



JOSH GREEN, M.D.  
GOVERNOR

SYLVIA LUKE  
LIEUTENANT GOVERNOR

LUIS P. SALAVERIA  
DIRECTOR

SABRINA NASIR  
DEPUTY DIRECTOR

EMPLOYEES' RETIREMENT SYSTEM  
HAWAII EMPLOYER-UNION HEALTH BENEFITS TRUST FUND  
OFFICE OF THE PUBLIC DEFENDER

**STATE OF HAWAII**  
**DEPARTMENT OF BUDGET AND FINANCE**  
*Ka 'Oihana Mālama Mo'ohelu a Kālā*  
P.O. BOX 150  
HONOLULU, HAWAII 96810-0150

ADMINISTRATIVE AND RESEARCH OFFICE  
BUDGET, PROGRAM PLANNING AND MANAGEMENT DIVISION  
FINANCIAL ADMINISTRATION DIVISION  
OFFICE OF FEDERAL AWARDS MANAGEMENT

December 24, 2024

The Honorable Ronald D. Kouchi  
President and Members  
of the Senate  
Thirty-Third State Legislature  
State Capitol, Room 409  
Honolulu, Hawaii 96813

The Honorable Nadine K. Nakamura  
Speaker and Members of the  
House of Representatives  
Thirty-Third State Legislature  
State Capitol, Room 431  
Honolulu, Hawaii 96813

Dear President Kouchi, Speaker Nakamura and Members of the Legislature:

For your information and consideration, I am transmitting a copy of the Actuarial Asset and Liability Stress Test 2024 report, as required by Act 85, Session Laws of Hawaii 2017. In accordance with Section 93-16, Hawaii Revised Statutes, a copy of this report has been transmitted to the Legislative Reference Bureau and the report may be viewed electronically at <http://ers.ehawaii.gov/resources/reports-to-legislature>.

Sincerely,

/s/

LUIS P. SALAVERIA  
Director of Finance

Enclosure

c: Legislative Reference Bureau

ec: Governor's Office: [Gov.ReportsDistribution@hawaii.gov](mailto:Gov.ReportsDistribution@hawaii.gov)  
Lieutenant Governor's Office: [LtGov.ReportsDistribution@hawaii.gov](mailto:LtGov.ReportsDistribution@hawaii.gov)  
Legislative Auditor: [auditors2@auditor.state.hi.us](mailto:auditors2@auditor.state.hi.us)  
Department of Budget and Finance: [DBFLeg.DIR@hawaii.gov](mailto:DBFLeg.DIR@hawaii.gov)



December 18, 2024

Board of Trustees  
Employees' Retirement System of  
The State of Hawaii  
City Financial Tower  
201 Merchant St., Ste. 1400  
Honolulu, HI 96813-2980

**Re: Stress Test Annual Report**

Dear Members of the Board:

The purpose of this report is to provide the Employees' Retirement System of the State of Hawaii (ERS) with the information it must submit to the legislature as required by ACT – 85 (2017). Act – 85 (2017) requires that the actuary of the ERS perform an annual stress test as defined by the legislation and described below. This stress test is based on the preliminary valuation results of ERS as of July 1, 2024.

**Requirements of Annual Stress Test Report**

The annual stress test must address the following scenarios:

1. A 30-year projection of the ERS's assets, liabilities, pension debt, service costs, employee contributions, employer contributions, net amortization, benefit payments, payroll, and funded ratio assuming the current actuarial assumptions are met, including a 7% return projected from the actuarial, or smoothed, value of assets. See Stress Test Exhibit 1.
2. Two 30-year projections of the same items above assuming the actual investment performance in future years is 2% less than the assumed rate of return, starting from the market value of assets as of the valuation date, but with two different contribution policies.
  - a. The first scenario shows the projected items assuming that the employer contribution rate in future years would increase if necessary to meet the current funding policy. In other words, if the funding period in a future year exceeds maximum funding period under the statute for the given valuation, the contribution rates would be adjusted to bring the funding period down to the maximum funding period (see discussion of maximum funding period later in this report). See Stress Test Exhibit 2A.
  - b. The second scenario shows the projected items assuming no change in the current statutory contribution rates. See Stress Test Exhibit 2B.

3. Two 30-year projections of the same items above assuming the actual investment performance in the first year is a negative 20% followed by a 20-year period where investment performance is 2% less than the assumed rate of return, but with two different contribution policies.
  - a. The first scenario shows the projected items assuming that the employer contribution rate in future years would increase if necessary to meet the current funding policy. In other words, if the funding period in a future year exceeds maximum funding period under the statute for the given valuation, the contribution rates would be adjusted to bring the funding period down to the maximum funding period (see discussion of maximum funding period later in this report). See Stress Test Exhibit 3A.
  - b. The second scenario shows the projected items assuming no change in the current statutory contribution rates. See Stress Test Exhibit 3B.
4. The estimated actuarial accrued liability, the total normal cost for each benefit tier, and the employer normal cost for each benefit tier under the current investment return assumption and using the 10-year average of the 30-year treasuries notes as of the valuation date. See Stress Test Exhibit 4.

### Stress Test Summary Results

The information required by the legislation is contained in the tables that follow this letter. The following is some brief commentary concerning the results themselves.

1. As shown in Stress Test Exhibit 1, the ERS is expected to be fully funded (100% funded ratio) in fiscal year ending 2046. **Important Note:** the Statutes governing the ERS contemplate that the employer contribution rates would be changed when the ERS is fully funded. However, because the statutes governing the stress test require the use of the same contribution pattern for Scenario's 1, 2B and 3B, we felt it would be inappropriate to change the contribution rates for Scenario #1 since the contribution rates would not change under the ERS statute in Scenarios 2B and 3B.
2. In past years, Stress Test Exhibits 2A and 2B have been identical. This was because the funding period at future valuation dates under both scenarios was never expected to exceed the maximum funding period. If the All Other Employees Group was shown separately, this would still be the case. The impact of the underperformance is a lengthening of the period of time until the All Other Employees Group is fully funded, but it is never expected that the funding period will be more than the maximum funding period from a future valuation date. However, for the Police and Fire Employees Group, the reduction of the maximum funding period (see discussion about maximum funding period later in this report), does result in the contribution rate for the Police and Fire Employee Group increasing in order to satisfy the maximum funding period after recognizing the underperformance.



Under the first part of the 2<sup>nd</sup> Stress Test (see Stress Test Exhibit 2A) the employer contribution rates would remain constant at 24.00% of pay for All Other Employees and would gradually increase to 45.50% of pay for Police and Firefighters and remain at that level for the foreseeable future. As shown in Stress Test Exhibit 2B (Employer Contributions remain at statutory rates) the funded ratio would stay relatively stable in the low 60's%, but over the next 30 years there would be no marked improvement in the funded ratio.

3. Under the first part of the 3<sup>rd</sup> Stress Test (see Stress Test Exhibit 3A) the employer contribution rates would increase over several years to 30.5% of pay and then remain constant for All Other Employees and increase over several years to 60.50% of pay for Police and Firefighters and remain at that level for the foreseeable future. As shown in Stress Test Exhibit 3B (Employer Contributions remain at statutory rates) the funded ratio would decline to the mid 30's% but the trust is never exhausted. The funded ratio would begin to slowly climb once the impact of the 20-year period of 5% returns ends.
4. The 10-year average of the 30-year treasury notes is 2.86% as of July 1, 2024.

Based on the information reviewed for this report, the stress test shows that the System is sustainable in the protracted low return environment of Scenario #2, but would require an increase in the Police and Fire contribution rate and the rates would need to be maintained for a much longer period of time than is currently expected. While we believe the likelihood of Scenario #3 occurring is remote, if it did occur it would require an increase in the employer contribution rates under the current statutes and the higher rates would be required for many years.

#### **Maximum Funding Period**

As the Board is aware, Legislation was passed by the Legislature and signed by the Governor that gradually lowers the maximum funding period of ERS. Prior years' stress tests always measured against a 30-year maximum funding period. However, with the new law the maximum funding period for the June 30, 2024 valuation is 25 years and that maximum will decrease by 1 each year in the future until it reaches 20 with the June 30, 2029 valuation. It will then remain at 20 years. While this new law is not expected to impact the ERS in consistent financial markets, it does impact the Stress Test because the Stress Test scenarios have severe underperformance which causes larger increases in the contribution rates than in previous years' tests.

#### **Disclosures**

The information contained in this report is based on the liabilities associated with the preliminary valuation results of the ERS as of June 30, 2024. The assets used in this report were estimated based on information provided by ERS. While the actual valuation results may be slightly different, it is not expected that those changes will have any material impact on the information contained herein.



Except as noted, the data, financial information, and actuarial methods and assumptions are those used in the June 30, 2024 actuarial valuation. These assumptions are detailed in the actuarial valuation report dated January 2025. The results of the actuarial valuation and this “Stress Test” are dependent on the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. Based on the scope of this engagement, we have not performed analysis on the potential range of future measurements based on other factors. The actuarial calculations are intended to provide information for rational decision making.

### **Temporary Hazardous Duty Pay**

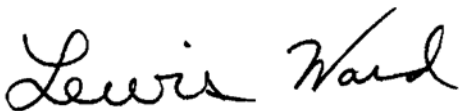
We are aware of the settlements between the employers and the employee groups regarding Temporary Hazardous Duty Pay (THDP) as a result of employment during the COVID-19 period. While the settlements will have an impact on the liabilities of the ERS, information is not currently available at an individual level for all of the impacted employees (current and former). Therefore, the impact will not be reflected in the June 30, 2024 actuarial valuation but will instead be reflected in the June 30, 2025 actuarial valuation when individual data should be available. It is not expected that the additional liabilities associated with the THDP will impact the contribution rates of the ERS.

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

Joe Newton is a member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

We look forward to discussing the results of this analysis with the Board.

Sincerely,



Lewis Ward  
Consultant



Joseph P. Newton  
Pension Market Leader and Actuary  
Enclosures



**Hawaii Employees Retirement System**  
**Stress Test Projections**  
(Dollar Amounts in \$ Millions)

Valuation Date	Market Value of Assets	Actuarial Value of Assets	Actuarial Accrued Liability	Unfunded		Projected Employee Contributions	Projected Employer Contributions	Net Amortization	Benefit Payments	Covered Payroll	Funded Ratio
				Actuarial Accrued Liability	Normal Cost						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
30-Jun-24	\$ 23,583	\$ 23,648	\$ 37,784	\$ 14,136	\$ 739	\$ 349	\$ 1,320	\$ 27	\$ 2,002	\$ 5,107	62.6%
30-Jun-25	24,940	24,940	39,103	14,164	753	365	1,351	(5)	2,116	5,232	63.8%
30-Jun-26	26,253	26,253	40,412	14,159	770	382	1,388	(43)	2,225	5,378	65.0%
30-Jun-27	27,600	27,600	41,716	14,116	788	400	1,426	(84)	2,336	5,528	66.2%
30-Jun-28	28,983	28,983	43,015	14,032	807	418	1,465	(130)	2,445	5,683	67.4%
30-Jun-29	30,409	30,409	44,311	13,902	827	436	1,505	(180)	2,555	5,843	68.6%
30-Jun-30	31,882	31,882	45,604	13,723	847	454	1,547	(234)	2,665	6,009	69.9%
30-Jun-31	33,405	33,405	46,894	13,489	868	474	1,590	(293)	2,776	6,181	71.2%
30-Jun-32	34,983	34,983	48,179	13,196	889	494	1,635	(359)	2,889	6,357	72.6%
30-Jun-33	36,622	36,622	49,460	12,838	911	515	1,682	(431)	3,001	6,539	74.0%
30-Jun-34	38,329	38,329	50,736	12,407	934	535	1,730	(509)	3,112	6,727	75.5%
30-Jun-35	40,111	40,111	52,010	11,898	958	557	1,780	(595)	3,224	6,922	77.1%
30-Jun-36	41,976	41,976	53,280	11,304	982	579	1,832	(687)	3,335	7,124	78.8%
30-Jun-37	43,932	43,932	54,550	10,618	1,008	602	1,886	(788)	3,445	7,332	80.5%
30-Jun-38	45,991	45,991	55,821	9,830	1,035	625	1,942	(897)	3,552	7,550	82.4%
30-Jun-39	48,163	48,163	57,097	8,934	1,063	649	2,000	(1,016)	3,657	7,776	84.4%
30-Jun-40	50,463	50,463	58,382	7,919	1,092	674	2,061	(1,144)	3,758	8,012	86.4%
30-Jun-41	52,907	52,907	59,683	6,775	1,123	699	2,124	(1,283)	3,858	8,257	88.6%
30-Jun-42	55,509	55,509	61,002	5,493	1,156	724	2,189	(1,434)	3,957	8,511	91.0%
30-Jun-43	58,283	58,283	62,343	4,060	1,189	750	2,257	(1,596)	4,053	8,774	93.5%
30-Jun-44	61,249	61,249	63,713	2,464	1,224	777	2,327	(1,772)	4,149	9,046	96.1%
30-Jun-45	64,422	64,422	65,115	693	1,260	804	2,399	(1,961)	4,243	9,327	98.9%
30-Jun-46	67,821	67,821	66,553	(1,268)	1,298	831	2,474	(2,165)	4,336	9,619	101.9%
30-Jun-47	71,466	71,466	68,034	(3,432)	1,338	859	2,552	(2,385)	4,427	9,920	105.0%
30-Jun-48	75,380	75,380	69,565	(5,816)	1,379	888	2,632	(2,622)	4,517	10,232	108.4%
30-Jun-49	79,587	79,587	71,150	(8,437)	1,421	918	2,714	(2,878)	4,609	10,554	111.9%
30-Jun-50	84,110	84,110	72,795	(11,315)	1,465	948	2,799	(3,153)	4,703	10,885	115.5%
30-Jun-51	88,969	88,969	74,503	(14,467)	1,511	979	2,887	(3,449)	4,798	11,225	119.4%
30-Jun-52	94,191	94,191	76,276	(17,915)	1,558	1,011	2,977	(3,768)	4,897	11,575	123.5%
30-Jun-53	99,802	99,802	78,119	(21,682)	1,606	1,042	3,070	(4,110)	4,998	11,936	127.8%



## Hawaii Employees' Retirement System

Stress Test Exhibit 2A - Actual Returns are 5% (2% Less than Assumed)

Scenario A - Contribution Rates Adjusted if Necessary to Keep Future Valuations' Funding Periods at Maximum Funding Period or Less  
(Dollar Amounts in \$ Millions)

Valuation Date (1)	Market Value of Assets (2)	Actuarial Value of Assets (3)	Actuarial Accrued Liability (4)	Unfunded		Normal Cost (6)	Projected Employee Contributions (7)	Projected Employer Contributions (8)	Net Amortization (9)	Benefit Payments (10)	Covered Payroll (11)	Funded Ratio (12)
				Actuarial Accrued Liability (5)	Normal Cost (6)							
30-Jun-24	\$ 23,583	\$ 23,648	\$ 37,784	\$ 14,136	\$ 739	\$ 349	\$ 1,320	\$ 27	\$ 2,002	\$ 5,107	62.6%	
30-Jun-25	24,402	24,790	39,103	14,313	753	365	1,351	5	2,116	5,232	63.4%	
30-Jun-26	25,194	25,816	40,412	14,596	770	382	1,388	(13)	2,225	5,378	63.9%	
30-Jun-27	25,968	26,749	41,716	14,967	788	400	1,426	(25)	2,336	5,528	64.1%	
30-Jun-28	26,723	27,549	43,015	15,466	807	418	1,473	(38)	2,445	5,683	64.0%	
30-Jun-29	27,471	28,331	44,311	15,980	827	436	1,523	(52)	2,555	5,843	63.9%	
30-Jun-30	28,212	29,101	45,604	16,504	847	454	1,575	(68)	2,665	6,009	63.8%	
30-Jun-31	28,950	29,863	46,894	17,031	868	474	1,618	(74)	2,776	6,181	63.7%	
30-Jun-32	29,673	30,611	48,179	17,568	889	494	1,664	(83)	2,889	6,357	63.5%	
30-Jun-33	30,385	31,346	49,460	18,113	911	515	1,711	(93)	3,001	6,539	63.4%	
30-Jun-34	31,086	32,071	50,736	18,665	934	535	1,761	(103)	3,112	6,727	63.2%	
30-Jun-35	31,780	32,788	52,010	19,222	958	557	1,812	(115)	3,224	6,922	63.0%	
30-Jun-36	32,468	33,498	53,280	19,782	982	579	1,865	(127)	3,335	7,124	62.9%	
30-Jun-37	33,151	34,205	54,550	20,345	1,008	602	1,919	(142)	3,445	7,332	62.7%	
30-Jun-38	33,836	34,912	55,821	20,909	1,035	625	1,976	(157)	3,552	7,550	62.5%	
30-Jun-39	34,526	35,625	57,097	21,472	1,063	649	2,035	(175)	3,657	7,776	62.4%	
30-Jun-40	35,228	36,349	58,382	22,033	1,092	674	2,097	(194)	3,758	8,012	62.3%	
30-Jun-41	35,949	37,093	59,683	22,590	1,123	699	2,161	(215)	3,858	8,257	62.2%	
30-Jun-42	36,694	37,861	61,002	23,141	1,156	724	2,228	(238)	3,957	8,511	62.1%	
30-Jun-43	37,468	38,659	62,343	23,684	1,189	750	2,297	(264)	4,053	8,774	62.0%	
30-Jun-44	38,278	39,495	63,713	24,218	1,224	777	2,368	(292)	4,149	9,046	62.0%	
30-Jun-45	39,131	40,373	65,115	24,741	1,260	804	2,441	(322)	4,243	9,327	62.0%	
30-Jun-46	40,031	41,301	66,553	25,252	1,298	831	2,518	(354)	4,336	9,619	62.1%	
30-Jun-47	40,986	42,285	68,034	25,749	1,338	859	2,597	(389)	4,427	9,920	62.2%	
30-Jun-48	42,004	43,334	69,565	26,231	1,379	888	2,678	(427)	4,517	10,232	62.3%	
30-Jun-49	43,092	44,455	71,150	26,695	1,421	918	2,762	(468)	4,609	10,554	62.5%	
30-Jun-50	44,257	45,655	72,795	27,140	1,465	948	2,849	(512)	4,703	10,885	62.7%	
30-Jun-51	45,503	46,938	74,503	27,565	1,511	979	2,938	(560)	4,798	11,225	63.0%	
30-Jun-52	46,835	48,309	76,276	27,967	1,558	1,011	3,030	(611)	4,897	11,575	63.3%	
30-Jun-53	48,257	49,774	78,119	28,345	1,606	1,042	3,124	(664)	4,998	11,936	63.7%	
30-Jun-54	49,774	51,337	80,035	28,698	1,655	1,076	3,221	(723)	5,103	12,306	64.1%	



**Hawaii Employees' Retirement System**  
**Stress Test Exhibit 2B - Actual Returns are 5% (2% Less than Assumed)**  
**Scenario B - Contribution Rates Kept at Current Statutory Rates**  
(Dollar Amounts in \$ Millions)

Valuation Date (1)	Market Value of Assets (2)	Actuarial Value of Assets (3)	Actuarial Accrued Liability (4)	Unfunded		Normal Cost (6)	Projected Employee Contributions (7)	Projected Employer Contributions (8)	Net Amortization (9)	Benefit Payments (10)	Covered Payroll (11)	Funded Ratio (12)
				Actuarial Accrued Liability (5)	Normal Cost (6)							
30-Jun-24	\$ 23,583	\$ 23,648	\$ 37,784	\$ 14,136	\$ 739	\$ 349	\$ 1,320	\$ 27	\$ 2,002	\$ 5,107	62.6%	
30-Jun-25	24,402	24,790	39,103	14,313	753	365	1,351	5	2,116	5,232	63.4%	
30-Jun-26	25,194	25,816	40,412	14,596	770	382	1,388	(13)	2,225	5,378	63.9%	
30-Jun-27	25,968	26,749	41,716	14,967	788	400	1,426	(25)	2,336	5,528	64.1%	
30-Jun-28	26,723	27,549	43,015	15,466	807	418	1,465	(30)	2,445	5,683	64.0%	
30-Jun-29	27,462	28,322	44,311	15,989	827	436	1,505	(34)	2,555	5,843	63.9%	
30-Jun-30	28,186	29,073	45,604	16,531	847	454	1,547	(37)	2,665	6,009	63.8%	
30-Jun-31	28,893	29,805	46,894	17,088	868	474	1,590	(41)	2,776	6,181	63.6%	
30-Jun-32	29,585	30,521	48,179	17,658	889	494	1,635	(47)	2,889	6,357	63.3%	
30-Jun-33	30,262	31,221	49,460	18,239	911	515	1,682	(53)	3,001	6,539	63.1%	
30-Jun-34	30,927	31,908	50,736	18,828	934	535	1,730	(60)	3,112	6,727	62.9%	
30-Jun-35	31,581	32,585	52,010	19,425	958	557	1,780	(68)	3,224	6,922	62.7%	
30-Jun-36	32,227	33,252	53,280	20,029	982	579	1,832	(76)	3,335	7,124	62.4%	
30-Jun-37	32,865	33,912	54,550	20,638	1,008	602	1,886	(86)	3,445	7,332	62.2%	
30-Jun-38	33,502	34,569	55,821	21,252	1,035	625	1,942	(97)	3,552	7,550	61.9%	
30-Jun-39	34,140	35,228	57,097	21,869	1,063	649	2,000	(110)	3,657	7,776	61.7%	
30-Jun-40	34,786	35,895	58,382	22,487	1,092	674	2,061	(124)	3,758	8,012	61.5%	
30-Jun-41	35,447	36,578	59,683	23,105	1,123	699	2,124	(140)	3,858	8,257	61.3%	
30-Jun-42	36,128	37,280	61,002	23,722	1,156	724	2,189	(158)	3,957	8,511	61.1%	
30-Jun-43	36,835	38,008	62,343	24,335	1,189	750	2,257	(177)	4,053	8,774	61.0%	
30-Jun-44	37,572	38,769	63,713	24,944	1,224	777	2,327	(198)	4,149	9,046	60.8%	
30-Jun-45	38,347	39,568	65,115	25,547	1,260	804	2,399	(221)	4,243	9,327	60.8%	
30-Jun-46	39,165	40,410	66,553	26,143	1,298	831	2,474	(246)	4,336	9,619	60.7%	
30-Jun-47	40,032	41,304	68,034	26,731	1,338	859	2,552	(273)	4,427	9,920	60.7%	
30-Jun-48	40,956	42,255	69,565	27,309	1,379	888	2,632	(303)	4,517	10,232	60.7%	
30-Jun-49	41,944	43,273	71,150	27,877	1,421	918	2,714	(336)	4,609	10,554	60.8%	
30-Jun-50	43,002	44,363	72,795	28,432	1,465	948	2,799	(371)	4,703	10,885	60.9%	
30-Jun-51	44,135	45,529	74,503	28,973	1,511	979	2,887	(408)	4,798	11,225	61.1%	
30-Jun-52	45,345	46,776	76,276	29,500	1,558	1,011	2,977	(449)	4,897	11,575	61.3%	
30-Jun-53	46,639	48,109	78,119	30,011	1,606	1,042	3,070	(492)	4,998	11,936	61.6%	
30-Jun-54	48,020	49,531	80,035	30,504	1,655	1,076	3,165	(539)	5,103	12,306	61.9%	





## Hawaii Employees' Retirement System

### Stress Test Exhibit 3A - Negative 20% Return Followed by 20-Year Period with 5% Returns

Scenario A - Contribution Rates Adjusted if Necessary to Keep Future Valuations' Funding Periods at Maximum Funding Period or Less  
(Dollar Amounts in \$ Millions)

Valuation Date (1)	Market Value of Assets (2)	Actuarial Value of Assets (3)	Actuarial Accrued Liability (4)	Unfunded		Normal Cost (6)	Projected Employee Contributions (7)	Projected Employer Contributions (8)	Net Amortization (9)	Benefit Payments (10)	Covered Payroll (11)	Funded Ratio (12)
				Actuarial Accrued Liability (5)	Normal Cost (6)							
30-Jun-24	\$ 23,583	\$ 23,648	\$ 37,784	\$ 14,136	\$ 739	\$ 349	\$ 1,320	\$ 27	\$ 2,002	\$ 5,107	62.6%	
30-Jun-25	18,551	23,327	39,103	15,776	753	365	1,368	90	2,116	5,232	59.7%	
30-Jun-26	19,067	22,757	40,412	17,654	770	382	1,527	58	2,225	5,378	56.3%	
30-Jun-27	19,677	22,086	41,716	19,630	788	400	1,671	47	2,336	5,528	52.9%	
30-Jun-28	20,369	21,282	43,015	21,732	807	418	1,905	(47)	2,445	5,683	49.5%	
30-Jun-29	21,242	22,033	44,311	22,278	827	436	1,964	(68)	2,555	5,843	49.7%	
30-Jun-30	22,125	22,858	45,604	22,746	847	454	2,018	(89)	2,665	6,009	50.1%	
30-Jun-31	23,011	23,737	46,894	23,157	868	474	2,073	(116)	2,776	6,181	50.6%	
30-Jun-32	23,904	24,651	48,179	23,528	889	494	2,132	(150)	2,889	6,357	51.2%	
30-Jun-33	24,807	25,580	49,460	23,880	911	515	2,193	(187)	3,001	6,539	51.7%	
30-Jun-34	25,723	26,524	50,736	24,212	934	535	2,256	(227)	3,112	6,727	52.3%	
30-Jun-35	26,656	27,487	52,010	24,523	958	557	2,321	(271)	3,224	6,922	52.8%	
30-Jun-36	27,610	28,471	53,280	24,810	982	579	2,389	(318)	3,335	7,124	53.4%	
30-Jun-37	28,588	29,480	54,550	25,070	1,008	602	2,459	(369)	3,445	7,332	54.0%	
30-Jun-38	29,598	30,521	55,821	25,299	1,035	625	2,532	(424)	3,552	7,550	54.7%	
30-Jun-39	30,645	31,602	57,097	25,495	1,063	649	2,608	(485)	3,657	7,776	55.3%	
30-Jun-40	31,740	32,730	58,382	25,652	1,092	674	2,687	(551)	3,758	8,012	56.1%	
30-Jun-41	32,891	33,917	59,683	25,766	1,123	699	2,769	(621)	3,858	8,257	56.8%	
30-Jun-42	34,105	35,168	61,002	25,833	1,156	724	2,854	(698)	3,957	8,511	57.7%	
30-Jun-43	35,392	36,494	62,343	25,849	1,189	750	2,942	(780)	4,053	8,774	58.5%	
30-Jun-44	36,761	37,904	63,713	25,809	1,224	777	3,034	(869)	4,149	9,046	59.5%	
30-Jun-45	38,220	39,407	65,115	25,708	1,260	804	3,128	(964)	4,243	9,327	60.5%	
30-Jun-46	40,539	41,202	66,553	25,351	1,298	831	3,226	(1,079)	4,336	9,619	61.9%	
30-Jun-47	43,053	43,332	68,034	24,702	1,338	859	3,327	(1,217)	4,427	9,920	63.7%	
30-Jun-48	45,781	45,839	69,565	23,725	1,379	888	3,431	(1,381)	4,517	10,232	65.9%	
30-Jun-49	48,743	48,768	71,150	22,382	1,421	918	3,539	(1,574)	4,609	10,554	68.5%	
30-Jun-50	51,960	51,968	72,795	20,827	1,465	948	3,650	(1,783)	4,703	10,885	71.4%	
30-Jun-51	55,450	55,452	74,503	19,050	1,511	979	3,764	(2,010)	4,798	11,225	74.4%	
30-Jun-52	59,233	59,234	76,276	17,042	1,558	1,011	3,882	(2,257)	4,897	11,575	77.7%	
30-Jun-53	63,333	63,333	78,119	14,786	1,606	1,042	4,003	(2,522)	4,998	11,936	81.1%	
30-Jun-54	67,771	67,771	80,035	12,264	1,655	1,076	4,127	(2,811)	5,103	12,306	84.7%	



**Hawaii Employees' Retirement System**  
**Stress Test Exhibit 3B - Negative 20% Return Followed by 20-Year Period with 5% Returns**  
**Scenario B - Contribution Rates Kept at Current Statutory Rates**  
(Dollar Amounts in \$ Millions)

Valuation Date (1)	Market Value of Assets (2)	Actuarial Value of Assets (3)	Actuarial Accrued Liability (4)	Unfunded		Normal Cost (6)	Projected Employee Contributions (7)	Projected Employer Contributions (8)	Net Amortization (9)	Benefit Payments (10)	Covered Payroll (11)	Funded Ratio (12)
				Actuarial Accrued Liability (5)	Normal Cost (6)							
30-Jun-24	\$ 23,583	\$ 23,648	\$ 37,784	\$ 14,136	\$ 739	\$ 349	\$ 1,320	\$ 27	\$ 2,002	\$ 5,107	62.6%	
30-Jun-25	18,551	23,327	39,103	15,776	753	365	1,351	107	2,116	5,232	59.7%	
30-Jun-26	19,050	22,740	40,412	17,672	770	382	1,388	203	2,225	5,378	56.3%	
30-Jun-27	19,517	21,924	41,716	19,792	788	400	1,426	313	2,336	5,528	52.6%	
30-Jun-28	19,949	20,857	43,015	22,158	807	418	1,465	439	2,445	5,683	48.5%	
30-Jun-29	20,349	21,127	44,311	23,184	827	436	1,505	470	2,555	5,843	47.7%	
30-Jun-30	20,717	21,425	45,604	24,179	847	454	1,547	498	2,665	6,009	47.0%	
30-Jun-31	21,051	21,735	46,894	25,158	868	474	1,590	524	2,776	6,181	46.3%	
30-Jun-32	21,351	22,039	48,179	26,140	889	494	1,635	547	2,889	6,357	45.7%	
30-Jun-33	21,616	22,312	49,460	27,148	911	515	1,682	571	3,001	6,539	45.1%	
30-Jun-34	21,849	22,552	50,736	28,184	934	535	1,730	595	3,112	6,727	44.5%	
30-Jun-35	22,049	22,761	52,010	29,249	958	557	1,780	620	3,224	6,922	43.8%	
30-Jun-36	22,218	22,936	53,280	30,344	982	579	1,832	646	3,335	7,124	43.0%	
30-Jun-37	22,356	23,080	54,550	31,470	1,008	602	1,886	672	3,445	7,332	42.3%	
30-Jun-38	22,467	23,196	55,821	32,625	1,035	625	1,942	699	3,552	7,550	41.6%	
30-Jun-39	22,553	23,286	57,097	33,811	1,063	649	2,000	726	3,657	7,776	40.8%	
30-Jun-40	22,620	23,357	58,382	35,026	1,092	674	2,061	753	3,758	8,012	40.0%	
30-Jun-41	22,674	23,412	59,683	36,270	1,123	699	2,124	782	3,858	8,257	39.2%	
30-Jun-42	22,716	23,456	61,002	37,545	1,156	724	2,189	810	3,957	8,511	38.5%	
30-Jun-43	22,751	23,493	62,343	38,850	1,189	750	2,257	839	4,053	8,774	37.7%	
30-Jun-44	22,785	23,528	63,713	40,185	1,224	777	2,327	868	4,149	9,046	36.9%	
30-Jun-45	22,821	23,565	65,115	41,549	1,260	804	2,399	899	4,243	9,327	36.2%	
30-Jun-46	23,307	23,719	66,553	42,834	1,298	831	2,474	922	4,336	9,619	35.6%	
30-Jun-47	23,837	24,009	68,034	44,025	1,338	859	2,552	937	4,427	9,920	35.3%	
30-Jun-48	24,417	24,454	69,565	45,111	1,379	888	2,632	943	4,517	10,232	35.2%	
30-Jun-49	25,057	25,072	71,150	46,078	1,421	918	2,714	938	4,609	10,554	35.2%	
30-Jun-50	25,762	25,767	72,795	47,028	1,465	948	2,799	931	4,703	10,885	35.4%	
30-Jun-51	26,537	26,539	74,503	47,964	1,511	979	2,887	921	4,798	11,225	35.6%	
30-Jun-52	27,389	27,389	76,276	48,887	1,558	1,011	2,977	908	4,897	11,575	35.9%	
30-Jun-53	28,323	28,323	78,119	49,796	1,606	1,042	3,070	893	4,998	11,936	36.3%	
30-Jun-54	29,345	29,345	80,035	50,690	1,655	1,076	3,165	874	5,103	12,306	36.7%	



## Hawaii Employees' Retirement System

### Stress Test Exhibit 4 - Comparison of Cost Items at Current Investment Return Assumption (7.00%) and 10-Year Average of 30-Year Treasuries (2.86%)

#### All Other Employees

Membership Tier	Valuation Assumptions		10-Year Average of 30-Year Treasuries	
	Hired Prior to July 1, 2012	Hired After June 30, 2012	Hired Prior to July 1, 2012	Hired After June 30, 2012
Actuarial Accrued Liability	\$28,313	\$1,974	\$48,484	\$4,773
Total Normal Cost %	12.79%	12.25%	40.88%	33.54%
Employer Normal Cost %	8.26%	4.17%	36.34%	25.47%

#### Police and Fire Employees

Membership Tier	Valuation Assumptions		10-Year Average of 30-Year Treasuries	
	Hired Prior to July 1, 2012	Hired After June 30, 2012	Hired Prior to July 1, 2012	Hired After June 30, 2012
Actuarial Accrued Liability	\$7,236	\$261	\$12,754	\$660
Total Normal Cost %	28.62%	22.45%	85.33%	65.50%
Employer Normal Cost %	16.42%	8.25%	73.13%	51.30%

Dollar Amounts are in \$ Millions

