% to 76.6%.

     For comparison purposes, if the pension plan portion of the net deferred gain were recognized immediately and entirely in the valuation value of assets in the June 30, 2018 valuation, the funded percentage would have increased from 75.6% to 77.3%.

   - If the pension plan portion of the net deferred gain were recognized immediately and entirely in the valuation value of assets, the aggregate employer rate (payable at the end of each pay period) would decrease from 35.15% to about 34.6% of payroll.

     For comparison purposes, if the pension plan portion of the net deferred gain were recognized immediately and entirely in the valuation value of assets in the June 30, 2018 valuation, the aggregate employer rate (payable at the end of each pay period) would have decreased from 34.86% of payroll to about 33.5% of payroll.

6. The actuarial valuation report as of June 30, 2019 is based on financial information as of that date. Changes in the value of assets subsequent to that date are not reflected. Declines in asset values will increase the actuarial cost of the plan, while increases will decrease the actuarial cost of the plan.

Ref: Pg. 38

7. The Actuarial Standards Board approved a new Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment. ASOP 51 is effective with EBMUDERS' June 30, 2019 actuarial valuation. ASOP 51 requires actuaries to identify and assess risks that "may reasonably be anticipated to significantly affect the plan's future financial condition." Examples of key risks listed that are particularly relevant to EBMUDERS are asset/liability mismatch risk, investment risk, and longevity risk. The standard also requires an actuary to consider if there is any ongoing contribution risk to the plan, however it does not require the actuary to evaluate the particular ability or willingness of contributing entities to make contributions when due, nor does it require the actuary to assess the likelihood or consequences of future changes in applicable law.

   The actuary's initial assessment can be strictly a qualitative discussion about potential adverse experience and the possible effect on future results, but it may also include quantitative numerical demonstrations where informative. The actuary is also encouraged to consider a recommendation as to whether a more detailed assessment or risk report would be significantly beneficial for the intended user in order to examine particular financial risks. When making that recommendation, the actuary will take into account such factors as the plan's design, risk profile, maturity, size, funded status, asset allocation, cash flow, possible insolvency and current market conditions.

   Since the actuarial valuation results are dependent on a fixed set of assumptions and data as of a specific date, there is risk that emerging results may differ, perhaps significantly, as actual experience is fluid and will not exactly track current assumptions. This potential divergence may have a significant impact on the future financial condition of the plan. We are in discussion with the System's staff regarding specific content for a more detailed analysis of the potential range of the impact of risk relative to the System's future financial condition to be provided later in a stand-alone report. Therefore, in this valuation report, we have only included a brief discussion of key risks that may affect the System in Section 2, Subsection J. The more detailed assessment of the risks tailored to specific interests or concerns of the Board will provide the Board with a better understanding of the inherent risks and is recommended. This assessment will further discuss and highlight information and risks particular to EBMUDERS such as detailed historical experience and key events, growing plan maturity, heightened contribution sensitivity to asset and liability changes, and projected sensitivity to potential future investment returns through selected scenario or stress test projections.

Summary of Key Valuation Results

		June 30, 2019		June 30, 2018 (Adopted Rates)[1]	
		Total Rate	Estimated Annual Dollar Amount[2]	Total Rate	Estimated Annual Dollar Amount[2]
Employer Contribution Rates: ***(payable at the end of each pay period)***	• 1955/1980 Plan	37.29%	$54,211,678	37.86%	$55,040,336
	• 2013 Tier	30.52%	20,439,959	31.24%	20,922,160
	• Combined	35.15%	$74,651,637	35.77%	$75,962,496
Average Member Contribution Rates: ***(payable at the end of each pay period)***	• 1955/1980 Plan	8.66%[3]	$12,589,787	8.66%[3]	$12,589,787
	• 2013 Tier	8.75%	5,860,080	8.75%	5,860,080
	Combined	8.69%	$18,449,867	8.69%	$18,449,867

(1) The recommended employer contribution rates from the June 30, 2018 valuation were 36.72% for the 1955/1980 Plan, 29.79% for the 2013 Tier, and 34.53% for the two plans combined (based on the June 30, 2019 projected annual compensation).

(2) Estimated based on June 30, 2019 projected annual compensation of $212,350,940 (that is, $145,378,597 for the 1955/1980 Plan and $66,972,343 for the 2013 Tier).

(3) The rate of 8.66% payable during the fiscal years 2019/2020 and 2020/2021 is calculated by taking the total employee rate payable beginning April 18, 2016 (i.e., 8.75%), less the HIB employee contribution rate of 0.09%.

Summary of Key Valuation Results (continued)

		June 30, 2019	June 30, 2018
Actuarial Accrued Liability:	• Retired members and beneficiaries	$1,467,355,838	$1,362,091,541
	• Inactive vested members	49,348,988	44,915,354
	• Active members	824,068,246	813,970,538
	• Total Actuarial Accrued Liability (AAL)	2,340,773,072	2,220,977,433
	• Normal Cost for plan year beginning June 30	46,124,490	44,711,240
Assets:	• Valuation value of pension plan assets (VVA)[(1)]	$1,777,065,164	$1,678,417,000
	• Market value of pension plan assets (MVA)[(1)]	1,792,124,000	1,716,478,000
	• Actuarial value of pension plan and HIB plan assets	1,817,562,986	1,714,363,843
	• Market value of pension plan and HIB plan assets	1,832,965,000	1,753,240,000
	• Actuarial value of total plan assets as a percentage of market value of total plan assets	99.2%	97.8%
Funded status:	• Unfunded Actuarial Accrued Liability (UAAL) on VVA basis	$563,707,908	$542,560,433
	• Funded ratio on VVA basis	75.9%	75.6%
	• UAAL on MVA basis	$548,649,072	$504,499,433
	• Funded ratio on MVA basis	76.6%	77.3%
Key assumptions:	• Net investment return	7.00%	7.00%
	• Price Inflation	2.75%	2.75%
	• Payroll Growth	3.25%	3.25%

(1) Net of HIB plan assets.

Summary of Key Valuation Results (continued)

		June 30, 2019	June 30, 2018	Change From Prior Year
Demographic data:	**Active Members:**			
	• Number of members	1,847	1,828	1.0%
	• Average age	47.6	47.8	-0.2
	• Average service	12.0	12.4	-0.4
	• Total projected compensation	$212,350,940	$202,994,918	4.6%
	• Average projected compensation	$114,971	$111,048	3.5%
	Retired Members and Beneficiaries:			
	• Number of members:			
	– Service retired	1,483	1,428	3.9%
	– Disability retired	59	61	-3.3%
	– Beneficiaries	302	290	4.1%
	– Total	1,844	1,779	3.7%
	• Average age	70.3	70.2	0.1
	• Average monthly benefit	$5,024	$4,841	3.8%
	Inactive Vested Members:			
	• Number of members[(1)]	303	284	6.7%
	• Average Age	49.1	49.1	0.0
	Total Members:	3,994	3,891	2.6%

(1) Includes inactive members due a refund of member contributions.

Important Information About Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal relies on a number of input items. These include:

Plan of benefits	Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by the System. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
Assets	The valuation is based on the Market Value of Assets as of the valuation date, as provided by the System. The System uses an "Actuarial Value of Assets" that differs from market value to gradually reflect year-to-year changes in the Market Value of Assets in determining the contribution requirements.
Actuarial assumptions	In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, termination, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases and cost-of-living adjustments. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the plan's assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the Board. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan. Future contribution requirements may differ from those determined in the valuation because of:
  - Differences between actual experience and anticipated experience;
  - Changes in actuarial assumptions or methods;
  - Changes in statutory provisions; and
  - Differences between the contribution rates determined by the valuation and those adopted by the Board.
- If the System is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The Board should look to their other advisors for expertise in these areas.

As Segal has no discretionary authority with respect to the management or assets of the Retirement System, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Retirement System.

Section 2: Actuarial Valuation Results

A. Member Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, inactive vested members, retired members and beneficiaries.

This section presents a summary of significant statistical data on these member groups.

More detailed information for this valuation year and the preceding valuation can be found in *Section 3, Exhibits A, B, and C.*

MEMBER POPULATION: 2010 – 2019

Year Ended June 30	Active Members	Inactive Vested Members[1]	Retired Members and Beneficiaries	Total Non-Actives	Ratio of Non-Actives to Actives	Ratio of Retired Members and Beneficiaries to Actives
2010	1,756	222	1,270	1,492	0.85	0.72
2011	1,702	226	1,325	1,551	0.91	0.78
2012	1,703	224	1,361	1,585	0.93	0.80
2013	1,666	232	1,440	1,672	1.00	0.86
2014	1,715	237	1,497	1,734	1.01	0.87
2015	1,762	239	1,563	1,802	1.02	0.89
2016	1,789	248	1,630	1,878	1.05	0.91
2017	1,802	267	1,713	1,980	1.10	0.95
2018	1,828	284	1,779	2,063	1.13	0.97
2019	1,847	303	1,844	2,147	1.16	1.00

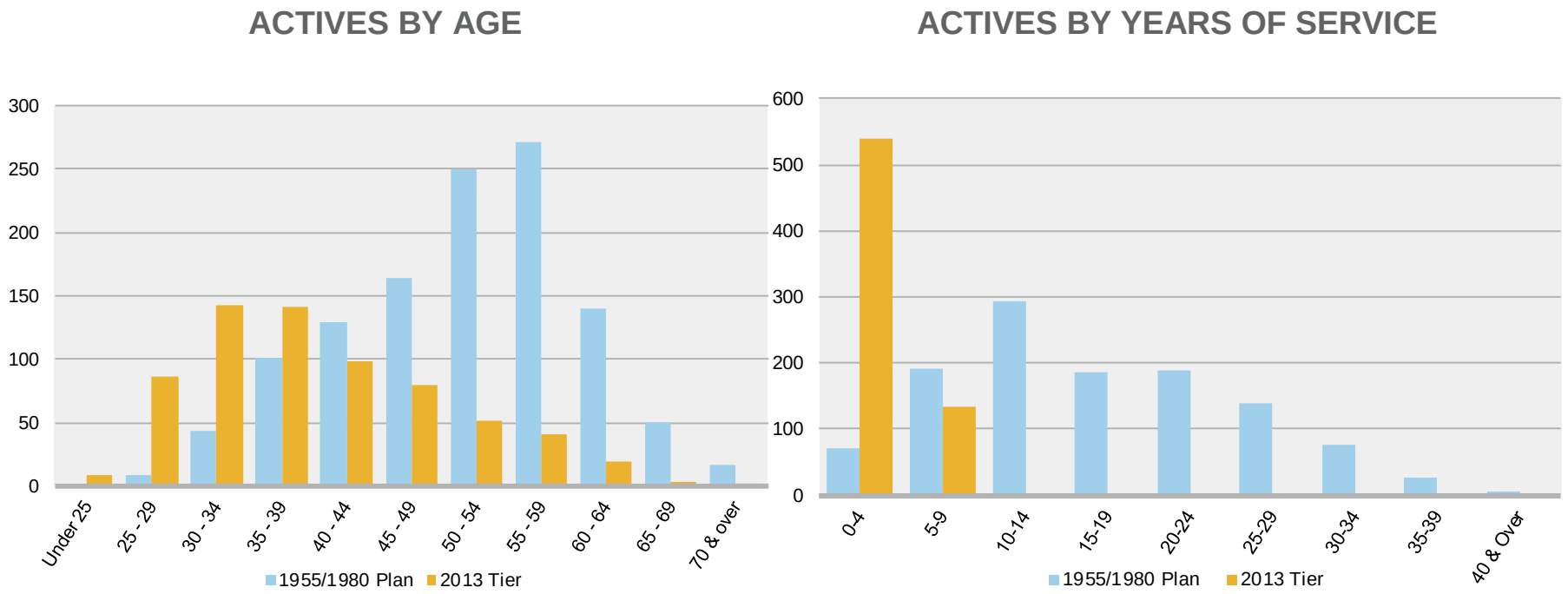
[1] Includes inactive members due a refund of contributions.

Active Members

Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 1,847 active members with an average age of 47.6, average years of service of 12.0 years and average compensation of $114,971. The 1,828 active members in the prior valuation had an average age of 47.8, average service of 12.4 years and average compensation of $111,048.

Among the active members, there were none with unknown age information.

Distribution of Active Members as of June 30, 2019



Inactive Members

In this year's valuation, there were 303 members with a vested right to a deferred or immediate vested benefit or a refund of contributions, versus 284 in the prior valuation.

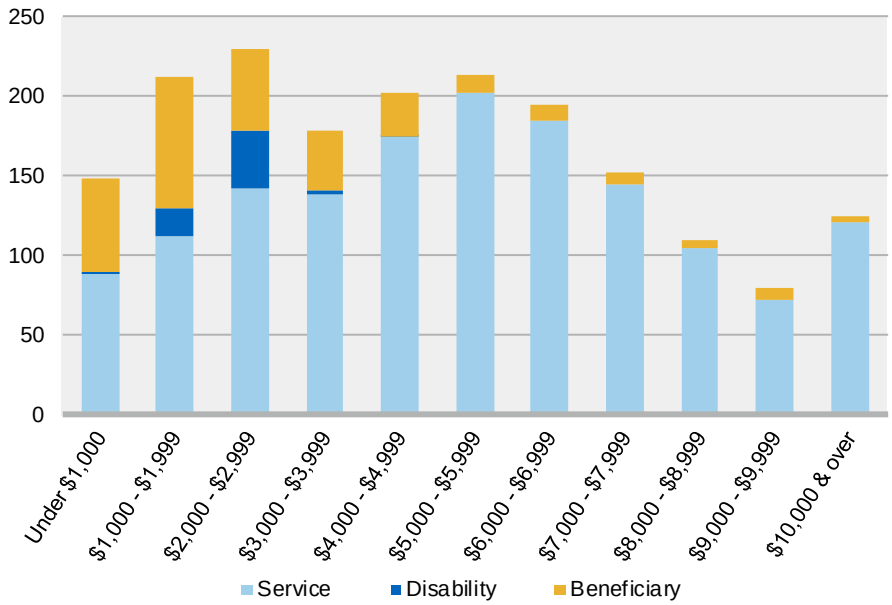
Retired Members and Beneficiaries

As of June 30, 2019, 1,542 retired members and 302 beneficiaries were receiving total monthly benefits of $9,264,209. For comparison, in the previous valuation, there were 1,489 retired members and 290 beneficiaries receiving monthly benefits of $8,612,030.

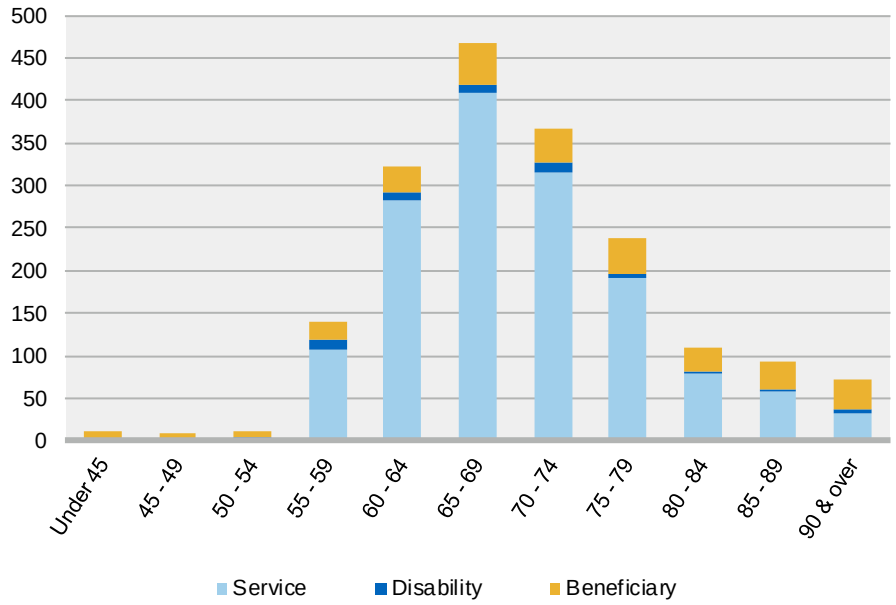
As of June 30, 2019, the average monthly benefit for retired members and beneficiaries is $5,024, compared to $4,841 in the previous valuation. The average age for retired members and beneficiaries is 70.3 in the current valuation, compared with 70.2 in the prior valuation.

Distribution of Retired Members and Beneficiaries as of June 30, 2019

RETIRED MEMBERS AND BENEFICIARIES BY TYPE AND MONTHLY AMOUNT



RETIRED MEMBERS AND BENEFICIARIES BY TYPE AND AGE



Historical Plan Population

The chart below demonstrates the progression of the active population over the last ten years. The chart also shows the growth among the retired population over the same time period.

MEMBER STATISTICS: 2010 – 2019

	Active Members			Retired Members and Beneficiaries		
Year Ended June 30	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2010	1,756	49.3	14.8	1,270	71.1	3,522
2011	1,702	49.6	14.9	1,325	70.8	3,684
2012	1,703	49.9	15.1	1,361	70.7	3,832
2013	1,666	49.7	14.9	1,440	70.3	4,007
2014	1,715	49.3	14.3	1,497	70.3	4,183
2015	1,762	48.8	13.7	1,563	70.1	4,360
2016	1,789	48.5	13.3	1,630	70.1	4,499
2017	1,802	48.0	12.8	1,713	70.1	4,649
2018	1,828	47.8	12.4	1,779	70.2	4,841
2019	1,847	47.6	12.0	1,844	70.3	5,024

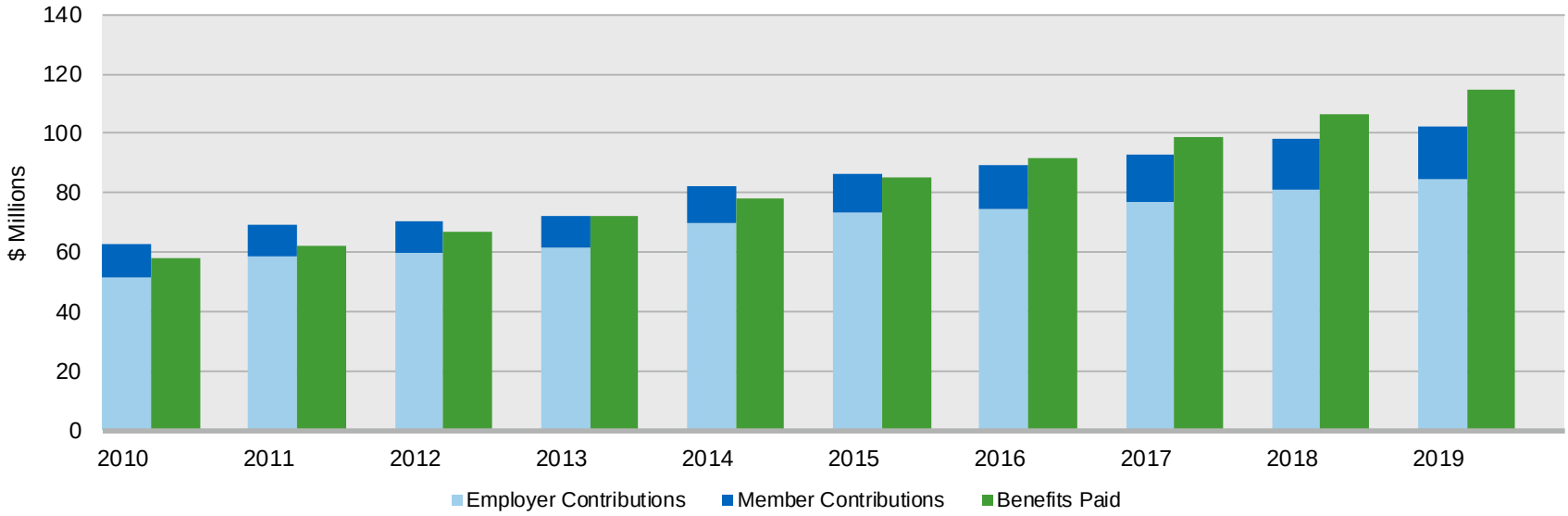
B. Financial Information

Pension plan funding anticipates that, over the long term, both contributions and investment earnings (less investment fees and administrative expenses) will be needed to cover benefit payments. Pension plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of transactions for the valuation year, is presented in *Section 3, Exhibits D, E, and F*.

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the valuation asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

COMPARISON OF CONTRIBUTIONS WITH BENEFITS
FOR YEARS ENDED JUNE 30, 2010 – 2019
(PENSION AND HIB PLANS)



DETERMINATION OF ACTUARIAL VALUE OF ASSETS

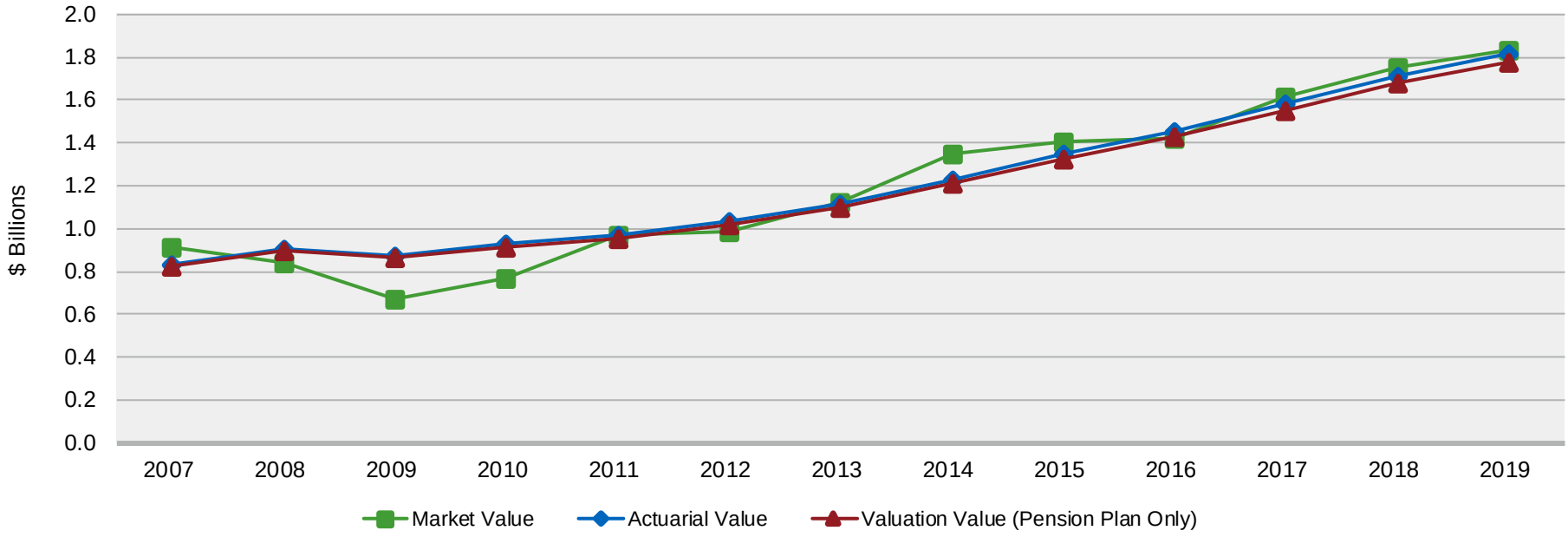
1	**Market Value of Assets:**					
	(a) Pension plan					**$1,792,124,000**
	(b) HIB plan					**40,841,000**
	(c) Total					**$1,832,965,000**
2	Calculation of deferred return	**Actual Return**	**Expected Return**	**Investment Gain/(Loss)**	**Percent Deferred**	**Deferred Return**
a)	Year ended June 30, 2015	$58,937,000	$101,068,500	$(42,131,500)	0%	$0
b)	Year ended June 30, 2016	12,894,000	105,466,650	(92,572,650)	20	(18,514,530)
c)	Year ended June 30, 2017	200,254,000	102,606,314	97,647,686	40	39,059,074
d)	Year ended June 30, 2018	148,798,000	116,619,368	32,178,632	60	19,307,178
e)	Year ended June 30, 2019	91,744,000	122,306,135	(30,562,135)	80	(24,449,708)
f)	Total unrecognized return[1]					$15,402,014
3	Preliminary Actuarial Value of Assets: 1c – 2f					$1,817,562,986
4	Adjustment to be within 30% corridor of market value					0
5	**Final Actuarial Value of Assets:** 3 + 4					**$1,817,562,986**
6	Actuarial Value of Assets as a percentage of Market Value of Assets: 5 ÷ 1c					99.2%
7	**Valuation Value of Pension Plan Assets:** 1a ÷ 1c x 5					**$1,777,065,164**

[1] Deferred return as of June 30, 2019 that will be recognized in each of the next four years (amounts may not total exactly due to rounding):

(a) Amount recognized on June 30, 2020	$1,338,306
(b) Amount recognized on June 30, 2021	19,852,836
(c) Amount recognized on June 30, 2022	323,299
(d) Amount recognized on June 30, 2023	(6,112,427)
(e) Total unrecognized return as of June 30, 2019	$15,402,014

The Market Value, Actuarial Value and Valuation Value of Assets are representations of the Plan's financial status. As investment gains and losses are gradually taken into account, the Actuarial Value of Assets tracks the Market Value of Assets. The Valuation Value of Assets is the actuarial value, excluding HIB assets. The Valuation Value of Assets is significant because the Plan's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the Unfunded Actuarial Accrued Liability is an important element in determining the contribution requirement.

MARKET VALUE, ACTUARIAL VALUE, AND VALUATION VALUE (PENSION PLAN ONLY) OF ASSETS AS OF JUNE 30, 2007 – 2019



C. Actuarial Experience

To calculate any actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the actuarially determined contribution will decrease from the previous year. On the other hand, the actuarially determined contribution will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years. There are no assumption changes reflected in this report.

The total loss is $26.7 million, which includes $4.3 million from investment losses, a gain of $3.5 million from contribution experience and $25.9 million in losses from all other sources. The net experience variation from individual sources other than investments and contributions was 1.11% of the Actuarial Accrued Liability. A discussion of the major components of the actuarial experience is on the following pages.

ACTUARIAL EXPERIENCE FOR YEAR ENDED JUNE 30, 2019

1	Net loss from investments[1]	$(4,277,541)
2	Actual contributions more than expected as a result of the Board's action to carry over the higher total employer contribution rates as originally determined in the June 30, 2016 valuation	3,522,324
3	Net loss from other experience[2]	(25,973,668)
4	Net experience loss:[3] 1 + 2 + 3	$(26,728,885)

(1) Details on next page.

(2) See *Subsection E* for further details.

(3) The net loss is attributed to actual liability experience from July 1, 2018 through June 30, 2019 compared to the projected experience based on the actuarial assumptions as of June 30, 2018. Does not include the effect of plan or assumption changes as of June 30, 2019, if any.

Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Plan's investment policy. The rate of return on the Market Value of Assets was 5.25% for the year ended June 30, 2019.

For valuation purposes, the assumed rate of return on the Valuation Value of Assets is 7.00% (for the June 30, 2018 valuation). The actual rate of return on a valuation value basis (after smoothing) for the 2018/2019 plan year was 6.74%. Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended June 30, 2019 with regard to its investments.

INVESTMENT EXPERIENCE FOR YEAR ENDED JUNE 30, 2019

		Valuation Value (includes pension plan assets only)	Actuarial Value (includes pension and HIB plan assets)	Market Value (includes pension and HIB plan assets)
1	Net investment income	$112,719,164	$115,218,143	$91,744,000
2	Average value of assets	1,671,381,500	1,708,354,343	1,747,230,500
3	Rate of return: 1 ÷ 2	6.74%	6.74%	5.25%
4	Assumed rate of return	7.00%	7.00%	7.00%
5	Expected investment income: 2 x 4	$116,996,705	$119,584,804	$122,306,135
6	Actuarial gain/(loss): 1 – 5	$(4,277,541)	$(4,366,661)	$(30,562,135)

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on a valuation value, actuarial value, and market value basis for the last ten years.

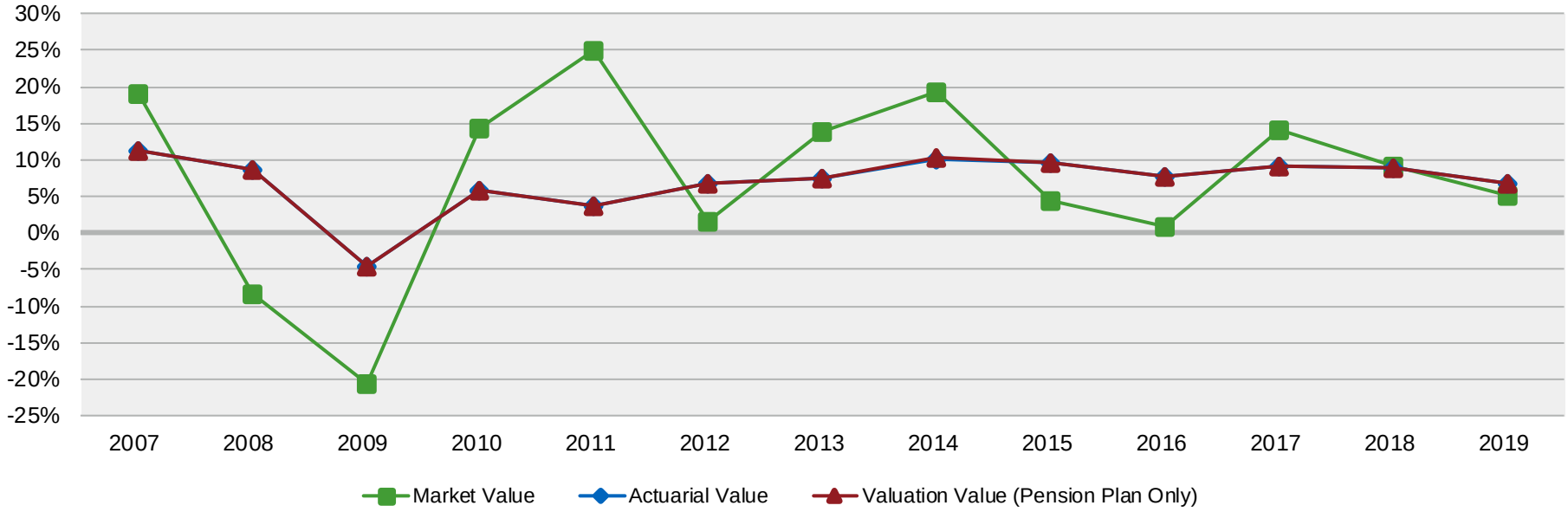
INVESTMENT RETURN – VALUATION VALUE, ACTUARIAL VALUE, AND MARKET VALUE: 2010 – 2019[1]

Year Ended June 30	Valuation Value Investment Return		Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent	Amount	Percent
2010	$51,167,488	5.93%	$51,966,871	5.96%	$95,737,000	14.27%
2011	33,223,487	3.62%	33,642,654	3.62%	191,970,000	24.85%
2012	64,558,352	6.75%	65,488,807	6.76%	15,202,000	1.57%
2013	75,506,213	7.40%	76,545,489	7.39%	137,318,000	13.91%
2014	112,077,589	10.22%	113,600,558	10.19%	218,575,000	19.41%
2015	117,145,293	9.68%	118,952,917	9.67%	58,937,000	4.37%
2016	102,598,231	7.74%	104,468,421	7.74%	12,894,000	0.92%
2017	131,217,766	9.23%	133,617,292	9.22%	200,254,000	14.15%
2018	139,184,681	9.01%	141,900,834	9.00%	148,798,000	9.25%
2019	112,719,164	6.74%	115,218,143	6.74%	91,744,000	5.25%
Most recent five-year geometric average return		8.47%		8.47%		6.69%
Most recent ten-year geometric average return		7.62%		7.61%		10.54%

[1] Market Value and Actuarial Value of Assets are for the pension plan and the HIB plan. Valuation Value of Assets are for the pension plan only.

Subsection B described the actuarial asset valuation method that gradually recognizes fluctuations in the market value rate of return. The goal of this is to stabilize the actuarial rate of return and to produce more level pension plan costs.

MARKET, ACTUARIAL AND VALUATION (PENSION PLAN ONLY) RATES OF RETURN FOR YEARS ENDED JUNE 30, 2007 – 2019



Contributions

Contributions for the year ended June 30, 2019, when adjusted for timing, totaled $94.9 million, compared to the projected amount of $91.4 million (also adjusted for timing). This resulted in a gain of $3.5 million for the year, when adjusted for timing.

Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among participants,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected),
- salary increases (greater or smaller than projected), and
- cost-of-living adjustments (COLAs; higher or lower than anticipated).

The net loss from this other experience for the year ended June 30, 2019 amounted to $25.9 million, which is 1.11% of the Actuarial Accrued Liability. This loss was mainly due to higher than expected individual salary increases for actives and higher than expected current and future COLA increases for retirees and beneficiaries. See *Subsection E* for a detailed development of the Unfunded Actuarial Accrued Liability.

D. Other Changes in the Actuarial Accrued Liability

The Actuarial Accrued Liability as of June 30, 2019 is $2.341 billion, an increase of $119.8 million, or 5.4%, from the liability as of the prior valuation date. The Actuarial Accrued Liability is expected to grow each year with Normal Cost and interest, and to decline due to benefit payments made. Additional fluctuations can occur due to actual experience that differs from expected (as discussed in the previous subsection).

Actuarial Assumptions

- There are no assumption changes reflected in this report.
- Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

Plan Provisions

- There were no changes in plan provisions since the prior valuation.
- A summary of plan provisions is in *Section 4, Exhibit II*.

E. Development of Unfunded/(Overfunded) Actuarial Accrued Liability

DEVELOPMENT FOR YEAR ENDED JUNE 30, 2019

1	**Unfunded Actuarial Accrued Liability at beginning of year**		**$542,560,433**
2	Total Normal Cost at beginning of year		44,711,240
3	Expected employer and member contributions at beginning of year		(85,422,118)
4	Interest		35,129,468
5	Expected Unfunded Actuarial Accrued Liability at end of year		$536,979,023
6	Changes due to:		
	a) Investment loss on smoothed value of assets	$4,277,541	
	b) Actual contributions more than expected as a result of the Board's action to carry over the higher total employer contribution rates as originally determined in the June 30, 2016 valuation	(3,522,324)	
	c) Loss due to higher than expected salary increases for continuing active members	6,019,850	
	d) Loss due to higher than expected current and future COLA increases for retirees and beneficiaries	13,031,588	
	e) Other losses on demographic experience	6,922,230	
	Total changes		$26,728,885
7	**Unfunded Actuarial Accrued Liability at end of year**		**$563,707,908**

Note: The "net loss from other experience" of $25,973,668 from Subsection C is equal to the sum of items 6c, 6d, and 6e.

F. Recommended Contribution

The recommended contribution is equal to the employer Normal Cost payment and a payment on the Unfunded Actuarial Accrued Liability. As of June 30, 2019, the average recommended employer contribution is 35.15% of compensation.

The Board sets the funding policy used to calculate the recommended contribution based on layered amortization periods. See *Section 4, Exhibit I* for further details on the funding policy.

The contribution requirement as of June 30, 2019 is based on the data previously described, the actuarial assumptions and Plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

AVERAGE RECOMMENDED EMPLOYER CONTRIBUTION FOR YEAR ENDING JUNE 30

All Tiers Combined		2019		2018 (Recommended Rates)	
		Amount	% of Projected Compensation	Amount	% of Projected Compensation
1	Total Normal Cost	$47,722,108	22.47%	$46,252,519	22.79%
2	Expected member Normal Cost contributions	18,449,867	8.69%	17,628,638	8.68%
3	Employer Normal Cost: 1 – 2	$29,272,241	13.78%	$28,623,881	14.11%
4	Actuarial Accrued Liability	2,340,773,072		2,220,977,433	
5	Valuation Value of Assets	1,777,065,164		1,678,417,000	
6	Unfunded Actuarial Accrued Liability: 4 – 5	$563,707,908		$542,560,433	
7	Payment on Unfunded Actuarial Accrued Liability	45,379,396	21.37%	42,121,445	20.75%
8	Total average recommended employer contribution: 3 + 7	$74,651,637	35.15%	$70,745,326	34.86%
9	Projected compensation	$212,350,940		$202,994,918	

Note: Contributions are assumed to be paid at the end of each pay period.

Reconciliation of Average Recommended Employer Contribution Rate

The chart below details the changes in the average recommended employer contribution from the prior valuation to the current year's valuation.

RECONCILIATION OF AVERAGE RECOMMENDED EMPLOYER CONTRIBUTION RATE FROM JUNE 30, 2018 TO JUNE 30, 2019

	Contribution Rate	Estimated Annual Dollar Amount[1]
Average Adopted Employer Contribution Rate as of June 30, 2018	**35.77%**	**$75,962,496**
Average Recommended Employer Contribution Rate as of June 30, 2018	**34.53%**	**$73,334,081**
• Effect of investment return less than expected on smoothed value of assets	0.14%	297,291
• Effect of individual salary increases higher than expected for continuing active members	0.20%	424,702
• Effect higher than expected current and future COLA increases for retirees and beneficiaries	0.44%	934,344
• Effect of amortizing prior year's UAAL over a larger than expected projected total payroll	(0.27)%	(573,348)
• Effect of actual contributions more than expected as a result of the Board's action to carry over the higher total employer contribution rates as originally determined in the June 30, 2016 valuation	(0.12)%	(254,821)
• Effect of other demographic experience losses on accrued liability	0.23%	489,388
Total change	0.62%	$1,317,556
Average Recommended Employer Contribution Rate as of June 30, 2019	**35.15%**	**$74,651,637**

[1] Based on June 30, 2019 projected compensation of $212,350,940.

Reconciliation of Average Recommended Member Contribution

The chart below details the changes in the average recommended member contribution from the prior valuation to the current year's valuation.

RECONCILIATION OF AVERAGE RECOMMENDED MEMBER CONTRIBUTION RATE FROM JUNE 30, 2018 TO JUNE 30, 2019

	Contribution Rate	Estimated Annual Dollar Amount[1]
Average Recommended Member Contribution Rate as of June 30, 2018	**8.69%**	**$18,449,867**
• Effect of changes in member demographics	0.00%	0
Total change	0.00%	$0
Average Recommended Member Contribution Rate as of June 30, 2019	**8.69%**	**$18,449,867**

[1] Based on June 30, 2019 projected compensation of $212,350,940.

Recommended Employer Contribution Rates
(% of payroll; payable at the end of each pay period)

	June 30, 2019 Actuarial Valuation		June 30, 2018 Actuarial Valuation (Adopted Rates)	
	Contribution Rate	Estimated Annual Dollar Amount[1]	Contribution Rate	Estimated Annual Dollar Amount[1]
1955/1980 Plan				
Total Normal Cost	24.58%	$35,734,059	24.63%	$35,806,748
Expected Employee Contributions	-8.66%[2]	-12,589,787	-8.66%[2]	-12,589,787
Employer Normal Cost	15.92%	$23,144,272	15.97%	$23,216,961
UAAL	21.37%	31,067,406	21.89%[3]	31,823,375
Total Employer Contribution	37.29%	$54,211,678	37.86%	$55,040,336
2013 Tier				
Total Normal Cost	17.90%	$11,988,049	17.79%	$11,914,380
Expected Employee Contributions	-8.75%	-5,860,080	-8.75%	-5,860,080
Employer Normal Cost	9.15%	$6,127,969	9.04%	$6,054,300
UAAL	21.37%	14,311,990	22.20%[3]	14,867,860
Total Employer Contribution	30.52%	$20,439,959	31.24%	$20,922,160
Combined				
Total Normal Cost	22.47%	$47,722,108	22.47%	$47,721,128
Expected Employee Contributions	-8.69%	-18,449,867	-8.69%	-18,449,867
Employer Normal Cost	13.78%	$29,272,241	13.78%	$29,271,261
UAAL	21.37%	45,379,396	21.99%	46,691,235
Total Employer Contribution	35.15%	$74,651,637	35.77%	$75,962,496

(1) Amounts are based on the following June 30, 2019 projected annual payroll:

1955/1980 Plan	$145,378,597
2013 Tier	66,972,343
Combined	$212,350,940

(2) The rate of 8.66% payable during the fiscal years 2019/2020 and 2020/2021 is calculated by taking the total employee rate payable beginning April 18, 2016 (i.e., 8.75%), less the HIB employee contribution rate of 0.09%.

(3) The adopted UAAL rates for the June 30, 2018 valuation for the 1955/1980 Plan and the 2013 Tier are not the same since the Board decided to carry over unchanged the higher employer contribution rates from the June 30, 2017 valuations for the June 30, 2018 valuations. For the Pension Plan, the employer normal cost rates for the 2018 valuation remain the same as those rates actuarially determined for that valuation in order to reflect the most recent demographic information, and the UAAL rates represent the difference between the total rates and the normal cost rates, which produces said variance in the UAAL rates.

Recommended Employer Contribution Rates
(% of payroll; payable at the end of each pay period; continued)

	June 30, 2019 Actuarial Valuation		June 30, 2018 Actuarial Valuation (Recommended Rates)	
	Contribution Rate	Estimated Annual Dollar Amount[1]	Contribution Rate	Estimated Annual Dollar Amount[1]
1955/1980 Plan				
Total Normal Cost	24.58%	$35,734,059	24.63%	$35,806,748
Expected Employee Contributions	-8.66%[2]	-12,589,787	-8.66%[2]	-12,589,787
Employer Normal Cost	15.92%	$23,144,272	15.97%	$23,216,961
UAAL	21.37%	31,067,406	20.75%	30,166,059
Total Employer Contribution	37.29%	$54,211,678	36.72%	$53,383,020
2013 Tier				
Total Normal Cost	17.90%	$11,988,049	17.79%	$11,914,380
Expected Employee Contributions	-8.75%	-5,860,080	-8.75%	-5,860,080
Employer Normal Cost	9.15%	$6,127,969	9.04%	$6,054,300
UAAL	21.37%	14,311,990	20.75%	13,896,761
Total Employer Contribution	30.52%	$20,439,959	29.79%	$19,951,061
Combined				
Total Normal Cost	22.47%	$47,722,108	22.47%	$47,721,128
Expected Employee Contributions	-8.69%	-18,449,867	-8.69%	-18,449,867
Employer Normal Cost	13.78%	$29,272,241	13.78%	$29,271,261
UAAL	21.37%	45,379,396	20.75%	44,062,820
Total Employer Contribution	35.15%	$74,651,637	34.53%	$73,334,081

[1] Amounts are based on the following June 30, 2019 projected annual payroll:

1955/1980 Plan	$145,378,597
2013 Tier	66,972,343
Combined	$212,350,940

[2] The rate of 8.66% payable during the fiscal years 2019/2020 and 2020/2021 is calculated by taking the total employee rate payable beginning April 18, 2016 (i.e., 8.75%), less the HIB employee contribution rate of 0.09%.

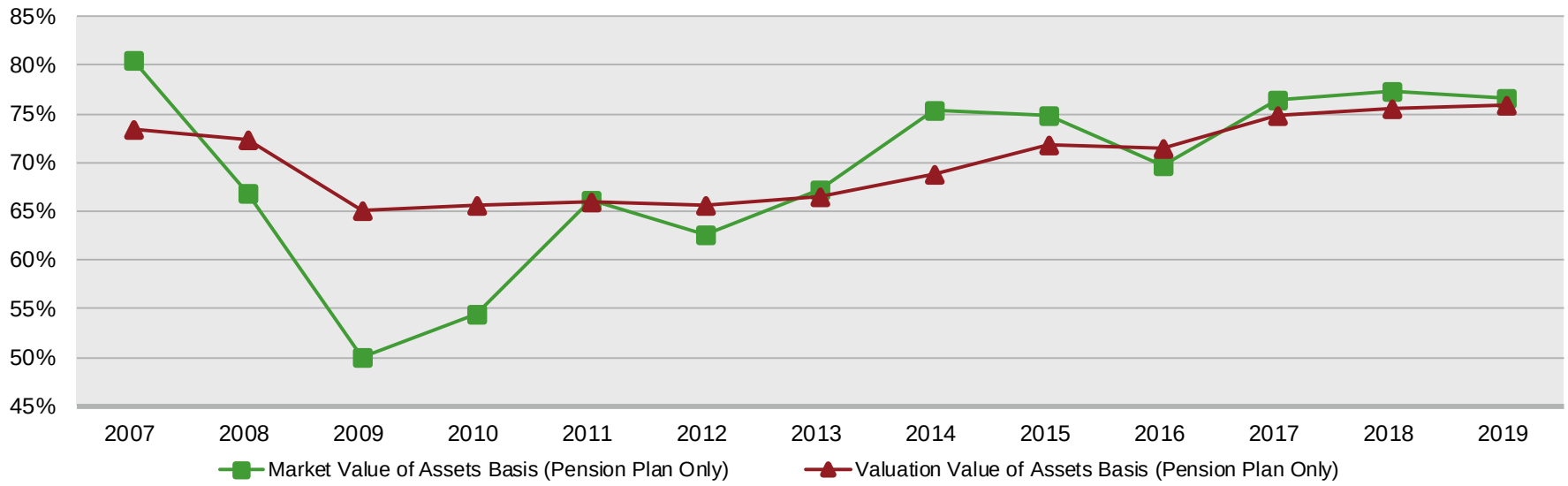
G. Funded Status

A commonly reported piece of information regarding the Plan's financial status is the funded ratio. These ratios compare the Valuation Value of Assets and the Market Value of Assets to the Actuarial Accrued Liability of the Plan. Higher ratios indicate a relatively well-funded plan, while lower ratios may indicate recent changes to actuarial assumptions, funding of the plan below actuarial requirements, poor asset performance, or a variety of other causes.

The chart below depicts a history of the funded ratio for the Plan. The chart on the next page shows the Plan's schedule of funding progress for the last ten years.

The funded status measures shown in this valuation are appropriate for assessing the need for or amount of future contributions. However, they are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. As the chart below shows, the measures are different depending on whether the Valuation Value or Market Value of Assets is used.

FUNDED RATIO
FOR YEARS ENDING JUNE 30, 2007 – 2019



SCHEDULE OF FUNDING PROGRESS
FOR YEARS ENDING JUNE 30, 2010 – 2019
(DOLLAR AMOUNTS IN THOUSANDS)

Actuarial Valuation Date as of June 30,	Valuation Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)	Funded Ratio (%) (a) / (b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll (%) [(b) - (a)] / (c)
2010	$915,845	$1,396,003	$480,158	65.6%	$164,085	292.6%
2011	954,719	1,446,039	491,320	66.0	159,505	308.0
2012	1,021,546	1,556,696	535,150	65.6	158,847	336.9
2013	1,095,847	1,646,534	550,687	66.6	159,246	345.8
2014	1,210,321	1,756,706	546,385	68.9	167,196	326.8
2015	1,327,113	1,845,912	518,799	71.9	174,899	296.6
2016	1,425,785	1,995,863	570,078	71.4	183,971	309.9
2017	1,549,213	2,068,015	518,802	74.9	184,859	280.6
2018	1,678,417	2,220,977	542,560	75.6	202,995	267.3
2019	1,777,065	2,340,773	563,708	75.9	212,351	265.5

H. Actuarial Balance Sheet

An overview of the Plan's funding is given by an Actuarial Balance Sheet. In this approach, first the amount and timing of all future payments that will be made by the Plan for current participants is determined. Then these payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value, referred to as the Actuarial Present Value of Future Benefits of the Plan.

Second, this Actuarial Present Value of Future Benefits is compared to the assets. The "assets" for this purpose include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future employer Normal Cost contributions, and the present value of future employer amortization payments for the Unfunded Actuarial Accrued Liability.

ACTUARIAL BALANCE SHEET

	Year Ended	
	June 30, 2019	June 30, 2018
Actuarial Present Value of Future Benefits		
• Present value of benefits for retired members and beneficiaries	$1,467,355,838	$1,362,091,541
• Present value of benefits for inactive vested members	49,348,988	44,915,354
• Present value of benefits for active members	1,198,778,097	1,176,255,013
Total Actuarial Present Value of Future Benefits	**$2,715,482,923**	**$2,583,261,908**
Current and future assets		
• Total Valuation Value of Assets	$1,777,065,164	$1,678,417,000
• Present value of future contributions by members	156,472,262	148,485,510
• Present value of future employer contributions for:		
» Entry age Normal Cost	218,237,589	213,798,965
» Unfunded Actuarial Accrued Liability	563,707,908	542,560,433
Total of current and future assets	**$2,715,482,923**	**$2,583,261,908**

I. Volatility Ratios

Retirement plans are subject to volatility in the level of required contributions. This volatility tends to increase as retirement plans become more mature.

The Asset Volatility Ratio (AVR), which is equal to the Market Value of Assets divided by total payroll, provides an indication of the potential contribution volatility for any given level of investment volatility. A higher AVR indicates that the plan is subject to a greater level of contribution volatility. This is a current measurement since it is based on the current level of assets.

The current AVR is about 8.4. This means that a 1% asset gain or loss (relative to the assumed investment return) translates to about 8.4% of one-year's payroll. Since actuarial gains and losses are amortized over 20 years, there would be a 0.6% of payroll decrease/(increase) in the required contribution for each 1% asset gain/(loss).

The Liability Volatility Ratio (LVR), which is equal to the Actuarial Accrued Liability divided by payroll, provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. This is because, over an extended period of time, the plan's assets should track the plan's liabilities.

The LVR also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions. The current LVR is about 11.0. This is about 31% higher than the AVR. Therefore, we would expect that contribution volatility will increase over the long term.

The chart on the next page shows how the asset and liability volatility ratios have varied over time.

VOLATILITY RATIOS FOR YEARS ENDED 2010 – 2019

Year Ended June 30	Asset Volatility Ratio	Liability Volatility Ratio
2010	4.6	8.5
2011	6.0	9.1
2012	6.1	9.8
2013	7.0	10.3
2014	7.9	10.5
2015	7.9	10.6
2016	7.6	10.8
2017	8.6	11.2
2018	8.5	10.9
2019	8.4	11.0

J. Risk Assessment

Since the actuarial valuation results are dependent on a fixed set of assumptions and data as of a specific date, there is risk that emerging results may differ, perhaps significantly, as actual experience is fluid and will not exactly track current assumptions. This potential divergence may have a significant impact on the future financial condition of the plan.

This section does not contain a detailed analysis of the potential range of future measurements, but does include a concise discussion of some of the primary risks that may affect the Plan's future financial condition. We recommend a more detailed assessment of the risks to provide the Board with a better understanding of the risks inherent in the Plan that can inform both financial preparation and future decision making. This assessment would enable us to work with the Board to highlight and illustrate particular risks or potential future outcomes it may be interested in discussing and could include tailored scenario testing, sensitivity testing, stress testing and stochastic modeling. As noted in the Significant Issues section of this report, we are in discussion with the System's staff regarding specific content for a detailed analysis of the potential range of the impact of risk relative to the System's future financial condition to be provided later in a stand-alone report.

This section provides descriptions and basic assessments of the primary risks that are likely to have an ongoing influence on the Plan's financial health, as well as a discussion of historical trends and maturity measures.

Risk Assessments

- Asset/Liability Mismatch Risk (the potential that future plan experience does not affect asset and liability values in the same way, causing them to diverge)

  The most significant asset/liability mismatch risk to the Plan is investment risk, as discussed below. In fact, investment risk has the potential to impact asset/liability mismatch in two ways. The first mismatch is evident in annual valuations: when asset values deviate from assumptions, they are typically independent from liability changes. The second mismatch can be caused when systemic asset deviations from assumptions may signal the need for an assumption change, which causes liability values and contribution rates to move in the opposite direction from any changes in the expected experience of asset growth rates.

  Asset/liability mismatch can also be caused by demographic assumption risk such as longevity, which affects liabilities but have no impact on asset levels. This risk is also discussed below.

- Investment Risk (the risk that investment returns will be different than expected)

  The investment return assumption is a long-term, static assumption for valuation purposes even though in reality market experience can be quite volatile in any given year. That volatility can cause significant changes in the financial health of the system, affecting both funded status and contribution rates. The inherent year-to-year volatility is reduced by smoothing through the Actuarial Value of Assets, however investment experience can still have a sizable impact. As discussed in *Section 2, Subsection I, Volatility Ratios,* on page 36, a 1% asset gain or loss (relative to the assumed investment return) translates to about 8.4% of one-year's payroll. Since

actuarial gains and losses are amortized over 20 years, there would be a 0.6% of payroll decrease/(increase) in the required contribution for each 1% asset gain or loss.

The single year market value rate of return over the last 10 years has ranged from a low of 0.92% to a high of 24.85%.

- Longevity Risk (the risk that mortality experience will be different than expected)

  The actuarial valuation includes current life expectancy assumptions and an expectation of future improvement in life expectancy, which are significant assumptions given the relatively long duration of liabilities for pension plans. Emerging plan experience that does not match these expectations will result in increases or decreases in the actuarially determined contribution over time. This risk can be reduced by using tables appropriate for the Plan (public experience tables) that are weighted by benefit levels, and by using generational mortality projections. We will be discussing the use of such mortality tables with the Board for the upcoming quadrennial experience study before we complete our next valuation as of June 30, 2020.

- Other Risks

  In addition to longevity, the valuation includes a variety of other assumptions that are unlikely to match future experience exactly. One example is projected salary scales over time. As salary is central to the determination of benefits paid in retirement, deviations from the projected salary scales could have a material impact on the benefits anticipated for each member. Examples of demographic assumptions include retirement, termination and disability assumptions, and will likely vary in significance for different pension plans.

Some plans also carry significant contribution risk, defined as the potential for actual future contributions deviating from expected future contributions. However, the employer has a proven track-record of making at least the Actuarially Determined Contributions based on the Board's Actuarial Funding Policy, so contribution risk is minimal.

Evaluation of Historical Trends

Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past ten years:

- The funded percentage on the Valuation Value of Assets basis has increased from 65.6% to 75.9%. This is primarily due to contributions made to amortize the UAAL under the Board's actuarial funding policy. For a more detailed history see *Section 2, Subsection G, Funded Status* starting on page 33.
- The average geometric investment return on the Actuarial Value of Assets was 7.61%. This includes a high of a 10.19% return and a low of 3.62%. The average over the last 5 years was 8.47%. For more details see the Investment Return table in *Section 2, Subsection C* on page 23.
- The primary source of new UAAL was the strengthening of assumptions through multiple assumption changes. For example, the assumption changes in 2012 included a change in the discount rate from 8.00% to 7.75% and a strengthening of the mortality assumption, adding $53.4 million in unfunded liability, and the assumption changes in 2016 included a change in the discount rate

from 7.50% to 7.25%, adding $52.6 million in unfunded liability. For more details on the unfunded liability changes see *Section 3, Exhibit G, Table of Amortization Bases* starting on page 51. A graphical representation of historical changes in UAAL by source will be included in the stand-alone risk assessment report.

- The plan's funding policy effectively deals with these unfunded liabilities over time. This can be seen most clearly in *Section 3, Exhibit H, Projection of UAAL Balances and Payments* provided on pages 53 and 54.

Maturity Measures

In the last 10 years the ratio of retired members and beneficiaries to active members has increased from 0.72 to 1.00. An increased ratio indicates that the plan has grown in maturity over time. This is to be expected, but is also informative for understanding plan sensitivity to particular risks. For more details see *Section 2, Subsection A, Member Data* on page 14.

As pension plans mature, the cash needed to fulfill benefit obligations will increase over time. Therefore, cash flow projections and analysis should be performed to assure that the Plan's asset allocation is aligned to meet emerging pension liabilities. For the prior year, benefits paid were $12.0 million more than contributions received.[3] Plans with high levels of negative cash flows may have a need for a larger allocation to income generating assets, which can create a drag on investment return. However, this plan currently has relatively low levels of negative cash flows. For more details on historical cash flows see the Comparison of Contributions with Benefits in *Section 2, Subsection B, Financial Information* on page 18.

A further discussion of plan maturity measures and how they relate to changes in assets and liabilities is included in *Section 2, Subsection I, Volatility Ratios* starting on page 36.

[3] Under the Retirement Board's actuarial funding policy, current assets plus the present value of future (employer and member) contributions will always be equal to the present value of benefits expected to be paid by the System. Based on the understanding that the present value of future contributions includes both the amounts required to pay the ongoing normal cost and any unfunded liabilities, it appears that the minimum contribution limit pursuant to Section 12335 of the Public Utilities Code does not apply.

Section 3: Supplemental Information

EXHIBIT A – TABLE OF PLAN COVERAGE
TOTAL PLAN

Category	Year Ended June 30		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	1,847	1,828	1.0%
• Average age	47.6	47.8	-0.2
• Average years of service	12.0	12.4	-0.4
• Total projected compensation	$212,350,940	$202,994,918	4.6%
• Average projected compensation	$114,971	$111,048	3.5%
• Account balances	$200,907,500	$190,870,938	5.3%
• Total active vested members	1,236	1,211	2.1%
Inactive vested members:			
• Number	303	284	6.7%
• Average age	49.1	49.1	0.0
Retired members:			
• Number in pay status	1,483	1,428	3.9%
• Average age	69.9	69.7	0.2
• Average monthly benefit	$5,567	$5,363	3.8%
Disabled members:			
• Number in pay status	59	61	-3.3%
• Average age	66.0	65.0	1.0
• Average monthly benefit	$2,243	$2,210	1.5%
Beneficiaries:			
• Number in pay status	302	290	4.1%
• Average age	73.3	73.6	-0.3
• Average monthly benefit	$2,901	$2,825	2.7%

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
1955/1980 PLAN

Category	Year Ended June 30		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	1,174	1,252	-6.2%
• Average age	51.8	51.5	0.3
• Average years of service	17.2	16.9	0.3
• Total projected compensation	$145,378,597	$148,241,558	-1.9%
• Average projected compensation	$123,832	$118,404	4.6%
• Account balances	$183,426,221	$179,078,975	2.4%
• Total active vested members	1,102	1,167	-5.6%
Inactive vested members:			
• Number	224	225	-0.4%
• Average age	51.5	50.9	0.6
Retired members:			
• Number in pay status	1,483	1,428	3.9%
• Average age	69.9	69.7	0.2
• Average monthly benefit	$5,567	$5,363	3.8%
Disabled members:			
• Number in pay status	59	61	-3.3%
• Average age	66.0	65.0	1.0
• Average monthly benefit	$2,243	$2,210	1.5%
Beneficiaries:			
• Number in pay status	302	290	4.1%
• Average age	73.3	73.6	-0.3
• Average monthly benefit	$2,901	$2,825	2.7%

EXHIBIT A – TABLE OF PLAN COVERAGE (CONTINUED)
2013 TIER

Category	Year Ended June 30		Change From Prior Year
	2019	2018	
Active members in valuation:			
• Number	673	576	16.8%
• Average age	40.3	39.7	0.6
• Average years of service	3.1	2.6	0.5
• Total projected compensation	$66,972,343	$54,753,360	22.3%
• Average projected compensation	$99,513	$95,058	4.7%
• Account balances	$17,481,279	$11,791,963	48.2%
• Total active vested members	134	44	204.5%
Inactive vested members:			
• Number	79	59	33.9%
• Average age	42.2	42.3	-0.1
Retired members:			
• Number in pay status	N/A	N/A	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A
Disabled members:			
• Number in pay status	N/A	N/A	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A
Beneficiaries:			
• Number in pay status	N/A	N/A	N/A
• Average age	N/A	N/A	N/A
• Average monthly benefit	N/A	N/A	N/A

EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF JUNE 30, 2019
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
TOTAL PLAN

	Years of Service									
Age	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	9	9	- -	- -	- -	- -	- -	- -	- -	- -
	$89,497	$89,497	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	96	75	19	2	- -	- -	- -	- -	- -	- -
	97,170	95,190	$103,644	$109,940	- -	- -	- -	- -	- -	- -
30 - 34	185	134	42	9	- -	- -	- -	- -	- -	- -
	101,723	97,928	111,473	112,728	- -	- -	- -	- -	- -	- -
35 - 39	242	127	69	40	6	- -	- -	- -	- -	- -
	109,267	99,873	114,281	126,082	$138,340	- -	- -	- -	- -	- -
40 - 44	228	87	57	51	29	4	- -	- -	- -	- -
	115,735	104,516	113,896	126,846	128,470	$151,951	- -	- -	- -	- -
45 - 49	244	76	45	47	40	27	9	- -	- -	- -
	114,473	102,511	110,154	120,732	119,577	131,095	$131,833	- -	- -	- -
50 - 54	301	49	38	59	40	55	38	20	2	- -
	121,065	101,278	118,640	123,095	118,188	120,496	134,415	$140,479	$217,373	- -
55 - 59	312	36	35	51	38	64	52	31	5	- -
	124,985	101,698	124,496	124,573	120,767	134,656	123,230	137,904	146,678	- -
60 - 64	159	15	17	19	22	26	28	19	10	3
	119,156	95,102	114,256	124,422	104,977	123,042	124,760	122,751	143,160	$149,076
65 - 69	53	2	3	12	7	7	8	3	9	2
	120,505	134,027	104,656	121,276	113,280	115,575	128,971	120,278	114,933	160,227
70 & over	18	1	- -	3	3	5	3	3	- -	- -
	103,815	124,180	- -	103,741	92,992	120,015	83,550	101,190	- -	- -
Total	**1,847**	**611**	**325**	**293**	**185**	**188**	**138**	**76**	**26**	**5**
	$114,971	**$99,963**	**$114,177**	**$123,439**	**$119,118**	**$127,664**	**$126,652**	**$132,648**	**$139,774**	**$153,536**

EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF JUNE 30, 2019 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
1955/1980 PLAN

	Years of Service									
Age	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	9	2	5	2	- -	- -	- -	- -	- -	- -
	$100,577	$77,753	$105,961	$109,940	- -	- -	- -	- -	- -	- -
30 - 34	43	11	23	9	- -	- -	- -	- -	- -	- -
	117,502	122,380	117,037	112,728	- -	- -	- -	- -	- -	- -
35 - 39	101	13	42	40	6	- -	- -	- -	- -	- -
	120,361	104,784	117,164	126,082	$138,340	- -	- -	- -	- -	- -
40 - 44	129	15	30	51	29	4	- -	- -	- -	- -
	125,639	117,376	121,474	126,846	128,470	$151,951	- -	- -	- -	- -
45 - 49	164	15	26	47	40	27	9	- -	- -	- -
	121,148	109,173	117,199	120,732	119,577	131,095	$131,833	- -	- -	- -
50 - 54	250	10	26	59	40	55	38	20	2	- -
	125,581	123,156	122,856	123,095	118,188	120,496	134,415	$140,479	$217,373	- -
55 - 59	271	5	25	51	38	64	52	31	5	- -
	128,691	130,357	129,865	124,573	120,767	134,656	123,230	137,904	146,678	- -
60 - 64	140	- -	13	19	22	26	28	19	10	3
	122,235	- -	118,152	124,422	104,977	123,042	124,760	122,751	143,160	$149,076
65 - 69	50	1	1	12	7	7	8	3	9	2
	121,215	143,873	112,152	121,276	113,280	115,575	128,971	120,278	114,933	160,227
70 & over	17	- -	- -	3	3	5	3	3	- -	- -
	102,617	- -	- -	103,741	92,992	120,015	83,550	101,190	- -	- -
Total	**1,174**	**72**	**191**	**293**	**185**	**188**	**138**	**76**	**26**	**5**
	$123,832	**$115,130**	**$120,016**	**$123,439**	**$119,118**	**$127,664**	**$126,652**	**$132,648**	**$139,774**	**$153,536**

EXHIBIT B – MEMBERS IN ACTIVE SERVICE AS OF JUNE 30, 2019 (CONTINUED)
BY AGE, YEARS OF SERVICE, AND AVERAGE PROJECTED COMPENSATION
2013 TIER

	Years of Service									
Age	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	9	9	- -	- -	- -	- -	- -	- -	- -	- -
	$89,497	$89,497	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	87	73	14	- -	- -	- -	- -	- -	- -	- -
	96,818	95,667	$102,817	- -	- -	- -	- -	- -	- -	- -
30 - 34	142	123	19	- -	- -	- -	- -	- -	- -	- -
	96,944	95,741	104,737	- -	- -	- -	- -	- -	- -	- -
35 - 39	141	114	27	- -	- -	- -	- -	- -	- -	- -
	101,321	99,313	109,796	- -	- -	- -	- -	- -	- -	- -
40 - 44	99	72	27	- -	- -	- -	- -	- -	- -	- -
	102,829	101,837	105,475	- -	- -	- -	- -	- -	- -	- -
45 - 49	80	61	19	- -	- -	- -	- -	- -	- -	- -
	100,788	100,873	100,514	- -	- -	- -	- -	- -	- -	- -
50 - 54	51	39	12	- -	- -	- -	- -	- -	- -	- -
	98,924	95,668	109,504	- -	- -	- -	- -	- -	- -	- -
55 - 59	41	31	10	- -	- -	- -	- -	- -	- -	- -
	100,489	97,075	111,074	- -	- -	- -	- -	- -	- -	- -
60 - 64	19	15	4	- -	- -	- -	- -	- -	- -	- -
	96,468	95,102	101,594	- -	- -	- -	- -	- -	- -	- -
65 - 69	3	1	2	- -	- -	- -	- -	- -	- -	- -
	108,665	124,180	100,908	- -	- -	- -	- -	- -	- -	- -
70 & over	1	1	- -	- -	- -	- -	- -	- -	- -	- -
	124,180	124,180	- -	- -	- -	- -	- -	- -	- -	- -
Total	**673**	**539**	**134**	**- -**	**- -**	**- -**	**- -**	**- -**	**- -**	**- -**
	$99,513	**$97,937**	**$105,855**	**- -**	**- -**	**- -**	**- -**	**- -**	**- -**	**- -**

EXHIBIT C – RECONCILIATION OF MEMBER DATA

	Active Members	Inactive Vested Members	Retired Members	Disabled Members	Beneficiaries	Total
Number as of June 30, 2018	**1,828**	**284**	**1,428**	**61**	**290**	**3,891**
• New members	136	0	0	0	0	136
• Terminations – with vested rights	-28	28	0	0	0	0
• Contribution refunds	-10	-3	0	0	0	-13
• Retirements	-79	-9	88	0	0	0
• New disabilities	0	0	0	0	0	0
• Return to work	2	-2	0	0	0	0
• Died with or without beneficiary	-2	-3	-33	-2	12[1]	-28
• Data adjustments	0	8[2]	0	0	0	8
Number as of June 30, 2019	**1,847**	**303**	**1,483**	**59**	**302**	**3,994**

[1] This is the net increase in the number of beneficiaries after subtracting the number of beneficiaries who died during the year.

[2] All 8 members were hired and terminated employment during fiscal 2018/2019.

EXHIBIT D – SUMMARY STATEMENT OF INCOME AND EXPENSES ON A MARKET VALUE BASIS FOR ALL PENSION PLAN AND HIB PLAN ASSETS

	Year Ended June 30, 2019		Year Ended June 30, 2018	
Net assets at market value at the beginning of the year		**$1,753,240,000**		**$1,612,644,000**
Contribution income:				
• Employer contributions	$84,551,000		$81,096,000	
• Member contributions	17,865,000		17,079,000	
Net contribution income		$102,416,000		$98,175,000
Investment income:				
• Interest, dividends and other income	$30,325,000		$31,365,000	
• Asset appreciation	69,141,000		124,488,000	
• Less investment and administrative fees	(7,722,000)		(7,055,000)	
Net investment income		$91,744,000		$148,798,000
Total income available for benefits		**$194,160,000**		**$246,973,000**
Less benefit payments:				
• Benefits paid	$(114,168,000)		$(105,984,000)	
• Refund of contributions	(267,000)		(393,000)	
Net benefit payments		$(114,435,000)		$(106,377,000)
Change in net assets at market value		**$79,725,000**		**$140,596,000**
Net assets at market value at the end of the year		**$1,832,965,000**		**$1,753,240,000**

Note: Results may be slightly off due to rounding.

EXHIBIT E – SUMMARY STATEMENT OF PLAN ASSETS

	Year Ended June 30, 2019		Year Ended June 30, 2018	
Cash equivalents		$42,729,000		$41,196,000
Accounts receivable:				
• Brokers, securities sold	$1,647,000		$2,424,000	
• Employer and member contributions	2,031,000		1,648,000	
• Interest and dividends	4,300,000		2,673,000	
Total accounts receivable		$7,978,000		$6,745,000
Investments:				
• Equities	$1,234,667,000		$1,197,060,000	
• Fixed income investments	463,013,000		431,709,000	
• Real estate	98,133,000		89,629,000	
• Securities lending collateral	48,857,000		47,104,000	
• Other assets	560,000		536,000	
Total investments at market value		$1,845,230,000		$1,766,038,000
Total assets		$1,895,937,000		$1,813,979,000
Accounts payable:				
• Accounts payable and accrued expenses	$(2,757,000)		$(2,167,000)	
• Payables to brokers, securities purchased	(11,358,000)		(11,468,000)	
• Securities lending collateral	(48,857,000)		(47,104,000)	
Total accounts payable		$(62,972,000)		$(60,739,000)
Net assets at market value		**$1,832,965,000**		**$1,753,240,000**
Net assets at actuarial value		**$1,817,562,986**		**$1,714,363,843**
Net assets at valuation value (Pension Plan Only)		**$1,777,065,164**		**$1,678,417,000**

Note: Results may be slightly off due to rounding.

EXHIBIT F – DEVELOPMENT OF THE FUND THROUGH JUNE 30, 2019 FOR ALL PENSION PLAN AND HIB PLAN ASSETS

Year Ended June 30	Employer Contributions	Employee Contributions	Net Investment Return[1]	Benefit Payments	Market Value of Assets at Year-End	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2010	$51,756,000	$10,918,000	$95,737,000	$58,109,000	$769,052,000	$925,906,871	120.4%
2011	58,481,000	10,850,000	191,970,000	62,114,000	968,239,000	966,766,525	99.8%
2012	59,651,000	10,723,000	15,202,000	66,843,000	986,972,000	1,035,786,332	104.9%
2013	61,567,000	10,566,000	137,318,000	72,095,000	1,124,328,000	1,112,369,821	98.9%
2014	70,117,000	12,133,000	218,575,000	78,265,000	1,346,888,000	1,229,955,379	91.3%
2015	73,141,000	13,427,000	58,937,000	85,184,000	1,407,209,000	1,350,292,296	96.0%
2016	74,672,000	14,925,000	12,894,000	91,571,000	1,418,129,000	1,452,786,717	102.4%
2017	76,860,000	16,018,000	200,254,000	98,617,000	1,612,644,000	1,580,665,009	98.0%
2018	81,096,000	17,079,000	148,798,000	106,377,000	1,753,240,000	1,714,363,843	97.8%
2019	84,551,000	17,865,000	91,744,000	114,435,000	1,832,965,000	1,817,562,986	99.2%

[1] On a market value basis, net of investment fees and administrative expenses.

EXHIBIT G – TABLE OF AMORTIZATION BASES

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment[1]
Experience Gain	06/30/2000	$(10,871,830)	30	$(11,190,198)	11	$(1,208,241)
Change in Assumptions	06/30/2000	8,629,891	30	8,882,608	11	959,083
Plan Amendments	06/30/2000	13,607,265	30	14,005,737	11	1,512,243
3.5% Retiree COLA Assumption	06/30/2000	27,057,441	30	27,849,787	11	3,007,029
Experience Loss	06/30/2001	2,292,281	30	2,429,952	12	244,536
Experience Loss	06/30/2002	26,232,251	30	28,443,996	13	2,686,255
Plan Amendments	06/30/2002	5,111,914	30	5,542,918	13	523,474
Experience Loss	06/30/2003	43,692,270	30	48,179,743	14	4,295,007
Plan Amendments	06/30/2003	67,138,578	30	74,034,130	14	6,599,809
Experience Loss	06/30/2004	32,731,232	30	36,522,652	15	3,088,733
New Assumption / Domestic Partners	06/30/2004	(9,812,646)	30	(10,949,295)	15	(925,986)
Experience Loss	06/30/2005	26,910,233	30	30,253,776	16	2,437,842
Remove Limit Pension Base	06/30/2005	27,315,928	30	30,570,304	16	2,463,347
Experience Loss	06/30/2006	14,160,133	30	15,978,962	17	1,231,506
Experience Gain	06/30/2007	(3,098,126)	30	(3,497,438)	18	(258,679)
Experience Gain	06/30/2008	(7,800,585)	30	(8,783,380)	19	(625,305)
Change in Assumptions	06/30/2008	51,413,374	30	57,890,953	19	4,121,364
Experience Loss	06/30/2009	114,894,458	30	128,697,014	20	8,842,562
Experience Loss	06/30/2010	3,039,098	30	3,378,451	21	224,569
Change in Assumptions	06/30/2010	8,098,499	30	9,002,797	21	598,424
Experience Loss	06/30/2011	4,428,038	30	4,878,313	22	314,386
Experience Gain	06/30/2012	(15,668,764)	20	(14,587,477)	13	(1,377,644)
Change in Assumptions	06/30/2012	53,400,521	25	54,856,276	18	4,057,297
Experience Loss	06/30/2013	10,858,322	20	10,313,425	14	919,395
Experience Gain	06/30/2014	(26,406,581)	20	(25,461,075)	15	(2,153,252)
Change in Assumptions	06/30/2014	18,421,049	25	18,894,310	20	1,298,197
Experience Gain	06/30/2015	(28,955,525)	20	(28,285,897)	16	(2,279,270)
Experience Gain	06/30/2016	(1,408,751)	20	(1,388,986)	17	(107,050)
Change in Assumptions	06/30/2016	52,595,760	25	53,605,379	22	3,454,636

EXHIBIT G – TABLE OF AMORTIZATION BASES (CONTINUED)

Type	Date Established	Initial Amount	Initial Period	Outstanding Balance	Years Remaining	Annual Payment[1]
Experience Gain	06/30/2017	(50,022,788)	20	(49,657,318)	18	(3,672,770)
Experience Loss	06/30/2018	14,053,082	20	14,003,644	19	996,945
Change in Assumptions	06/30/2018	12,484,391	25	12,564,960	24	765,535
Experience Loss	06/30/2019	26,728,885	20	26,728,885	20	1,836,498
Total				**$563,707,908**		**$43,870,475**

[1] Beginning of year payment, reflecting level percentage of payroll.

Note: The equivalent single amortization period is about 17 years.

EXHIBIT H – PROJECTION OF UAAL BALANCES AND PAYMENTS

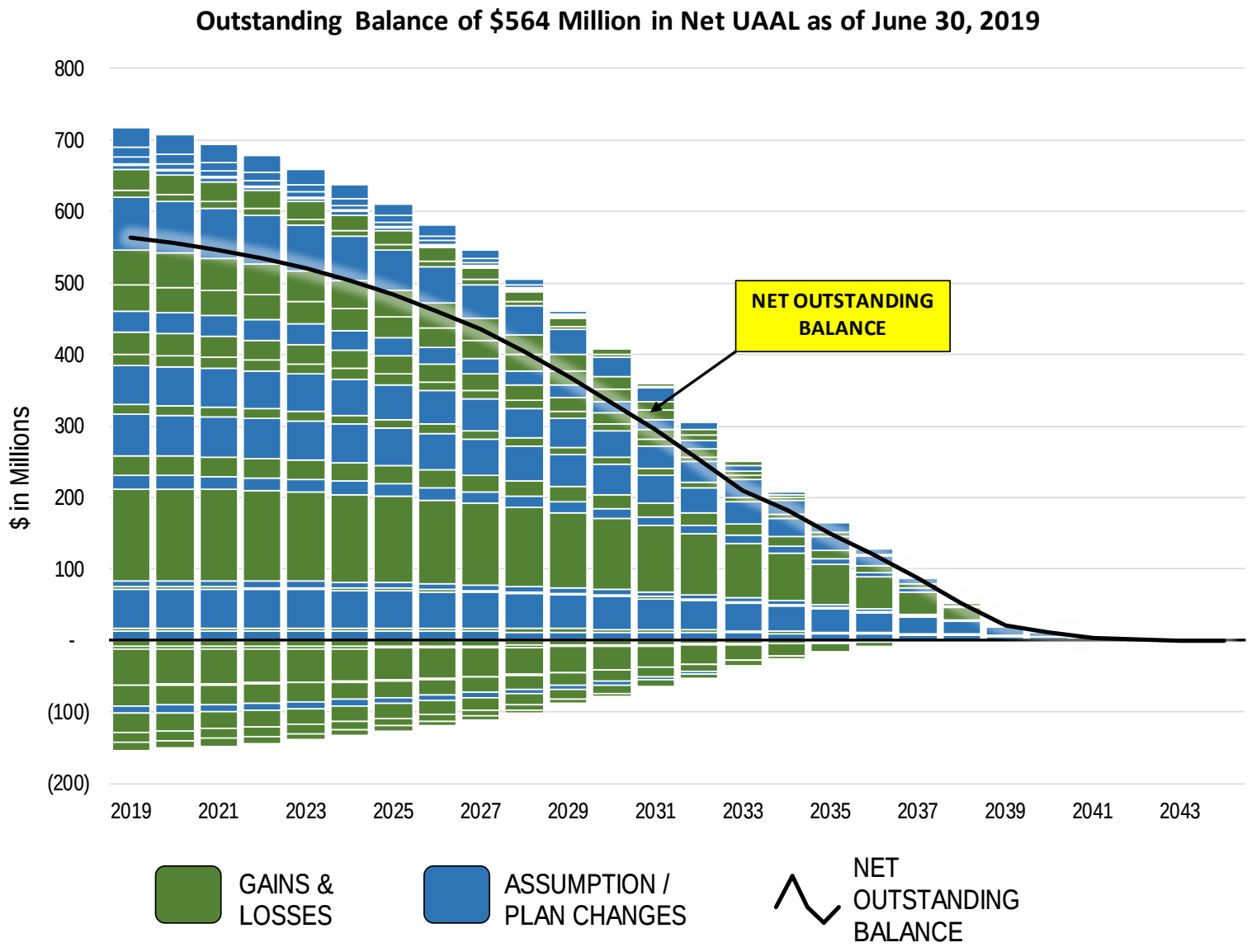


EXHIBIT H – PROJECTION OF UAAL BALANCES AND PAYMENTS (CONTINUED)

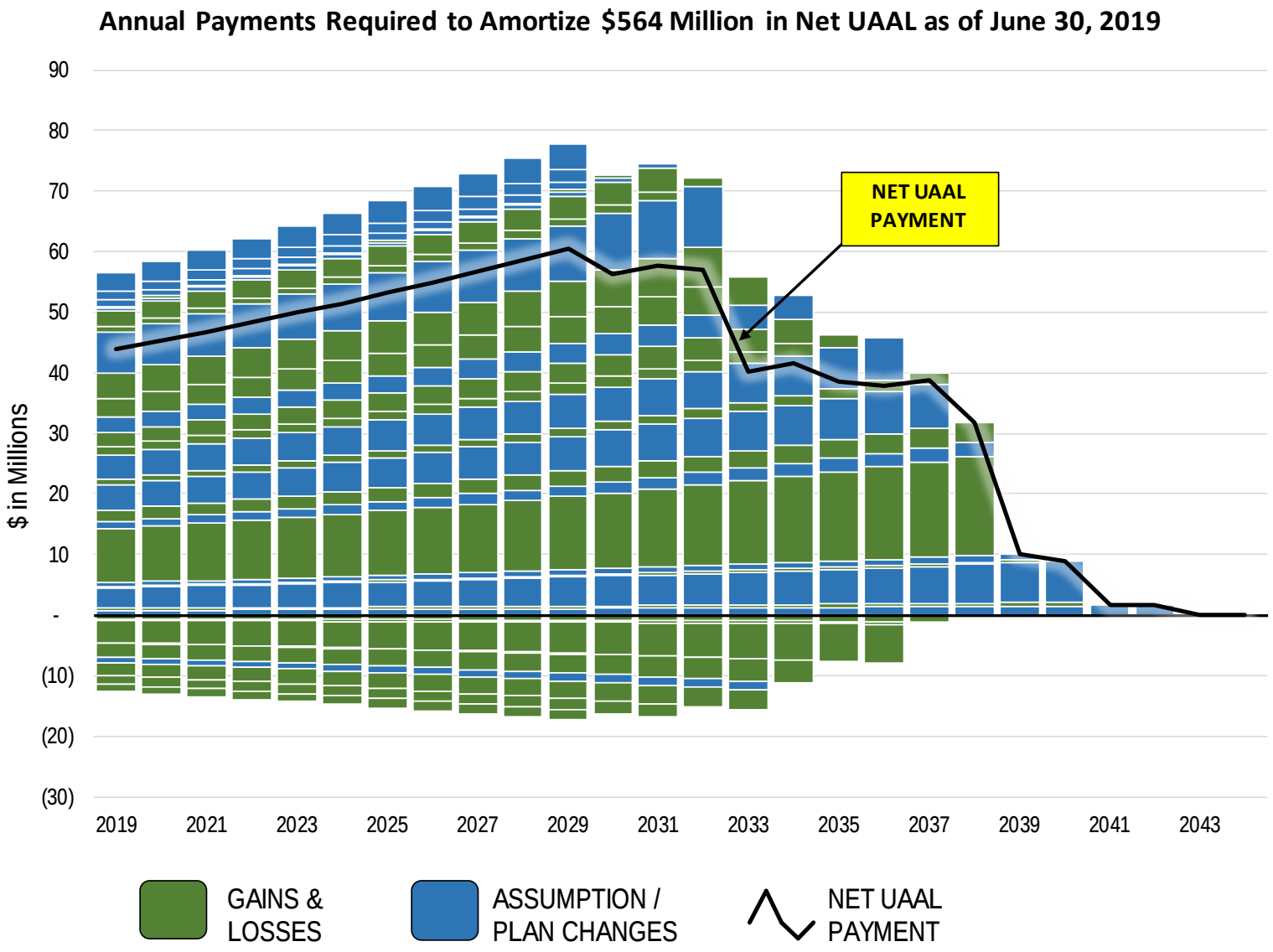


EXHIBIT I – DEFINITION OF PENSION TERMS

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated Normal Costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners and Beneficiaries:	Actuarial Present Value of lifetime benefits to existing pensioners and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the recommended contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield actuarial liabilities that are larger than projected.
Actuarially Equivalent:	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is: Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.) Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Benefits:	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund of member contributions or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
Actuarial Valuation:	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan, as well as Actuarially Determined Contributions.
Actuarial Value of Assets (AVA):	The value of the Plan's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the Actuarially Determined Contribution.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the Plan.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the Unfunded Actuarial Accrued Liability. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is intended to payoff the Unfunded Actuarial Accrued Liability.

Assumptions or Actuarial Assumptions:	The estimates upon which the cost of the Plan is calculated, including: Investment return - the rate of investment yield that the Plan will earn over the long-term future; Mortality rates - the rate or probability of death at a given age for employees and pensioners; Retirement rates - the rate or probability of retirement at a given age or service; Disability rates – the rate or probability of disability retirement at a given age; Withdrawal rates - the rate or probability at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement; Salary increase rates - the rates of salary increase due to inflation, real wage growth and merit and promotion increases.
Closed Amortization Period:	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 20 years, it is 19 years at the end of one year, 18 years at the end of two years, etc. See Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula based on the member's compensation, age and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Experience Study:	A periodic review and analysis of the actual experience of the Plan that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified based on recommendations from the Actuary.
Funded Ratio:	The ratio of the Valuation Value of Assets VVA to the Actuarial Accrued Liability (AAL). Plans sometimes also calculate a market funded ratio, using the Market Value of Assets (MVA), rather than the VVA .
Investment Return:	The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Normal Cost:	The portion of the Actuarial Present Value of Future Benefits allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of the Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of member contributions and employer Normal Cost unless otherwise specifically stated.

Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in each future year in determining the Amortization Period.
Unfunded Actuarial Accrued Liability:	The excess of the Actuarial Accrued Liability over the Valuation Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus or an Overfunded Actuarial Accrued Liability.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Benefits is determined. The expected benefits to be paid in the future are discounted to this date.
Valuation Value of Assets:	The Actuarial Value of Assets reduced by the value of non-valuation reserves.

Section 4: Actuarial Valuation Basis

EXHIBIT I – ACTUARIAL ASSUMPTIONS AND METHODS

Rationale for Assumptions	The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the July 1, 2012 through June 30, 2016 Actuarial Experience Study report dated November 10, 2016 and the Review of Economic Actuarial Assumptions report dated September 12, 2018. Unless otherwise noted, all actuarial assumptions and methods shown below apply to both tiers. These assumptions were adopted by the Board.
Economic Assumptions	
Net Investment Return:	7.00%; net of administrative and investment expenses. Based on the Review of Economic Actuarial Assumptions referenced above, expected administrative and investment expenses represent about 0.16% of the average Market Value of Assets.
Employee Contribution Crediting Rate:	7.00%, compounded semi-annually.
Consumer Price Index:	Increase of 2.75% per year. Retiree COLA increases due to CPI are subject to a 2.75% maximum change per year (for members with a sufficient COLA bank, withdrawals from the bank can be made to increase the retiree COLA up to 3% per year).
Payroll Growth:	Inflation of 2.75% per year plus real "across the board" salary increases of 0.50% per year, used to amortize the Unfunded Actuarial Accrued Liability as a level percentage of payroll.
Increase in Internal Revenue Code Section 401(a)(17) Compensation Limit:	Increase of 2.75% per year from the valuation date.
Increase in California Government Code Section 7522.10 Compensation Limit:	Increase of 2.75% per year from the valuation date.

Salary Increases:

The annual rate of compensation increase includes: inflation at 2.75%, plus "across the board" salary increases of 0.50% per year, plus the following merit and promotion increases:

Merit and Promotion Increases	
Years of Service	**Rate (%)**
Less than 1	6.00
1 – 2	5.00
2 – 3	4.00
3 – 4	3.00
4 – 5	2.00
5 – 6	1.00
6 – 7	0.80
7 & Over	0.50

Demographic Assumptions

Post-Retirement Mortality Rates:

Healthy Members and All Beneficiaries

- **Males:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, set forward two years, projected 20 years with the two-dimensional mortality improvement scale MP-2015.
- **Females:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, set forward one year, projected 20 years with the two-dimensional mortality improvement scale MP-2015.

Disabled Members

- **Males:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, set forward nine years, projected 20 years with the two-dimensional mortality improvement scale MP-2015.
- **Females:** Headcount-Weighted RP-2014 Healthy Annuitant Mortality Table, set forward nine years, projected 20 years with the two-dimensional mortality improvement scale MP-2015.

The above mortality tables contain a margin slightly less than 20% for males and females combined, based on actual to expected deaths, as a provision to reflect future mortality improvement, based on a review of mortality experience as of the measurement date.

Pre-Retirement Mortality Rates:

- **Males:** Headcount-Weighted RP-2014 Employee Mortality Table, set forward two years, projected 20 years with the two-dimensional mortality improvement scale MP-2015.
- **Females:** Headcount-Weighted RP-2014 Employee Mortality Table, set forward one year, projected 20 years with the two-dimensional mortality improvement scale MP-2015.

	Rate (%)	
Age	Male	Female
20	0.04	0.01
25	0.04	0.02
30	0.05	0.02
35	0.05	0.03
40	0.07	0.04
45	0.11	0.07
50	0.19	0.12
55	0.33	0.19
60	0.58	0.27
65	0.96	0.39

Disability Incidence:

Disability Incidence		
	Rate (%)	
Age	Male	Female
25	0.000	0.000
30	0.006	0.030
35	0.016	0.068
40	0.068	0.212
45	0.160	0.330
50	0.200	0.380
55	0.200	0.460
60	0.230	0.560
65	0.310	0.660

Disabilities rates are applicable after eight years of service.

Termination:

Ordinary Withdrawal (< 5 Years of Service)		
Years of Service	Rate (%)	
	Male	Female
Less than 1	2.25	3.00
1 – 2	1.00	2.50
2 – 3	0.75	2.25
3 – 4	0.50	2.00
4 – 5	0.25	1.25

Ordinary Withdrawal (5+ Years of Service)		
	Rate (%)	
Age	Male	Female
25	0.230	0.640
30	0.205	0.540
35	0.180	0.440
40	0.155	0.340
45	0.130	0.240
50	0.105	0.140
55	0.080	0.085
60	0.055	0.060

Vested Termination		
	Rate (%)	
Age	Male	Female
25	6.40	7.00
30	5.40	6.40
35	3.50	4.80
40	2.20	3.40
45	1.70	2.40
50	0.96	1.40
55	0.48	0.70
60	0.34	0.50

Retirement Rates:

Age	Retirement Rates (%)			
	1955/1980 Plan		2013 Tier	
	Male	Female	Male	Female
52	0.00	0.00	2.00	1.00
53	0.00	0.00	2.00	1.00
54(1)	6.00	6.00	3.00	2.00
55	7.00	7.00	5.00	4.00
56	7.00	8.00	6.00	5.00
57	9.00	8.00	6.00	5.00
58	10.00	9.00	6.00	5.00
59	10.00	12.00	8.00	7.00
60	13.00	13.00	8.00	7.00
61	13.00	19.00	10.00	11.00
62	25.00	19.00	19.00	15.00
63	20.00	17.00	16.00	12.00
64	15.00	17.00	8.00	12.00
65	25.00	17.00	26.00	17.00
66	25.00	30.00	25.00	20.00
67	20.00	30.00	35.00	25.00
68	25.00	30.00	35.00	35.00
69	40.00	30.00	40.00	35.00
70 & Over	100.00	100.00	100.00	100.00

(1) The rate for 1955/1980 Plan members age 54 with 30 or more years of service (i.e., eligible for unreduced benefits) is 50% for males and females.

Retirement Age for Inactive Vested Members:	59
Reciprocity:	30% of members who terminate with a vested benefit are assumed to enter a reciprocal system. For reciprocals, 3.75% compensation increases are assumed per annum.
Future Benefit Accruals:	1.0 year of service per year of employment, plus 0.036 years of additional service to anticipate conversion of unused sick leave for each year of employment. As directed by EBMUDERS, this assumption has been applied to active members in the 1955/1980 Plan and the 2013 Tier.
Unknown Data for Members:	Same as those exhibited by members with similar known characteristics. If not specified, members are assumed to be male.
Percent Married/Domestic Partnership:	The percent married/domestic partnership at retirement is assumed to be 80% for male members and 50% for female members.

Age and Gender of Spouse/Domestic Partner:	Female (or male) spouses/domestic partners are 3 years younger (or older) than the members. Spouses/domestic partners of active and inactive members are assumed to be the opposite sex of the member.
Form of Payment:	At retirement, members with spouses or domestic partners are assumed to elect the following form of payment (single members are assumed to elect the Unmodified option):

Form of Payment	Election Percentage
Unmodified or Option 1	50%
Option 2 (100% Continuance)	10%
Option 3 (50% Continuance)	20%
Option 4 (25% Continuance)	20%

Actuarial Funding Policy	
Actuarial Cost Method:	Entry Age Cost Method. Entry Age is the age at the member's hire date. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are based on costs allocated as a level percentage of compensation, as if the current benefit formula for each individual has always been in effect (i.e., "replacement life within a tier").
Actuarial Value of Assets:	Market value of assets (MVA) less unrecognized returns in each of the last five years. Unrecognized returns are equal to the difference between the actual market returns and the expected returns on the market value, and are recognized over a five-year period. The actuarial value of assets (AVA) is limited by a 30% corridor; the AVA cannot be less than 70% of MVA, nor greater than 130% of MVA.
Valuation Value of Assets:	The proportion of the Actuarial Value of Assets allocated to the pension plan, based on the proportion of the MVA attributable to the pension plan.
Amortization Policy:	Prior to July 1, 2011, the UAAL from plan changes, assumption changes, and experience gains/losses were amortized over separate decreasing 30-year periods. On or after July 1, 2011, any new UAAL resulting from plan changes are amortized over separate decreasing 15-year periods; assumption and method changes are amortized over separate decreasing 25-year periods; and experience gains/losses are amortized over separate decreasing 20-year periods.

Other Actuarial Methods	
Employer Contributions:	Employer contributions consist of two components: *Normal Cost* The annual contribution rate that, if paid annually from a member's first year of membership through the year of retirement, would accumulate to the amount necessary to fully fund the member's retirement-related benefits. Accumulation includes annual crediting of interest at the assumed investment earnings rate. The contribution rate is expressed as a level percentage of the member's compensation. *Contribution to the Unfunded Actuarial Accrued Liability (UAAL)* The annual contribution rate that, if paid annually over the UAAL amortization period, would accumulate to the amount necessary to fully fund the UAAL. Accumulation includes annual crediting of interest at the assumed investment earning rate. The contribution (or rate credit in the case of a negative UAAL) is calculated to remain as a level percentage of future active member payroll (including payroll for new members as they enter the System) assuming a constant number of active members. In order to remain as a level percentage of payroll, amortization payments (credits) are scheduled to increase at the annual rate of 3.25% (i.e., 2.75% inflation plus 0.50% across-the-board salary increase). The amortization policy is described on the previous page. The recommended employer contributions are provided in *Section 2, Subsection F.*

Member Contributions:

1955/1980 Plan Members

Employee contribution rates for 1955/1980 Plan members are prescribed in the Ordinance. Effective April 17, 2006, the rate of member retirement contributions is 6.83%, and 6.74% of that rate is allocated to pay pension benefits. The rest, or 0.09%, is used to pay HIB benefits. The Board of Directors may adjust the employee rates solely pursuant to the terms of a negotiated collective bargaining agreement or memorandum of understanding with employee bargaining units.

Based on bargaining unit contract negotiations in 2013, members are contracted to pay the following employee rates (as a percentage of pay) beginning April 22, 2013:

	Member Rate		
Effective Date	(a) Total	(b) HIB Plan	(c) = (a) – (b) Pension Plan
April 17, 2006[1]	6.83%[1]	0.09%	6.74%
April 22, 2013	7.33%	0.09%	7.24%
April 21, 2014	7.83%	0.09%	7.74%
April 20, 2015	8.33%	0.09%	8.24%
April 18, 2016	8.75%	0.09%	8.66%

[1] Pursuant to the Ordinance.

2013 Tier Members

Pursuant to Section 7522.30(a) of the California Government Code, 2013 Tier members are required to contribute at least 50% of the Normal Cost rate. In addition, there are certain additional requirements that would have to be met such as requiring the employee rates be rounded to the nearest one quarter of one percent and requiring the new employees to pay the contribution rate of "similarly situated employees", if it is greater. (reference: Section 7522.30(c).) We further understand that different rules may have to be applied for collectively bargained employees, non-represented, managerial or other supervisory employees. (reference: Section 7522.30(e).) In preparing the Normal Cost rates in this report, we have assumed that exactly 50% of the Normal Cost would be paid by the new members and we have taken into account in this valuation only the requirements of Section 7522.30(c), but not requirements of Section 7522.30(e). We have also compared the total Normal Cost rates between the current valuation and the initial CalPEPRA valuation so that a rate increase (or decrease) of less than 1% of payroll would result in no change to the member's rate. (reference: Section 7522.30(d).) In particular, the total Normal Cost rate of 17.56% was determined in the first CalPEPRA valuation and this rate has been used through the June 30, 2018 valuation to determine the 50% of the Normal Cost paid by the employees because the change in the total Normal Cost has been less than 1% of payroll over that time.

Accumulation for all members includes crediting of interest at the assumed investment earnings rate. The member contribution rates are provided in *Section 2, Subsection F*.

Internal Revenue Code Section 415:	Section 415 of the Internal Revenue Code (IRC) specifies the maximum benefits that may be paid to an individual from a defined benefit plan and the maximum amounts that may be allocated each year to an individual's account in a defined contribution plan. A qualified pension plan may not pay benefits in excess of the Section 415 limits. The ultimate penalty for non-compliance is disqualification: active members could be taxed on their vested benefits and the IRS may seek to tax the income earned on the plan's assets. In particular, Section 415(b) of the IRC limits the maximum annual benefit payable at the Normal Retirement Age to a dollar limit of $160,000 indexed for inflation. That limit is $225,000 for 2019. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must be adjusted based on each participant's circumstances, for such things as age at retirement, form of benefits chosen and after tax contributions. Benefits for members in the non-CalPEPRA plan in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m). Legal Counsel's review and interpretation of the law and regulations should be sought on any questions in this regard. Contribution rates determined in this valuation have not been reduced for the Section 415 limitations. Actual limitations will result in gains as they occur.
Changes in Actuarial Assumptions:	There have been no changes in actuarial assumptions since the last valuation.

EXHIBIT II – SUMMARY OF PLAN PROVISIONS

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Plan Year:	July 1 through June 30
Census Date:	June 30
Membership Eligibility:	
1955/1980 Plan	All employees who first become members before January 1, 2013.
2013 Tier	All employees who first become members on or after January 1, 2013.
Final Compensation for Benefit Determination:	
1955/1980 Plan	Highest two consecutive years of compensation earnable (FAS2).
2013 Tier	Highest thirty-six consecutive months of pensionable compensation (FAS3).
Compensation Limit:	
1955/1980 Plan	IRC Section 401(a)(17) compensation limit applies to all employees who began membership in EBMUDERS on or after January 1, 1996.
2013 Tier	$124,180 for 2019
Service:	Years of service (Yrs) are generally based on a member's employment during a period of time in which retirement contributions are deducted from their compensation.
Normal or Unreduced Retirement Eligibility:	
Age and Service Requirement	
1955/1980 Plan	Age 65; Age 62 with 5 years of service; Age 59 with 20 years of service; Age 54 with 30 years of service; Other combinations of age and service between ages 54 and 59.
2013 Tier	Age 67 with 5 years of service (for unreduced benefit).

Early Retirement Eligibility:	
Age and Service Requirement	
1955/1980 Plan	Age 54 with 5 years of service.
2013 Tier	Age 52 with 5 years of service.
Benefit Formula:	
1955/1980 Plan:	
1955 Formula	2.42% (2.82% if member is credited with District Service on or after January 1, 2004) times Final Compensation per year of service including all service extension credit.
1955/80 Formula	2.42% (2.82% if member is credited with District Service on or after January 1, 2004) times Final Compensation per year of service up to August 1, 1980 including all service extension credit, plus 2.20% (2.60% if member is credited with District Service on or after January 1, 2004) times Final Compensation per year of service after August 1, 1980. Applies to members who elected to convert to the 1980 Formula in 1980.
1955/90 Formula	2.42% (2.82% if member is credited with District Service on or after January 1, 2004) times Final Compensation per year of service up to January 1, 2000 including all service extension credit, plus 2.20% (2.60% if member is credited with District Service on or after January 1, 2004) times Final Compensation per year of service after January 1, 2000. Applies to members who elected to convert to the 1980 Formula in 1989.
1980 Formula	2.20% (2.60% if member is credited with District Service on or after January 1, 2004) times Final Compensation per year of service including all service extension credit. Applies to all members hired on or after January 1, 1980.
Service Extension Credit	2.42% (2.82% if member is credited with District Service on or after January 1, 2004) for members with any service under the 1955 Formula or 2.20% (2.60% if member is credited with District Service on or after January 1, 2004) for members with service only under the 1980 Formula times Final Compensation per year of Service Extension Credit. Service extension credit is the number of unused sick leave days credited to a member at the time of retirement converted on a 260-day basis. The number of such days is then doubled for the benefit calculation and for service retirements to meet the early retirement provision of the Ordinance.
Benefit Adjustments	Reduced by 3% per year under the age of eligibility for an unreduced benefit, based on service at retirement, for retirements before age 63 (before age 62 commencing November 1, 2000). Effective July 1, 1999, Service Extension Credit is included in the years of service calculation of service for determining eligibility for unreduced retirement.

Benefit Formula: (continued)		
2013 Tier:	**Retirement Age**	**Benefit Formula**
	52	1.00% x FAS3 x Yrs
	55	1.30% x FAS3 x Yrs
	60	1.80% x FAS3 x Yrs
	62	2.00% x FAS3 x Yrs
	65	2.30% x FAS3 x Yrs
	67 & Over	2.50% x FAS3 x Yrs
Disability:		
Eligibility	Eight years of service (not available for Directors).	
Benefit	Greater of: 1.5% time Final Compensation per year of service. One-third of Final Compensation.	
Vesting:		
Requirements	Five years of service, must leave contributions on deposit, reciprocal service counts for vesting purposes.	
Pre-Retirement Death:		
Eligibility	Eligible for retirement.	
Benefit	50% of the unmodified service retirement benefit to eligible surviving spouse/surviving domestic partner plus the lump sum payment of accumulated retirement contributions. OR	
Eligibility	None.	
Benefit	Lump sum payment of accumulated retirement contributions.	
Post-Retirement Death Benefit:	50% of the unmodified service retirement benefit to surviving spouse or registered domestic partner (tied to the implementation of the AB 205 legislation).	

Post-Retirement Cost-of-Living Benefits:

Payable July 1 of each year, the basic minimum COLA benefit is the lesser of 3% and the actual change in the cost of living index.

Excess of the actual change of cost of living index over 3% is accumulated in individual retiree COLA banks.

Withdrawals from the bank are made in years when the index increases less than 3%.

Increases of up to 5% are granted in years when the Retirement Board determines that the System is more than 85% funded on a Projected Benefit Obligation basis. In those years when the System is more than 85% funded and the cost of living index exceeds 5%, any excess cost of living over 5% is accumulated in the COLA bank.

Effective October 1, 2000, in those years when the system is more than 85% funded on a Projected Benefit Obligation basis and the cost of living is less than 4%, withdrawals from the bank are made to allow cost of living increases up to 4%.

Member Contributions:

1955/1980 Plan

Effective April 17, 2006, retirement system members contribute at a rate of 6.83% of pay, as prescribed in the Ordinance. Based on bargaining unit contract negotiations in 2013, members are contracted to pay the following employee rates (as a percentage of pay) beginning April 22, 2013:

	Member Rate		
Effective Date	(a) Total	(b) HIB Plan	(c) = (a) – (b) Pension Plan
April 17, 2006[1]	6.83%[1]	0.09%	6.74%
April 22, 2013	7.33%	0.09%	7.24%
April 21, 2014	7.83%	0.09%	7.74%
April 20, 2015	8.33%	0.09%	8.24%
April 18, 2016	8.75%	0.09%	8.66%

[1] Pursuant to the Ordinance.

2013 Tier

Initial member contribution rate is set at 50% of the total 2013 Tier Normal Cost rate, rounded to the nearest quarter of 1%. Once established, the member contribution rate will be adjusted annually to reflect the change in the 2013 Tier Normal Cost rate, but only if the change is more than 1% of payroll.

Changes in Plan Provisions: There have been no changes in plan provisions since the last valuation.

Note: The summary of major plan provisions is designed to outline principal plan benefits as interpreted for purposes of the actuarial valuation. If the System should find the plan summary not in accordance with the actual provisions, the System should alert the actuary so they can both be sure the proper provisions are valued.

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