

City of Houston
Retirement Plan Design Study

January 17, 2014

RETIREMENT
HORIZONS
INCORPORATED

January 17, 2014

Mr. Kelly Dowe
City of Houston, Finance Director
611 Walker, 10th Floor
Houston, Texas 77002

Dear Mr. Dowe:

To address concerns about long-term budget sustainability of future pension funding commitments, the City of Houston retained Retirement Horizons Inc. (RHI) to perform a special actuarial study encompassing all three of its retirement systems – HFFRF, HPOPS, and HMEPS. This report summarizes the estimated long-term funding cost savings associated with a broad range of possible plan design changes identified by the City of Houston, with our report organized as follows:

- Executive Summary
- Plan Design Alternatives
- Detailed Actuarial Forecasts
- Actuarial Valuation Basis
- Appendices by Fund

The results of this study were determined according to the actuarial assumptions and methods as stated in this report, which unless specifically noted, are consistent with those selected by the Funds. It is important to note that RHI is relying on the certifications from the respective Fund actuarial reports as to the reasonableness and appropriateness for the original actuarial valuations. Our results could be materially different in the future if actual plan experience differs significantly from the underlying valuation basis which includes the census data provided, actuarial assumptions and methods selected, and plan provisions measured.

Due to the unique situation in which the City of Houston, as plan sponsor, is unable to obtain detailed member census data used by the Funds actuaries, RHI has relied upon the census data summaries from the most recent actuarial reports as published by each Fund. As we previously discussed with the Finance Department and outlined in more detail herein, we have some concerns about this approach, in particular related to the DROP account values and the inactive member data.

In spite of these limitations, we believe the results of this study provide the City of Houston with useful “high level” input on the potential cost savings of alternative plan design changes identified by the City of Houston for budget analysis. However, our results should not be relied upon for any other purposes such as the State of Texas actuarial audit requirements or compliance with GASB financial disclosures.

The signing actuaries are members of the Society of Actuaries and other professional actuarial organizations and meet the “Qualification Standards for Actuaries Issuing Statements of Actuarial Opinion” and are available to respond to questions regarding the information contained in this report or to provide further explanations or details as needed, respectfully submitted by Retirement Horizons Inc.



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Executive Summary

Summary of Plan Design Alternatives

Below is a high level summary of the plan design alternatives identified by the City of Houston for analysis in this special actuarial study, assuming the respective changes become effective for fiscal year beginning July 1, 2014. As indicated in the table below, the changes are valued first with regard to future members (new hires) only, and then again applied to current members as well in some cases. You will notice that some of the plan design alternatives are applicable for certain current members only in HPOPS and HMEPS, because those provisions have already been eliminated for employees hired after a certain date.

Plan Design Alternative	HFRRF	HPOPS	HMEPS
Eliminate COLA	Future members only	Future members only	Hired after 2008 not eligible
	Current & Future members	Current & Future members	Members hired before 2008
Reduce COLA to 1%	Future members only	Future members only	Hired after 2008 not eligible
	Current & Future members	Current & Future members	Members hired before 2008
Freeze DROP Accounts	Future members only	Hired after 2004 not eligible	Hired after 2008 not eligible
	Current & Future members	Members hired before 2004	Members hired before 2008
Eliminate DROP Interest	Future members only	Hired after 2004 not eligible	Hired after 2008 not eligible
	Current & Future members	Members hired before 2004	Members hired before 2008
Delay Retirement Age	Future members only	Not requested	Future members only
	Current & Future members <i>(Excluding current retirees)</i>	Not requested	Current & Future members <i>(Excluding current retirees)</i>
Normal Form 50% J&S	Future members only	Future members only	Future members receive Single Life Annuity
	Current & Future members <i>(Excluding current retirees)</i>	Current & Future members <i>(Excluding current retirees)</i>	Members hired before 2008 <i>(Excluding current retirees)</i>
Apply HPOPS Design	Future members only	Not applicable	Not needed

It is important to note that some of the plan design alternatives would be considered reduction in benefits accrued. Article XVI, Section 66 of the Texas Constitution prohibits certain public employee retirement systems from making changes that would reduce or otherwise impair benefits accrued as of the date of the plan change. However, it is our understanding that the City of Houston voters overwhelmingly approved an opt-out of this constitutional amendment in May 2004. That being said, we strongly recommend that the City of Houston review any plan design changes being considered with legal counsel before making a final decision, especially those affecting any current members.

Finally, please see the Actuarial Methods and Assumptions discussion in the Valuation Basis section of this report for some important discussion of the potential impact that certain plan design changes could have with regard to accelerated early retirement decisions by members and associated workforce reduction.

Executive Summary

Net Present Value Savings – Changes for Future Hires Only

The table below summarizes the forecasted cash funding cost savings for each plan design alternative, with the changes applied to future members only. Our baseline forecast assumes these design changes would become effective July 1, 2014 at the earliest. Based on this, the net present values shown below are the funding cost savings (discounted at 8.5%) starting with the fiscal year beginning July 1, 2014, with the net present value savings shown over the next 10, 20 and 30 year periods.

Elimination of the COLA produces the largest total net present value funding cost savings of \$325 million over 30 years, or 47 million over the first 10 years. Looking at each of the Funds, elimination of the COLA generates the greatest savings when applied to HPOPS of \$194 million over 30 years, or \$9 million over the first 10 years. Please see the Detailed Actuarial Forecasts section of this report for year-by-year results for each plan design alternative scenario and each Fund.

Net PV Savings (\$ Millions)	HFRRF	HPOPS	HMEPS	Total
Eliminate COLA				
• 10 Years	\$39	\$9	Not Applicable	\$47
• 20 Years	\$85	\$107	Not Applicable	\$191
• 30 Years	\$130	\$194	Not Applicable	\$325
Reduce COLA to 1%				
• 10 Years	\$27	\$4	Not Applicable	\$31
• 20 Years	\$58	\$79	Not Applicable	\$137
• 30 Years	\$90	\$148	Not Applicable	\$238
Freeze DROP Accounts				
• 10 Years	\$27	Not Applicable	Not Applicable	\$27
• 20 Years	\$59	Not Applicable	Not Applicable	\$59
• 30 Years	\$91	Not Applicable	Not Applicable	\$91
Eliminate DROP Interest				
• 10 Years	\$11	Not Applicable	Not Applicable	\$11
• 20 Years	\$23	Not Applicable	Not Applicable	\$23
• 30 Years	\$36	Not Applicable	Not Applicable	\$36
Delay Retirement Age				
• 10 Years	\$12	Not Applicable	\$14	\$26
• 20 Years	\$26	Not Applicable	\$34	\$59
• 30 Years	\$40	Not Applicable	\$50	\$90
Normal Form 50% J&S				
• 10 Years	\$11	\$1	Not Applicable	\$12
• 20 Years	\$24	\$44	Not Applicable	\$68
• 30 Years	\$37	\$78	Not Applicable	\$115
Apply HPOPS Design				
• 10 Years	\$52	Not Applicable	Not Needed	\$52
• 20 Years	\$114	Not Applicable	Not Needed	\$114
• 30 Years	\$175	Not Applicable	Not Needed	\$175

Executive Summary

Net Present Value Savings – Changes for Current Members (active and retired) and Future Hires

The table below summarizes the forecasted cash funding cost savings for each plan design alternative, with the changes applied to both current and future members where applicable. These calculations also sum up the funding cost savings (discounted at 8.5%) starting with the fiscal year beginning July 1, 2014, with the net present value savings shown over the next 10, 20 and 30 year periods.

Elimination of the COLA produces the largest total net present value funding cost savings of \$3,104 million over 30 years, or \$1,531 million over the first 10 years. This change has the most significant impact in part because it also reduces future benefits for current retired members of all three Funds. Looking at each of the Funds, elimination of the COLA generates the greatest net present value funding cost savings of \$1,164 million over 30 years, or \$534 million over the first 10 years. Please see the Detailed Actuarial Forecasts section of this report for year-by-year results for each plan design alternative and each Fund.

Net PV Savings (\$ Millions)	HFRRF	HPOPS	HMEPS	Total
Eliminate COLA				
• 10 Years	\$559	\$534	\$438	\$1,531
• 20 Years	\$863	\$942	\$719	\$2,524
• 30 Years	\$1,028	\$1,164	\$913	\$3,104
Reduce COLA to 1%				
• 10 Years	\$396	\$328	\$192	\$916
• 20 Years	\$612	\$631	\$324	\$1,567
• 30 Years	\$729	\$794	\$438	\$1,961
Freeze DROP Accounts				
• 10 Years	\$300	\$323	\$59	\$682
• 20 Years	\$465	\$599	\$113	\$1,177
• 30 Years	\$551	\$717	\$183	\$1,452
Eliminate DROP Interest				
• 10 Years	\$106	\$79	\$26	\$211
• 20 Years	\$166	\$211	\$51	\$428
• 30 Years	\$201	\$276	\$71	\$548
Delay Retirement Age				
• 10 Years	\$75	Not Applicable	\$303	\$378
• 20 Years	\$109	Not Applicable	\$505	\$615
• 30 Years	\$128	Not Applicable	\$649	\$777
Normal Form 50% J&S				
• 10 Years	\$68	\$19	\$35	\$122
• 20 Years	\$109	\$112	\$69	\$291
• 30 Years	\$134	\$165	\$94	\$393
Apply HPOPS Design				
• 10 Years	Not Calculated	Not Applicable	Not Needed	Not Applicable
• 20 Years	Not Calculated	Not Applicable	Not Needed	Not Applicable
• 30 Years	Not Calculated	Not Applicable	Not Needed	Not Applicable

Executive Summary

Projected City Contribution Rate – Changes for Future Hires Only

The table below shows the forecasted actuarially determined City contribution rate for the plan design alternatives when applied to future members only. The City contribution rates are determined based on each Fund's cost method and assume the changes are effective for the fiscal year beginning July 1, 2014, with future City contribution rates shown at intervals of 10, 20 and 30 years compared to the current plan design base line costs for each Fund.

As mentioned earlier, elimination of the COLA produces the greatest total cost savings, with the reduction in the City contribution rate most substantial for the HPOPS retirement system. Please see the Detailed Actuarial Forecasts section of this report for year-by-year results for each plan design alternative and Fund.

City Contribution Rate (% of pay)	HFRRF	HPOPS	HMEPS
Base Line Costs			
• 10 Years	32.34%	35.55%	32.20%
• 20 Years	30.44%	30.35%	27.83%
• 30 Years	28.81%	27.54%	17.78%
Eliminate COLA			
• 10 Years	29.29%	32.28%	Not Applicable
• 20 Years	25.31%	23.23%	Not Applicable
• 30 Years	21.08%	17.80%	Not Applicable
Reduce COLA to 1%			
• 10 Years	30.25%	33.24%	Not Applicable
• 20 Years	26.91%	24.59%	Not Applicable
• 30 Years	23.50%	19.74%	Not Applicable
Freeze DROP Accounts			
• 10 Years	30.21%	Not Applicable	Not Applicable
• 20 Years	26.85%	Not Applicable	Not Applicable
• 30 Years	23.40%	Not Applicable	Not Applicable
Eliminate DROP Interest			
• 10 Years	31.50%	Not Applicable	Not Applicable
• 20 Years	29.03%	Not Applicable	Not Applicable
• 30 Years	26.68%	Not Applicable	Not Applicable
Delay Retirement Age			
• 10 Years	31.41%	Not Applicable	31.55%
• 20 Years	28.88%	Not Applicable	26.89%
• 30 Years	26.46%	Not Applicable	16.74%
Normal Form 50% J&S			
• 10 Years	31.47%	34.58%	Not Applicable
• 20 Years	28.98%	26.46%	Not Applicable
• 30 Years	26.62%	24.96%	Not Applicable
Apply HPOPS Design			
• 10 Years	28.25%	Not Applicable	Not Needed
• 20 Years	23.55%	Not Applicable	Not Needed
• 30 Years	18.42%	Not Applicable	Not Needed

Executive Summary

Projected City Contribution Rate – Changes for Current Members (active and retired) and Future Hires

The table below shows the forecasted actuarially determined City contribution rate for the plan design alternatives when applied to both current and future members where applicable. The City contribution rates are determined based on each Fund's cost method and assume the changes are effective for the fiscal year beginning July 1, 2014, with future City contribution rates shown at intervals of 10, 20 and 30 years compared to the current plan design base line costs for each Fund.

As you would expect, elimination of the COLA produces the greatest reduction in City contribution rate, with the impact most substantial for the HFRRF retirement system. Please see the Detailed Actuarial Forecasts section of this report for year-by-year results for each plan design alternative and Fund.

City Contribution Rate (% of pay)	HFRRF	HPOPS	HMEPS
Base Line Costs			
• 10 Years	32.34%	35.55%	32.20%
• 20 Years	30.44%	30.35%	27.83%
• 30 Years	28.81%	27.54%	17.78%
Eliminate COLA			
• 10 Years	6.51%	12.10%	20.56%
• 20 Years	6.92%	11.08%	17.01%
• 30 Years	7.16%	10.84%	0.00%
Reduce COLA to 1%			
• 10 Years	14.02%	18.11%	26.78%
• 20 Years	13.79%	16.19%	22.50%
• 30 Years	13.50%	15.11%	0.00%
Freeze DROP Accounts			
• 10 Years	18.14%	20.69%	30.11%
• 20 Years	17.15%	17.28%	25.45%
• 30 Years	15.42%	19.96%	0.00%
Eliminate DROP Interest			
• 10 Years	27.28%	26.96%	31.17%
• 20 Years	25.60%	24.13%	26.81%
• 30 Years	24.05%	23.39%	15.69%
Delay Retirement Age			
• 10 Years	29.16%	Not Applicable	23.17%
• 20 Years	27.99%	Not Applicable	20.08%
• 30 Years	25.45%	Not Applicable	0.00%
Normal Form 50% J&S			
• 10 Years	29.00%	31.02%	30.80%
• 20 Years	27.07%	25.58%	26.48%
• 30 Years	25.31%	23.99%	15.44%
Apply HPOPS Design			
• 10 Years	Not Calculated	Not Applicable	Not Needed
• 20 Years	Not Calculated	Not Applicable	Not Needed
• 30 Years	Not Calculated	Not Applicable	Not Needed

Executive Summary

Additional Commentary Regarding the Results

It is important to note that all forecasts assume there are no future changes in the underlying assumptions and that the actual experience follows the underlying assumptions, especially the important 8.5% return on assets and the specific payroll growth assumption of each Fund. Adverse variations in actual experience will result in an increase in projected funding costs, and favorable variations will have the opposite impact.

Each Fund has unique plan provisions as well as variations in their funding policy, actuarial assumptions and actuarial cost methods, which makes comparison of alternative plan design results by Fund difficult. Below is a summary of the per capita Present Value of Projected Benefits (PVB) as reported for each Fund also split by participant group. The PVB measure is good benchmark of the ultimate cost of each plan design as it includes expected future service and compensation for current active members in the calculation, and does not vary by the actuarial cost method selected.

Fund Valuation Report	HFRRF	HPOPS	HMEPS
PVB (\$ millions)			
• Actives Members	\$2,272	\$3,363	\$1,974
• Members in Pay Status	\$2,157	\$2,316	\$2,145
• Inactive Members	\$1	\$4	\$168
• Total	\$4,430	\$5,683	\$4,287
Number of Participants			
• Active Members	3,788	5,326	11,670
• Members in Pay Status	2,790	3,199	9,078
• Inactive Members	8	31	3,237
• Total	6,586	8,556	23,985
Per Capita PVB (\$ thousands)			
• Active Members	\$600	\$631	\$169
• Members in Pay Status	\$773	\$724	\$236
• Inactive Members	\$125	\$129	\$52
• Total	\$673	\$664	\$179

As shown above, while HMEPS has the greatest number of members, the average PVB per member for the other Funds is about 3.7 times higher than HMEPS. The larger PVB per capita for HFRRF and HPOPS is generally due to the more generous benefit formulas and the earlier retirement eligibility.

However, it should also be noted that HFRRF active members contribute 9.0% of pay and HPOPS active members contribute 10.25% of pay (8.75% to 9.25% for entrants prior to October 2004) whereas the majority of HMEPS active members contribute 0% (except for Group D which contributes 5.0%).

Executive Summary

Below are some observations and comments that may help explain the results shown on the prior pages.

- All forecasts assume new entrants will be hired to replace those that leave or retire from the Fund. Salaries for these new entrants are assumed to increase each year based on the payroll growth assumption for each plan.
- While the HMEPS plan is as large as the HFRRF in terms of total PVB, the reduced COLA alternatives in HMEPS produce the smallest savings of any Fund for three reasons: 1) the COLA has already been eliminated for new HMEPS members; 2) the COLA is not compounded in HMEPS; 3) it is only 2% per year compared to higher rates for the other Funds.
- While HPOPS already eliminated the DROP feature for those hired after October 2004, the 30 year savings from freezing the DROP for current members still exceeds the savings for HFRRF. As the Actuarial Liability for the pre-2004 HPOPS members is still larger than the entire HFRRF active member population, the savings can be larger.

While the City may decide to implement more than one design alternative, the savings may not be additive. For example, if the City decided to move to a 1% COLA, freeze all DROP balances and move future firefighters into the HPOPS design, the 30 year NPV of savings for the HFRRF would equal \$1.222 billion while summing the 30 year NPV of savings for each of the alternatives would equal \$1.455 billion.

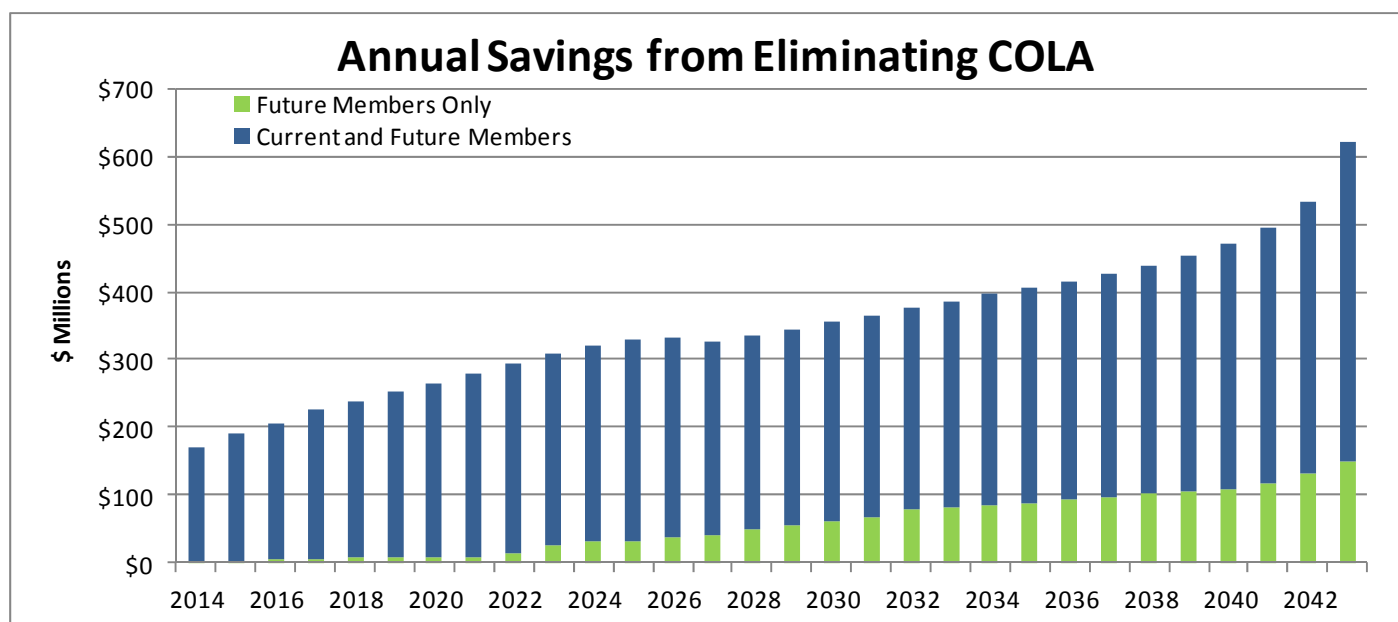
Plan Design Alternatives

Eliminate COLA

HFRRF members older than age 48 receive a fixed rate 3% COLA compounded annually. HPOPS members receive a COLA equal to 80% of the prior year's CPI-U compounded annually, with a minimum of 2.4% and maximum of 8.0% (Fund actuarial valuation assumes 2.8% future rate).

HMEPS members receive a 3% annual COLA if hired prior to January 1, 2005, reduced to 2% for members hired after January 1, 2005 and 0% if hired after January 1, 2008. HMEPS COLAs are based on the original annuity amount rather than using the compound approach.

Eliminating the COLA for *future members only* does not produce any immediate savings – and no reduction in the unfunded actuarial liability – but rather the cash contribution cost and unfunded liabilities reduce over time as the closed group of current members that retain the COLA retire in future years are gradually replaced by new hires under the lower cost plan design. The annual savings (in future dollars) under this scenario ranges from \$1 million in year 1 increasing to \$150 million by year 30.



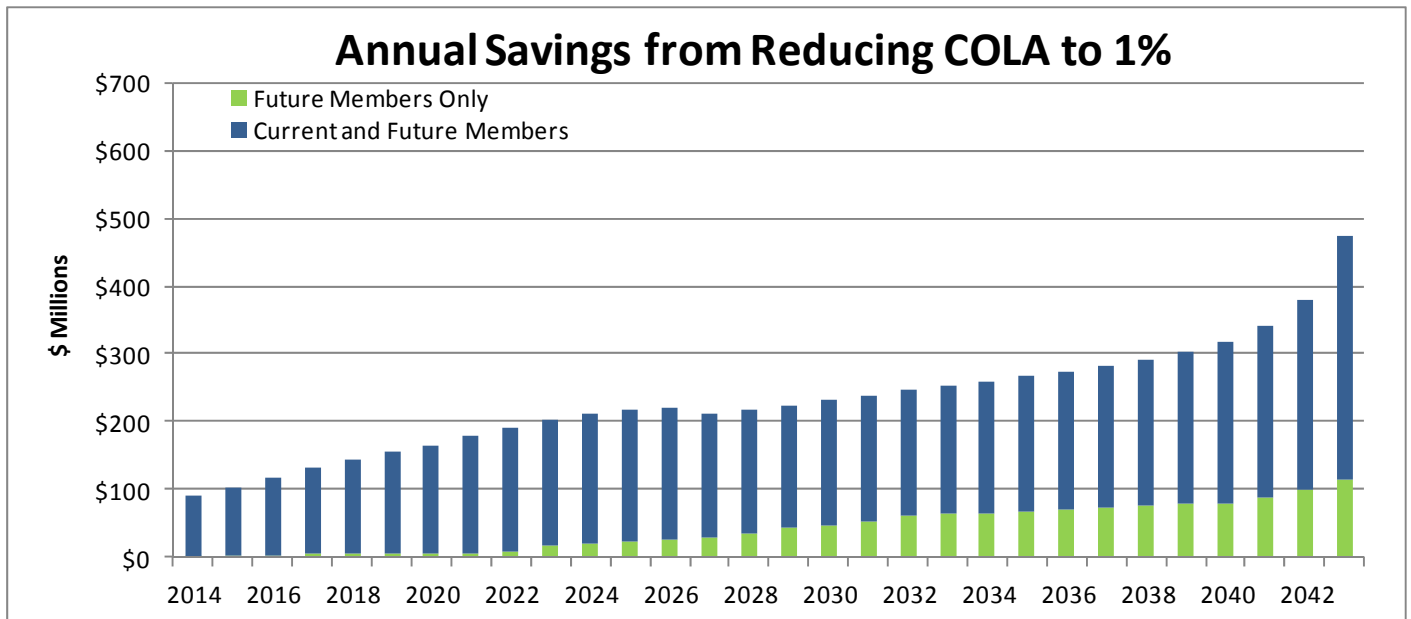
Eliminating the COLA for *both current and future members* produces an immediate and substantial savings of \$170 million in year 1 increasing to \$621 million by year 30. Under this approach there would also be a corresponding reduction in the unfunded actuarial liability of \$2.982 billion as of July 1, 2014, with the funded status of HFRRF increasing above 100% as a result of the change:

Unfunded Liability	Baseline Plan	Funded %	Eliminate COLA	Net Decrease	Revised Funded %
HFRRF	\$610	82.6%	-\$278	\$888	110.7%
HPOPS	\$1,217	76.4%	\$127	\$1,090	96.9%
HMEPS	\$2,032	52.7%	\$1,028	\$1,004	68.7%
Total	\$3,858	N/A	\$877	\$2,982	N/A

Plan Design Alternatives

Reduce COLA to 1.0%

As you would expect, reducing the automatic COLA to 1% per annum does not reduce cash funding cost as much as complete elimination of the COLA. Applying this plan change to *future members only*, the annual savings (future dollars) ranges from \$1 million in year 1 increasing to \$113 million by year 30 (about 75% of the savings in year 30 compared with complete elimination of the COLA).



Reducing the COLA to 1% for *both current and future members* produces an immediate and substantial cost reduction of \$90 million in year 1 increasing to \$474 million by year 30 (about 76% of the savings in year 30 compared to complete elimination of the COLA). Under this approach there would also be a reduction in the unfunded actuarial liability of \$1.911 billion as of July 1, 2014, with the funded status of HFFRF after the plan change exceeding 100%:

Unfunded Liability	Baseline Plan	Funded %	1% COLA	Net Decrease	Revised Funded %
HFFRF	\$610	82.6%	-\$29	\$638	101.0%
HPOPS	\$1,217	76.4%	\$459	\$758	89.6%
HMEPS	\$2,032	52.7%	\$1,517	\$515	59.8%
Total	\$3,858	N/A	\$1,947	\$1,911	N/A

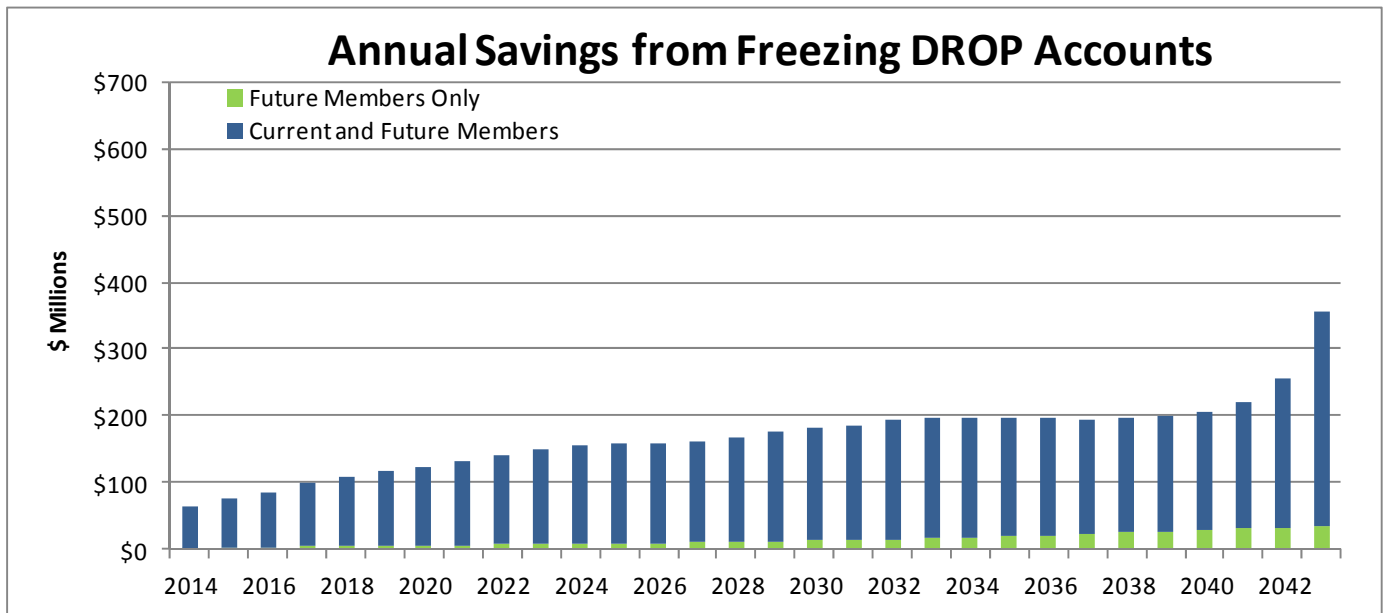
Plan Design Alternatives

Freeze DROP Accounts

Under the current HFRRF plan design, members that have qualified for a service pension are also eligible to enter the deferred retirement option plan (DROP), where a notional account is established to accumulate credits as summarized below. Members of HPOPS and HMEPS have similar benefit provisions, but were closed for HPOPS hired after October 9, 2004 and for HMEPS hired after January 1, 2008 (Group D).

- Monthly service and supplemental pensions including applicable COLA increases.
- Member contributions (but not corresponding City contributions) during the DROP period.
- Interest at 5-year average rate of return earned by the Fund (5% minimum, 10% maximum).
- Service pension during DROP also increases 2% per annum (maximum 20% cumulative).

This plan design alternative assumes the DROP account balance would be frozen for members in DROP or PROP as of July 1, 2014, with no further credits or accumulation of any kind. Applying this plan change to future members only, the annual savings (future dollars) ranges from \$1 million in year 1 increasing to \$35 million by year 30, but with no immediate reduction in unfunded actuarial liabilities.



Freezing DROP/PROP for both current and future members produces annual savings of \$66 million in year 1 increasing to \$355 million by year 30. Furthermore, this change reduces unfunded actuarial liabilities by a total of \$1,394 million as of July 1, 2014, with the largest decrease of \$706 million applicable to HPOPS.

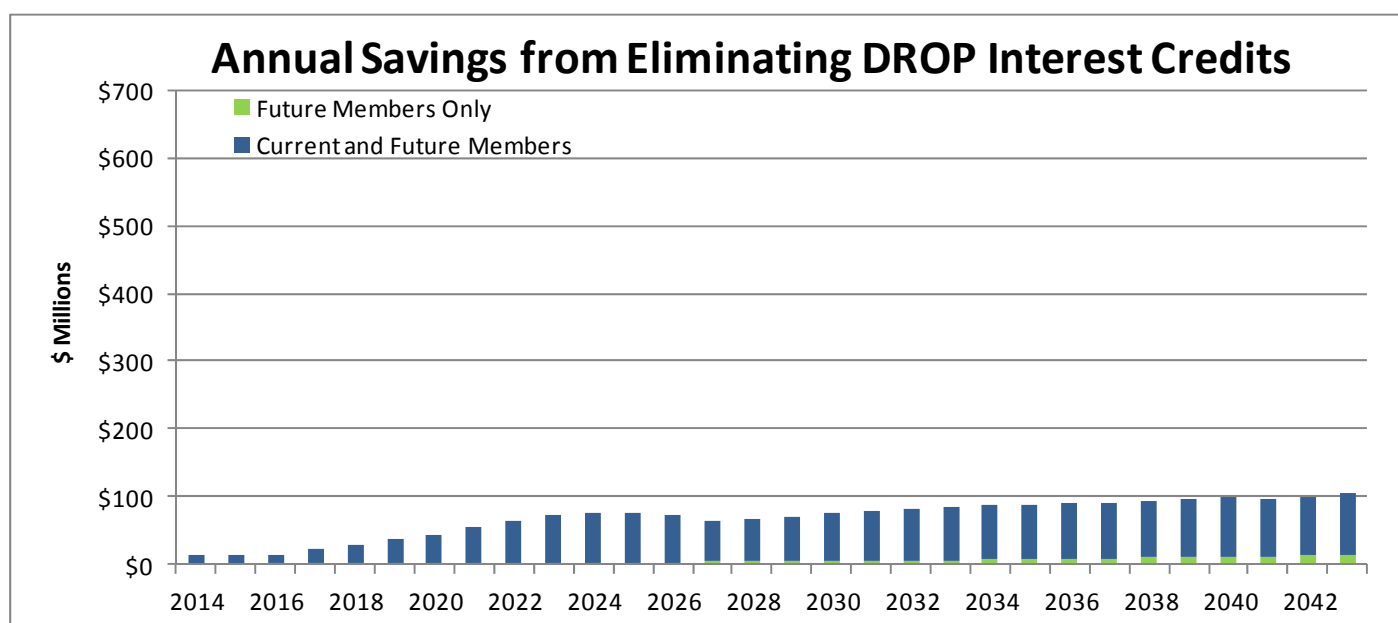
Unfunded Liability	Baseline Plan	Funded %	Freeze Drop	Net Decrease	Revised Funded %
HFRRF	\$610	82.6%	\$175	\$435	94.3%
HPOPS	\$1,217	76.4%	\$511	\$706	88.5%
HMEPS	\$2,032	52.7%	\$1,778	\$253	56.0%
Total	\$3,858	N/A	\$2,464	\$1,394	N/A

Plan Design Alternatives

Eliminate DROP Interest Credits

Under this scenario, we assume that interest credits to DROP and PROP accounts are eliminated effective July 1, 2014, but that eligible members continue to receive other account accumulations (service pensions, supplemental pensions, COLAs and member contributions if applicable).

As you would expect of eliminating interest credits only, it does not reduce cash funding cost as much as the prior scenario of complete elimination account freeze. Applying this plan change to *future hires only*, the annual savings (future dollars) ranges from \$0 in year 1 increasing to \$14 million by year 30 (about 40% of the savings in year 30 compared with complete account freeze), with no immediate reduction in the unfunded actuarial liability.



Eliminating interest credits for *both current and future members* produces an annual cost savings of \$13 million in year 1 increasing to \$107 million by year 30 (about 30% of the savings in year 30 compared to complete DROP account freeze). Furthermore, this approach reduces total unfunded actuarial liabilities by \$568 million as of July 1, 2014, with the largest decrease of \$305 million applicable to HPOPS.

Unfunded Liability	Baseline Plan	Funded %	Drop Interest	Net Decrease	Revised Funded %
HFRRF	\$610	82.6%	\$441	\$168	86.7%
HPOPS	\$1,217	76.4%	\$912	\$305	81.2%
HMEPS	\$2,032	52.7%	\$1,937	\$95	53.8%
Total	\$3,858	N/A	\$3,291	\$568	N/A

Please see the Actuarial Methods and Assumptions discussion in the Valuation Basis section of this report for important discussion of the potential impact that *either change to the DROP* provisions could have with regard to accelerated early retirement decisions by members and associated workforce reduction.

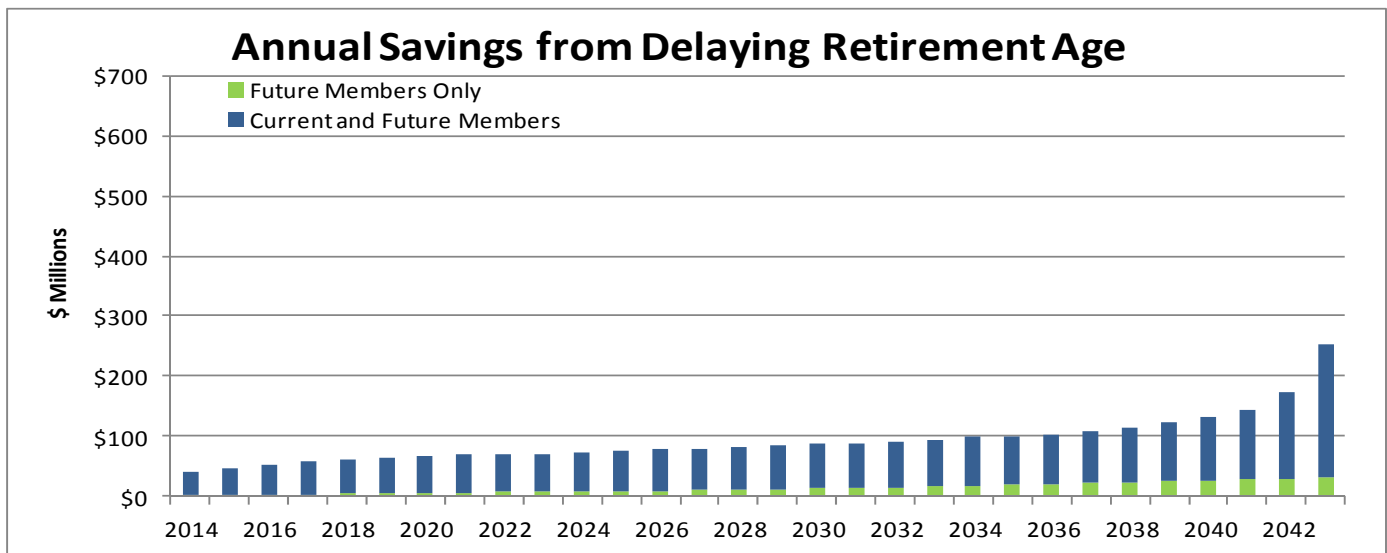
Plan Design Alternatives

Delayed Eligibility for Full Retirement

The change in this scenario would delay eligibility for full unreduced retirement benefits for HFRRF to age 55 with 10 years of service. For HMEPS the eligibility for full unreduced retirement would be delayed to age 65 with 5 years of service. No additional changes are being considered for HPOPS at this time.

This plan design alternative assumes the change would become effective July 1, 2014, and that members who would otherwise be eligible for full retirement at that date under the prior plan rules would instead be required to continue working until the new delayed retirement eligibility date before they could commence full unreduced benefits. In practice, however, they would still be eligible for immediate retirement benefits reduced on an actuarial equivalent basis for commencement prior to the new full retirement eligibility date.

Applying this plan change to future members only, the savings (future dollars) ranges from \$1 million in year 1 increasing to \$32 million by year 30, with no immediate reduction in unfunded actuarial liabilities.



Applying this change for both current and future members produces cost savings of \$41 million in year 1 increasing to \$253 million by year 30. Furthermore, this approach reduces the total unfunded actuarial liabilities by \$769 million as of July 1, 2014, with the largest decrease of \$662 million applicable to HMEPS.

Unfunded Liability	Baseline Plan	Funded %	Delay Retirement	Net Decrease	Revised Funded %
HFRRF	\$610	82.6%	\$502	\$108	85.2%
HPOPS	\$1,217	76.4%	\$1,217	\$0	76.4%
HMEPS	\$2,032	52.7%	\$1,370	\$662	62.3%
Total	\$3,858	N/A	\$3,089	\$769	N/A

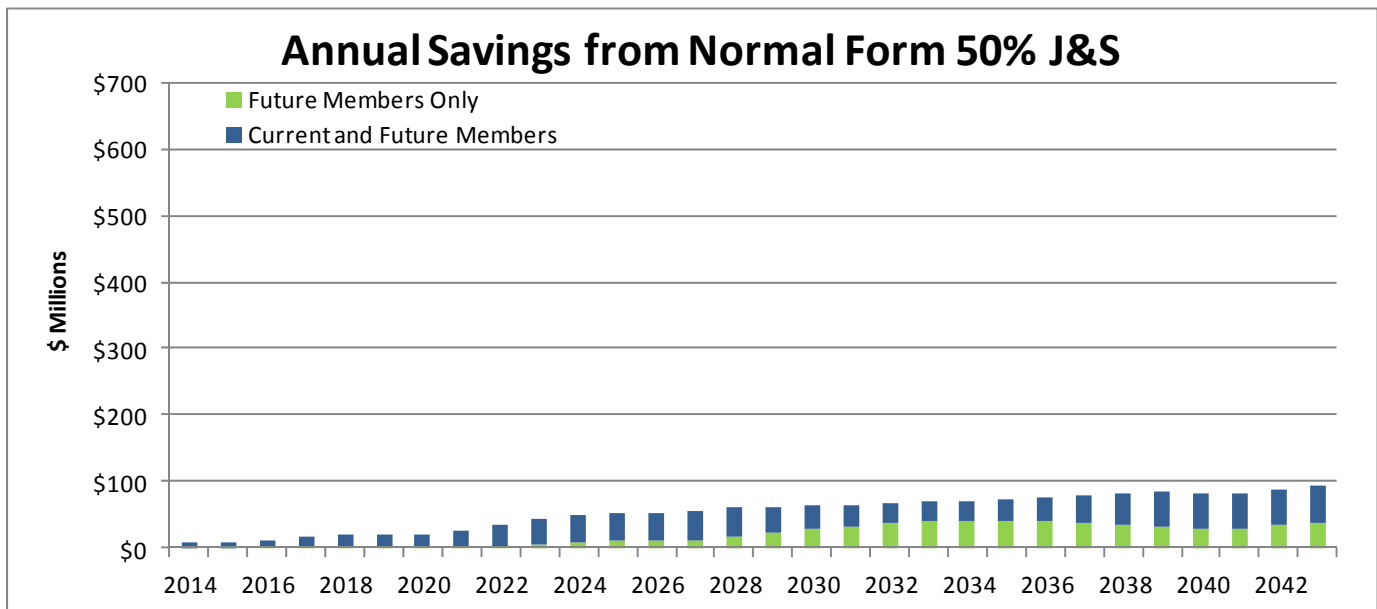
While providing advance notice of this type of plan change could accelerate retirement decisions by active members, additional analysis would be required to determine the potential impact on liability and costs.

Plan Design Alternatives

Normal Form 50% Joint & Survivor Annuity

Both HFRRF and HPOPS provide a plan subsidized 100% joint & survivor annuity normal form of payment to all current and future members, whereas HMEPS provides this benefit only to a grandfathered group. This plan design alternative assumes the normal form of payment will be reduced to a 50% joint & survivor as of July 1, 2014, with 100% joint and survivor still available as an optional form of payment “purchased” by the retiree as an actuarial equivalent reduction. However, we have assumed no change for the current retired and surviving spouse members as of the effective date.

Applying this plan change to future members only, the annual savings (future dollars) ranges from \$0 in year 1 increasing to \$39 million by year 30, with no immediate reduction in unfunded actuarial liabilities.



Applying this change for both current and future members produces cost savings of \$9 million in year 1 and increasing to \$94 million by year 30. Furthermore, this approach reduces the total unfunded actuarial liabilities by \$319 million as of July 1, 2014, with the largest decrease of \$120 million applicable to HMEPS.

Unfunded Liability	Baseline Plan	Funded %	50% J&S	Net Decrease	Revised Funded %
HFRRF	\$610	82.6%	\$527	\$82	84.5%
HPOPS	\$1,217	76.4%	\$1,100	\$117	78.2%
HMEPS	\$2,032	52.7%	\$1,912	\$120	54.2%
Total	\$3,858	N/A	\$3,539	\$319	N/A

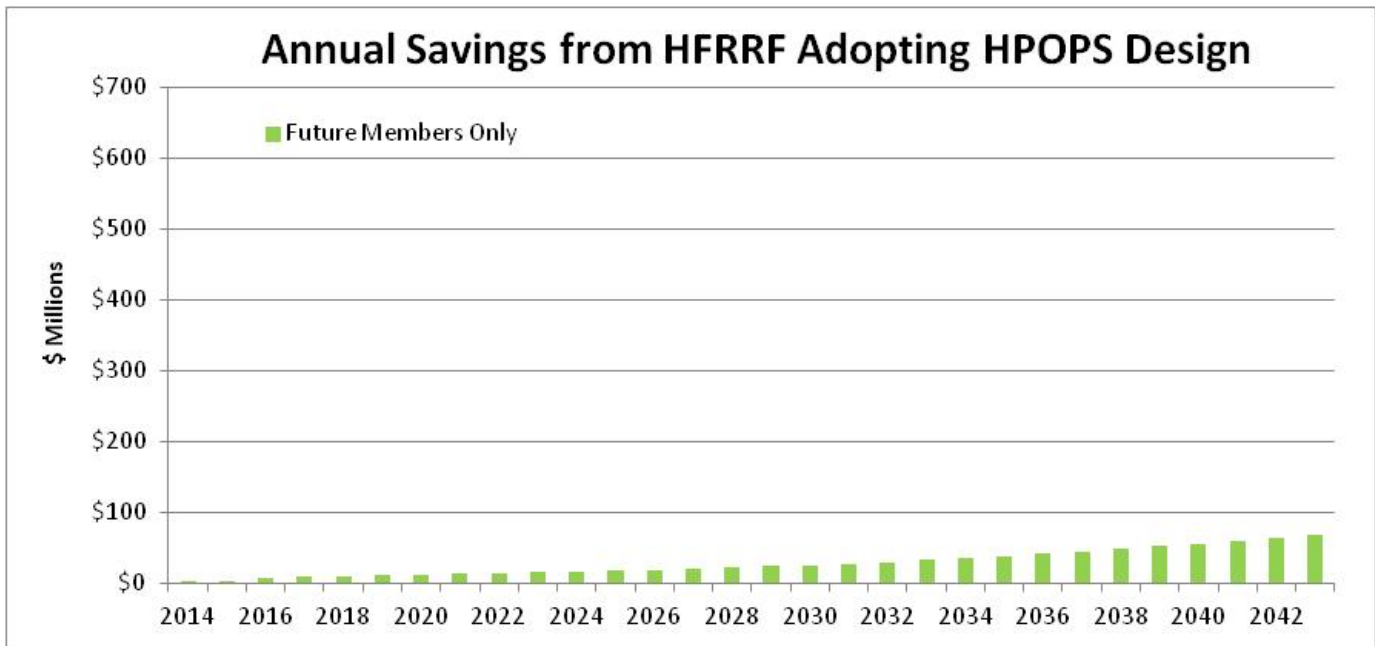
While providing advance notice of this type of plan change could accelerate retirement decisions by active members, additional analysis would be required to determine the potential impact on liability and costs.

Plan Design Alternatives

Apply HPOPS Design to HFRRF

This plan design alternative would create more consistency in retirement benefits for all public safety employees, with HFRRF adopting basic benefit provisions similar to HPOPS for officers hired after October 2004. These changes affect the benefit formula, definition of plan compensation, member contribution rates, later retirement eligibility age and elimination of the DROP.

Cost forecasting for this scenario was performed for future HFRRF members only, with the annual savings (future dollars) ranges from \$1 million in year 1 increasing to \$67 million by year 30, with no immediate reduction in unfunded actuarial liabilities.

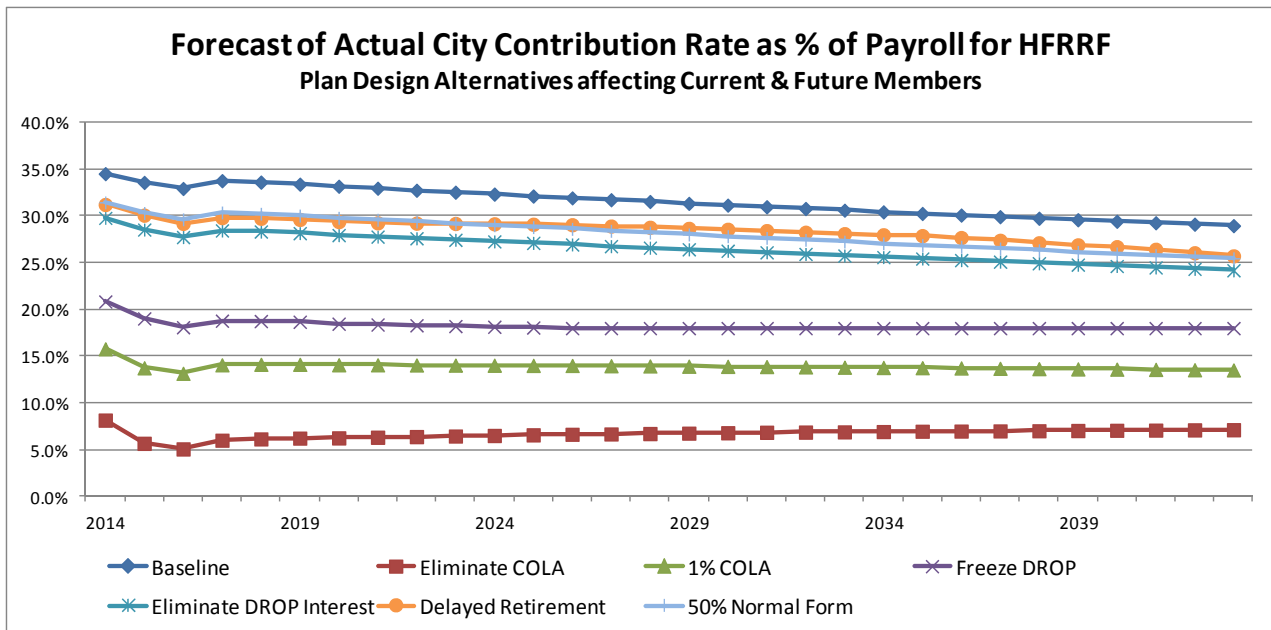
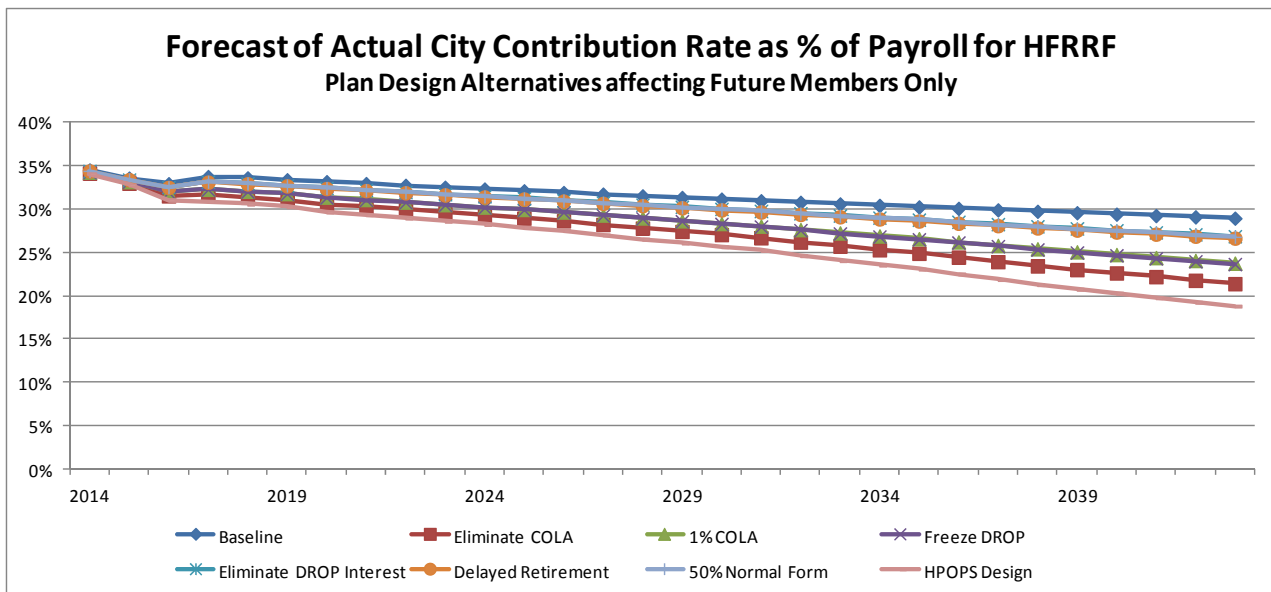


Please see the Actuarial Methods and Assumptions section of this report for some important discussion of the potential impact this change could have with regard to accelerated early retirement decisions by the members and associated workforce reduction.

Detailed Actuarial Forecasts

HFRRF Forecasts

The first graph below shows the progression of the actual City contribution rate for the baseline forecast and for the alternative plan designs applicable to future members only. As shown below, it takes several years for the City contribution rate to significantly decrease as the reduction in contributions occurs as the new members replace the current members. As shown in the second graph, more immediate and long-term savings are available for the alternate designs affecting current and future members.



The following pages contain the numerical detail supporting the HFRRF forecasts shown above.

Detailed Actuarial Forecasts

HFRRF Forecast – Baseline

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow
2014	609,676,783	82.6%	33.59%	30	2,859,342,660	2015	279,326,965	96,440,331	25,139,427	173,085,232	(51,505,474)
2015	600,148,408	83.7%	32.94%	30	3,041,230,838	2016	287,706,774	96,636,224	25,893,610	376,151,948	(253,622,114)
2016	654,921,254	82.2%	33.77%	30	3,019,241,755	2017	296,337,977	97,620,193	26,670,418	323,261,821	(198,971,210)
2017	667,553,462	82.1%	33.62%	30	3,054,603,472	2018	305,228,116	103,080,042	27,470,530	192,707,045	(62,156,473)
2018	677,331,696	82.7%	33.40%	30	3,241,143,451	2019	314,384,959	105,689,480	28,294,646	200,639,470	(66,655,344)
2019	687,035,238	83.3%	33.18%	30	3,438,509,151	2020	323,816,508	108,154,638	29,143,486	265,215,216	(127,917,092)
2020	696,862,390	83.7%	32.96%	30	3,586,038,222	2021	333,531,003	110,668,411	30,017,790	231,384,626	(90,698,425)
2021	706,829,020	84.3%	32.75%	30	3,786,342,588	2022	343,536,933	113,246,068	30,918,324	240,768,223	(96,603,831)
2022	716,938,116	84.8%	32.54%	30	3,997,114,622	2023	353,843,041	115,890,360	31,845,874	250,783,246	(103,047,012)
2023	727,191,787	85.3%	32.34%	30	4,218,656,529	2024	364,458,332	118,603,206	32,801,250	260,939,985	(109,535,529)
2024	737,592,106	85.8%	32.13%	30	4,451,830,378	2025	375,392,082	121,386,511	33,785,287	271,201,450	(116,029,652)
2025	748,141,171	86.3%	31.93%	30	4,697,614,504	2026	386,653,844	124,242,234	34,798,846	323,855,196	(164,814,116)
2026	758,841,109	86.6%	31.74%	30	4,911,191,339	2027	398,253,459	127,172,389	35,842,811	332,029,935	(169,014,735)
2027	769,694,080	87.0%	31.54%	30	5,138,192,189	2028	410,201,063	130,179,050	36,918,096	341,335,566	(174,238,420)
2028	780,702,268	87.3%	31.35%	30	5,378,643,393	2029	422,507,095	133,264,346	38,025,639	350,694,179	(179,404,194)
2029	791,867,896	87.7%	31.16%	30	5,633,746,255	2030	435,182,308	136,430,473	39,166,408	360,529,609	(184,932,728)
2030	803,193,214	88.0%	30.98%	30	5,904,347,625	2031	448,237,777	139,679,686	40,341,400	445,104,622	(265,083,536)
2031	814,680,509	88.2%	30.79%	30	6,110,794,622	2032	461,684,910	143,014,309	41,551,642	437,635,691	(253,069,740)
2032	826,332,095	88.5%	30.61%	30	6,347,627,487	2033	475,535,457	146,436,733	42,798,191	444,098,239	(254,863,315)
2033	838,150,321	88.7%	30.44%	30	6,602,442,639	2034	489,801,521	149,949,414	44,082,137	450,819,856	(256,788,305)
2034	850,137,572	89.0%	30.26%	30	6,876,620,451	2035	504,495,567	153,554,884	45,404,601	457,249,221	(258,289,736)
2035	862,296,266	89.3%	30.09%	30	7,172,260,616	2036	519,630,434	157,255,746	46,766,739	610,444,953	(406,422,468)
2036	874,628,855	89.3%	29.92%	30	7,332,086,615	2037	535,219,347	161,054,680	48,169,741	545,877,030	(336,652,609)
2037	887,137,824	89.5%	29.76%	30	7,580,972,531	2038	551,275,927	164,954,441	49,614,833	545,190,663	(330,621,389)
2038	899,825,698	89.7%	29.59%	30	7,857,325,835	2039	567,814,205	168,957,869	51,103,278	544,134,336	(324,073,189)
2039	912,695,033	89.9%	29.43%	30	8,164,035,802	2040	584,848,631	173,067,880	52,636,377	542,356,638	(316,652,381)
2040	925,748,426	90.2%	29.27%	30	8,504,622,970	2041	602,394,090	177,287,480	54,215,468	677,485,370	(445,982,422)
2041	938,988,509	90.3%	29.11%	30	8,733,585,483	2042	620,465,913	181,619,760	55,841,932	589,144,554	(351,682,862)
2042	952,417,952	90.5%	28.96%	30	9,084,066,422	2043	639,079,890	186,067,902	57,517,190	575,940,327	(332,355,235)
2043	966,039,463	90.8%	28.81%	30	9,485,043,164	2044	658,252,287	190,635,179	59,242,706	564,066,384	(314,188,499)

Detailed Actuarial Forecasts

HFRRF Forecast – Eliminate COLA for New Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	608,645,091	82.6%	33.00%	30	2,859,342,660	2015	279,326,965	95,420,167	25,139,427	173,085,232	(52,525,638)	1,020,164
2015	598,447,961	83.7%	31.54%	30	3,040,168,201	2016	287,706,774	94,939,859	25,893,610	376,151,948	(255,318,479)	1,696,365
2016	650,757,462	82.3%	31.63%	30	3,016,321,803	2017	296,337,977	93,462,961	26,670,418	323,261,821	(203,128,442)	4,157,232
2017	661,058,437	82.2%	31.37%	30	3,047,105,013	2018	305,228,116	96,556,219	27,470,530	192,707,045	(68,680,296)	6,523,823
2018	670,383,951	82.8%	31.08%	30	3,226,212,191	2019	314,384,959	98,621,053	28,294,646	200,639,470	(73,723,771)	7,068,427
2019	679,750,726	83.4%	30.58%	30	3,414,946,025	2020	323,816,508	100,646,813	29,143,486	265,215,216	(135,424,917)	7,507,825
2020	688,510,106	83.8%	30.29%	30	3,552,651,829	2021	333,531,003	101,990,285	30,017,790	231,384,626	(99,376,551)	8,678,126
2021	698,082,994	84.3%	29.95%	30	3,741,078,926	2022	343,536,933	104,045,274	30,918,324	240,768,223	(105,804,625)	9,200,794
2022	707,616,199	84.8%	29.62%	30	3,938,419,695	2023	353,843,041	105,977,090	31,845,874	250,783,246	(112,960,282)	9,913,270
2023	717,276,699	85.2%	29.29%	30	4,144,646,541	2024	364,458,332	107,947,756	32,801,250	260,939,985	(120,190,979)	10,655,450
2024	727,078,169	85.7%	28.98%	30	4,360,430,470	2025	375,392,082	109,970,023	33,785,287	271,201,450	(127,446,140)	11,416,488
2025	737,020,979	86.2%	28.66%	30	4,586,553,810	2026	386,653,844	112,043,660	34,798,846	323,855,196	(177,012,690)	12,198,574
2026	747,094,190	86.5%	28.24%	30	4,777,984,046	2027	398,253,459	114,157,244	35,842,811	332,029,935	(182,029,880)	13,015,145
2027	756,805,577	86.8%	27.82%	30	4,980,105,268	2028	410,201,063	115,823,261	36,918,096	341,335,566	(188,594,209)	14,355,789
2028	766,680,348	87.1%	27.44%	30	5,192,165,616	2029	422,507,095	117,553,131	38,025,639	350,694,179	(195,115,409)	15,711,215
2029	776,770,089	87.5%	27.07%	30	5,415,052,541	2030	435,182,308	119,397,291	39,166,408	360,529,609	(201,965,910)	17,033,182
2030	787,066,086	87.8%	26.71%	30	5,649,322,616	2031	448,237,777	121,347,287	40,341,400	445,104,622	(283,415,935)	18,332,399
2031	797,475,502	87.9%	26.21%	30	5,814,996,849	2032	461,684,910	123,311,356	41,551,642	437,635,691	(272,772,693)	19,702,953
2032	807,332,953	88.2%	25.74%	30	6,006,163,650	2033	475,535,457	124,630,242	42,798,191	444,098,239	(276,669,806)	21,806,491
2033	817,416,521	88.4%	25.31%	30	6,209,240,008	2034	489,801,521	126,062,377	44,082,137	450,819,856	(280,675,342)	23,887,037
2034	827,802,173	88.6%	24.92%	30	6,425,114,062	2035	504,495,567	127,682,838	45,404,601	457,249,221	(284,161,782)	25,872,046
2035	838,469,970	88.8%	24.46%	30	6,655,426,998	2036	519,630,434	129,472,963	46,766,739	610,444,953	(434,205,251)	27,782,783
2036	848,915,769	88.8%	23.94%	30	6,742,382,667	2037	535,219,347	130,935,041	48,169,741	545,877,030	(366,772,248)	30,119,639
2037	859,056,944	88.9%	23.46%	30	6,909,770,127	2038	551,275,927	131,980,902	49,614,833	545,190,663	(363,594,928)	32,973,539
2038	869,487,790	89.1%	23.03%	30	7,094,724,889	2039	567,814,205	133,190,351	51,103,278	544,134,336	(359,840,707)	35,767,518
2039	880,307,707	89.2%	22.64%	30	7,299,357,137	2040	584,848,631	134,662,179	52,636,377	542,356,638	(355,058,082)	38,405,701
2040	891,489,999	89.4%	22.21%	30	7,526,441,961	2041	602,394,090	136,371,943	54,215,468	677,485,370	(486,897,959)	40,915,537
2041	902,499,119	89.4%	21.78%	30	7,629,640,102	2042	620,465,913	137,791,705	55,841,932	589,144,554	(395,510,917)	43,828,055
2042	913,632,610	89.6%	21.41%	30	7,840,632,920	2043	639,079,890	139,209,616	57,517,190	575,940,327	(379,213,521)	46,858,286
2043	925,183,379	89.7%	21.08%	30	8,087,108,662	2044	658,252,287	140,913,368	59,242,706	564,066,384	(363,910,310)	49,721,811

Detailed Actuarial Forecasts

HFRRF Forecast – Reduce COLA to 1% for New Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	608,967,749	82.6%	33.18%	30	2,859,342,660	2015	279,326,965	95,739,221	25,139,427	173,085,232	(52,206,584)	701,110
2015	598,979,773	83.7%	31.98%	30	3,040,500,538	2016	287,706,774	95,470,395	25,893,610	376,151,948	(254,787,943)	1,165,829
2016	652,059,682	82.2%	32.30%	30	3,017,235,013	2017	296,337,977	94,763,131	26,670,418	323,261,821	(201,828,272)	2,857,062
2017	663,089,746	82.1%	32.07%	30	3,049,450,146	2018	305,228,116	98,596,537	27,470,530	192,707,045	(66,639,978)	4,483,505
2018	672,556,848	82.8%	31.81%	30	3,230,881,923	2019	314,384,959	100,831,694	28,294,646	200,639,470	(71,513,130)	4,857,786
2019	682,028,946	83.4%	31.39%	30	3,422,315,362	2020	323,816,508	102,994,875	29,143,486	265,215,216	(133,076,855)	5,159,763
2020	691,122,270	83.8%	31.12%	30	3,563,093,380	2021	333,531,003	104,704,357	30,017,790	231,384,626	(96,662,479)	5,964,054
2021	700,818,301	84.3%	30.83%	30	3,755,235,077	2022	343,536,933	106,922,811	30,918,324	240,768,223	(102,927,088)	6,323,257
2022	710,531,615	84.8%	30.53%	30	3,956,776,457	2023	353,843,041	109,077,453	31,845,874	250,783,246	(109,859,919)	6,812,907
2023	720,377,629	85.3%	30.25%	30	4,167,793,069	2024	364,458,332	111,280,235	32,801,250	260,939,985	(116,858,500)	7,322,971
2024	730,366,389	85.7%	29.96%	30	4,389,015,673	2025	375,392,082	113,540,515	33,785,287	271,201,450	(123,875,648)	7,845,996
2025	740,498,805	86.2%	29.69%	30	4,621,287,898	2026	386,653,844	115,858,750	34,798,846	323,855,196	(173,197,600)	8,383,484
2026	750,768,024	86.5%	29.33%	30	4,819,644,455	2027	398,253,459	118,227,715	35,842,811	332,029,935	(177,959,409)	8,944,674
2027	760,836,440	86.9%	28.99%	30	5,029,546,749	2028	410,201,063	120,313,017	36,918,096	341,335,566	(184,104,453)	9,866,033
2028	771,065,686	87.2%	28.66%	30	5,250,486,301	2029	422,507,095	122,466,793	38,025,639	350,694,179	(190,201,747)	10,797,553
2029	781,491,909	87.5%	28.35%	30	5,483,448,719	2030	435,182,308	124,724,396	39,166,408	360,529,609	(196,638,805)	11,706,077
2030	792,109,826	87.9%	28.04%	30	5,729,081,359	2031	448,237,777	127,080,721	40,341,400	445,104,622	(277,682,501)	12,598,965
2031	802,856,348	88.0%	27.64%	30	5,907,507,222	2032	461,684,910	129,473,430	41,551,642	437,635,691	(266,610,619)	13,540,879
2032	813,274,912	88.3%	27.26%	30	6,112,956,027	2033	475,535,457	131,450,194	42,798,191	444,098,239	(269,849,854)	14,986,539
2033	823,900,993	88.5%	26.91%	30	6,332,213,626	2034	489,801,521	133,533,018	44,082,137	450,819,856	(273,204,701)	16,416,396
2034	834,787,542	88.7%	26.59%	30	6,566,322,107	2035	504,495,567	135,774,288	45,404,601	457,249,221	(276,070,332)	17,780,596
2035	845,921,615	89.0%	26.22%	30	6,817,066,051	2036	519,630,434	138,161,995	46,766,739	610,444,953	(425,516,219)	19,093,751
2036	856,957,504	89.0%	25.81%	30	6,926,811,825	2037	535,219,347	140,354,921	48,169,741	545,877,030	(357,352,368)	20,699,759
2037	867,839,202	89.1%	25.43%	30	7,119,687,825	2038	551,275,927	142,293,335	49,614,833	545,190,663	(353,282,495)	22,661,106
2038	878,975,932	89.3%	25.08%	30	7,333,227,365	2039	567,814,205	144,376,598	51,103,278	544,134,336	(348,654,460)	24,581,271
2039	890,436,802	89.5%	24.76%	30	7,569,784,291	2040	584,848,631	146,673,514	52,636,377	542,356,638	(343,046,747)	26,394,366
2040	902,204,278	89.7%	24.42%	30	7,832,366,830	2041	602,394,090	149,168,227	54,215,468	677,485,370	(474,101,675)	28,119,253
2041	913,911,129	89.7%	24.08%	30	7,974,897,620	2042	620,465,913	151,498,875	55,841,932	589,144,554	(381,803,747)	30,120,885
2042	925,762,676	89.9%	23.77%	30	8,229,515,172	2043	639,079,890	153,864,487	57,517,190	575,940,327	(364,558,650)	32,203,415
2043	937,961,067	90.1%	23.50%	30	8,524,310,907	2044	658,252,287	156,463,802	59,242,706	564,066,384	(348,359,876)	34,171,377

Detailed Actuarial Forecasts

HFRRF Forecast – Eliminate DROP for New Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	608,954,596	82.6%	33.18%	30	2,859,342,660	2015	279,326,965	95,726,215	25,139,427	173,085,232	(52,219,590)	714,116
2015	598,958,094	83.7%	31.96%	30	3,040,486,991	2016	287,706,774	95,448,769	25,893,610	376,151,948	(254,809,569)	1,187,455
2016	652,006,597	82.2%	32.28%	30	3,017,197,789	2017	296,337,977	94,710,131	26,670,418	323,261,821	(201,881,272)	2,910,062
2017	663,006,941	82.1%	32.04%	30	3,049,354,552	2018	305,228,116	98,513,366	27,470,530	192,707,045	(66,723,149)	4,566,676
2018	672,468,270	82.8%	31.78%	30	3,230,691,571	2019	314,384,959	100,741,580	28,294,646	200,639,470	(71,603,244)	4,947,900
2019	681,936,077	83.4%	31.36%	30	3,422,014,963	2020	323,816,508	102,899,160	29,143,486	265,215,216	(133,172,570)	5,255,478
2020	691,015,789	83.8%	31.09%	30	3,562,667,747	2021	333,531,003	104,593,723	30,017,790	231,384,626	(96,773,113)	6,074,688
2021	700,706,800	84.3%	30.79%	30	3,754,658,025	2022	343,536,933	106,805,512	30,918,324	240,768,223	(103,044,387)	6,440,556
2022	710,412,772	84.8%	30.50%	30	3,956,028,174	2023	353,843,041	108,951,071	31,845,874	250,783,246	(109,986,301)	6,939,289
2023	720,251,224	85.3%	30.21%	30	4,166,849,538	2024	364,458,332	111,144,391	32,801,250	260,939,985	(116,994,344)	7,458,815
2024	730,232,349	85.7%	29.92%	30	4,387,850,443	2025	375,392,082	113,394,969	33,785,287	271,201,450	(124,021,194)	7,991,542
2025	740,357,036	86.2%	29.64%	30	4,619,872,018	2026	386,653,844	115,703,233	34,798,846	323,855,196	(173,353,117)	8,539,001
2026	750,618,264	86.5%	29.29%	30	4,817,946,234	2027	398,253,459	118,061,788	35,842,811	332,029,935	(178,125,336)	9,110,601
2027	760,672,125	86.9%	28.94%	30	5,027,531,345	2028	410,201,063	120,129,997	36,918,096	341,335,566	(184,287,473)	10,049,053
2028	770,886,922	87.2%	28.61%	30	5,248,108,949	2029	422,507,095	122,266,494	38,025,639	350,694,179	(190,402,046)	10,997,852
2029	781,299,429	87.5%	28.30%	30	5,480,660,654	2030	435,182,308	124,507,245	39,166,408	360,529,609	(196,855,956)	11,923,228
2030	791,904,223	87.9%	27.99%	30	5,725,830,116	2031	448,237,777	126,847,006	40,341,400	445,104,622	(277,916,216)	12,832,680
2031	802,637,004	88.0%	27.58%	30	5,903,736,177	2032	461,684,910	129,222,242	41,551,642	437,635,691	(266,861,807)	13,792,067
2032	813,032,695	88.3%	27.20%	30	6,108,602,797	2033	475,535,457	131,172,189	42,798,191	444,098,239	(270,127,859)	15,264,544
2033	823,636,661	88.5%	26.85%	30	6,327,200,792	2034	489,801,521	133,228,488	44,082,137	450,819,856	(273,509,231)	16,720,926
2034	834,502,793	88.7%	26.52%	30	6,560,565,973	2035	504,495,567	135,444,451	45,404,601	457,249,221	(276,400,169)	18,110,433
2035	845,617,859	89.0%	26.15%	30	6,810,477,077	2036	519,630,434	137,807,798	46,766,739	610,444,953	(425,870,416)	19,447,948
2036	856,629,694	89.0%	25.74%	30	6,919,293,845	2037	535,219,347	139,970,932	48,169,741	545,877,030	(357,736,357)	21,083,748
2037	867,481,208	89.1%	25.35%	30	7,111,130,841	2038	551,275,927	141,872,964	49,614,833	545,190,663	(353,702,866)	23,081,477
2038	878,589,163	89.3%	25.00%	30	7,323,505,165	2039	567,814,205	143,920,606	51,103,278	544,134,336	(349,110,452)	25,037,263
2039	890,023,906	89.5%	24.68%	30	7,558,760,728	2040	584,848,631	146,183,890	52,636,377	542,356,638	(343,536,371)	26,883,990
2040	901,767,528	89.7%	24.33%	30	7,819,896,255	2041	602,394,090	148,646,605	54,215,468	677,485,370	(474,623,297)	28,640,875
2041	913,445,937	89.7%	23.98%	30	7,960,823,707	2042	620,465,913	150,940,122	55,841,932	589,144,554	(382,362,500)	30,679,638
2042	925,268,213	89.9%	23.67%	30	8,213,662,961	2043	639,079,890	153,267,102	57,517,190	575,940,327	(365,156,035)	32,800,800
2043	937,440,204	90.1%	23.40%	30	8,506,489,003	2044	658,252,287	155,829,911	59,242,706	564,066,384	(348,993,767)	34,805,268

Detailed Actuarial Forecasts

HFRRF Forecast – Eliminate DROP Interest for New Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	609,393,062	82.6%	33.43%	30	2,859,342,660	2015	279,326,965	96,159,784	25,139,427	173,085,232	(51,786,021)	280,547
2015	599,680,781	83.7%	32.56%	30	3,040,938,611	2016	287,706,774	96,169,724	25,893,610	376,151,948	(254,088,614)	466,500
2016	653,776,205	82.2%	33.18%	30	3,018,438,767	2017	296,337,977	96,476,952	26,670,418	323,261,821	(200,114,451)	1,143,241
2017	665,767,325	82.1%	33.00%	30	3,052,541,392	2018	305,228,116	101,285,989	27,470,530	192,707,045	(63,950,526)	1,794,053
2018	675,421,063	82.7%	32.76%	30	3,237,037,349	2019	314,384,959	103,745,662	28,294,646	200,639,470	(68,599,162)	1,943,818
2019	685,031,993	83.4%	32.47%	30	3,432,029,285	2020	323,816,508	106,089,985	29,143,486	265,215,216	(129,981,745)	2,064,653
2020	694,565,508	83.7%	32.23%	30	3,576,856,956	2021	333,531,003	108,281,925	30,017,790	231,384,626	(93,084,911)	2,386,486
2021	704,423,858	84.3%	31.98%	30	3,773,895,072	2022	343,536,933	110,715,849	30,918,324	240,768,223	(99,134,050)	2,530,219
2022	714,374,584	84.8%	31.74%	30	3,980,973,507	2023	353,843,041	113,164,211	31,845,874	250,783,246	(105,773,161)	2,726,149
2023	724,465,134	85.3%	31.50%	30	4,198,303,771	2024	364,458,332	115,672,957	32,801,250	260,939,985	(112,465,778)	2,930,249
2024	734,700,770	85.8%	31.27%	30	4,426,695,391	2025	375,392,082	118,246,977	33,785,287	271,201,450	(119,169,186)	3,139,534
2025	745,083,115	86.2%	31.03%	30	4,667,072,800	2026	386,653,844	120,887,627	34,798,846	323,855,196	(168,168,723)	3,354,607
2026	755,610,702	86.6%	30.77%	30	4,874,559,320	2027	398,253,459	123,593,224	35,842,811	332,029,935	(172,593,900)	3,579,165
2027	766,149,737	86.9%	30.52%	30	5,094,718,271	2028	410,201,063	126,231,208	36,918,096	341,335,566	(178,186,262)	3,947,842
2028	776,846,235	87.3%	30.27%	30	5,327,361,988	2029	422,507,095	128,943,761	38,025,639	350,694,179	(183,724,779)	4,320,585
2029	787,715,994	87.6%	30.04%	30	5,573,605,465	2030	435,182,308	131,746,346	39,166,408	360,529,609	(189,616,855)	4,684,127
2030	798,758,249	88.0%	29.80%	30	5,834,215,726	2031	448,237,777	134,638,275	40,341,400	445,104,622	(270,124,947)	5,041,411
2031	809,949,127	88.2%	29.53%	30	6,029,450,210	2032	461,684,910	137,595,996	41,551,642	437,635,691	(258,488,053)	5,418,313
2032	821,107,326	88.4%	29.27%	30	6,253,724,905	2033	475,535,457	140,439,948	42,798,191	444,098,239	(260,860,100)	5,996,785
2033	832,448,520	88.6%	29.03%	30	6,494,311,886	2034	489,801,521	143,380,477	44,082,137	450,819,856	(263,357,242)	6,568,937
2034	843,995,333	88.9%	28.79%	30	6,752,456,160	2035	504,495,567	146,440,071	45,404,601	457,249,221	(265,404,549)	7,114,813
2035	855,744,030	89.1%	28.54%	30	7,030,131,334	2036	519,630,434	149,615,480	46,766,739	610,444,953	(414,062,734)	7,640,266
2036	867,557,751	89.2%	28.28%	30	7,169,917,989	2037	535,219,347	152,771,778	48,169,741	545,877,030	(344,935,511)	8,282,902
2037	879,415,577	89.4%	28.02%	30	7,396,391,825	2038	551,275,927	155,886,718	49,614,833	545,190,663	(339,689,112)	9,067,723
2038	891,482,768	89.6%	27.79%	30	7,647,610,526	2039	567,814,205	159,121,801	51,103,278	544,134,336	(333,909,257)	9,836,068
2039	903,788,514	89.8%	27.56%	30	7,926,249,115	2040	584,848,631	162,506,313	52,636,377	542,356,638	(327,213,948)	10,561,567
2040	916,327,353	90.0%	27.33%	30	8,235,623,134	2041	602,394,090	166,035,706	54,215,468	677,485,370	(457,234,196)	11,251,774
2041	928,953,922	90.1%	27.10%	30	8,430,000,439	2042	620,465,913	169,567,045	55,841,932	589,144,554	(363,735,577)	12,052,715
2042	941,751,977	90.3%	26.88%	30	8,742,122,139	2043	639,079,890	173,181,872	57,517,190	575,940,327	(345,241,265)	12,886,030
2043	954,804,035	90.5%	26.68%	30	9,100,611,099	2044	658,252,287	176,961,681	59,242,706	564,066,384	(327,861,997)	13,673,498

Detailed Actuarial Forecasts

HFRRF Forecast – Change Retirement Eligibility to Age 55 with 10 Years of Service for New Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	609,362,644	82.6%	33.41%	30	2,859,342,660	2015	279,326,965	96,129,706	25,139,427	173,085,232	(51,816,099)	310,625
2015	599,630,646	83.7%	32.52%	30	3,040,907,281	2016	287,706,774	96,119,709	25,893,610	376,151,948	(254,138,629)	516,515
2016	653,653,443	82.2%	33.12%	30	3,018,352,677	2017	296,337,977	96,354,383	26,670,418	323,261,821	(200,237,020)	1,265,810
2017	665,575,829	82.1%	32.93%	30	3,052,320,313	2018	305,228,116	101,093,645	27,470,530	192,707,045	(64,142,870)	1,986,397
2018	675,216,218	82.7%	32.69%	30	3,236,597,126	2019	314,384,959	103,537,260	28,294,646	200,639,470	(68,807,564)	2,152,220
2019	684,817,219	83.4%	32.39%	30	3,431,334,565	2020	323,816,508	105,868,628	29,143,486	265,215,216	(130,203,102)	2,286,010
2020	694,319,254	83.7%	32.15%	30	3,575,872,612	2021	333,531,003	108,026,065	30,017,790	231,384,626	(93,340,771)	2,642,346
2021	704,165,996	84.3%	31.90%	30	3,772,560,546	2022	343,536,933	110,444,579	30,918,324	240,768,223	(99,405,320)	2,801,489
2022	714,099,742	84.8%	31.65%	30	3,979,242,983	2023	353,843,041	112,871,934	31,845,874	250,783,246	(106,065,438)	3,018,426
2023	724,172,803	85.3%	31.41%	30	4,196,121,707	2024	364,458,332	115,358,798	32,801,250	260,939,985	(112,779,937)	3,244,408
2024	734,390,782	85.8%	31.17%	30	4,424,000,613	2025	375,392,082	117,910,379	33,785,287	271,201,450	(119,505,784)	3,476,132
2025	744,755,253	86.2%	30.94%	30	4,663,798,354	2026	386,653,844	120,527,970	34,798,846	323,855,196	(168,528,380)	3,714,264
2026	755,264,362	86.6%	30.67%	30	4,870,631,916	2027	398,253,459	123,209,493	35,842,811	332,029,935	(172,977,631)	3,962,896
2027	765,769,738	86.9%	30.41%	30	5,090,057,331	2028	410,201,063	125,807,949	36,918,096	341,335,566	(178,609,521)	4,371,101
2028	776,432,820	87.3%	30.16%	30	5,321,863,988	2029	422,507,095	128,480,541	38,025,639	350,694,179	(184,187,999)	4,783,805
2029	787,270,857	87.6%	29.92%	30	5,567,157,630	2030	435,182,308	131,244,150	39,166,408	360,529,609	(190,119,051)	5,186,323
2030	798,282,765	88.0%	29.68%	30	5,826,696,720	2031	448,237,777	134,097,773	40,341,400	445,104,622	(270,665,449)	5,581,913
2031	809,441,863	88.1%	29.40%	30	6,020,729,084	2032	461,684,910	137,015,086	41,551,642	437,635,691	(259,068,963)	5,999,223
2032	820,547,165	88.4%	29.13%	30	6,243,657,387	2033	475,535,457	139,797,017	42,798,191	444,098,239	(261,503,031)	6,639,716
2033	831,837,217	88.6%	28.88%	30	6,482,718,930	2034	489,801,521	142,676,206	44,082,137	450,819,856	(264,061,513)	7,273,208
2034	843,336,809	88.9%	28.64%	30	6,739,144,210	2035	504,495,567	145,677,273	45,404,601	457,249,221	(266,167,347)	7,877,611
2035	855,041,550	89.1%	28.38%	30	7,014,893,313	2036	519,630,434	148,796,349	46,766,739	610,444,953	(414,881,865)	8,459,397
2036	866,799,641	89.2%	28.10%	30	7,152,531,502	2037	535,219,347	151,883,748	48,169,741	545,877,030	(345,823,541)	9,170,932
2037	878,587,656	89.4%	27.84%	30	7,376,602,485	2038	551,275,927	154,914,545	49,614,833	545,190,663	(340,661,285)	10,039,896
2038	890,588,302	89.5%	27.59%	30	7,625,126,445	2039	567,814,205	158,067,253	51,103,278	544,134,336	(334,963,805)	10,890,616
2039	902,833,623	89.7%	27.36%	30	7,900,755,435	2040	584,848,631	161,373,981	52,636,377	542,356,638	(328,346,280)	11,693,899
2040	915,317,296	90.0%	27.12%	30	8,206,783,017	2041	602,394,090	164,829,377	54,215,468	677,485,370	(458,440,525)	12,458,103
2041	927,878,087	90.0%	26.88%	30	8,397,452,359	2042	620,465,913	168,274,843	55,841,932	589,144,554	(365,027,779)	13,344,917
2042	940,608,450	90.2%	26.66%	30	8,705,461,472	2043	639,079,890	171,800,330	57,517,190	575,940,327	(346,622,807)	14,267,572
2043	953,599,455	90.5%	26.46%	30	9,059,395,215	2044	658,252,287	175,495,712	59,242,706	564,066,384	(329,327,966)	15,139,467

Detailed Actuarial Forecasts

HFRRF Forecast – Change Normal Form to 50% J&S for New Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	609,383,997	82.6%	33.42%	30	2,859,342,660	2015	279,326,965	96,150,820	25,139,427	173,085,232	(51,794,985)	289,511
2015	599,665,840	83.7%	32.54%	30	3,040,929,274	2016	287,706,774	96,154,818	25,893,610	376,151,948	(254,103,520)	481,406
2016	653,739,620	82.2%	33.16%	30	3,018,413,109	2017	296,337,977	96,440,423	26,670,418	323,261,821	(200,150,980)	1,179,770
2017	665,710,255	82.1%	32.98%	30	3,052,475,503	2018	305,228,116	101,228,665	27,470,530	192,707,045	(64,007,850)	1,851,377
2018	675,360,013	82.7%	32.74%	30	3,236,906,148	2019	314,384,959	103,683,551	28,294,646	200,639,470	(68,661,273)	2,005,929
2019	684,967,984	83.4%	32.44%	30	3,431,822,235	2020	323,816,508	106,024,013	29,143,486	265,215,216	(130,047,717)	2,130,625
2020	694,492,117	83.7%	32.20%	30	3,576,563,588	2021	333,531,003	108,205,670	30,017,790	231,384,626	(93,161,166)	2,462,741
2021	704,347,008	84.3%	31.96%	30	3,773,497,337	2022	343,536,933	110,635,001	30,918,324	240,768,223	(99,214,898)	2,611,067
2022	714,292,674	84.8%	31.71%	30	3,980,457,750	2023	353,843,041	113,077,102	31,845,874	250,783,246	(105,860,270)	2,813,258
2023	724,378,011	85.3%	31.47%	30	4,197,653,439	2024	364,458,332	115,579,326	32,801,250	260,939,985	(112,559,409)	3,023,880
2024	734,608,384	85.8%	31.24%	30	4,425,892,252	2025	375,392,082	118,146,659	33,785,287	271,201,450	(119,269,504)	3,239,852
2025	744,985,402	86.2%	31.01%	30	4,666,096,899	2026	386,653,844	120,780,436	34,798,846	323,855,196	(168,275,914)	3,461,798
2026	755,507,483	86.6%	30.74%	30	4,873,388,813	2027	398,253,459	123,478,857	35,842,811	332,029,935	(172,708,267)	3,693,532
2027	766,036,487	86.9%	30.49%	30	5,093,329,143	2028	410,201,063	126,105,061	36,918,096	341,335,566	(178,312,409)	4,073,989
2028	776,723,026	87.3%	30.24%	30	5,325,723,385	2029	422,507,095	128,805,704	38,025,639	350,694,179	(183,862,836)	4,458,642
2029	787,583,331	87.6%	30.00%	30	5,571,683,777	2030	435,182,308	131,596,674	39,166,408	360,529,609	(189,766,527)	4,833,799
2030	798,616,542	88.0%	29.77%	30	5,831,974,790	2031	448,237,777	134,477,186	40,341,400	445,104,622	(270,286,036)	5,202,500
2031	809,797,949	88.2%	29.49%	30	6,026,850,999	2032	461,684,910	137,422,865	41,551,642	437,635,691	(258,661,184)	5,591,444
2032	820,940,383	88.4%	29.23%	30	6,250,724,421	2033	475,535,457	140,248,331	42,798,191	444,098,239	(261,051,717)	6,188,402
2033	832,266,336	88.6%	28.98%	30	6,490,856,766	2034	489,801,521	143,170,580	44,082,137	450,819,856	(263,567,139)	6,778,834
2034	843,799,075	88.9%	28.75%	30	6,748,488,719	2035	504,495,567	146,212,730	45,404,601	457,249,221	(265,631,890)	7,342,154
2035	855,534,671	89.1%	28.49%	30	7,025,589,855	2036	519,630,434	149,371,350	46,766,739	610,444,953	(414,306,864)	7,884,396
2036	867,331,812	89.2%	28.22%	30	7,164,736,190	2037	535,219,347	152,507,114	48,169,741	545,877,030	(345,200,175)	8,547,566
2037	879,168,832	89.4%	27.97%	30	7,390,493,890	2038	551,275,927	155,596,976	49,614,833	545,190,663	(339,978,854)	9,357,465
2038	891,216,191	89.6%	27.73%	30	7,640,909,461	2039	567,814,205	158,807,507	51,103,278	544,134,336	(334,223,551)	10,150,362
2039	903,503,928	89.8%	27.50%	30	7,918,651,082	2040	584,848,631	162,168,836	52,636,377	542,356,638	(327,551,425)	10,899,044
2040	916,026,326	90.0%	27.27%	30	8,227,027,742	2041	602,394,090	165,676,177	54,215,468	677,485,370	(457,593,725)	11,611,303
2041	928,633,291	90.1%	27.03%	30	8,420,299,940	2042	620,465,913	169,181,922	55,841,932	589,144,554	(364,120,700)	12,437,838
2042	941,411,172	90.3%	26.82%	30	8,731,195,941	2043	639,079,890	172,770,123	57,517,190	575,940,327	(345,653,014)	13,297,779
2043	954,445,033	90.5%	26.62%	30	9,088,327,283	2044	658,252,287	176,524,768	59,242,706	564,066,384	(328,298,910)	14,110,411

Detailed Actuarial Forecasts

HFRRF Forecast – HPOPS Design for New Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	608,451,650	82.6%	32.80%	30	2,859,342,660	2015	279,326,965	95,228,887	25,385,990	173,085,232	(52,470,355)	1,211,444
2015	597,872,299	83.8%	31.06%	30	3,040,225,786	2016	287,706,774	94,367,831	26,506,499	376,151,948	(255,277,618)	2,268,393
2016	649,324,219	82.3%	30.90%	30	3,016,426,845	2017	296,337,977	92,034,524	27,616,591	323,261,821	(203,610,706)	5,585,669
2017	658,823,032	82.2%	30.60%	30	3,046,716,641	2018	305,228,116	94,313,522	28,474,974	192,707,045	(69,918,549)	8,766,520
2018	667,992,828	82.8%	30.28%	30	3,224,501,002	2019	314,384,959	96,191,091	29,361,018	200,639,470	(75,087,361)	9,498,389
2019	677,243,797	83.4%	29.68%	30	3,411,669,024	2020	323,816,508	98,065,802	30,383,874	265,215,216	(136,765,540)	10,088,836
2020	685,636,091	83.8%	29.37%	30	3,547,699,845	2021	333,531,003	99,006,982	31,326,316	231,384,626	(101,051,328)	11,661,429
2021	695,073,587	84.3%	28.99%	30	3,733,961,521	2022	343,536,933	100,882,299	32,330,819	240,768,223	(107,555,105)	12,363,769
2022	704,408,787	84.8%	28.61%	30	3,928,873,953	2023	353,843,041	102,569,200	33,364,942	250,783,246	(114,849,104)	13,321,160
2023	713,865,343	85.3%	28.25%	30	4,132,321,951	2024	364,458,332	104,284,741	34,429,573	260,939,985	(122,225,671)	14,318,465
2024	723,460,913	85.7%	27.89%	30	4,344,938,886	2025	375,392,082	106,045,396	35,525,998	271,201,450	(129,630,056)	15,341,115
2025	733,195,277	86.2%	27.54%	30	4,567,470,601	2026	386,653,844	107,850,187	36,657,098	323,855,196	(179,347,911)	16,392,047
2026	743,053,006	86.5%	27.03%	30	4,754,846,320	2027	398,253,459	109,683,071	37,897,893	332,029,935	(184,448,971)	17,489,318
2027	752,371,928	86.8%	26.54%	30	4,952,481,030	2028	410,201,063	110,888,240	39,166,872	341,335,566	(191,280,454)	19,290,810
2028	761,857,043	87.1%	26.09%	30	5,159,395,234	2029	422,507,095	112,152,178	40,463,119	350,694,179	(198,078,882)	21,112,168
2029	771,576,901	87.4%	25.67%	30	5,376,409,825	2030	435,182,308	113,541,910	41,789,742	360,529,609	(205,197,957)	22,888,563
2030	781,519,021	87.8%	25.24%	30	5,604,028,661	2031	448,237,777	115,045,297	43,161,897	445,104,622	(286,897,428)	24,634,389
2031	791,557,866	87.9%	24.63%	30	5,762,226,469	2032	461,684,910	116,538,232	44,679,986	437,635,691	(276,417,473)	26,476,077
2032	800,798,536	88.1%	24.06%	30	5,945,111,264	2033	475,535,457	117,134,026	46,223,416	444,098,239	(280,740,797)	29,302,707
2033	810,285,765	88.3%	23.55%	30	6,138,757,688	2034	489,801,521	117,850,969	47,790,370	450,819,856	(285,178,517)	32,098,445
2034	820,120,818	88.6%	23.08%	30	6,343,950,087	2035	504,495,567	118,789,080	49,385,965	457,249,221	(289,074,176)	34,765,804
2035	830,276,067	88.8%	22.53%	30	6,562,247,172	2036	519,630,434	119,922,385	51,087,031	610,444,953	(439,435,537)	37,333,361
2036	840,073,231	88.8%	21.88%	30	6,635,834,516	2037	535,219,347	120,581,167	52,903,263	545,877,030	(372,392,600)	40,473,513
2037	849,400,423	88.9%	21.29%	30	6,788,311,037	2038	551,275,927	120,645,995	54,747,471	545,190,663	(369,797,197)	44,308,446
2038	859,055,364	89.0%	20.77%	30	6,956,481,286	2039	567,814,205	120,895,011	56,612,555	544,134,336	(366,626,770)	48,062,858
2039	869,170,740	89.2%	20.30%	30	7,142,294,238	2040	584,848,631	121,459,960	58,504,990	542,356,638	(362,391,688)	51,607,920
2040	879,709,788	89.3%	19.78%	30	7,348,389,786	2041	602,394,090	122,306,965	60,506,367	677,485,370	(494,672,038)	54,980,515
2041	889,951,960	89.3%	19.26%	30	7,428,355,751	2042	620,465,913	122,725,544	62,569,215	589,144,554	(403,849,795)	58,894,216
2042	900,296,160	89.4%	18.81%	30	7,613,553,347	2043	639,079,890	123,101,811	64,654,890	575,940,327	(388,183,626)	62,966,091
2043	911,135,053	89.6%	18.42%	30	7,831,383,764	2044	658,252,287	123,821,220	66,764,428	564,066,384	(373,480,736)	66,813,959

Detailed Actuarial Forecasts

HFRRF Forecast – Eliminate COLA for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	(278,236,780)	110.7%	5.67%	30	2,859,342,660	2015	279,326,965	22,764,194	25,139,427	165,258,213	(117,354,592)	73,676,137
2015	(305,910,943)	111.3%	5.07%	30	2,972,979,633	2016	287,706,774	16,309,847	25,893,610	361,432,147	(319,228,690)	80,326,377
2016	(264,937,108)	110.1%	6.00%	30	2,877,489,550	2017	296,337,977	15,018,256	26,670,418	302,165,004	(260,476,330)	82,601,937
2017	(266,121,028)	110.3%	6.14%	30	2,837,651,445	2018	305,228,116	18,327,205	27,470,530	168,052,364	(122,254,629)	84,752,837
2018	(269,778,447)	110.1%	6.22%	30	2,944,219,450	2019	314,384,959	19,307,553	28,294,646	170,362,112	(122,759,913)	86,381,927
2019	(273,663,753)	109.8%	6.25%	30	3,059,219,249	2020	323,816,508	20,147,591	29,143,486	226,312,667	(177,021,590)	88,007,047
2020	(277,777,570)	109.8%	6.32%	30	3,125,046,870	2021	333,531,003	20,845,958	30,017,790	188,047,357	(137,183,609)	89,822,453
2021	(281,798,733)	109.5%	6.39%	30	3,239,625,847	2022	343,536,933	21,719,458	30,918,324	190,873,019	(138,235,237)	91,526,610
2022	(285,904,699)	109.3%	6.45%	30	3,362,726,086	2023	353,843,041	22,596,458	31,845,874	194,106,900	(139,664,568)	93,293,902
2023	(290,070,497)	109.1%	6.51%	30	3,494,660,765	2024	364,458,332	23,503,048	32,801,250	197,242,215	(140,937,917)	95,100,158
2024	(294,295,174)	108.8%	6.57%	30	3,636,347,560	2025	375,392,082	24,441,967	33,785,287	200,248,801	(142,021,547)	96,944,544
2025	(298,579,876)	108.6%	6.63%	30	3,788,818,602	2026	386,653,844	25,413,946	34,798,846	242,522,609	(182,309,817)	98,828,288
2026	(302,927,943)	108.4%	6.67%	30	3,910,450,804	2027	398,253,459	26,417,588	35,842,811	242,533,127	(180,272,728)	100,754,801
2027	(307,422,323)	108.2%	6.71%	30	4,044,543,187	2028	410,201,063	27,372,786	36,918,096	243,813,201	(179,522,319)	102,806,264
2028	(311,976,258)	108.0%	6.76%	30	4,190,759,560	2029	422,507,095	28,366,098	38,025,639	244,984,666	(178,592,929)	104,898,248
2029	(316,582,770)	107.8%	6.80%	30	4,350,321,606	2030	435,182,308	29,406,475	39,166,408	246,465,666	(177,892,783)	107,023,998
2030	(321,244,476)	107.6%	6.85%	30	4,524,111,496	2031	448,237,777	30,493,541	40,341,400	317,087,719	(246,252,778)	109,186,145
2031	(325,979,427)	107.6%	6.87%	30	4,638,404,834	2032	461,684,910	31,611,686	41,551,642	301,927,898	(228,764,570)	111,402,623
2032	(330,887,455)	107.4%	6.89%	30	4,781,286,836	2033	475,535,457	32,664,239	42,798,191	299,899,903	(224,437,473)	113,772,494
2033	(335,851,557)	107.3%	6.92%	30	4,940,909,004	2034	489,801,521	33,767,560	44,082,137	298,184,578	(220,334,881)	116,181,854
2034	(340,860,738)	107.1%	6.96%	30	5,118,446,842	2035	504,495,567	34,934,899	45,404,601	296,372,821	(216,033,321)	118,619,985
2035	(345,919,721)	107.0%	6.98%	30	5,315,634,614	2036	519,630,434	36,164,191	46,766,739	429,147,115	(346,216,185)	121,091,555
2036	(351,113,479)	107.0%	7.00%	30	5,388,222,557	2037	535,219,347	37,374,027	48,169,741	361,727,436	(276,183,668)	123,680,653
2037	(356,445,831)	106.9%	7.01%	30	5,542,852,446	2038	551,275,927	38,562,098	49,614,833	353,781,975	(265,605,044)	126,392,343
2038	(361,831,929)	106.8%	7.04%	30	5,721,989,491	2039	567,814,205	39,813,758	51,103,278	346,033,995	(255,116,959)	129,144,111
2039	(367,258,405)	106.6%	7.06%	30	5,927,613,928	2040	584,848,631	41,144,951	52,636,377	338,212,900	(244,431,572)	131,922,929
2040	(372,730,893)	106.4%	7.08%	30	6,162,185,872	2041	602,394,090	42,553,107	54,215,468	455,364,082	(358,595,507)	134,734,373
2041	(378,334,746)	106.4%	7.10%	30	6,292,699,015	2042	620,465,913	43,956,834	55,841,932	368,678,385	(268,879,619)	137,662,926
2042	(384,032,466)	106.2%	7.13%	30	6,531,516,105	2043	639,079,890	45,395,076	57,517,190	351,635,162	(248,722,896)	140,672,826
2043	(389,774,700)	106.1%	7.16%	30	6,812,367,669	2044	658,252,287	46,919,097	59,242,706	336,254,210	(230,092,407)	143,716,082

Detailed Actuarial Forecasts

HFRRF Forecast – Reduce COLA to 1% for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	(28,811,016)	101.0%	13.75%	30	2,859,342,660	2015	279,326,965	44,081,890	25,139,427	167,842,079	(98,620,762)	52,358,441
2015	(51,333,418)	101.7%	13.16%	30	2,992,381,361	2016	287,706,774	39,568,092	25,893,610	366,250,077	(300,788,375)	57,068,132
2016	(6,416,043)	100.2%	14.07%	30	2,917,539,534	2017	296,337,977	39,002,191	26,670,418	309,004,935	(243,332,326)	58,618,002
2017	(3,724,570)	100.1%	14.12%	30	2,898,666,819	2018	305,228,116	42,931,245	27,470,530	175,958,313	(105,556,538)	60,148,797
2018	(3,607,130)	100.1%	14.12%	30	3,027,471,564	2019	314,384,959	44,391,952	28,294,646	179,976,059	(107,289,461)	61,297,528
2019	(3,674,065)	100.1%	14.07%	30	3,165,245,407	2020	323,816,508	45,712,380	29,143,486	238,684,382	(163,828,516)	62,442,258
2020	(3,875,877)	100.1%	14.06%	30	3,253,291,077	2021	333,531,003	46,940,067	30,017,790	201,538,433	(124,580,576)	63,728,344
2021	(3,966,626)	100.1%	14.05%	30	3,391,313,488	2022	343,536,933	48,317,477	30,918,324	206,256,210	(127,020,409)	64,928,591
2022	(4,077,921)	100.1%	14.04%	30	3,538,321,798	2023	353,843,041	49,717,272	31,845,874	211,414,531	(129,851,385)	66,173,088
2023	(4,191,610)	100.1%	14.02%	30	3,694,653,276	2024	364,458,332	51,158,387	32,801,250	216,506,172	(132,546,535)	67,444,819
2024	(4,306,466)	100.1%	14.01%	30	3,861,244,764	2025	375,392,082	52,643,310	33,785,287	221,498,810	(135,070,213)	68,743,201
2025	(4,422,719)	100.1%	14.00%	30	4,039,151,268	2026	386,653,844	54,173,147	34,798,846	266,715,731	(177,743,738)	70,069,087
2026	(4,542,161)	100.1%	13.97%	30	4,185,768,751	2027	398,253,459	55,747,492	35,842,811	268,907,650	(177,317,347)	71,424,897
2027	(4,724,581)	100.1%	13.95%	30	4,345,197,807	2028	410,201,063	57,308,610	36,918,096	272,282,768	(178,056,062)	72,870,440
2028	(4,906,074)	100.1%	13.92%	30	4,517,262,495	2029	422,507,095	58,920,252	38,025,639	275,554,189	(178,608,298)	74,344,094
2029	(5,081,091)	100.1%	13.90%	30	4,703,235,583	2030	435,182,308	60,589,407	39,166,408	279,147,667	(179,391,852)	75,841,066
2030	(5,250,754)	100.1%	13.88%	30	4,904,044,371	2031	448,237,777	62,316,593	40,341,400	353,622,995	(250,965,002)	77,363,093
2031	(5,427,068)	100.1%	13.85%	30	5,044,139,181	2032	461,684,910	64,091,599	41,551,642	340,278,518	(234,635,277)	78,922,710
2032	(5,680,496)	100.1%	13.81%	30	5,213,730,340	2033	475,535,457	65,846,283	42,798,191	340,287,839	(231,643,365)	80,590,450
2033	(5,927,598)	100.1%	13.79%	30	5,400,852,819	2034	489,801,521	67,663,717	44,082,137	340,564,797	(228,818,943)	82,285,697
2034	(6,159,387)	100.1%	13.76%	30	5,606,810,710	2035	504,495,567	69,554,573	45,404,601	340,663,453	(225,704,279)	84,000,311
2035	(6,378,639)	100.1%	13.73%	30	5,833,515,082	2036	519,630,434	71,518,078	46,766,739	479,206,502	(360,921,685)	85,737,668
2036	(6,646,167)	100.1%	13.69%	30	5,932,634,217	2037	535,219,347	73,496,085	48,169,741	411,945,426	(290,279,600)	87,558,595
2037	(6,962,063)	100.1%	13.66%	30	6,116,678,518	2038	551,275,927	75,489,673	49,614,833	405,577,741	(280,473,235)	89,464,768
2038	(7,266,613)	100.1%	13.63%	30	6,326,857,367	2039	567,814,205	77,559,093	51,103,278	399,243,784	(270,581,413)	91,398,776
2039	(7,549,691)	100.1%	13.61%	30	6,565,479,752	2040	584,848,631	79,716,459	52,636,377	392,657,603	(260,304,767)	93,351,421
2040	(7,814,604)	100.1%	13.58%	30	6,835,375,157	2041	602,394,090	81,960,812	54,215,468	514,870,314	(378,694,034)	95,326,668
2041	(8,120,615)	100.1%	13.55%	30	6,999,593,507	2042	620,465,913	84,235,885	55,841,932	427,020,305	(286,942,488)	97,383,875
2042	(8,445,171)	100.1%	13.52%	30	7,277,151,648	2043	639,079,890	86,565,527	57,517,190	410,603,757	(266,521,040)	99,502,375
2043	(8,750,029)	100.1%	13.50%	30	7,600,285,822	2044	658,252,287	88,989,471	59,242,706	395,770,400	(247,538,223)	101,645,708

Detailed Actuarial Forecasts

HFRRF Forecast – Freeze DROP for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	174,580,320	94.3%	19.03%	30	2,859,342,660	2015	279,326,965	58,219,996	25,139,427	159,665,555	(76,306,132)	38,220,335
2015	155,823,141	95.2%	18.10%	30	3,015,979,613	2016	287,706,774	54,760,387	25,893,610	267,695,749	(187,041,752)	41,875,837
2016	202,894,357	93.8%	18.79%	30	3,065,899,884	2017	296,337,977	53,629,655	26,670,418	183,551,062	(103,250,989)	43,990,538
2017	208,139,599	93.9%	18.75%	30	3,210,991,704	2018	305,228,116	57,339,637	27,470,530	189,773,745	(104,963,578)	45,740,405
2018	211,239,414	94.1%	18.67%	30	3,366,362,583	2019	314,384,959	58,959,685	28,294,646	197,276,520	(110,022,189)	46,729,795
2019	214,225,410	94.3%	18.47%	30	3,529,345,398	2020	323,816,508	60,468,645	29,143,486	211,906,950	(122,294,819)	47,685,993
2020	216,818,834	94.5%	18.38%	30	3,692,763,698	2021	333,531,003	61,589,275	30,017,790	220,844,265	(129,237,200)	49,079,136
2021	219,861,375	94.6%	18.30%	30	3,862,453,558	2022	343,536,933	63,148,188	30,918,324	230,414,096	(136,347,584)	50,097,880
2022	222,946,147	94.8%	18.22%	30	4,038,745,630	2023	353,843,041	64,749,355	31,845,874	240,074,826	(143,479,597)	51,141,005
2023	226,076,211	94.9%	18.14%	30	4,222,174,632	2024	364,458,332	66,396,431	32,801,250	249,822,757	(150,625,076)	52,206,775
2024	229,252,134	95.1%	18.06%	30	4,413,329,395	2025	375,392,082	68,090,664	33,785,287	259,629,671	(157,753,720)	53,295,847
2025	232,474,207	95.2%	17.98%	30	4,612,881,587	2026	386,653,844	69,833,061	34,798,846	274,098,128	(169,466,221)	54,409,173
2026	235,740,807	95.3%	17.89%	30	4,816,568,135	2027	398,253,459	71,685,623	35,842,811	287,895,685	(180,367,251)	55,486,766
2027	238,923,463	95.5%	17.80%	30	5,025,614,809	2028	410,201,063	73,836,191	36,918,096	301,131,688	(190,377,401)	56,342,859
2028	241,761,655	95.6%	17.71%	30	5,241,429,544	2029	422,507,095	76,051,277	38,025,639	313,804,155	(199,727,239)	57,213,069
2029	244,217,345	95.7%	17.62%	30	5,465,299,865	2030	435,182,308	78,332,815	39,166,408	325,862,634	(208,363,411)	58,097,658
2030	246,247,335	95.9%	17.52%	30	5,698,680,503	2031	448,237,777	80,682,800	40,341,400	345,468,121	(224,443,921)	58,996,886
2031	247,789,232	96.0%	17.40%	30	5,934,298,275	2032	461,684,910	83,103,284	41,551,642	362,226,842	(237,571,916)	59,911,025
2032	248,705,961	96.1%	17.27%	30	6,175,542,231	2033	475,535,457	85,596,382	42,798,191	377,473,528	(249,078,955)	60,840,351
2033	248,939,132	96.3%	17.15%	30	6,424,644,610	2034	489,801,521	88,164,274	44,082,137	391,280,204	(259,033,793)	61,785,140
2034	248,426,789	96.4%	17.02%	30	6,683,952,650	2035	504,495,567	90,809,202	45,404,601	403,658,391	(267,444,588)	62,745,682
2035	247,097,845	96.6%	16.88%	30	6,956,004,109	2036	519,630,434	93,533,478	46,766,739	428,441,616	(288,141,399)	63,722,268
2036	244,811,416	96.7%	16.72%	30	7,228,546,688	2037	535,219,347	96,339,482	48,169,741	445,476,241	(300,967,018)	64,715,198
2037	241,422,972	96.9%	16.55%	30	7,510,157,059	2038	551,275,927	99,229,667	49,614,833	459,766,483	(310,921,983)	65,724,774
2038	236,834,235	97.1%	16.39%	30	7,804,715,167	2039	567,814,205	102,206,557	51,103,278	471,494,202	(318,184,367)	66,751,312
2039	230,940,926	97.2%	16.22%	30	8,116,237,381	2040	584,848,631	105,272,754	52,636,377	480,921,963	(323,012,832)	67,795,126
2040	223,625,437	97.4%	16.03%	30	8,448,800,642	2041	602,394,090	108,430,936	54,215,468	499,363,671	(336,717,267)	68,856,544
2041	214,699,506	97.6%	15.83%	30	8,794,557,030	2042	620,465,913	111,683,864	55,841,932	508,987,514	(341,461,718)	69,935,896
2042	203,994,318	97.8%	15.63%	30	9,164,343,378	2043	639,079,890	115,034,380	57,517,190	515,958,373	(343,406,803)	71,033,522
2043	191,352,924	98.0%	15.42%	30	9,563,233,198	2044	658,252,287	118,485,412	59,242,706	520,873,539	(343,145,421)	72,149,767

Detailed Actuarial Forecasts

HFRRF Forecast – Eliminate DROP Interest for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	441,320,673	86.7%	28.54%	30	2,859,342,660	2015	279,326,965	83,220,186	25,139,427	168,273,560	(59,913,947)	13,220,145
2015	428,294,399	87.8%	27.74%	30	3,032,680,958	2016	287,706,774	82,120,960	25,893,610	336,023,664	(228,009,094)	14,515,264
2016	479,968,356	86.4%	28.45%	30	3,038,384,740	2017	296,337,977	82,218,704	26,670,418	290,660,864	(181,771,742)	15,401,489
2017	489,522,355	86.3%	28.33%	30	3,094,702,945	2018	305,228,116	86,833,320	27,470,530	191,354,257	(77,050,407)	16,246,722
2018	496,684,611	86.8%	28.16%	30	3,269,196,026	2019	314,384,959	89,076,048	28,294,646	198,982,403	(81,611,709)	16,613,432
2019	503,768,896	87.3%	27.96%	30	3,453,439,008	2020	323,816,508	91,200,036	29,143,486	247,614,097	(127,270,575)	16,954,602
2020	510,819,284	87.6%	27.79%	30	3,603,673,852	2021	333,531,003	93,246,488	30,017,790	227,100,212	(103,835,934)	17,421,923
2021	518,085,766	88.0%	27.61%	30	3,791,978,580	2022	343,536,933	95,460,793	30,918,324	236,266,741	(109,887,624)	17,785,275
2022	525,434,770	88.4%	27.44%	30	3,989,588,047	2023	353,843,041	97,712,623	31,845,874	245,783,593	(116,225,096)	18,177,737
2023	532,887,542	88.7%	27.28%	30	4,196,980,281	2024	364,458,332	100,022,853	32,801,250	255,311,574	(122,487,471)	18,580,353
2024	540,447,000	89.1%	27.11%	30	4,415,064,560	2025	375,392,082	102,394,545	33,785,287	264,819,725	(128,639,893)	18,991,966
2025	548,114,472	89.4%	26.95%	30	4,644,865,099	2026	386,653,844	104,829,235	34,798,846	305,849,779	(166,221,698)	19,412,999
2026	555,889,898	89.7%	26.77%	30	4,853,272,885	2027	398,253,459	107,327,107	35,842,811	315,305,735	(172,135,817)	19,845,282
2027	563,705,671	90.0%	26.60%	30	5,072,824,917	2028	410,201,063	109,821,565	36,918,096	325,296,599	(178,556,938)	20,357,485
2028	571,636,549	90.3%	26.43%	30	5,303,917,148	2029	422,507,095	112,385,817	38,025,639	335,062,491	(184,651,035)	20,878,529
2029	579,690,850	90.5%	26.27%	30	5,547,880,889	2030	435,182,308	115,028,430	39,166,408	344,738,104	(190,543,266)	21,402,043
2030	587,869,795	90.8%	26.11%	30	5,806,024,404	2031	448,237,777	117,751,084	40,341,400	410,250,926	(252,158,442)	21,928,602
2031	596,162,718	91.0%	25.93%	30	6,019,088,625	2032	461,684,910	120,543,741	41,551,642	409,472,070	(247,376,687)	22,470,568
2032	604,482,686	91.2%	25.76%	30	6,255,277,916	2033	475,535,457	123,320,803	42,798,191	417,675,936	(251,556,942)	23,115,930
2033	612,932,055	91.4%	25.60%	30	6,506,833,230	2034	489,801,521	126,182,605	44,082,137	425,438,269	(255,173,527)	23,766,809
2034	621,524,392	91.6%	25.44%	30	6,775,666,963	2035	504,495,567	129,143,136	45,404,601	432,369,536	(257,821,799)	24,411,748
2035	630,258,274	91.8%	25.28%	30	7,064,292,449	2036	519,630,434	132,201,776	46,766,739	545,703,020	(366,734,505)	25,053,970
2036	639,065,468	91.9%	25.11%	30	7,259,089,101	2037	535,219,347	135,291,847	48,169,741	505,367,964	(321,906,376)	25,762,833
2037	647,944,117	92.1%	24.94%	30	7,518,887,139	2038	551,275,927	138,411,339	49,614,833	508,266,920	(320,240,748)	26,543,102
2038	656,967,511	92.2%	24.79%	30	7,802,377,266	2039	567,814,205	141,632,520	51,103,278	510,131,461	(317,395,663)	27,325,349
2039	666,150,734	92.4%	24.64%	30	8,112,846,730	2040	584,848,631	144,971,155	52,636,377	510,769,310	(313,161,778)	28,096,725
2040	675,491,800	92.6%	24.49%	30	8,454,088,593	2041	602,394,090	148,426,373	54,215,468	609,069,845	(406,428,004)	28,861,107
2041	684,924,041	92.7%	24.33%	30	8,722,923,838	2042	620,465,913	151,933,348	55,841,932	550,569,159	(342,793,879)	29,686,412
2042	694,474,374	92.9%	24.19%	30	9,083,430,484	2043	639,079,890	155,518,861	57,517,190	543,178,716	(330,142,665)	30,549,041
2043	704,188,376	93.1%	24.05%	30	9,488,078,621	2044	658,252,287	159,228,543	59,242,706	536,176,647	(317,705,398)	31,406,636

Detailed Actuarial Forecasts

HFRRF Forecast – Change Normal Form to 50% J&S for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	527,236,442	84.5%	30.32%	30	2,859,342,660	2015	279,326,965	87,868,143	25,139,427	172,951,286	(59,943,716)	8,572,188
2015	515,859,511	85.6%	29.64%	30	3,032,447,093	2016	287,706,774	87,232,692	25,893,610	375,897,504	(262,771,202)	9,403,532
2016	569,223,805	84.1%	30.38%	30	3,000,192,431	2017	296,337,977	87,823,578	26,670,418	322,826,741	(208,332,745)	9,796,615
2017	580,264,418	83.9%	30.24%	30	3,024,202,537	2018	305,228,116	92,718,976	27,470,530	192,039,619	(71,850,113)	10,361,066
2018	588,740,452	84.5%	30.04%	30	3,198,090,161	2019	314,384,959	95,057,395	28,294,646	199,693,155	(76,341,114)	10,632,085
2019	597,143,604	85.0%	29.80%	30	3,381,748,349	2020	323,816,508	97,264,998	29,143,486	263,936,765	(137,528,281)	10,889,640
2020	605,525,422	85.3%	29.60%	30	3,514,496,859	2021	333,531,003	99,389,940	30,017,790	229,713,686	(100,305,956)	11,278,471
2021	614,147,090	85.8%	29.40%	30	3,698,785,147	2022	343,536,933	101,688,332	30,918,324	238,642,542	(106,035,886)	11,557,736
2022	622,867,546	86.2%	29.20%	30	3,892,382,240	2023	353,843,041	104,022,246	31,845,874	248,135,428	(112,267,308)	11,868,114
2023	631,712,109	86.6%	29.00%	30	4,095,532,554	2024	364,458,332	106,416,279	32,801,250	257,697,036	(118,479,507)	12,186,927
2024	640,683,923	87.1%	28.81%	30	4,309,065,156	2025	375,392,082	108,873,458	33,785,287	267,285,153	(124,626,408)	12,513,053
2025	649,784,549	87.5%	28.62%	30	4,533,929,407	2026	386,653,844	111,395,283	34,798,846	319,181,096	(172,986,967)	12,846,951
2026	659,013,607	87.8%	28.42%	30	4,725,282,595	2027	398,253,459	113,981,360	35,842,811	326,506,981	(176,682,810)	13,191,029
2027	668,301,815	88.1%	28.22%	30	4,928,733,392	2028	410,201,063	116,563,156	36,918,096	334,868,300	(181,387,048)	13,615,894
2028	677,729,186	88.4%	28.02%	30	5,144,214,813	2029	422,507,095	119,218,762	38,025,639	343,181,328	(185,936,927)	14,045,584
2029	687,302,186	88.7%	27.84%	30	5,372,912,341	2030	435,182,308	121,954,670	39,166,408	351,860,136	(190,739,058)	14,475,803
2030	697,021,599	89.0%	27.65%	30	5,615,670,728	2031	448,237,777	124,771,848	40,341,400	435,156,628	(270,043,380)	14,907,838
2031	706,874,765	89.1%	27.45%	30	5,792,845,262	2032	461,684,910	127,657,991	41,551,642	426,272,614	(257,062,981)	15,356,318
2032	716,782,120	89.3%	27.26%	30	5,998,985,717	2033	475,535,457	130,534,456	42,798,191	431,175,245	(257,842,598)	15,902,277
2033	726,844,376	89.5%	27.07%	30	6,221,623,425	2034	489,801,521	133,499,718	44,082,137	436,187,359	(258,605,504)	16,449,696
2034	737,072,562	89.8%	26.89%	30	6,462,173,311	2035	504,495,567	136,564,991	45,404,601	440,749,987	(258,780,395)	16,989,893
2035	747,465,431	90.0%	26.70%	30	6,722,789,899	2036	519,630,434	139,729,519	46,766,739	591,898,119	(405,401,861)	17,526,227
2036	757,955,391	90.0%	26.51%	30	6,846,278,300	2037	535,219,347	142,926,936	48,169,741	525,080,401	(333,983,724)	18,127,744
2037	768,541,098	90.2%	26.33%	30	7,057,552,389	2038	551,275,927	146,155,425	49,614,833	521,956,434	(326,186,176)	18,799,016
2038	779,300,753	90.3%	26.15%	30	7,295,042,438	2039	567,814,205	149,491,789	51,103,278	518,285,216	(317,690,149)	19,466,080
2039	790,243,670	90.5%	25.98%	30	7,561,728,094	2040	584,848,631	152,945,829	52,636,377	513,726,060	(308,143,854)	20,122,051
2040	801,368,049	90.7%	25.81%	30	7,861,223,485	2041	602,394,090	156,516,507	54,215,468	645,897,598	(435,165,623)	20,770,973
2041	812,612,033	90.8%	25.64%	30	8,048,134,037	2042	620,465,913	160,143,399	55,841,932	554,412,254	(338,426,923)	21,476,361
2042	823,992,443	91.0%	25.47%	30	8,355,665,655	2043	639,079,890	163,843,005	57,517,190	537,923,312	(316,563,117)	22,224,897
2043	835,561,817	91.2%	25.31%	30	8,712,826,600	2044	658,252,287	167,667,382	59,242,706	522,668,864	(295,758,776)	22,967,797

Detailed Actuarial Forecasts

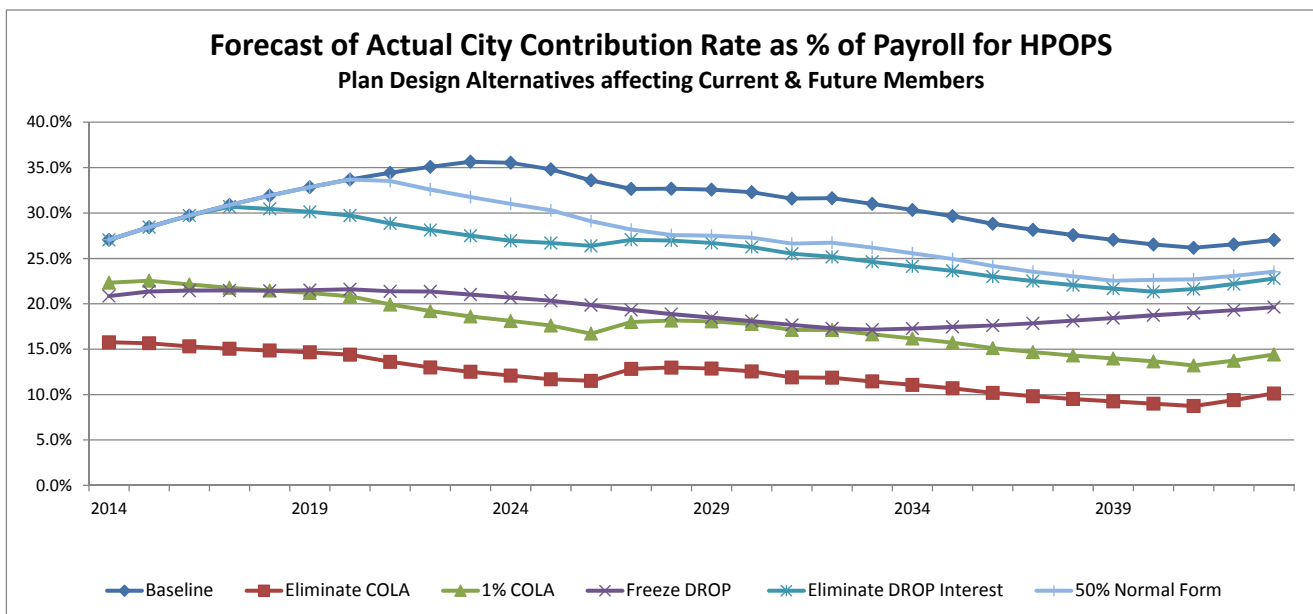
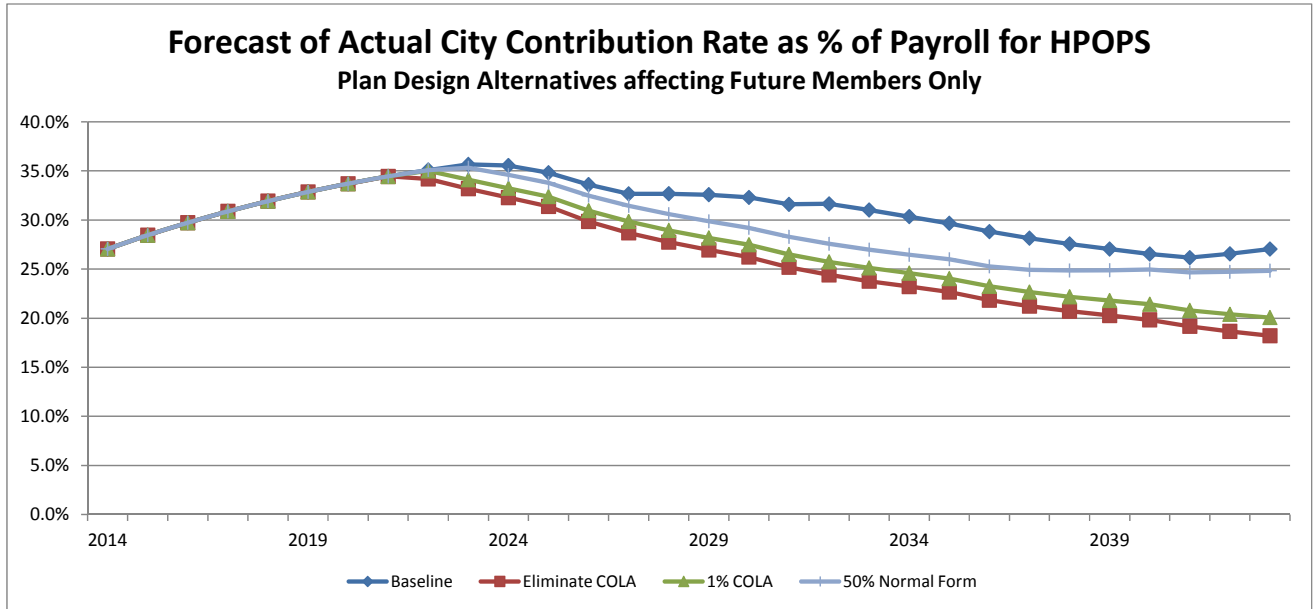
HFRRF Forecast – Delay Retirement Eligibility to Age 55 and 10 Years of Service for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	502,114,917	85.2%	30.09%	30	2,859,342,660	2015	279,326,965	87,219,949	25,139,427	141,745,477	(29,386,101)	9,220,382
2015	490,346,874	86.4%	29.20%	30	3,065,630,215	2016	287,706,774	86,560,351	25,893,610	440,839,170	(328,385,209)	10,075,873
2016	542,724,293	84.5%	29.82%	30	2,965,034,078	2017	296,337,977	86,543,204	26,670,418	321,493,511	(208,279,889)	11,076,989
2017	552,984,868	84.4%	29.75%	30	2,986,168,597	2018	305,228,116	91,031,861	27,470,530	184,596,345	(66,093,954)	12,048,181
2018	561,253,686	84.9%	29.63%	30	3,163,141,934	2019	314,384,959	93,529,626	28,294,646	191,349,981	(69,525,709)	12,159,854
2019	569,489,430	85.5%	29.40%	30	3,351,290,491	2020	323,816,508	95,943,869	29,143,486	261,747,460	(136,660,105)	12,210,769
2020	577,463,708	85.8%	29.27%	30	3,482,449,347	2021	333,531,003	98,046,746	30,017,790	221,161,854	(93,097,318)	12,621,665
2021	585,893,661	86.2%	29.23%	30	3,671,893,220	2022	343,536,933	100,542,025	30,918,324	229,117,090	(97,656,741)	12,704,043
2022	594,771,552	86.7%	29.20%	30	3,872,345,583	2023	353,843,041	103,426,898	31,845,874	237,457,662	(102,184,890)	12,463,462
2023	603,791,903	87.1%	29.16%	30	4,084,758,023	2024	364,458,332	106,404,173	32,801,250	245,761,133	(106,555,710)	12,199,033
2024	612,933,851	87.6%	29.11%	30	4,310,312,634	2025	375,392,082	109,453,826	33,785,287	268,140,972	(124,901,859)	11,932,685
2025	622,187,956	87.9%	29.06%	30	4,534,958,887	2026	386,653,844	112,566,842	34,798,846	280,452,054	(133,086,366)	11,675,392
2026	631,547,119	88.3%	28.92%	30	4,769,640,926	2027	398,253,459	115,736,400	35,842,811	296,232,313	(144,653,102)	11,435,989
2027	640,665,820	88.7%	28.79%	30	5,011,538,304	2028	410,201,063	118,620,937	36,918,096	311,776,694	(156,237,661)	11,558,113
2028	649,961,885	89.0%	28.67%	30	5,261,255,988	2029	422,507,095	121,628,718	38,025,639	325,607,008	(165,952,651)	11,635,628
2029	659,460,612	89.3%	28.57%	30	5,521,480,443	2030	435,182,308	124,785,759	39,166,408	343,934,541	(179,982,374)	11,644,714
2030	669,151,374	89.6%	28.43%	30	5,788,415,345	2031	448,237,777	128,082,946	40,341,400	395,256,259	(226,831,913)	11,596,740
2031	678,782,790	89.9%	28.25%	30	6,027,014,021	2032	461,684,910	131,272,992	41,551,642	395,923,524	(223,098,890)	11,741,317
2032	688,358,046	90.1%	28.11%	30	6,289,753,089	2033	475,535,457	134,356,735	42,798,191	411,283,781	(234,128,855)	12,079,998
2033	698,209,738	90.4%	27.99%	30	6,562,669,675	2034	489,801,521	137,660,721	44,082,137	424,007,593	(242,264,735)	12,288,693
2034	708,350,709	90.6%	27.89%	30	6,849,757,777	2035	504,495,567	141,200,051	45,404,601	434,349,599	(247,744,947)	12,354,833
2035	718,751,004	90.9%	27.69%	30	7,155,091,499	2036	519,630,434	144,947,768	46,766,739	557,637,289	(365,922,782)	12,307,978
2036	728,685,150	91.0%	27.39%	30	7,357,934,038	2037	535,219,347	148,188,808	48,169,741	499,983,767	(303,625,218)	12,865,872
2037	738,254,605	91.2%	27.13%	30	7,645,409,654	2038	551,275,927	151,015,385	49,614,833	517,032,537	(316,402,319)	13,939,056
2038	748,104,805	91.4%	26.91%	30	7,943,272,295	2039	567,814,205	154,058,840	51,103,278	529,763,412	(324,601,294)	14,899,029
2039	758,284,962	91.6%	26.71%	30	8,257,360,839	2040	584,848,631	157,370,070	52,636,377	538,763,620	(328,757,173)	15,697,810
2040	768,764,287	91.8%	26.43%	30	8,593,427,698	2041	602,394,090	160,921,647	54,215,468	666,193,742	(451,056,627)	16,365,833
2041	778,838,473	91.9%	26.06%	30	8,825,142,833	2042	620,465,913	164,019,791	55,841,932	587,558,597	(367,696,874)	17,599,969
2042	788,394,985	92.1%	25.73%	30	9,166,794,195	2043	639,079,890	166,545,780	57,517,190	592,700,195	(368,637,225)	19,522,122
2043	798,322,722	92.3%	25.45%	30	9,536,283,448	2044	658,252,287	169,369,294	59,242,706	594,765,217	(366,153,217)	21,265,885

Detailed Actuarial Forecasts

HPOPS Forecasts

As HPOPS eliminated the expensive DROP feature for those hired after September 2004, there are fewer plan design alternatives. The second graph forecasts the cost reductions if the plan design alternatives applied to those hired prior to October 2004 as well as future members.



The following pages contain the numerical detail supporting the HPOPS forecasts shown above.

Detailed Actuarial Forecasts

HPOPS Forecast – Baseline

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow
2014	1,216,945,948	76.40%	38.38%	30	3,720,482,625	2015	417,652,195	113,000,000	39,295,130	358,350,946	(206,055,816)
2015	1,323,677,838	75.14%	38.42%	30	3,822,089,042	2016	432,270,022	123,000,000	40,926,836	482,301,022	(318,374,186)
2016	1,417,837,845	73.60%	38.50%	30	3,815,337,446	2017	447,399,473	133,000,000	42,733,773	457,789,634	(282,055,861)
2017	1,501,499,319	72.45%	38.56%	30	3,845,842,342	2018	463,058,455	143,000,000	44,527,230	426,805,215	(239,277,985)
2018	1,576,133,026	71.73%	38.55%	30	3,923,499,016	2019	479,265,501	153,000,000	46,338,488	428,484,586	(229,146,098)
2019	1,642,493,788	71.24%	38.41%	30	4,018,310,219	2020	496,039,794	163,000,000	48,177,950	431,330,070	(220,152,120)
2020	1,704,645,612	70.91%	37.56%	30	4,111,843,454	2021	513,401,187	173,000,000	50,125,629	530,211,111	(307,085,482)
2021	1,757,871,653	70.28%	36.86%	30	4,118,486,185	2022	531,370,229	183,000,000	52,242,102	441,730,356	(206,488,254)
2022	1,803,512,686	70.29%	36.20%	30	4,234,316,089	2023	549,968,187	193,000,000	54,370,971	444,154,918	(196,783,947)
2023	1,841,740,908	70.49%	35.55%	30	4,369,994,719	2024	569,217,074	203,000,000	56,524,035	447,930,883	(188,406,848)
2024	1,872,614,049	70.85%	34.82%	30	4,525,768,148	2025	589,139,672	209,426,905	58,713,290	451,847,559	(183,707,364)
2025	1,899,450,443	71.31%	33.61%	30	4,699,507,604	2026	609,759,561	212,333,125	61,026,403	619,573,738	(346,214,210)
2026	1,926,009,585	71.06%	32.66%	30	4,711,468,641	2027	631,101,146	212,083,381	63,459,463	515,566,910	(240,024,066)
2027	2,035,553,608	70.46%	32.68%	30	4,839,567,989	2028	653,189,686	213,361,343	65,916,328	514,737,690	(235,460,019)
2028	2,128,130,752	70.13%	32.58%	30	4,983,345,806	2029	676,051,325	220,960,015	68,412,057	514,231,875	(224,859,803)
2029	2,199,417,204	70.12%	32.30%	30	5,150,408,211	2030	699,713,121	227,995,069	70,959,435	514,894,889	(215,940,385)
2030	2,252,271,595	70.38%	31.60%	30	5,340,932,931	2031	724,203,080	233,920,740	73,618,773	606,731,479	(299,191,966)
2031	2,369,820,576	69.76%	31.64%	30	5,456,951,983	2032	749,550,188	236,846,661	76,350,579	542,307,982	(229,110,742)
2032	2,402,489,825	70.23%	31.02%	30	5,658,625,426	2033	775,784,445	245,450,348	79,141,097	551,720,150	(227,128,705)
2033	2,421,118,648	70.86%	30.35%	30	5,879,097,493	2034	802,936,901	249,062,167	82,001,635	567,135,205	(236,071,403)
2034	2,439,637,777	71.48%	29.67%	30	6,108,326,174	2035	831,039,693	252,188,129	84,980,043	585,249,318	(248,081,146)
2035	2,458,636,124	72.09%	28.82%	30	6,343,743,995	2036	860,126,082	255,167,833	88,014,615	608,805,340	(265,622,892)
2036	2,478,465,680	72.65%	28.15%	30	6,579,878,718	2037	890,230,495	256,552,924	91,138,130	625,151,983	(277,460,929)
2037	2,500,986,091	73.19%	27.57%	30	6,823,045,099	2038	921,388,562	259,399,451	94,359,901	638,058,017	(284,298,665)
2038	2,525,026,008	73.72%	27.05%	30	7,079,198,517	2039	953,637,162	262,936,426	97,686,249	650,493,977	(289,871,302)
2039	2,550,115,583	74.25%	26.54%	30	7,350,781,025	2040	987,014,463	266,970,236	101,147,229	665,568,645	(297,451,180)
2040	2,623,263,219	74.44%	26.17%	30	7,636,898,854	2041	1,021,559,969	271,080,220	104,697,095	688,026,917	(312,249,602)
2041	2,801,794,686	73.90%	26.55%	30	7,930,948,229	2042	1,057,314,568	276,714,765	108,365,612	708,504,331	(323,423,954)
2042	3,001,779,337	73.30%	27.04%	30	8,237,464,186	2043	1,094,320,578	290,587,691	112,161,351	727,843,124	(325,094,082)
2043	3,211,689,339	72.74%	27.54%	30	8,567,455,679	2044	1,132,621,798	306,302,767	116,089,100	747,317,535	(324,925,668)

Detailed Actuarial Forecasts

HPOPS Forecast – Eliminate COLA for New Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	1,216,147,131	76.41%	38.05%	30	3,720,482,625	2015	417,652,195	113,000,000	39,295,130	358,350,923	(206,055,793)	-
2015	1,321,485,364	75.17%	37.64%	30	3,822,089,066	2016	432,270,022	123,000,000	40,926,836	482,300,570	(318,373,734)	-
2016	1,412,226,254	73.68%	37.39%	30	3,815,337,943	2017	447,399,473	133,000,000	42,733,773	457,788,040	(282,054,267)	-
2017	1,490,825,861	72.60%	37.20%	30	3,845,844,542	2018	463,058,455	143,000,000	44,527,230	426,801,391	(239,274,161)	-
2018	1,558,952,431	71.95%	36.98%	30	3,923,505,386	2019	479,265,501	153,000,000	46,338,488	428,476,806	(229,138,318)	-
2019	1,617,416,125	71.55%	36.63%	30	4,018,325,234	2020	496,039,794	163,000,000	48,177,950	431,316,051	(220,138,101)	-
2020	1,670,176,444	71.33%	35.27%	30	4,111,874,955	2021	513,401,187	173,000,000	50,125,629	530,188,043	(307,062,414)	-
2021	1,710,935,850	70.84%	34.19%	30	4,118,545,392	2022	531,370,229	183,000,000	52,242,102	441,694,917	(206,452,815)	-
2022	1,741,414,244	71.02%	33.19%	30	4,234,418,780	2023	549,968,187	188,039,038	54,370,971	444,103,030	(201,693,021)	4,960,962
2023	1,766,942,195	71.32%	32.28%	30	4,364,994,934	2024	569,217,074	188,936,322	56,524,035	447,857,570	(202,397,213)	14,063,678
2024	1,792,274,260	71.65%	31.39%	30	4,505,773,730	2025	589,139,672	190,170,915	58,713,290	451,746,906	(202,862,701)	19,255,990
2025	1,817,234,472	72.03%	29.86%	30	4,657,865,188	2026	609,759,561	191,394,092	61,026,403	619,438,947	(367,018,452)	20,939,033
2026	1,837,608,957	71.73%	28.69%	30	4,644,622,073	2027	631,101,146	188,447,334	63,459,463	515,390,363	(263,483,566)	23,636,047
2027	1,860,173,321	71.90%	27.75%	30	4,742,610,922	2028	653,189,686	187,420,425	65,916,328	514,510,629	(261,173,876)	25,940,918
2028	1,884,042,514	72.09%	26.95%	30	4,851,372,824	2029	676,051,325	187,593,497	68,412,057	513,944,297	(257,938,743)	33,366,518
2029	1,908,836,618	72.31%	26.23%	30	4,972,773,870	2030	699,713,121	188,575,512	70,959,435	514,535,426	(255,000,479)	39,419,557
2030	1,934,223,866	72.57%	25.18%	30	5,107,528,964	2031	724,203,080	189,978,125	73,618,773	606,287,404	(342,690,506)	43,942,615
2031	1,957,073,501	72.53%	24.41%	30	5,158,418,408	2032	749,550,188	188,765,338	76,350,579	541,765,418	(276,649,501)	48,081,323
2032	1,982,140,732	72.76%	23.77%	30	5,285,222,070	2033	775,784,445	189,358,206	79,141,097	537,943,365	(269,444,062)	56,092,142
2033	2,008,437,252	73.03%	23.23%	30	5,430,475,219	2034	802,936,901	190,866,937	82,001,635	534,594,396	(261,725,824)	58,195,230
2034	2,035,686,189	73.35%	22.66%	30	5,596,259,693	2035	831,039,693	193,012,953	84,980,043	575,428,089	(297,435,093)	59,175,176
2035	2,062,916,766	73.57%	21.84%	30	5,737,169,061	2036	860,126,082	194,899,369	88,014,615	552,636,911	(269,722,927)	60,268,464
2036	2,087,908,109	73.94%	21.23%	30	5,919,910,019	2037	890,230,495	194,397,091	91,138,130	537,850,025	(252,314,804)	62,155,833
2037	2,114,964,322	74.38%	20.71%	30	6,136,958,097	2038	921,388,562	195,566,312	94,359,901	539,075,488	(249,149,275)	63,833,139
2038	2,143,165,169	74.85%	20.27%	30	6,375,699,438	2039	953,637,162	197,531,375	97,686,249	541,508,915	(246,291,291)	65,405,051
2039	2,172,293,142	75.35%	19.83%	30	6,637,605,235	2040	987,014,463	200,069,438	101,147,229	572,353,396	(271,136,729)	66,900,798
2040	2,201,705,221	75.80%	19.17%	30	6,894,555,566	2041	1,021,559,969	202,568,065	104,697,095	554,534,102	(247,268,942)	68,512,155
2041	2,228,993,001	76.36%	18.66%	30	7,198,980,921	2042	1,057,314,568	202,726,816	108,365,612	565,175,687	(254,083,259)	73,987,949
2042	2,257,943,982	76.92%	18.21%	30	7,521,722,921	2043	1,094,320,578	204,183,976	112,161,351	579,402,181	(263,056,854)	86,403,715
2043	2,287,896,849	77.46%	17.80%	30	7,861,933,840	2044	1,132,621,798	206,297,488	116,089,100	593,988,065	(271,601,477)	100,005,279

Detailed Actuarial Forecasts

HPOPS – Reduce COLA to 1% for New Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	1,216,390,868	76.41%	38.15%	30	3,720,482,625	2015	417,652,195	113,000,000	39,295,130	358,350,931	(206,055,801)	-
2015	1,322,154,337	75.16%	37.88%	30	3,822,089,057	2016	432,270,022	123,000,000	40,926,836	482,300,743	(318,373,907)	-
2016	1,413,938,477	73.65%	37.73%	30	3,815,337,753	2017	447,399,473	133,000,000	42,733,773	457,788,643	(282,054,870)	-
2017	1,494,082,573	72.55%	37.62%	30	3,845,843,708	2018	463,058,455	143,000,000	44,527,230	426,802,860	(239,275,630)	-
2018	1,564,194,614	71.88%	37.46%	30	3,923,502,951	2019	479,265,501	153,000,000	46,338,488	428,479,777	(229,141,289)	-
2019	1,625,067,875	71.46%	37.17%	30	4,018,319,497	2020	496,039,794	163,000,000	48,177,950	431,321,347	(220,143,397)	-
2020	1,680,693,744	71.20%	35.97%	30	4,111,862,985	2021	513,401,187	173,000,000	50,125,629	530,196,664	(307,071,035)	-
2021	1,725,256,992	70.67%	35.00%	30	4,118,523,051	2022	531,370,229	183,000,000	52,242,102	441,708,028	(206,465,926)	-
2022	1,760,361,841	70.80%	34.11%	30	4,234,380,315	2023	549,968,187	192,513,260	54,370,971	444,122,188	(197,237,957)	486,740
2023	1,786,681,146	71.11%	33.24%	30	4,369,592,912	2024	569,217,074	194,163,324	56,524,035	447,884,501	(197,197,142)	8,836,676
2024	1,812,466,968	71.47%	32.39%	30	4,516,177,935	2025	589,139,672	195,842,707	58,713,290	451,783,639	(197,227,642)	13,584,198
2025	1,837,844,498	71.87%	30.96%	30	4,675,021,823	2026	609,759,561	197,497,734	61,026,403	619,487,753	(360,963,616)	14,835,391
2026	1,858,980,514	71.61%	29.85%	30	4,669,541,824	2027	631,101,146	195,363,652	63,459,463	515,453,674	(256,630,559)	16,719,729
2027	1,882,083,712	71.80%	28.95%	30	4,776,784,427	2028	653,189,686	194,965,683	65,916,328	514,591,319	(253,709,308)	18,395,660
2028	1,906,378,219	72.03%	28.18%	30	4,896,222,921	2029	676,051,325	195,687,491	68,412,057	514,045,294	(249,945,746)	25,272,524
2029	1,931,509,084	72.30%	27.48%	30	5,029,757,618	2030	699,713,121	197,160,109	70,959,435	514,659,942	(246,540,398)	30,834,960
2030	1,957,179,006	72.61%	26.49%	30	5,178,163,233	2031	724,203,080	199,028,267	73,618,773	606,438,893	(333,791,853)	34,892,473
2031	1,980,535,802	72.62%	25.74%	30	5,244,319,154	2032	749,550,188	198,543,520	76,350,579	541,947,304	(267,053,205)	38,303,141
2032	2,005,912,992	72.90%	25.12%	30	5,388,412,314	2033	775,784,445	199,706,050	79,141,097	538,159,247	(259,312,100)	45,744,298
2033	2,032,424,447	73.23%	24.59%	30	5,552,981,061	2034	802,936,901	201,723,777	82,001,635	534,847,684	(251,122,272)	47,338,390
2034	2,059,814,566	73.61%	24.04%	30	5,740,212,561	2035	831,039,693	204,337,488	84,980,043	575,722,208	(286,404,677)	47,850,641
2035	2,087,203,416	73.90%	23.25%	30	5,904,834,817	2036	860,126,082	206,742,712	88,014,615	552,975,238	(258,217,911)	48,425,121
2036	2,112,542,747	74.33%	22.66%	30	6,113,796,700	2037	890,230,495	206,992,636	91,138,130	541,160,742	(243,029,976)	49,560,288
2037	2,142,962,284	74.80%	22.18%	30	6,356,852,958	2038	921,388,562	208,800,626	94,359,901	545,996,972	(242,836,445)	50,598,825
2038	2,178,563,901	75.25%	21.80%	30	6,620,560,855	2039	953,637,162	211,558,809	97,686,249	550,155,997	(240,910,939)	51,377,617
2039	2,217,236,728	75.71%	21.42%	30	6,908,509,231	2040	987,014,463	215,125,815	101,147,229	572,873,831	(256,600,787)	51,844,421
2040	2,247,628,116	76.23%	20.79%	30	7,203,604,954	2041	1,021,559,969	218,827,780	104,697,095	570,589,924	(247,065,049)	52,252,440
2041	2,292,324,461	76.68%	20.40%	30	7,533,815,601	2042	1,057,314,568	219,840,756	108,365,612	582,115,702	(253,909,334)	56,874,009
2042	2,341,122,742	77.11%	20.07%	30	7,884,465,083	2043	1,094,320,578	223,188,411	112,161,351	592,282,686	(256,932,924)	67,399,280
2043	2,387,231,779	77.59%	19.74%	30	8,261,329,391	2044	1,132,621,798	227,316,530	116,089,100	602,433,681	(259,028,051)	78,986,237

Detailed Actuarial Forecasts

HPOPS – Change Normal Form to 50% J&S for New Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	1,216,714,665	76.40%	38.28%	30	3,720,482,625	2015	417,652,195	113,000,000	39,295,130	358,350,946	(206,055,816)	-
2015	1,323,043,046	75.14%	38.20%	30	3,822,089,042	2016	432,270,022	123,000,000	40,926,836	482,301,022	(318,374,186)	-
2016	1,416,213,108	73.62%	38.18%	30	3,815,337,446	2017	447,399,473	133,000,000	42,733,773	457,789,634	(282,055,861)	-
2017	1,498,409,004	72.50%	38.17%	30	3,845,842,342	2018	463,058,455	143,000,000	44,527,230	426,805,215	(239,277,985)	-
2018	1,571,158,670	71.79%	38.10%	30	3,923,499,016	2019	479,265,501	153,000,000	46,338,488	428,484,537	(229,146,049)	-
2019	1,635,232,944	71.33%	37.90%	30	4,018,310,270	2020	496,039,794	163,000,000	48,177,950	431,329,379	(220,151,429)	-
2020	1,694,665,594	71.03%	36.90%	30	4,111,844,259	2021	513,401,187	173,000,000	50,125,629	530,209,173	(307,083,544)	-
2021	1,744,282,113	70.44%	36.09%	30	4,118,489,161	2022	531,370,229	183,000,000	52,242,102	441,726,462	(206,484,360)	-
2022	1,785,533,043	70.50%	35.33%	30	4,234,323,543	2023	549,968,187	193,000,000	54,370,971	444,147,698	(196,776,727)	-
2023	1,818,587,936	70.75%	34.58%	30	4,370,010,641	2024	569,217,074	201,107,220	56,524,035	447,918,930	(190,287,675)	1,892,780
2024	1,845,459,720	71.14%	33.79%	30	4,523,826,809	2025	589,139,672	203,752,863	58,713,290	451,829,390	(189,363,237)	5,674,042
2025	1,871,524,874	71.58%	32.48%	30	4,691,510,693	2026	609,759,561	206,013,496	61,026,403	619,547,729	(352,507,830)	6,319,629
2026	1,893,783,876	71.34%	31.45%	30	4,696,237,476	2027	631,101,146	204,967,820	63,459,463	515,531,221	(247,103,938)	7,115,561
2027	1,917,714,524	71.59%	30.60%	30	4,815,669,092	2028	653,189,686	205,412,733	65,916,328	514,689,472	(243,360,411)	7,948,610
2028	1,942,687,498	71.87%	29.87%	30	4,949,188,282	2029	676,051,325	206,870,891	68,412,057	514,168,233	(238,885,285)	14,089,124
2029	1,968,381,151	72.20%	29.20%	30	5,098,740,648	2030	699,713,121	209,002,745	70,959,435	514,812,703	(234,850,523)	18,992,324
2030	1,994,544,021	72.57%	28.28%	30	5,265,179,759	2031	724,203,080	211,496,987	73,618,773	606,627,358	(321,511,598)	22,423,753
2031	2,018,694,031	72.64%	27.57%	30	5,351,515,434	2032	749,550,188	211,987,173	76,350,579	542,178,179	(253,840,427)	24,859,488
2032	2,044,604,542	72.99%	26.98%	30	5,518,473,135	2033	775,784,445	213,914,374	79,141,097	538,439,095	(245,383,624)	31,535,974
2033	2,071,525,186	73.40%	26.46%	30	5,708,593,280	2034	802,936,901	216,616,308	82,001,635	545,766,279	(247,148,336)	32,445,859
2034	2,110,709,747	73.71%	26.01%	30	5,912,717,699	2035	831,039,693	219,859,501	84,980,043	576,125,700	(271,286,156)	32,328,628
2035	2,139,412,749	74.08%	25.28%	30	6,107,733,349	2036	860,126,082	223,720,418	88,014,615	580,556,295	(268,821,262)	31,447,415
2036	2,195,017,466	74.24%	24.93%	30	6,321,700,705	2037	890,230,495	225,042,516	91,138,130	593,106,328	(276,925,682)	31,510,408
2037	2,284,286,810	74.14%	24.86%	30	6,544,869,199	2038	921,388,562	229,667,172	94,359,901	601,965,214	(277,938,141)	29,732,279
2038	2,385,792,412	74.00%	24.89%	30	6,785,568,224	2039	953,637,162	237,070,146	97,686,249	610,116,215	(275,359,820)	25,866,280
2039	2,496,028,904	73.86%	24.95%	30	7,049,058,849	2040	987,014,463	245,706,870	101,147,229	620,502,858	(273,648,759)	21,263,366
2040	2,585,941,493	73.94%	24.67%	30	7,336,278,041	2041	1,021,559,969	254,895,876	104,697,095	637,983,454	(278,390,483)	16,184,344
2041	2,711,652,364	73.82%	24.72%	30	7,642,213,652	2042	1,057,314,568	260,888,302	108,365,612	653,448,189	(284,194,275)	15,826,463
2042	2,847,947,006	73.67%	24.85%	30	7,967,437,712	2043	1,094,320,578	270,570,112	112,161,351	667,637,665	(284,906,202)	20,017,579
2043	2,987,012,201	73.58%	24.96%	30	8,318,948,900	2044	1,132,621,798	281,411,346	116,089,100	681,825,823	(284,325,377)	24,891,421

Detailed Actuarial Forecasts

HPOPS Forecast – Eliminate COLA for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	126,594,483	96.89%	15.66%	30	3,720,482,625	2015	417,652,195	65,832,904	39,295,130	348,754,982	(243,626,948)	47,167,096
2015	163,539,059	96.04%	15.32%	30	3,782,953,698	2016	432,270,022	67,704,985	40,926,836	465,860,554	(357,228,733)	55,295,015
2016	190,058,367	95.32%	15.06%	30	3,732,403,407	2017	447,399,473	68,532,268	42,733,773	434,320,514	(323,054,473)	64,467,732
2017	209,397,498	94.80%	14.86%	30	3,713,153,389	2018	463,058,455	69,727,034	44,527,230	396,011,395	(281,757,131)	73,272,966
2018	222,864,475	94.48%	14.66%	30	3,735,283,808	2019	479,265,501	71,220,714	46,338,488	389,864,772	(272,305,570)	81,779,286
2019	231,125,034	94.30%	14.41%	30	3,769,140,373	2020	496,039,794	72,735,886	48,177,950	384,600,202	(263,686,366)	90,264,114
2020	238,053,237	94.17%	13.61%	30	3,798,173,968	2021	513,401,187	73,958,364	50,125,629	467,711,741	(343,627,748)	99,041,636
2021	240,153,211	94.03%	13.00%	30	3,742,801,539	2022	531,370,229	72,332,553	52,242,102	371,795,519	(247,220,864)	110,667,447
2022	241,802,891	94.05%	12.51%	30	3,787,302,645	2023	549,968,187	71,473,709	54,370,971	364,341,046	(238,496,366)	121,526,291
2023	242,866,732	94.10%	12.10%	30	3,844,997,348	2024	569,217,074	71,208,093	56,524,035	358,165,402	(230,433,274)	131,791,907
2024	243,264,127	94.19%	11.69%	30	3,916,262,704	2025	589,139,672	71,286,623	58,713,290	352,010,867	(222,010,954)	138,140,282
2025	299,065,645	93.08%	11.51%	30	4,002,625,486	2026	609,759,561	71,301,161	61,026,403	496,132,682	(363,805,118)	141,031,964
2026	486,061,191	89.07%	12.83%	30	3,942,381,494	2027	631,101,146	72,652,102	63,459,463	388,811,294	(252,699,729)	139,431,279
2027	552,605,701	87.90%	12.98%	30	3,997,402,010	2028	653,189,686	83,830,515	65,916,328	377,783,004	(228,036,161)	129,530,828
2028	587,008,584	87.47%	12.86%	30	4,083,267,925	2029	676,051,325	87,762,242	68,412,057	367,263,282	(211,088,983)	133,197,773
2029	598,285,559	87.55%	12.56%	30	4,194,541,393	2030	699,713,121	90,013,314	70,959,435	357,991,887	(197,019,138)	137,981,755
2030	590,531,737	88.03%	11.90%	30	4,330,330,795	2031	724,203,080	90,955,336	73,618,773	429,490,937	(264,916,828)	142,965,404
2031	635,726,652	87.41%	11.86%	30	4,403,837,124	2032	749,550,188	89,208,636	76,350,579	387,796,213	(222,236,998)	147,638,025
2032	630,079,159	87.81%	11.45%	30	4,529,856,385	2033	775,784,445	92,015,702	79,141,097	395,275,245	(224,118,446)	153,434,646
2033	621,711,398	88.26%	11.08%	30	4,664,303,164	2034	802,936,901	91,960,309	82,001,635	399,884,963	(225,923,019)	157,101,858
2034	613,473,564	88.70%	10.70%	30	4,808,098,308	2035	831,039,693	92,062,169	84,980,043	407,488,518	(230,446,306)	160,125,960
2035	605,262,676	89.13%	10.19%	30	4,959,074,691	2036	860,126,082	92,045,761	88,014,615	420,826,084	(240,765,708)	163,122,072
2036	597,318,914	89.55%	9.82%	30	5,111,556,628	2037	890,230,495	90,717,962	91,138,130	427,119,860	(245,263,768)	165,834,962
2037	591,112,910	89.93%	9.51%	30	5,272,041,260	2038	921,388,562	90,465,499	94,359,901	430,401,356	(245,575,956)	168,933,952
2038	585,746,550	90.29%	9.25%	30	5,445,699,593	2039	953,637,162	90,720,485	97,686,249	433,775,590	(245,368,856)	172,215,941
2039	580,832,986	90.66%	9.00%	30	5,634,188,278	2040	987,014,463	91,321,535	101,147,229	440,489,904	(248,021,140)	175,648,701
2040	594,603,905	90.76%	8.74%	30	5,835,644,616	2041	1,021,559,969	91,929,161	104,697,095	455,036,267	(258,410,011)	179,151,059
2041	743,337,056	89.05%	9.39%	30	6,042,772,521	2042	1,057,314,568	92,446,026	108,365,612	468,047,722	(267,236,084)	184,268,739
2042	910,384,714	87.30%	10.13%	30	6,257,748,503	2043	1,094,320,578	102,811,296	112,161,351	480,355,526	(265,382,879)	187,776,395
2043	1,082,735,757	85.71%	10.84%	30	6,492,394,055	2044	1,132,621,798	114,698,311	116,089,100	493,156,588	(262,369,177)	191,604,456

Detailed Actuarial Forecasts

HPOPS Forecast – Reduce COLA to 1% for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	459,066,176	89.56%	22.55%	30	3,720,482,625	2015	417,652,195	93,265,443	39,295,130	352,151,774	(219,591,201)	19,734,557
2015	503,535,529	88.78%	22.13%	30	3,807,990,134	2016	432,270,022	97,487,968	40,926,836	471,632,596	(333,217,792)	25,512,032
2016	535,895,315	87.98%	21.77%	30	3,784,578,536	2017	447,399,473	99,000,885	42,733,773	442,490,339	(300,755,681)	33,999,115
2017	561,005,349	87.42%	21.48%	30	3,792,990,569	2018	463,058,455	100,802,459	44,527,230	406,638,971	(261,309,282)	42,197,541
2018	580,264,159	87.11%	21.19%	30	3,843,206,309	2019	479,265,501	102,922,478	46,338,488	403,078,922	(253,817,956)	50,077,522
2019	594,330,480	86.94%	20.84%	30	3,905,493,602	2020	496,039,794	105,087,415	48,177,950	400,450,904	(247,185,539)	57,912,585
2020	607,199,228	86.84%	19.92%	30	3,962,617,640	2021	513,401,187	106,977,911	50,125,629	488,789,568	(331,686,028)	66,022,089
2021	615,174,334	86.59%	19.20%	30	3,932,747,742	2022	531,370,229	105,863,480	52,242,102	395,156,507	(237,050,925)	77,136,520
2022	622,869,328	86.63%	18.61%	30	4,002,974,534	2023	549,968,187	105,586,258	54,370,971	390,769,993	(230,812,764)	87,413,742
2023	630,122,548	86.72%	18.11%	30	4,085,858,709	2024	569,217,074	105,946,771	56,524,035	387,628,494	(225,157,688)	97,053,229
2024	636,847,901	86.85%	17.61%	30	4,181,814,790	2025	589,139,672	106,690,378	58,713,290	384,489,905	(219,086,237)	102,736,527
2025	642,792,446	87.03%	16.73%	30	4,292,387,474	2026	609,759,561	107,395,439	61,026,403	536,134,036	(367,712,194)	104,937,686
2026	838,630,579	83.59%	18.00%	30	4,250,968,785	2027	631,101,146	105,565,126	63,459,463	429,424,054	(260,399,465)	106,518,255
2027	921,276,453	82.49%	18.16%	30	4,322,437,679	2028	653,189,686	117,547,538	65,916,328	421,264,535	(237,800,669)	95,813,805
2028	972,461,244	82.03%	18.07%	30	4,423,874,939	2029	676,051,325	122,801,226	68,412,057	413,496,832	(222,283,549)	98,158,789
2029	1,000,539,614	82.02%	17.79%	30	4,550,434,375	2030	699,713,121	126,452,653	70,959,435	406,897,842	(209,485,754)	101,542,416
2030	1,009,439,995	82.36%	17.13%	30	4,701,368,149	2031	724,203,080	128,819,677	73,618,773	484,469,011	(282,030,561)	105,101,063
2031	1,074,844,781	81.69%	17.12%	30	4,786,202,202	2032	749,550,188	128,388,489	76,350,579	433,247,696	(228,508,628)	108,458,172
2032	1,076,360,422	82.12%	16.64%	30	4,936,218,677	2033	775,784,445	132,846,111	79,141,097	443,853,848	(231,866,640)	112,604,237
2033	1,074,425,995	82.61%	16.19%	30	5,095,028,781	2034	802,936,901	133,614,330	82,001,635	451,508,138	(235,892,173)	115,447,837
2034	1,072,703,315	83.09%	15.73%	30	5,262,812,674	2035	831,039,693	134,522,310	84,980,043	462,027,969	(242,525,616)	117,665,819
2035	1,071,127,421	83.56%	15.13%	30	5,437,492,372	2036	860,126,082	135,315,624	88,014,615	478,163,248	(254,833,009)	119,852,209
2036	1,069,958,344	84.00%	14.68%	30	5,613,500,321	2037	890,230,495	134,712,247	91,138,130	487,189,168	(261,338,791)	121,840,677
2037	1,070,781,433	84.42%	14.31%	30	5,797,300,882	2038	921,388,562	135,296,533	94,359,901	493,050,195	(263,393,761)	124,102,918
2038	1,072,617,763	84.83%	13.98%	30	5,994,329,792	2039	953,637,162	136,440,539	97,686,249	498,804,961	(264,678,173)	126,495,887
2039	1,075,055,949	85.24%	13.66%	30	6,206,518,708	2040	987,014,463	137,973,509	101,147,229	507,584,415	(268,463,677)	128,996,727
2040	1,077,800,010	85.65%	13.21%	30	6,432,419,839	2041	1,021,559,969	139,533,285	104,697,095	524,074,146	(279,843,766)	131,546,935
2041	1,222,669,045	84.50%	13.73%	30	6,664,953,582	2042	1,057,314,568	139,691,789	108,365,612	538,737,103	(290,679,702)	137,022,976
2042	1,400,476,802	83.14%	14.42%	30	6,905,329,737	2043	1,094,320,578	150,274,570	112,161,351	552,412,533	(289,976,612)	140,313,121
2043	1,586,162,590	81.88%	15.11%	30	7,166,277,169	2044	1,132,621,798	163,378,489	116,089,100	566,333,979	(286,866,390)	142,924,278

Detailed Actuarial Forecasts

HPOPS Forecast – Freeze DROP for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	511,079,628	88.52%	21.36%	30	3,720,302,529	2015	417,652,195	87,122,994	39,295,130	327,281,181	(200,863,057)	25,877,006
2015	557,823,717	87.78%	21.46%	30	3,827,302,588	2016	432,270,022	92,337,362	40,926,836	395,297,182	(262,032,984)	30,662,638
2016	594,182,431	87.13%	21.47%	30	3,879,681,018	2017	447,399,473	95,995,663	42,733,773	371,504,457	(232,775,021)	37,004,337
2017	623,225,257	86.74%	21.44%	30	3,966,987,684	2018	463,058,455	99,426,339	44,527,230	344,117,722	(200,164,153)	43,573,661
2018	658,589,849	86.39%	21.51%	30	4,095,683,983	2019	479,265,501	102,745,219	46,338,488	332,285,937	(183,202,230)	50,254,781
2019	696,846,562	86.09%	21.60%	30	4,252,987,572	2020	496,039,794	106,693,049	48,177,950	338,574,181	(183,703,182)	56,306,951
2020	728,170,423	85.97%	21.38%	30	4,408,457,324	2021	513,401,187	110,918,060	50,125,629	316,010,831	(154,967,142)	62,081,940
2021	775,648,671	85.71%	21.37%	30	4,608,052,919	2022	531,370,229	113,596,995	52,242,102	307,237,257	(141,398,160)	69,403,005
2022	790,840,001	86.05%	21.03%	30	4,839,128,525	2023	549,968,187	117,520,851	54,370,971	326,316,820	(154,424,998)	75,479,149
2023	802,902,468	86.42%	20.69%	30	5,075,448,951	2024	569,217,074	119,701,217	56,524,035	344,619,026	(168,393,774)	83,298,783
2024	814,246,884	86.78%	20.35%	30	5,316,512,565	2025	589,139,672	121,873,188	58,713,290	360,866,294	(180,279,816)	87,553,717
2025	825,534,366	87.13%	19.87%	30	5,564,981,099	2026	609,759,561	124,077,744	61,026,403	391,125,726	(206,021,579)	88,255,381
2026	827,073,986	87.57%	19.33%	30	5,806,443,729	2027	631,101,146	125,394,817	63,459,463	417,754,377	(228,900,097)	86,688,564
2027	828,239,013	87.98%	18.88%	30	6,043,444,860	2028	653,189,686	126,267,610	65,916,328	441,022,742	(248,838,804)	87,093,733
2028	829,679,419	88.36%	18.47%	30	6,278,813,194	2029	676,051,325	127,615,871	68,412,057	461,368,618	(265,340,690)	93,344,144
2029	831,118,761	88.71%	18.10%	30	6,516,116,589	2030	699,713,121	129,266,525	70,959,435	479,272,074	(279,046,114)	98,728,544
2030	832,418,017	89.05%	17.67%	30	6,758,538,333	2031	724,203,080	131,094,302	73,618,773	511,445,670	(306,732,595)	102,826,438
2031	833,489,640	89.36%	17.30%	30	6,991,331,502	2032	749,550,188	132,482,018	76,350,579	533,290,357	(324,457,760)	104,364,643
2032	856,749,798	89.41%	17.15%	30	7,224,501,636	2033	775,784,445	134,173,762	79,141,097	551,720,150	(338,405,291)	111,276,586
2033	913,806,757	89.10%	17.28%	30	7,462,163,780	2034	802,936,901	137,677,656	82,001,635	567,135,205	(347,455,914)	111,384,511
2034	979,230,155	88.74%	17.47%	30	7,709,931,276	2035	831,039,693	143,642,238	84,980,043	585,249,318	(356,627,037)	108,545,891
2035	1,054,378,044	88.32%	17.62%	30	7,968,420,513	2036	860,126,082	150,272,631	88,014,615	608,805,340	(370,518,094)	104,895,202
2036	1,136,362,651	87.88%	17.85%	30	8,233,390,401	2037	890,230,495	156,826,473	91,138,130	625,151,983	(377,187,380)	99,726,451
2037	1,225,729,561	87.42%	18.13%	30	8,513,226,879	2038	921,388,562	164,498,610	94,359,901	638,058,017	(379,199,506)	94,900,841
2038	1,321,505,823	86.97%	18.44%	30	8,814,193,869	2039	953,637,162	172,923,987	97,686,249	650,493,977	(379,883,741)	90,012,439
2039	1,423,074,557	86.53%	18.75%	30	9,139,491,025	2040	987,014,463	181,976,988	101,147,229	665,568,645	(382,444,428)	84,993,248
2040	1,532,658,477	86.10%	18.98%	30	9,489,117,404	2041	1,021,559,969	191,534,535	104,697,095	688,026,917	(391,795,287)	79,545,685
2041	1,647,372,839	85.68%	19.30%	30	9,857,747,918	2042	1,057,314,568	200,721,286	108,365,612	708,504,331	(399,417,433)	75,993,479
2042	1,768,356,298	85.29%	19.63%	30	10,248,884,508	2043	1,094,320,578	211,220,270	112,161,351	727,843,124	(404,461,503)	79,367,421
2043	1,894,590,150	84.92%	19.96%	30	10,667,174,977	2044	1,132,621,798	222,339,998	116,089,100	747,317,535	(408,888,437)	83,962,769

Detailed Actuarial Forecasts

HPOPS Forecast – Eliminate Interest on DROP for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	912,149,898	81.20%	31.01%	30	3,720,482,625	2015	417,652,195	113,000,000	39,295,130	345,229,880	(192,934,750)	-
2015	981,274,252	80.36%	30.88%	30	3,835,756,381	2016	432,270,022	123,000,000	40,926,836	447,512,624	(283,585,788)	-
2016	1,035,477,086	79.46%	30.71%	30	3,866,403,264	2017	447,399,473	133,000,000	42,733,773	422,860,114	(247,126,341)	-
2017	1,076,331,033	78.98%	30.47%	30	3,937,632,507	2018	463,058,455	142,199,824	44,527,230	397,439,281	(210,712,227)	800,176
2018	1,105,624,177	78.89%	30.13%	30	4,052,846,391	2019	479,265,501	146,017,440	46,338,488	398,542,168	(206,186,240)	6,982,560
2019	1,129,389,999	78.95%	29.74%	30	4,182,567,874	2020	496,039,794	149,461,086	48,177,950	401,281,207	(203,642,171)	13,538,914
2020	1,152,071,539	79.08%	28.87%	30	4,308,563,441	2021	513,401,187	152,677,055	50,125,629	455,886,291	(253,083,607)	20,322,945
2021	1,170,412,833	79.11%	28.13%	30	4,391,400,743	2022	531,370,229	153,412,123	52,242,102	400,819,211	(195,164,986)	29,587,877
2022	1,188,232,961	79.40%	27.51%	30	4,543,997,258	2023	549,968,187	154,710,103	54,370,971	404,986,609	(195,905,535)	38,289,897
2023	1,205,604,088	79.72%	26.96%	30	4,708,612,370	2024	569,217,074	156,583,208	56,524,035	410,489,972	(197,382,729)	46,416,792
2024	1,248,660,086	79.73%	26.70%	30	4,885,442,410	2025	589,139,672	158,803,379	58,713,290	415,892,794	(198,376,125)	50,623,526
2025	1,317,383,283	79.47%	26.39%	30	5,076,033,946	2026	609,759,561	162,822,863	61,026,403	530,149,216	(306,299,950)	49,510,262
2026	1,470,582,657	77.91%	27.06%	30	5,165,453,789	2027	631,101,146	166,531,051	63,459,463	474,502,770	(244,512,256)	45,552,330
2027	1,544,622,491	77.59%	26.98%	30	5,329,247,641	2028	653,189,686	176,731,156	65,916,328	476,649,031	(234,001,547)	36,630,187
2028	1,592,571,087	77.65%	26.70%	30	5,517,819,199	2029	676,051,325	182,412,321	68,412,057	479,045,065	(228,220,687)	38,547,694
2029	1,620,545,562	77.99%	26.26%	30	5,728,336,968	2030	699,713,121	186,817,747	70,959,435	482,064,944	(224,287,762)	41,177,322
2030	1,631,671,651	78.54%	25.51%	30	5,960,714,451	2031	724,203,080	190,171,900	73,618,773	544,361,464	(280,570,791)	43,748,840
2031	1,674,546,018	78.63%	25.18%	30	6,151,516,149	2032	749,550,188	191,247,723	76,350,579	533,290,357	(265,692,055)	45,598,938
2032	1,685,984,335	79.11%	24.63%	30	6,374,514,295	2033	775,784,445	195,303,800	79,141,097	551,720,150	(277,275,253)	50,146,548
2033	1,696,078,314	79.58%	24.13%	30	6,603,602,600	2034	802,936,901	197,786,761	82,001,635	567,135,205	(287,346,809)	51,275,406
2034	1,706,495,331	80.05%	23.64%	30	6,841,004,043	2035	831,039,693	200,532,247	84,980,043	585,249,318	(299,737,028)	51,655,882
2035	1,717,083,872	80.50%	23.00%	30	7,084,892,995	2036	860,126,082	203,338,284	88,014,615	608,805,340	(317,452,441)	51,829,549
2036	1,727,956,378	80.93%	22.50%	30	7,330,037,997	2037	890,230,495	204,792,560	91,138,130	625,151,983	(329,221,293)	51,760,364
2037	1,740,674,774	81.34%	22.07%	30	7,583,052,596	2038	921,388,562	207,353,163	94,359,901	638,058,017	(336,344,953)	52,046,288
2038	1,754,367,306	81.74%	21.67%	30	7,849,593,503	2039	953,637,162	210,451,209	97,686,249	650,493,977	(342,356,519)	52,485,217
2039	1,775,656,066	82.08%	21.34%	30	8,131,989,233	2040	987,014,463	213,933,785	101,147,229	665,568,645	(350,487,631)	53,036,451
2040	1,918,874,422	81.46%	21.63%	30	8,429,265,225	2041	1,021,559,969	218,022,237	104,697,095	688,026,917	(365,307,585)	53,057,983
2041	2,095,285,373	80.66%	22.18%	30	8,735,398,778	2042	1,057,314,568	228,720,909	108,365,612	708,504,331	(371,417,810)	47,993,856
2042	2,285,714,756	79.86%	22.79%	30	9,060,301,031	2043	1,094,320,578	242,766,740	112,161,351	727,843,124	(372,915,033)	47,820,951
2043	2,484,988,511	79.11%	23.39%	30	9,410,421,759	2044	1,132,621,798	258,082,573	116,089,100	747,317,535	(373,145,862)	48,220,194

Detailed Actuarial Forecasts

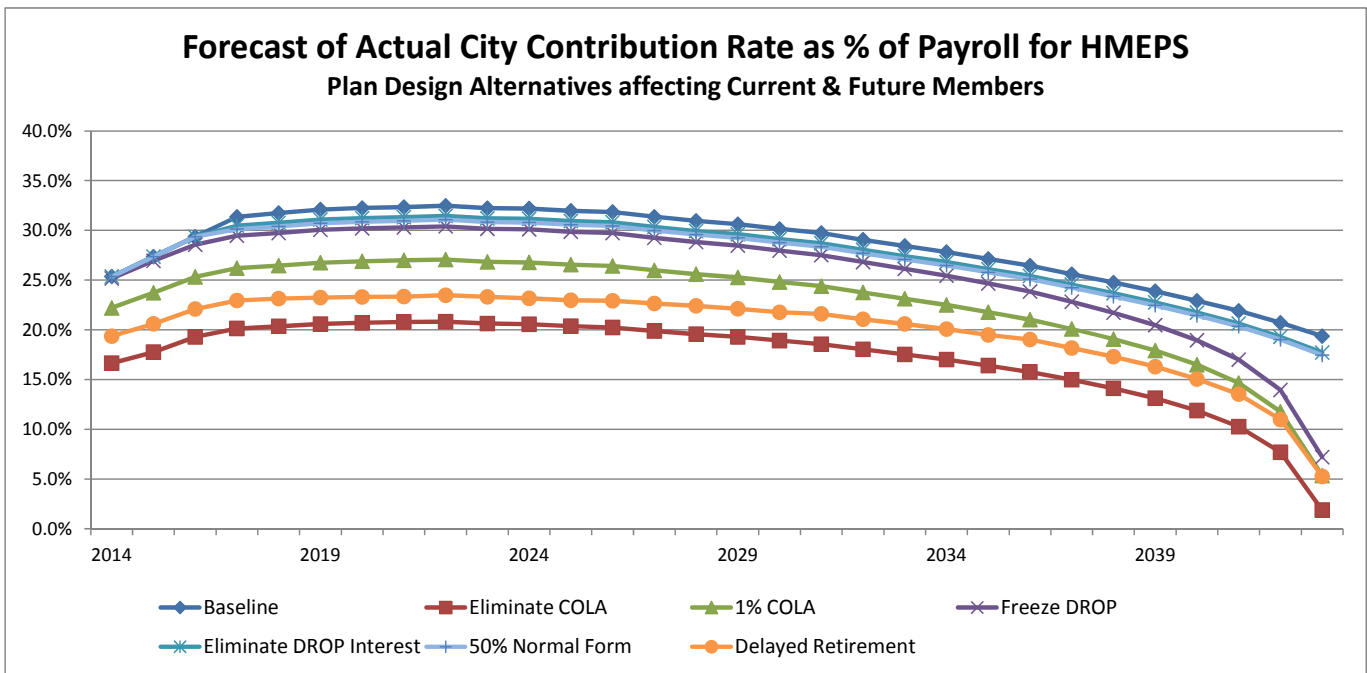
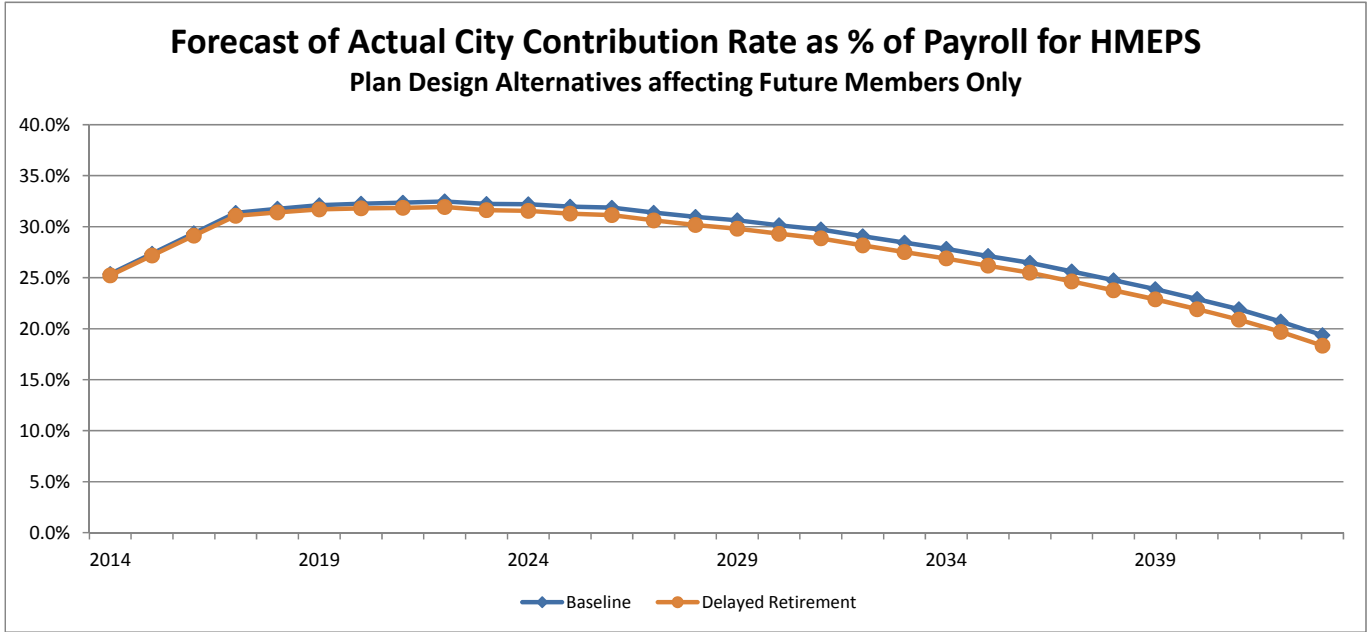
HPOPS Forecast – Change Normal Form to 50% J&S for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	1,099,856,383	78.18%	35.52%	30	3,720,482,625	2015	417,652,195	113,000,000	39,295,130	358,350,946	(206,055,816)	-
2015	1,191,979,199	77.04%	35.38%	30	3,822,089,042	2016	432,270,022	123,000,000	40,926,836	482,301,022	(318,374,186)	-
2016	1,270,032,132	75.68%	35.27%	30	3,815,337,446	2017	447,399,473	133,000,000	42,733,773	457,789,634	(282,055,861)	-
2017	1,335,968,863	74.72%	35.15%	30	3,845,842,342	2018	463,058,455	143,000,000	44,527,230	426,588,754	(239,061,524)	-
2018	1,391,139,018	74.19%	34.95%	30	3,923,724,489	2019	479,265,501	153,000,000	46,338,488	428,012,870	(228,674,382)	-
2019	1,436,153,789	73.91%	34.61%	30	4,019,046,212	2020	496,039,794	163,000,000	48,177,950	430,558,151	(219,380,201)	-
2020	1,474,901,540	73.81%	33.53%	30	4,113,479,538	2021	513,401,187	173,000,000	50,125,629	528,905,238	(305,779,609)	-
2021	1,502,415,712	73.47%	32.60%	30	4,121,678,208	2022	531,370,229	178,154,939	52,242,102	439,883,446	(209,486,405)	4,845,061
2022	1,524,904,347	73.67%	31.76%	30	4,234,736,554	2023	549,968,187	179,264,895	54,370,971	441,713,710	(208,077,844)	13,735,105
2023	1,546,973,738	73.93%	31.02%	30	4,358,792,692	2024	569,217,074	180,787,953	56,524,035	444,811,019	(207,499,031)	22,212,047
2024	1,568,846,461	74.23%	30.30%	30	4,493,862,192	2025	589,139,672	182,771,141	58,713,290	447,957,254	(206,472,823)	26,655,764
2025	1,590,232,273	74.57%	29.11%	30	4,641,345,090	2026	609,759,561	184,757,808	61,026,403	614,589,460	(368,805,249)	27,575,317
2026	1,608,038,474	74.28%	28.18%	30	4,625,046,885	2027	631,101,146	183,740,608	63,459,463	509,468,835	(262,268,764)	28,342,773
2027	1,645,182,453	74.23%	27.59%	30	4,722,894,018	2028	653,189,686	184,063,903	65,916,328	507,393,310	(257,413,079)	29,297,440
2028	1,726,679,561	73.74%	27.50%	30	4,834,206,009	2029	676,051,325	186,510,595	68,412,057	505,498,949	(250,576,297)	34,449,420
2029	1,791,191,861	73.53%	27.28%	30	4,962,183,092	2030	699,713,121	192,445,164	70,959,435	504,624,732	(241,220,133)	35,549,905
2030	1,837,733,048	73.59%	26.63%	30	5,110,821,831	2031	724,203,080	197,547,441	73,618,773	594,549,400	(323,383,186)	36,373,299
2031	1,949,499,620	72.70%	26.74%	30	5,182,611,355	2032	749,550,188	199,626,002	76,350,579	528,154,112	(252,177,531)	37,220,659
2032	1,976,900,559	73.00%	26.19%	30	5,337,552,514	2033	775,784,445	207,441,873	79,141,097	533,233,712	(246,650,742)	38,008,475
2033	1,988,440,900	73.51%	25.58%	30	5,511,200,274	2034	802,936,901	210,299,351	82,001,635	545,766,279	(253,465,293)	38,762,816
2034	1,999,686,990	74.02%	24.95%	30	5,691,966,335	2035	831,039,693	212,547,124	84,980,043	560,754,191	(263,227,024)	39,641,005
2035	2,011,328,204	74.52%	24.16%	30	5,877,279,391	2036	860,126,082	214,604,299	88,014,615	580,556,295	(277,937,381)	40,563,534
2036	2,023,742,264	74.99%	23.55%	30	6,062,162,507	2037	890,230,495	215,083,186	91,138,130	593,106,328	(286,885,012)	41,469,738
2037	2,038,753,075	75.42%	23.03%	30	6,252,896,284	2038	921,388,562	216,992,643	94,359,901	601,965,214	(290,612,670)	42,406,808
2038	2,055,199,182	75.86%	22.56%	30	6,455,575,399	2039	953,637,162	219,580,205	97,686,249	610,116,215	(292,849,761)	43,356,221
2039	2,158,219,673	75.57%	22.65%	30	6,672,798,529	2040	987,014,463	222,649,894	101,147,229	620,502,858	(296,705,735)	44,320,342
2040	2,281,718,017	75.17%	22.69%	30	6,904,018,679	2041	1,021,559,969	231,414,857	104,697,095	637,983,454	(301,871,502)	39,665,363
2041	2,448,615,432	74.49%	23.07%	30	7,148,753,632	2042	1,057,314,568	239,910,034	108,365,612	653,448,189	(305,172,543)	36,804,731
2042	2,631,168,226	73.80%	23.53%	30	7,410,181,928	2043	1,094,320,578	252,491,308	112,161,351	667,637,665	(302,985,006)	38,096,383
2043	2,821,595,695	73.18%	23.99%	30	7,695,494,890	2044	1,132,621,798	266,522,266	116,089,100	681,825,823	(299,214,457)	39,780,501

Detailed Actuarial Forecasts

HMEPS Forecasts

As HMEPS eliminated the expensive DROP, COLA and 100% J&S feature for those hired on or after January 1, 2008, there are fewer plan design alternatives. The second graph forecasts the cost reductions if the plan design alternatives applied to those hired prior to January 1, 2008 as well as future members.



The following pages contain the numerical detail supporting the HMEPS forecasts shown above.

Detailed Actuarial Forecasts

HMEPS Forecast – Baseline

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow
2014	2,031,686,840	52.66%	29.68%	30	2,125,083,631	2015	567,327,062	143,874,143	15,434,712	267,640,639	(108,331,784)
2015	2,200,167,040	50.27%	31.10%	30	2,181,267,060	2016	580,028,499	158,695,797	14,728,363	287,932,104	(114,507,944)
2016	2,310,012,464	49.17%	31.77%	30	2,234,912,813	2017	593,827,096	174,347,635	13,993,264	307,576,132	(119,235,233)
2017	2,366,632,569	49.15%	31.76%	30	2,287,342,457	2018	604,908,536	189,699,317	13,369,216	354,344,447	(151,275,914)
2018	2,412,059,930	48.91%	32.10%	29	2,308,825,794	2019	620,443,627	197,036,578	12,524,878	369,101,344	(159,539,888)
2019	2,453,184,449	48.64%	32.26%	28	2,322,887,226	2020	637,219,064	204,558,827	11,765,771	378,272,481	(161,947,883)
2020	2,489,874,054	48.40%	32.35%	27	2,335,237,910	2021	649,983,313	209,655,355	11,146,852	385,282,849	(164,480,642)
2021	2,512,337,605	48.28%	32.48%	26	2,345,696,180	2022	672,336,747	217,505,283	10,218,741	414,743,790	(187,019,766)
2022	2,528,029,866	47.99%	32.23%	25	2,332,288,277	2023	689,125,801	223,849,925	9,563,155	424,644,068	(191,230,988)
2023	2,538,567,024	47.67%	32.20%	24	2,312,924,811	2024	711,521,442	229,324,040	8,838,284	431,843,838	(193,681,514)
2024	2,543,839,373	47.36%	31.97%	23	2,289,050,671	2025	730,610,129	235,262,459	8,119,201	434,032,585	(190,650,925)
2025	2,543,442,436	47.12%	31.86%	22	2,266,209,073	2026	760,652,118	243,196,852	7,381,481	459,688,015	(209,109,682)
2026	2,534,474,596	46.71%	31.37%	21	2,221,086,092	2027	788,642,533	251,259,256	6,719,645	447,113,222	(189,134,321)
2027	2,516,743,215	46.57%	30.97%	20	2,193,479,986	2028	815,572,628	255,864,468	6,120,027	465,416,281	(203,431,786)
2028	2,493,007,791	46.28%	30.63%	19	2,147,840,903	2029	847,538,701	262,449,552	5,496,713	461,727,246	(193,780,981)
2029	2,460,377,216	46.15%	30.15%	18	2,108,535,079	2030	877,441,933	268,779,604	4,916,412	453,650,700	(179,954,684)
2030	2,418,762,311	46.24%	29.74%	17	2,080,640,445	2031	917,156,247	276,519,534	4,270,394	474,957,751	(194,167,823)
2031	2,365,705,191	46.24%	29.06%	16	2,034,645,872	2032	955,876,706	284,230,124	3,772,883	441,084,245	(153,081,238)
2032	2,300,762,346	46.86%	28.43%	15	2,029,007,897	2033	995,116,208	289,222,649	3,323,751	448,000,527	(155,454,127)
2033	2,225,706,427	47.58%	27.83%	14	2,020,119,078	2034	1,038,696,157	295,352,725	2,861,536	432,862,508	(134,648,247)
2034	2,138,320,169	48.74%	27.13%	13	2,032,803,293	2035	1,081,616,041	301,029,165	2,481,459	414,883,466	(111,372,842)
2035	2,038,304,703	50.40%	26.46%	12	2,071,589,795	2036	1,133,629,235	307,599,366	2,047,484	425,342,183	(115,695,333)
2036	1,923,536,602	52.30%	25.61%	11	2,108,717,139	2037	1,185,603,411	313,707,730	1,772,922	380,304,771	(64,824,119)
2037	1,793,610,606	55.13%	24.76%	10	2,203,942,582	2038	1,239,611,410	317,440,707	1,528,379	374,951,220	(55,982,134)
2038	1,649,702,718	58.41%	23.88%	9	2,316,704,460	2039	1,297,527,971	321,220,555	1,290,198	355,467,356	(32,956,603)
2039	1,490,529,974	62.31%	22.92%	8	2,463,880,208	2040	1,355,648,014	323,724,625	1,095,304	335,754,454	(10,934,525)
2040	1,316,289,329	66.79%	21.91%	7	2,647,359,708	2041	1,422,638,804	326,006,424	855,390	338,928,124	(12,066,310)
2041	1,125,848,820	71.65%	20.71%	6	2,845,118,429	2042	1,490,326,384	326,503,968	729,308	300,017,581	27,215,695
2042	919,987,147	77.13%	19.37%	5	3,102,291,508	2043	1,561,047,830	323,255,014	617,098	293,856,901	30,015,211
2043	701,295,560	82.84%	17.78%	4	3,384,507,536	2044	1,635,323,519	316,682,208	505,574	277,804,251	39,383,531

Detailed Actuarial Forecasts

HMEPS Forecast – Change Retirement Eligibility to Age 65 and 5 Years of Service for New Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	1,809,796,555	55.48%	27.18%	29	2,120,216,086	2015	567,327,062	143,118,698	15,434,712	267,640,636	(109,087,226)	755,445
2015	1,989,184,612	52.68%	29.12%	28	2,171,831,512	2016	580,028,499	157,624,098	14,728,363	287,932,094	(115,579,633)	1,071,699
2016	2,169,497,642	50.57%	31.07%	27	2,219,963,588	2017	593,827,096	172,934,129	13,993,264	307,576,111	(120,648,718)	1,413,506
2017	2,217,273,655	50.54%	31.40%	26	2,265,464,493	2018	604,908,536	187,940,266	13,369,216	354,344,411	(153,034,929)	1,759,051
2018	2,251,488,443	50.31%	31.70%	25	2,279,669,701	2019	620,443,627	194,836,904	12,524,878	369,101,056	(161,739,274)	2,199,674
2019	2,279,007,216	50.05%	31.80%	24	2,283,880,358	2020	637,219,064	201,985,931	11,765,771	378,271,692	(164,519,990)	2,572,896
2020	2,301,258,814	49.82%	31.85%	23	2,284,697,432	2021	649,983,313	206,710,860	11,146,852	385,281,265	(167,423,553)	2,944,495
2021	2,308,522,070	49.73%	31.94%	22	2,283,566,043	2022	672,336,747	214,170,179	10,218,741	414,741,139	(190,352,219)	3,335,104
2022	2,307,357,236	49.41%	31.62%	21	2,253,988,948	2023	689,125,801	220,073,726	9,563,155	424,639,504	(195,002,623)	3,776,199
2023	2,302,366,748	49.07%	31.55%	20	2,218,456,735	2024	711,521,442	225,013,693	8,838,284	431,835,737	(197,983,760)	4,310,347
2024	2,290,098,201	48.71%	31.29%	19	2,174,694,465	2025	730,610,129	230,510,184	8,119,201	434,018,763	(195,389,378)	4,752,275
2025	2,270,289,125	48.42%	31.14%	18	2,130,924,168	2026	760,652,118	238,009,279	7,381,481	459,665,697	(214,274,937)	5,187,573
2026	2,240,560,736	47.89%	30.62%	17	2,059,131,088	2027	788,642,533	245,583,544	6,719,645	447,079,091	(194,775,902)	5,675,712
2027	2,200,096,519	47.65%	30.17%	16	2,002,804,719	2028	815,572,628	249,713,563	6,120,027	465,366,846	(209,533,256)	6,150,905
2028	2,154,005,353	47.21%	29.80%	15	1,926,016,092	2029	847,538,701	255,705,196	5,496,713	461,658,540	(200,456,631)	6,744,356
2029	2,097,066,392	46.88%	29.30%	14	1,850,858,767	2030	877,441,933	261,519,900	4,916,412	453,558,660	(187,122,348)	7,259,704
2030	2,029,257,780	46.79%	28.86%	13	1,784,315,897	2031	917,156,247	268,744,580	4,270,394	474,838,253	(201,823,279)	7,774,954
2031	1,948,601,109	46.49%	28.17%	12	1,693,043,186	2032	955,876,706	275,888,937	3,772,883	440,933,747	(161,271,927)	8,341,187
2032	1,854,456,081	46.90%	27.51%	11	1,638,202,882	2033	995,116,208	280,322,025	3,323,751	447,815,599	(164,169,823)	8,900,624
2033	1,749,883,002	47.38%	26.89%	10	1,575,511,214	2034	1,038,696,157	285,790,495	2,861,536	432,639,638	(143,987,607)	9,562,230
2034	1,631,601,985	48.36%	26.18%	9	1,528,195,283	2035	1,081,616,041	290,860,206	2,481,459	414,619,610	(121,277,945)	10,168,959
2035	1,499,454,303	50.04%	25.49%	8	1,501,761,843	2036	1,133,629,235	296,815,226	2,047,484	425,034,318	(126,171,608)	10,784,140
2036	1,352,231,733	52.01%	24.63%	7	1,465,369,262	2037	1,185,603,411	302,255,922	1,772,922	379,950,275	(75,921,431)	11,451,808
2037	1,190,012,524	55.44%	23.76%	6	1,480,564,311	2038	1,239,611,410	305,321,608	1,528,379	374,423,523	(67,573,536)	12,119,099
2038	1,014,830,539	59.74%	22.88%	5	1,505,931,704	2039	1,297,527,971	308,355,215	1,290,198	354,618,860	(44,973,447)	12,865,340
2039	826,370,439	65.33%	21.91%	4	1,557,374,620	2040	1,355,648,014	310,134,035	1,095,304	334,416,597	(23,187,258)	13,590,590
2040	626,347,836	72.33%	20.89%	3	1,637,246,515	2041	1,422,638,804	311,669,887	855,390	336,898,678	(24,373,401)	14,336,537
2041	417,243,536	80.49%	19.69%	2	1,721,126,872	2042	1,490,326,384	311,365,433	729,308	296,984,354	15,110,387	15,138,535
2042	204,841,312	90.06%	18.34%	1	1,855,552,574	2043	1,561,047,830	307,306,706	617,098	289,404,124	18,519,680	15,948,308
2043	190,550,631	91.32%	16.74%	1	2,005,512,969	2044	1,635,323,519	299,848,667	505,574	271,420,848	28,933,393	16,833,541

Detailed Actuarial Forecasts

HMEPS Forecast – Eliminate COLA for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	1,028,179,996	68.73%	17.76%	29	2,125,083,631	2015	567,327,062	94,506,395	15,434,712	249,160,664	(139,219,557)	49,367,748
2015	1,162,785,206	65.34%	19.29%	28	2,149,894,741	2016	580,028,499	103,014,902	14,728,363	260,343,413	(142,600,148)	55,680,895
2016	1,242,452,251	63.62%	20.14%	27	2,172,808,500	2017	593,827,096	114,552,108	13,993,264	270,703,007	(142,157,635)	59,795,527
2017	1,270,614,752	63.36%	20.36%	26	2,197,681,604	2018	604,908,536	121,818,598	13,369,216	307,042,939	(171,855,125)	67,880,719
2018	1,293,587,417	62.89%	20.59%	25	2,192,159,085	2019	620,443,627	126,311,330	12,524,878	312,629,510	(173,793,302)	70,725,248
2019	1,313,311,547	62.45%	20.71%	24	2,183,906,011	2020	637,219,064	131,173,224	11,765,771	314,045,130	(171,106,135)	73,385,603
2020	1,329,552,846	62.09%	20.80%	23	2,177,689,078	2021	649,983,313	134,605,451	11,146,852	311,040,405	(165,288,102)	75,049,904
2021	1,331,563,576	62.05%	20.83%	22	2,177,134,267	2022	672,336,747	139,820,272	10,218,741	328,230,953	(178,191,940)	77,685,011
2022	1,327,809,340	61.96%	20.63%	21	2,162,345,733	2023	689,125,801	143,517,657	9,563,155	329,493,550	(176,412,738)	80,332,268
2023	1,320,004,522	61.94%	20.56%	20	2,148,098,695	2024	711,521,442	146,817,298	8,838,284	329,563,085	(173,907,503)	82,506,742
2024	1,307,640,832	62.02%	20.37%	19	2,135,247,179	2025	730,610,129	150,233,421	8,119,201	325,797,507	(167,444,885)	85,029,038
2025	1,290,736,099	62.25%	20.24%	18	2,128,198,264	2026	760,652,118	154,969,210	7,381,481	340,390,258	(178,039,567)	88,227,642
2026	1,267,189,072	62.47%	19.89%	17	2,108,881,578	2027	788,642,533	159,583,440	6,719,645	325,772,381	(159,469,296)	91,675,816
2027	1,237,231,008	63.01%	19.57%	16	2,107,900,315	2028	815,572,628	162,177,646	6,120,027	335,720,737	(167,423,064)	93,686,822
2028	1,202,324,364	63.57%	19.29%	15	2,098,119,308	2029	847,538,701	165,881,448	5,496,713	328,990,522	(157,612,361)	96,568,104
2029	1,160,574,253	64.38%	18.92%	14	2,098,017,938	2030	877,441,933	169,283,993	4,916,412	319,465,553	(145,265,148)	99,495,611
2030	1,112,114,042	65.50%	18.56%	13	2,111,182,286	2031	917,156,247	173,480,427	4,270,394	331,794,081	(154,043,260)	103,039,107
2031	1,055,320,788	66.72%	18.04%	12	2,115,787,383	2032	955,876,706	177,373,953	3,772,883	305,218,222	(124,071,386)	106,856,171
2032	990,300,219	68.50%	17.53%	11	2,153,156,122	2033	995,116,208	179,536,563	3,323,751	309,623,943	(126,763,629)	109,686,086
2033	918,107,701	70.47%	17.01%	10	2,190,705,813	2034	1,038,696,157	182,075,215	2,861,536	297,299,959	(112,363,208)	113,277,510
2034	837,569,182	72.85%	16.41%	9	2,246,981,636	2035	1,081,616,041	183,993,661	2,481,459	283,496,586	(97,021,466)	117,035,504
2035	748,897,964	75.63%	15.77%	8	2,324,619,980	2036	1,133,629,235	185,983,673	2,047,484	290,039,982	(102,008,825)	121,615,693
2036	651,209,249	78.68%	14.98%	7	2,403,378,819	2037	1,185,603,411	186,964,008	1,772,922	259,000,612	(70,263,682)	126,743,722
2037	545,155,913	82.23%	14.12%	6	2,523,245,032	2038	1,239,611,410	185,750,308	1,528,379	256,411,468	(69,132,781)	131,690,399
2038	432,302,485	86.00%	13.12%	5	2,654,590,140	2039	1,297,527,971	183,184,021	1,290,198	243,461,777	(58,987,558)	138,036,534
2039	313,434,177	89.96%	11.89%	4	2,808,228,769	2040	1,355,648,014	177,919,288	1,095,304	230,626,406	(51,611,814)	145,805,337
2040	191,016,087	93.98%	10.26%	3	2,983,166,130	2041	1,422,638,804	169,120,844	855,390	234,022,327	(64,046,093)	156,885,580
2041	68,344,603	97.88%	7.69%	2	3,159,873,937	2042	1,490,326,384	152,898,763	729,308	208,556,918	(54,928,847)	173,605,205
2042	(46,571,960)	101.40%	1.88%	1	3,362,203,085	2043	1,561,047,830	120,033,308	617,098	206,575,355	(85,924,949)	203,221,706
2043	(135,738,568)	103.98%	0.00%	1	3,549,529,572	2044	1,635,323,519	30,717,832	505,574	197,065,901	(165,842,495)	285,964,376

Detailed Actuarial Forecasts

HMEPS Forecast – Reduce COLA to 1% for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	1,516,640,096	59.84%	23.73%	29	2,125,083,631	2015	567,327,062	125,960,035	15,434,712	262,162,982	(120,768,235)	17,914,108
2015	1,660,001,254	57.12%	25.32%	28	2,168,550,386	2016	580,028,499	137,656,527	14,728,363	276,658,072	(124,273,182)	21,039,270
2016	1,745,847,790	55.88%	26.21%	27	2,211,432,342	2017	593,827,096	150,381,581	13,993,264	290,747,678	(126,372,833)	23,966,054
2017	1,779,477,738	55.89%	26.46%	26	2,255,161,178	2018	604,908,536	158,557,168	13,369,216	331,892,198	(159,965,814)	31,142,149
2018	1,807,435,638	55.63%	26.75%	25	2,265,831,096	2019	620,443,627	164,175,340	12,524,878	340,925,899	(164,225,681)	32,861,238
2019	1,831,396,452	55.38%	26.89%	24	2,272,578,976	2020	637,219,064	170,454,138	11,765,771	344,907,978	(162,688,069)	34,104,689
2020	1,850,758,658	55.21%	26.99%	23	2,281,329,364	2021	649,983,313	174,795,448	11,146,852	345,783,281	(159,840,981)	34,859,907
2021	1,855,208,642	55.28%	27.07%	22	2,293,751,198	2022	672,336,747	181,436,034	10,218,741	368,177,218	(176,522,443)	36,069,249
2022	1,852,615,872	55.27%	26.84%	21	2,288,881,770	2023	689,125,801	186,525,499	9,563,155	372,870,382	(176,781,728)	37,324,426
2023	1,844,621,207	55.31%	26.78%	20	2,283,124,834	2024	711,521,442	190,942,318	8,838,284	375,719,040	(175,938,438)	38,381,722
2024	1,830,887,842	55.44%	26.56%	19	2,277,633,421	2025	730,610,129	195,646,148	8,119,201	373,903,249	(170,137,900)	39,616,311
2025	1,811,155,695	55.71%	26.42%	18	2,277,796,016	2026	760,652,118	202,013,955	7,381,481	393,287,462	(183,892,026)	41,182,897
2026	1,782,840,960	55.93%	25.98%	17	2,262,805,047	2027	788,642,533	208,372,650	6,719,645	379,448,435	(164,356,140)	42,886,606
2027	1,745,892,838	56.50%	25.60%	16	2,267,489,228	2028	815,572,628	211,908,609	6,120,027	393,337,752	(175,309,116)	43,955,859
2028	1,702,421,021	57.04%	25.27%	15	2,260,560,246	2029	847,538,701	216,970,914	5,496,713	387,697,743	(165,230,116)	45,478,638
2029	1,649,962,635	57.84%	24.81%	14	2,263,785,512	2030	877,441,933	221,724,503	4,916,412	378,450,470	(151,809,555)	47,055,101
2030	1,588,476,655	58.96%	24.39%	13	2,281,665,252	2031	917,156,247	227,539,483	4,270,394	394,818,637	(163,008,760)	48,980,051
2031	1,515,864,508	60.16%	23.75%	12	2,288,689,472	2032	955,876,706	233,124,875	3,772,883	365,556,985	(128,659,227)	51,105,249
2032	1,431,918,136	61.97%	23.13%	11	2,333,359,350	2033	995,116,208	236,358,204	3,323,751	372,088,859	(132,406,904)	52,864,445
2033	1,338,075,826	63.99%	22.50%	10	2,377,639,196	2034	1,038,696,157	240,226,287	2,861,536	358,485,091	(115,397,268)	55,126,438
2034	1,232,662,504	66.47%	21.78%	9	2,443,990,583	2035	1,081,616,041	243,417,371	2,481,459	342,772,787	(96,873,957)	57,611,794
2035	1,115,676,501	69.45%	21.03%	8	2,535,957,726	2036	1,133,629,235	246,883,240	2,047,484	351,815,930	(102,885,206)	60,716,126
2036	985,728,943	72.73%	20.09%	7	2,629,088,388	2037	1,185,603,411	249,321,449	1,772,922	314,779,568	(63,685,197)	64,386,281
2037	843,156,192	76.68%	19.07%	6	2,772,573,336	2038	1,239,611,410	249,032,667	1,528,379	312,076,820	(61,515,774)	68,408,040
2038	689,715,773	80.95%	17.91%	5	2,930,631,457	2039	1,297,527,971	247,412,306	1,290,198	296,412,477	(47,709,973)	73,808,249
2039	525,825,272	85.57%	16.49%	4	3,117,184,411	2040	1,355,648,014	242,819,726	1,095,304	280,697,058	(36,782,028)	80,904,899
2040	353,857,966	90.40%	14.65%	3	3,331,658,804	2041	1,422,638,804	234,572,946	855,390	285,503,972	(50,075,636)	91,433,478
2041	176,850,951	95.26%	11.76%	2	3,550,307,995	2042	1,490,326,384	218,316,423	729,308	253,400,189	(34,354,458)	108,187,545
2042	3,016,211	99.92%	5.34%	1	3,805,310,304	2043	1,561,047,830	183,655,838	617,098	250,586,002	(66,313,066)	139,599,176
2043	(148,206,750)	103.80%	0.00%	1	4,048,820,700	2044	1,635,323,519	87,395,928	505,574	238,210,569	(150,309,067)	229,286,280

Detailed Actuarial Forecasts

HMEPS Forecast – Freeze DROP for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	1,778,459,588	55.96%	26.93%	29	2,125,083,631	2015	567,327,062	142,819,500	15,434,712	246,755,148	(88,500,936)	1,054,643
2015	1,926,514,023	53.82%	28.56%	28	2,202,829,266	2016	580,028,499	156,224,784	14,728,363	261,036,358	(90,083,211)	2,471,013
2016	2,015,672,830	53.13%	29.47%	27	2,284,915,801	2017	593,827,096	169,586,536	13,993,264	273,242,883	(89,663,083)	4,761,099
2017	2,052,233,384	53.63%	29.73%	26	2,373,887,955	2018	604,908,536	178,249,410	13,369,216	311,671,241	(120,052,615)	11,449,907
2018	2,082,863,419	53.92%	30.05%	25	2,437,101,483	2019	620,443,627	184,470,828	12,524,878	327,933,398	(130,937,692)	12,565,750
2019	2,109,095,138	54.18%	30.21%	24	2,493,644,666	2020	637,219,064	191,509,100	11,765,771	340,999,634	(137,724,763)	13,049,727
2020	2,130,130,182	54.46%	30.30%	23	2,547,357,741	2021	649,983,313	196,337,688	11,146,852	346,749,817	(139,265,277)	13,317,667
2021	2,135,887,630	54.94%	30.41%	22	2,603,782,410	2022	672,336,747	203,742,500	10,218,741	366,891,494	(152,930,253)	13,762,783
2022	2,133,917,416	55.39%	30.16%	21	2,649,895,804	2023	689,125,801	209,578,132	9,563,155	382,781,544	(163,640,257)	14,271,793
2023	2,125,820,991	55.84%	30.11%	20	2,688,083,841	2024	711,521,442	214,593,769	8,838,284	396,364,618	(172,932,565)	14,730,271
2024	2,111,353,469	56.29%	29.87%	19	2,719,249,631	2025	730,610,129	219,987,821	8,119,201	406,638,498	(178,531,476)	15,274,638
2025	2,090,105,803	56.79%	29.74%	18	2,746,786,957	2026	760,652,118	227,230,409	7,381,481	419,980,421	(185,368,531)	15,966,443
2026	2,059,235,529	57.35%	29.25%	17	2,768,964,656	2027	788,642,533	234,524,154	6,719,645	427,219,261	(185,975,462)	16,735,102
2027	2,018,540,667	58.04%	28.83%	16	2,792,081,336	2028	815,572,628	238,564,901	6,120,027	441,589,944	(196,905,016)	17,299,567
2028	1,970,477,833	58.74%	28.47%	15	2,805,155,137	2029	847,538,701	244,355,379	5,496,713	445,777,967	(195,925,875)	18,094,173
2029	1,912,279,704	59.59%	27.97%	14	2,820,178,497	2030	877,441,933	249,833,141	4,916,412	446,340,658	(191,591,105)	18,946,463
2030	1,843,811,779	60.64%	27.51%	13	2,840,969,681	2031	917,156,247	256,515,679	4,270,394	448,750,588	(187,964,515)	20,003,855
2031	1,762,720,547	61.93%	26.81%	12	2,867,201,182	2032	955,876,706	263,007,926	3,772,883	445,128,737	(178,347,928)	21,222,198
2032	1,668,629,757	63.52%	26.13%	11	2,905,836,386	2033	995,116,208	266,815,172	3,323,751	449,762,836	(179,623,913)	22,407,477
2033	1,563,182,943	65.34%	25.45%	10	2,946,225,508	2034	1,038,696,157	271,395,843	2,861,536	441,642,782	(167,385,403)	23,956,882
2034	1,444,436,477	67.52%	24.66%	9	3,003,147,885	2035	1,081,616,041	275,269,073	2,481,459	430,620,746	(152,870,214)	25,760,092
2035	1,312,273,467	70.13%	23.85%	8	3,080,506,158	2036	1,133,629,235	279,526,017	2,047,484	421,039,710	(139,466,209)	28,073,349
2036	1,165,034,846	73.18%	22.83%	7	3,178,817,440	2037	1,185,603,411	282,745,662	1,772,922	406,979,644	(122,461,060)	30,962,068
2037	1,002,887,321	76.71%	21.72%	6	3,303,808,050	2038	1,239,611,410	282,952,644	1,528,379	400,552,089	(116,071,066)	34,488,063
2038	827,691,870	80.63%	20.48%	5	3,446,357,634	2039	1,297,527,971	281,839,310	1,290,198	385,045,106	(101,915,598)	39,381,245
2039	639,669,021	84.97%	18.95%	4	3,616,441,226	2040	1,355,648,014	277,607,010	1,095,304	368,791,445	(90,089,131)	46,117,615
2040	441,142,840	89.63%	17.00%	3	3,814,005,633	2041	1,422,638,804	269,655,926	855,390	354,583,246	(84,071,930)	56,350,498
2041	235,011,436	94.50%	13.95%	2	4,035,246,894	2042	1,490,326,384	253,380,942	729,308	338,422,036	(84,311,786)	73,123,026
2042	29,595,965	99.31%	7.20%	1	4,275,744,678	2043	1,561,047,830	217,758,150	617,098	329,985,452	(111,610,204)	105,496,864
2043	(154,889,822)	103.56%	0.00%	1	4,508,615,698	2044	1,635,323,519	117,775,952	505,574	315,273,631	(196,992,105)	198,906,256

Detailed Actuarial Forecasts

HMEPS Forecast – Eliminate DROP Interest for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	1,937,085,011	53.85%	28.54%	30	2,125,083,631	2015	567,327,062	143,874,143	15,434,712	265,546,825	(106,237,970)	-
2015	2,097,524,055	51.49%	29.89%	30	2,183,538,848	2016	580,028,499	158,695,797	14,728,363	284,502,877	(111,078,717)	-
2016	2,198,644,825	50.48%	30.48%	30	2,241,098,414	2017	593,827,096	174,347,635	13,993,264	302,903,618	(114,562,719)	-
2017	2,245,798,680	50.59%	30.76%	29	2,299,123,512	2018	604,908,536	184,398,584	13,369,216	347,730,000	(149,962,200)	5,300,733
2018	2,286,476,581	50.40%	31.09%	28	2,323,263,493	2019	620,443,627	190,856,544	12,524,878	361,988,319	(158,606,897)	6,180,034
2019	2,323,363,844	50.18%	31.24%	27	2,339,832,432	2020	637,219,064	198,104,583	11,765,771	370,908,565	(161,038,211)	6,454,244
2020	2,355,741,653	49.99%	31.33%	26	2,354,890,352	2021	649,983,313	203,055,826	11,146,852	376,782,248	(162,579,570)	6,599,529
2021	2,373,678,240	49.95%	31.46%	25	2,369,367,942	2022	672,336,747	210,676,544	10,218,741	402,273,471	(181,378,186)	6,828,739
2022	2,384,697,496	49.79%	31.21%	24	2,364,389,393	2023	689,125,801	216,781,469	9,563,155	414,215,803	(187,871,179)	7,068,456
2023	2,390,414,141	49.59%	31.17%	23	2,351,706,450	2024	711,521,442	222,052,060	8,838,284	421,645,056	(190,754,712)	7,271,980
2024	2,390,668,232	49.41%	30.95%	22	2,334,619,691	2025	730,610,129	227,752,365	8,119,201	424,313,360	(188,441,794)	7,510,094
2025	2,385,074,512	49.29%	30.83%	21	2,318,374,055	2026	760,652,118	235,384,953	7,381,481	444,658,714	(201,892,280)	7,811,899
2026	2,370,782,532	49.09%	30.35%	20	2,285,854,755	2027	788,642,533	243,118,538	6,719,645	437,449,025	(187,610,842)	8,140,718
2027	2,347,616,969	49.11%	29.95%	19	2,265,759,996	2028	815,572,628	247,513,311	6,120,027	454,296,299	(200,662,961)	8,351,157
2028	2,318,204,659	49.03%	29.61%	18	2,229,631,050	2029	847,538,701	253,799,360	5,496,713	451,126,382	(191,830,309)	8,650,192
2029	2,279,726,146	49.11%	29.13%	17	2,199,768,997	2030	877,441,933	259,819,681	4,916,412	443,805,405	(179,069,312)	8,959,923
2030	2,232,088,856	49.42%	28.71%	16	2,180,978,436	2031	917,156,247	267,181,973	4,270,394	457,315,714	(185,863,347)	9,337,561
2031	2,172,890,808	49.77%	28.05%	15	2,152,927,887	2032	955,876,706	274,475,404	3,772,883	432,654,743	(154,406,456)	9,754,720
2032	2,101,719,582	50.64%	27.42%	14	2,156,329,052	2033	995,116,208	279,118,708	3,323,751	438,564,579	(156,122,120)	10,103,941
2033	2,020,269,629	51.65%	26.81%	13	2,157,975,933	2034	1,038,696,157	284,802,043	2,861,536	424,000,004	(136,336,425)	10,550,682
2034	1,926,411,186	53.10%	26.11%	12	2,181,003,855	2035	1,081,616,041	289,991,615	2,481,459	406,782,644	(114,309,570)	11,037,550
2035	1,819,880,536	55.06%	25.42%	11	2,229,679,717	2036	1,133,629,235	295,961,393	2,047,484	409,437,619	(111,428,742)	11,637,973
2036	1,698,668,880	57.36%	24.55%	10	2,285,378,656	2037	1,185,603,411	301,372,651	1,772,922	374,186,255	(71,040,682)	12,335,079
2037	1,562,477,756	60.46%	23.67%	9	2,389,410,289	2038	1,239,611,410	304,364,749	1,528,379	368,293,572	(62,400,444)	13,075,958
2038	1,412,543,930	64.00%	22.76%	8	2,511,540,116	2039	1,297,527,971	307,189,382	1,290,198	349,336,307	(40,856,727)	14,031,173
2039	1,247,828,026	68.13%	21.74%	7	2,667,313,746	2040	1,355,648,014	308,521,844	1,095,304	330,241,217	(20,624,069)	15,202,781
2040	1,068,793,439	72.78%	20.64%	6	2,858,231,236	2041	1,422,638,804	309,220,069	855,390	327,415,823	(17,340,364)	16,786,355
2041	874,801,006	77.82%	19.30%	5	3,068,919,657	2042	1,490,326,384	307,561,346	729,308	296,230,772	12,059,882	18,942,622
2042	667,331,535	83.30%	17.72%	4	3,329,493,262	2043	1,561,047,830	301,261,954	617,098	289,703,780	12,175,272	21,993,060
2043	450,072,926	88.92%	15.69%	3	3,612,618,871	2044	1,635,323,519	289,761,712	505,574	274,149,868	16,117,418	26,920,496

Detailed Actuarial Forecasts

HMEPS Forecast – Delay Retirement Eligibility to Age 65 and 5 Years of Service for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	1,369,873,084	62.30%	20.61%	29	2,128,674,822	2015	576,831,644	111,703,410	16,652,126	206,324,086	(77,968,550)	32,170,733
2015	1,509,628,061	59.97%	22.10%	28	2,219,449,953	2016	589,610,492	121,489,942	16,444,231	218,872,520	(80,938,347)	37,205,855
2016	1,593,610,621	59.22%	22.95%	27	2,314,303,347	2017	604,869,709	133,646,074	15,849,390	233,113,677	(83,618,213)	40,701,561
2017	1,625,618,921	59.76%	23.14%	26	2,413,810,250	2018	621,644,089	142,668,583	15,517,371	264,472,649	(106,286,695)	47,030,734
2018	1,650,885,073	60.20%	23.25%	25	2,496,803,060	2019	639,980,426	148,104,315	15,262,173	273,715,231	(110,348,743)	48,932,263
2019	1,672,652,700	60.69%	23.31%	24	2,582,218,274	2020	659,305,665	153,256,262	15,080,178	280,388,336	(112,051,896)	51,302,565
2020	1,691,022,386	61.25%	23.35%	23	2,672,830,330	2021	670,314,489	156,222,203	14,921,764	293,025,642	(121,881,675)	53,433,152
2021	1,696,052,304	61.94%	23.48%	22	2,760,357,347	2022	691,645,424	161,476,920	13,867,785	330,122,798	(154,778,093)	56,028,363
2022	1,695,243,261	62.45%	23.32%	21	2,819,449,375	2023	712,559,448	167,279,019	13,369,135	328,013,714	(147,365,560)	56,570,906
2023	1,688,162,551	63.14%	23.17%	20	2,891,376,831	2024	735,580,016	171,532,981	12,974,924	338,131,783	(153,623,878)	57,791,059
2024	1,675,970,368	63.87%	22.97%	19	2,962,460,461	2025	752,680,146	174,389,579	12,667,729	344,047,712	(156,990,404)	60,872,880
2025	1,659,803,809	64.65%	22.92%	18	3,035,822,960	2026	779,981,060	179,185,527	12,146,158	411,868,199	(220,536,514)	64,011,325
2026	1,636,840,898	65.05%	22.65%	17	3,046,288,376	2027	805,213,392	184,587,728	11,106,837	393,881,725	(198,187,160)	66,671,528
2027	1,606,147,634	65.74%	22.41%	16	3,081,703,198	2028	833,208,972	188,738,473	10,447,499	407,245,589	(208,059,617)	67,125,995
2028	1,568,373,668	66.47%	22.12%	15	3,109,265,254	2029	863,812,778	193,621,760	9,915,623	412,961,245	(209,423,862)	68,827,792
2029	1,522,290,831	67.33%	21.76%	14	3,137,501,172	2030	884,771,176	195,701,320	9,489,488	412,440,556	(207,249,748)	73,078,284
2030	1,470,228,541	68.32%	21.61%	13	3,170,424,354	2031	925,749,961	201,476,952	8,734,345	526,038,744	(315,827,447)	75,042,582
2031	1,407,236,600	68.70%	21.07%	12	3,088,121,481	2032	960,992,633	207,664,249	7,829,454	441,475,584	(225,981,881)	76,565,875
2032	1,332,618,052	69.91%	20.60%	11	3,096,076,222	2033	999,210,200	210,514,026	7,236,731	444,367,581	(226,616,824)	78,708,623
2033	1,248,741,788	71.31%	20.08%	10	3,103,920,322	2034	1,040,371,009	214,315,041	6,754,330	439,826,624	(218,757,253)	81,037,684
2034	1,153,943,162	73.01%	19.49%	9	3,120,814,888	2035	1,071,727,117	215,176,280	6,364,415	429,527,084	(207,986,389)	85,852,885
2035	1,050,455,538	75.00%	19.03%	8	3,150,811,440	2036	1,127,401,393	219,677,090	5,605,884	568,237,225	(342,954,251)	87,922,276
2036	933,249,859	76.49%	18.17%	7	3,036,755,278	2037	1,176,199,198	223,810,558	4,917,314	431,985,740	(203,257,868)	89,897,172
2037	802,241,956	79.25%	17.30%	6	3,064,425,524	2038	1,228,382,324	223,229,417	4,455,998	425,176,719	(197,491,304)	94,211,290
2038	661,045,977	82.43%	16.29%	5	3,100,749,671	2039	1,283,900,675	222,150,457	4,081,267	413,263,611	(187,031,887)	99,070,098
2039	509,406,681	86.09%	15.05%	4	3,151,572,880	2040	1,331,450,629	216,925,529	3,777,469	397,714,752	(177,011,754)	106,799,096
2040	350,836,451	90.17%	13.54%	3	3,217,827,668	2041	1,403,073,723	211,174,175	3,188,588	509,991,877	(295,629,114)	114,832,249
2041	184,917,688	94.47%	10.97%	2	3,161,289,232	2042	1,468,457,674	198,846,584	2,754,488	379,246,826	(177,645,754)	127,657,384
2042	18,507,769	99.43%	5.26%	1	3,228,510,407	2043	1,537,578,452	168,714,518	2,462,850	366,542,410	(195,365,042)	154,540,496
2043	(129,998,866)	104.12%	0.00%	1	3,283,539,329	2044	1,610,493,713	84,670,656	2,226,725	351,298,711	(264,401,330)	232,011,552

Detailed Actuarial Forecasts

HMEPS Forecast – Change Normal Form to 50% J&S for Current and Future Members

Valuation as of July 1,	Unfunded Actuarial Liability	Funded Status	Calculated City Contribution Rate	Funding Period	Market Value of Assets	FYE 6/30	Covered Compensation	Employer Contribution	Employee Contribution	Benefit Payments	Net Cash Flow	Savings
2014	1,912,046,915	54.17%	28.24%	30	2,125,083,631	2015	567,327,062	143,874,143	15,434,712	261,700,586	(102,391,731)	-
2015	2,070,357,722	51.86%	29.57%	30	2,187,712,017	2016	580,028,499	158,695,797	14,728,363	280,416,275	(106,992,115)	-
2016	2,169,169,354	50.92%	30.14%	30	2,250,060,266	2017	593,827,096	174,347,635	13,993,264	298,899,774	(110,558,875)	-
2017	2,213,817,793	51.10%	30.40%	29	2,313,191,292	2018	604,908,536	182,344,004	13,369,216	342,503,737	(146,790,517)	7,355,313
2018	2,253,917,437	50.96%	30.72%	28	2,342,057,411	2019	620,443,627	188,591,046	12,524,878	356,628,406	(155,512,482)	8,445,532
2019	2,290,396,990	50.79%	30.87%	27	2,363,679,521	2020	637,219,064	195,743,340	11,765,771	365,735,451	(158,226,340)	8,815,487
2020	2,322,432,165	50.65%	30.96%	26	2,383,917,723	2021	649,983,313	200,638,975	11,146,852	371,882,681	(160,096,854)	9,016,380
2021	2,340,054,918	50.67%	31.08%	25	2,403,661,197	2022	672,336,747	208,173,609	10,218,741	399,546,221	(181,153,871)	9,331,674
2022	2,350,823,332	50.54%	30.83%	24	2,401,949,500	2023	689,125,801	214,194,540	9,563,155	409,456,008	(185,698,313)	9,655,385
2023	2,356,355,305	50.41%	30.80%	23	2,394,928,912	2024	711,521,442	219,397,535	8,838,284	416,918,716	(188,682,897)	9,926,505
2024	2,356,479,437	50.29%	30.57%	22	2,383,879,099	2025	730,610,129	225,019,819	8,119,201	419,657,022	(186,518,002)	10,242,640
2025	2,350,825,980	50.25%	30.46%	21	2,374,026,328	2026	760,652,118	232,553,586	7,381,481	443,897,607	(203,962,540)	10,643,266
2026	2,336,572,122	50.08%	29.98%	20	2,344,114,026	2027	788,642,533	240,181,423	6,719,645	433,228,579	(186,327,511)	11,077,833
2027	2,313,558,071	50.18%	29.58%	19	2,330,491,092	2028	815,572,628	244,518,405	6,120,027	450,794,748	(200,156,316)	11,346,063
2028	2,284,370,349	50.18%	29.25%	18	2,300,543,878	2029	847,538,701	250,721,023	5,496,713	448,138,399	(191,920,663)	11,728,529
2029	2,246,222,416	50.34%	28.78%	17	2,276,744,879	2030	877,441,933	256,658,213	4,916,412	441,417,245	(179,842,620)	12,121,391
2030	2,199,030,400	50.73%	28.36%	16	2,263,795,331	2031	917,156,247	263,920,824	4,270,394	461,492,962	(193,301,744)	12,598,710
2031	2,140,419,304	51.08%	27.70%	15	2,234,854,983	2032	955,876,706	271,109,599	3,772,883	431,117,579	(156,235,097)	13,120,525
2032	2,069,993,935	52.01%	27.08%	14	2,243,381,839	2033	995,116,208	275,684,789	3,323,751	438,030,461	(159,021,921)	13,537,860
2033	1,989,424,187	53.07%	26.48%	13	2,249,430,841	2034	1,038,696,157	281,282,971	2,861,536	424,636,417	(140,491,910)	14,069,754
2034	1,896,609,464	54.54%	25.78%	12	2,275,876,340	2035	1,081,616,041	286,389,802	2,481,459	408,575,858	(119,704,597)	14,639,363
2035	1,791,297,436	56.50%	25.10%	11	2,326,918,957	2036	1,133,629,235	292,262,802	2,047,484	418,419,180	(124,108,894)	15,336,564
2036	1,671,508,792	58.72%	24.24%	10	2,377,285,662	2037	1,185,603,411	297,576,005	1,772,922	377,604,200	(78,255,273)	16,131,725
2037	1,536,963,774	61.75%	23.37%	9	2,481,466,207	2038	1,239,611,410	300,498,501	1,528,379	372,860,708	(70,833,828)	16,942,206
2038	1,388,888,471	65.20%	22.46%	8	2,602,438,232	2039	1,297,527,971	303,245,830	1,290,198	355,333,830	(50,797,802)	17,974,725
2039	1,226,269,590	69.20%	21.45%	7	2,755,323,154	2040	1,355,648,014	304,509,383	1,095,304	337,570,972	(31,966,285)	19,215,242
2040	1,049,582,048	73.70%	20.36%	6	2,941,589,146	2041	1,422,638,804	305,130,839	855,390	340,717,347	(34,731,118)	20,875,585
2041	858,216,127	78.54%	19.03%	5	3,140,671,357	2042	1,490,326,384	303,401,996	729,308	305,399,459	(1,268,155)	23,101,972
2042	653,669,458	83.85%	17.46%	4	3,393,063,313	2043	1,561,047,830	297,066,402	617,098	300,119,790	(2,436,290)	26,188,612
2043	439,619,800	89.29%	15.44%	3	3,665,920,779	2044	1,635,323,519	285,548,161	505,574	285,699,188	354,547	31,134,047

Actuarial Valuation Basis

Base Line Comparison

The City of Houston retained RHI to perform an independent actuarial study of retirement system costs under alternative plan designs scenarios identified by the City of Houston. In order to determine the potential funding cost savings, RHI attempted to duplicate the actuarial valuations for each of the Funds based on the most recently published actuarial valuation reports as of July 1, 2012. Below is a summary of key valuation results from the RHI calculations, with the variance calculated as a percentage of the results from the respective Fund valuation reports:

Retirement System	Present Value of Benefits (PVB)	Actuarial Accrued Liability (AAL)	Normal Cost Annual \$ Amount	City Contribution Rate % of Payroll
HFRRF	+1.3%	-0.3%	+1.9%	+1.9%
HPOPS	+2.1%	+2.5%	-4.4%	+1.9%
HMEPS	+1.5%	+1.5%	-10.6%	+0.6%

While the margin of error for HFRRF and HPOPS may appear reasonable on a percentage basis, the absolute dollar amounts of these differences are still substantial. The margin of error in the normal cost calculation for HMEPS appears more significant, although the absolute dollar amounts here are not as substantial due to actuarial cost method used by this Fund (entry age normal replacement life). It is also important to note that significant differences and systematic bias may exist due to the simplified census data methods and assumptions used, with the potential for offsetting errors that cannot be detected without more detailed information from the Fund actuaries that was not available from their published report.

As most of the difference in the RHI calculations of the Present Value of Benefits occurs for the active members in DROP, obtaining the current DROP balances and post-retirement annuities values for this group is crucial to improving the accuracy of this study. While a similar split of Actuarial Liability and Normal Cost for those in DROP was not available in the actuarial reports, we believe a similar trend would be found in these measurements as well. Therefore, we strongly recommend further analysis based on duplicate copies of the actual census data files and other information from the Fund actuaries before the City of Houston relies on the RHI calculation of liabilities and costs.

With that being said, however, we believe these results still provide a reasonable starting point for the City to use to evaluate long-term funding requirements and budget sustainability of its financial commitment to its retirement systems, and evaluate plan design alternatives in terms of the relative value of changes as a percentage of total liabilities and costs.

The following tables provide additional detail on the results of the duplication compared to the most recent actuarial valuation reports prepared for each of the Funds. As each of the Funds has significant differences in benefit structures and effective dates for plan changes, using different actuarial cost methods, with the valuations performed by different actuaries, there are some format differences in the summary of results for each Fund.

Actuarial Valuation Basis

Comparison of Results – HFRRF

July 1, 2012 (\$ millions)	Fund Report	RHI Results	Difference	Percentage
Present Value of Projected Benefits				
• Active Members in DROP	\$1,122.5	\$1,103.3	-\$19.2	-1.7%
• Other Active Members	\$1,149.4	\$1,236.1	\$86.8	7.6%
• Members in Pay Status	\$2,156.8	\$2,148.3	-\$8.5	-0.4%
• Inactive Members	\$1.2	\$1.1	\$0.0	-4.1%
• Total Present Value Benefits	\$4,429.7	\$4,488.9	\$59.1	1.3%
Actuarial Accrued Liability				
• Total Active Members	\$1,595.0	\$1,590.8	-\$4.2	-0.3%
• Members in Pay Status	\$2,156.8	\$2,148.3	-\$8.5	-0.4%
• Inactive Members	\$1.2	\$1.1	\$0.0	-4.1%
• Total Actuarial Liability	\$3,752.9	\$3,740.2	-\$12.7	-0.3%
Actuarial Value of Assets	\$3,263.3	\$3,263.3	\$0.0	0.0%
Unfunded Actuarial Liability (UAL)	\$489.6	\$477.0	-\$12.7	-2.6%
Other Actuarial Present Values				
• Valuation Compensation	\$2,531.6	\$2,673.0	\$141.4	5.6%
• Total Future Normal Cost	\$676.8	\$748.6	\$71.8	10.6%
• Member Contributions	\$213.6	\$240.6	\$27.0	12.7%
• City's PV Future Normal Cost	\$463.3	\$508.1	\$44.8	9.7%
Total Annual Normal Cost (MOY)	\$70.8	\$72.2	\$1.4	1.9%
City Required Contribution Rate				
• Normal Cost	18.3%	19.6%	1.3%	7.1%
• UAL Amortization	12.8%	12.1%	-0.7%	-5.5%
• Total City Rate	31.1%	31.7%	0.6%	1.9%
Annual City Contribution Amount	\$84.2	\$83.5	-\$0.8	-0.9%
Total Valuation Compensation	\$270.9	\$263.3	-\$7.6	-2.8%

Actuarial Valuation Basis

Comparison of Results – HPOPS

July 1, 2012 (\$ millions)	Fund Report	RHI Results	Difference	Percentage
Present Value of Projected Benefits				
• Post-2004 Actives	\$253.3	\$253.1	(\$0.2)	1.7%
• Pre-2004 Actives in DROP	\$2,015.3	\$2,099.2	\$83.9	4.2%
• Other Pre-2004 Actives	\$1,094.6	\$1,095.6	\$1.0	0.1%
• Members in Pay Status	\$2,316.1	\$2,348.3	\$32.3	1.4%
• Inactive Members	\$4.2	\$4.8	\$0.6	15.5%
• Total Present Value Benefits	\$5,683.4	\$5,801.0	\$117.6	2.1%
Actuarial Accrued Liability				
• Total Active Members	\$2,426.9	\$2,511.3	\$84.4	3.5%
• Members in Pay Status	\$2,316.1	\$2,348.3	\$32.3	1.4%
• Inactive Members	\$4.2	\$4.8	\$0.6	15.5%
• Total Actuarial Liability	\$4,747.2	\$4,864.5	\$117.3	2.5%
Actuarial Value of Assets	\$3,888.5	\$3,888.5	\$0.0	0.0%
Unfunded Actuarial Liability (UAL)	\$858.7	\$976.0	\$117.3	13.7%
Other Actuarial Present Values				
• Valuation Compensation	\$3,200.7	\$3,520.4	\$319.7	10.0%
• Total Future Normal Cost	\$936.2	\$936.5	\$0.2	0.0%
• Member Contributions	\$304.2	\$333.9	\$29.7	9.8%
• City's PV Future Normal Cost	\$632.0	\$602.5	(\$29.5)	-4.7%
Total Annual Normal Cost (MOY)	\$116.3	\$111.2	(\$5.1)	-4.4%
City Required Contribution Rate				
• Normal Cost	20.5%	19.2%	-1.4%	-6.7%
• UAL Amortization	14.0%	16.0%	2.0%	14.4%
• Total City Rate	34.5%	35.1%	0.6%	1.9%
Annual City Contribution Amount	\$134.5	\$137.0	\$2.5	1.9%
Total Valuation Compensation	\$389.9	\$389.9	\$0.0	0.0%

Actuarial Valuation Basis

Comparison of Results - HMEPS

July 1, 2012 (\$ millions)	Fund Report	RHI Results	Difference	Percentage
Present Value of Projected Benefits				
• Active Members	\$1,974.2	\$1,989.5	\$15.3	0.8%
• Members in Pay Status	\$2,144.5	\$2,184.0	\$39.5	1.8%
• Inactive Members	\$168.0	\$175.9	\$7.9	4.7%
• Total Present Value Benefits	\$4,286.7	\$4,349.4	\$62.7	1.5%
Actuarial Accrued Liability				
• Total Active Members	\$1,654.3	\$1,668.0	\$13.7	0.8%
• Members in Pay Status	\$2,144.5	\$2,184.0	\$39.5	1.8%
• Inactive Members	\$168.0	\$175.9	\$7.9	4.7%
• Total Actuarial Liability	\$3,966.8	\$4,027.9	\$61.1	1.5%
Actuarial Value of Assets	\$2,344.1	\$2,344.1	\$0.0	0.0%
Unfunded Actuarial Liability (UAL)	\$1,622.7	\$1,683.8	\$61.1	3.8%
Other Actuarial Present Values				
• Valuation Compensation	\$3,650.0	\$3,965.1	\$315.1	8.6%
• Total Future Normal Cost	\$319.9	\$321.5	\$1.6	0.5%
• Member Contributions	\$119.0	\$125.7	\$6.7	5.6%
• City's PV Future Normal Cost	\$200.9	\$195.8	-\$5.1	-2.5%
Total Annual Normal Cost (MOY)	\$31.2	\$27.9	-\$3.3	-10.6%
City Required Contribution Rate				
• Normal Cost	5.8%	5.2%	-0.6%	-10.5%
• UAL Amortization	20.3%	21.1%	0.8%	3.7%
• Total City Rate	26.1%	26.3%	0.2%	0.6%
Annual City Contribution Amount	\$139.6	\$140.4	\$0.8	0.6%
Total Valuation Compensation	\$534.4	\$534.4	\$0.0	0.0%

Actuarial Valuation Basis

Active Member Census Data

The most accurate and efficient approach to performing the valuation duplication process is to start with an exact duplicate copy of the census data files used by the Fund actuary. Because, the City of Houston was unable to obtain this information from the Funds, RHI constructed member census data files relying on the demographic summaries included in the actuarial valuation reports as of July 1, 2012.

Hypothetical data records were created for active members based on the age/service grids provided in the actuarial reports, setting age and service at mid-range value and then using the average pay within each 5-year cell. Compensation history was developed by regression from the average pay for each hypothetical data record cell using the salary scale assumption. Please see the Appendix for detailed summaries of the active census data used and comparison to the data summaries provided in the actuarial valuation reports.

Inactive Member Census Data

Hypothetical data records were created for inactive members based on the average annual pension benefit for each of the valuation membership groups for benefits in pay status (retirees, beneficiaries and disabled) as well as deferred vested members. Because average age data was not always provided in the actuarial reports, we estimated the age of some membership groups. Please see the Appendix for summaries of the inactive data used and comparison to the data summaries provided in the actuarial valuation reports.

Due to the limitations of the data summaries in the valuation reports, RHI made assumptions regarding the gender of the members as follows:

- HMEPS – Of all retired, disabled, deferred vested and surviving spouses and beneficiaries, 50% were assumed to be male and 50% female, with all dependent spouses assumed to be the opposite gender.
- HFRRF - all retired, disabled and deferred vested members were assumed male and all beneficiaries and dependent spouses were assumed female.
- HPOPS - all retired, disabled and deferred vested members were assumed male and all beneficiaries and dependent spouses were assumed female.

We also assumed 70% of the HMEPS, 90% of the HPOPS, and 100% of the HFRRF inactive members were married with spouses being three years younger than the member. Each inactive member was assumed to be receiving the average annual benefit based on the data summary in the actuarial report for their respective membership group.

Actuarial Valuation Basis

DROP Balance Estimation

Each of the Funds includes a Deferred Retirement Option Plan (DROP) for at least some portion of its active members, as well as the retired members. Again, because detailed census data for individual members was not available, RHI was required to estimate this important component of total plan liabilities and costs as part of the development of the hypothetical census data.

In general, we assumed DROP entry date for each cohort of the celled service groups equal to the earliest eligibility age to project past and future DROP participation. For members already in DROP, we estimated the value of account balances as of the measurement date based on annuity amounts developed in the duplication process, with historical annual interest credited at assumed rates as follows:

- 4.25% for HMEPS
- 8.5% for HFRRF
- 7.0% for HPOPS

For HPOPS inactive members, we relied upon PROP balances published in the CAFR of \$441.1 million as of July 1, 2012. For HFRRF and HMEPS inactive members, we relied on estimated DROP balances of \$557 million and \$72 million respectively, as provided by the City of Houston.

As the Funds actuarial reports do not disclose the value of the DROP balances, we strongly recommend further analysis based on duplicate copies of the actual census data files and other information from the Fund actuaries before the City of Houston relies on the RHI calculation of liabilities and costs as a “valuation replication.”

Plan Benefit Provisions

RHI performed the duplication process based on the plan provisions summarized in the Appendix section of this report. Due to census data limitations mentioned above, we did not explicitly value special transition benefits for plan changes effective in past years, and have documented certain other plan provisions not explicitly measured in the Appendix sections. We believe our methodology is consistent with the summary valuation described in the most recent valuation reports but would need additional data and information from the Fund actuaries to confirm whether these transitional provisions continue to have a material impact on the valuation results.

Actuarial Valuation Basis

Actuarial Assumptions and Methods

RHI performed the duplication process based on the actuarial assumption and methods as summarized in the Appendix section of this report. We believe our approach is consistent with the valuation basis as described in the most recent valuation reports prepared by the Fund actuaries as of July 1, 2012, subject to the following interpretations and clarifications applied by RHI:

- For active members in DROP, we assumed DROP entry dates equal to the age when first eligible unless that would have occurred prior to the maximum DROP duration period.
- Valuation pay was based on the compensation shown in the age/service grid of the actuarial report.
- Linear interpolation was used to determine the rates of termination and disability incidence between the sample rates.
- All pre-retirement deaths were assumed to be duty related.
- All disabilities were assumed to be duty related.
- All terminated vested members eligible for an annuity are assumed to elect an annuity.

For purposes of the plan design analysis, the freeze of the DROP account accumulations was assumed to take effect July 1, 2014. Our model assumes the service retirement benefits (including DROP benefits) accrued up to this date will be grandfathered as a guaranteed minimum. For active members currently in DROP that continue working, they are assumed to elect the larger actuarial present value of the following choice at retirement.

- Total annuity benefit accrued as if member had exited from DROP and retired as of June 30, 2013, plus the accumulated DROP account balance as of June 30, 2013.
- Service pension calculated on total service and final average pay at actual retirement as if the member had never entered DROP.

For active members currently participating in DROP, curtailment of this popular benefit provisions is likely to accelerate early retirement decisions, especially for firefighters that cannot earn any additional benefits under the new plan design because they have already completed 30 years of service. Our pricing model assumes 100% rate of retirement for the firefighters with 30+ years of service. As the benefit accruals for the HMEPS and HPOPS Funds extend beyond thirty years, those members are not assumed to immediately retire upon completion of 30 years of service.

Based on the HFRRF valuation report as of July 1, 2012, there were 876 active members participating in DROP representing total payroll of approximately \$70.9 million of payroll (average \$80,936 per member). About 50% of this group has 30+ years of service, and we have assumed immediate replacement of these members with newly hired firefighters. A mass exodus of firefighters could cause other ripple effects for the Fund and City of Houston, but these considerations are beyond the scope of this study.

Actuarial Valuation Basis

Funding Policy

The City's actuarially determined contribution rate for all three Funds is generally equal to the normal cost plus amortization of the unfunded actuarial liability over a 30-year open period. In forecasting the future contributions, however, we relied on the stated funding policies as described in the respective actuarial reports which include the following modifications:

- City contributions to HFRRF will equal 23.9% of payroll for the fiscal years beginning August 1, 2013 and 2014, increasing to the prior year's actuarially determined rate in future years.
- City contributions to HPOPS will equal \$93 million for the fiscal year beginning August 1, 2013, increasing by the lesser of \$10 million or the prior year's actuarially determined amount in future years.
- City contributions to HMEPS will equal 21.36% of payroll for the fiscal year beginning August 1, 2013, increasing by the lesser of an additional 2% of payroll or the prior year's actuarially determined amount in future years.

In addition, once the City's future contribution to HMEPS reaches the actuarially determined amount, the calculation of the amortization of the unfunded actuarial liability will change from 30-year open period to a 30-year closed period. Closed period amortization is similar to a traditional home mortgage which if fully paid over a 30-year fixed term from the initial loan date, whereas an open period amortization is similar to refinancing your mortgage each year for a new 30-year period.

Under the 30-year closed period amortization and assuming all the underlying assumptions are met, the amortization payment is projected to fully pay off the unfunded actuarial liability by the 30th year. Upon changing to the closed period amortization, future City contributions will be higher than they would have been remaining under the open period method until the end of the 30-year period, at which point the unfunded actuarial liability is projected to be eliminated. This difference in amortization methodology makes cost comparisons between HMEPS and the other two Funds more difficult.

Finally, in some cases the City Contribution rate is limited to a floor minimum not less than two-times the member contribution rate or some other fixed amount. However, we have assumed this minimum floor rate would not apply in situations where the proposed plan design change would reduce the actuarially determined contribution rate below the minimum floor lever. We believe this approach allows for a more realistic and meaningful comparison of the cost reductions for the various plan design scenarios.

HFRRF Appendix

Active Data

July 1, 2012	HFRRF Valuation	RHI Duplication	Difference	Percentage
Active Members in DROP				
• Number	876	876	0	0.0%
• Average Age	53.3	53.2	0.1	0.0%
• Average Service	29.7	29.7	0.0	0.1%
• Average Prior Year Actual Pay	\$68,681,071	\$68,681,071	\$0	0.0%
• Total Valuation Compensation	\$73,707,962	\$70,896,373	-\$2,811,589	-3.8%
Other Active Members				
• Number	2,912	2,912	0	0.0%
• Average Age	37.0	37.0	0.0	-0.1%
• Average Service	9.7	9.7	0.0	-0.5%
• Average Prior Year Actual Pay	\$183,718,360	\$183,718,360	\$0	0.0%
• Total Valuation Compensation	\$197,165,038	\$192,396,081	-\$4,768,957	-2.4%
Total Active Members				
• Number	3,788	3,788	0	0.0%
• Average Age	40.8	40.7	0.1	-0.1%
• Average Service	14.3	14.3	0.0	-0.3%
• Average Prior Year Actual Pay	\$252,399,431	\$252,399,431	\$0	0.0%
• Total Valuation Compensation	\$270,873,000	\$263,292,454	-\$7,580,546	-2.8%

HFRRF Appendix

Inactive Data

July 1, 2012	HFRRF Valuation	RHI Duplication
Retired Members		
• Number	1,948	1,948
• Average Age	n/a	63
• Average Annual Benefit	\$42,886	\$42,886
Beneficiaries in Pay Status		
• Number	518	518
• Average Age	n/a	68
• Average Annual Benefit	\$32,953	\$32,953
Disabled Members		
• Number	324	324
• Average Age	n/a	55
• Average Annual Benefit	\$41,861	\$41,861
Deferred Vested Members		
• Number	8	8
• Average Age	n/a	47
• Average Annual Benefit	\$10,729	\$10,729

HFRRF Appendix

Summary of Plan Provisions

Covered Members	Any firefighter who has not reached the age of 36 at the time he or she first enters employment shall automatically become a participant in the Fund upon completing the training period.
Final Average Salary	The average of the highest 36 months of salary (or 78 pay periods), including base pay and overtime, before reduction for pre-tax employee contributions and salary deferrals.
Standard Service Pension	
Eligibility	20 years of service
Benefit	For retirement on or after November 1, 1997, 50% of average monthly salary; plus 3% of average monthly salary per year of service in excess of 20 years.
Maximum	For retirement on or after September 1, 1991, 80% of average monthly salary. In addition, a member will receive a \$5,000 lump sum payment upon retirement.
Supplemental Bonus Check	Supplemental payments totaling up to \$5 million will be payable on a prorated basis determined by the Board of Trustees to all retirees and survivors.
Deferred Retirement Option Plan (DROP)	
Eligibility	20 years of service.
Benefit	Effective July 1, 2000, eligible participants may elect to participate in the DROP for up to ten years or until they leave active service. The member's standard or alternate service pension (whichever is greater) will be calculated based on service and earnings at the time the DROP is elected.

HFRRF Appendix

Summary of Plan Provisions (Continued)

A notional account will be maintained for each DROP participant. This account will be credited with the following amounts while the member is a participant of the DROP:

- The member's monthly retirement pension, including applicable cost-of-living adjustments,
- The member's contribution to the Retirement Fund, and
- Investment earnings/losses at the rate of the Retirement Fund's earnings/losses averaged over a five-year period.

A benefit equal to the DROP account balance will be paid at the time the member leaves active service.

Effective on July 1, 2000, a three-year back DROP is available for all eligible participants. The DROP account will be recalculated based on what the account balance would have been had the participant elected the DROP up to 3 years earlier than he/she actually did. The initial DROP entry date cannot be backdated prior to September 1, 1995, or prior to 20 years of credited service, and must be on the first of the month selected.

The monthly benefit for a participant at actual retirement will increase 2% for every year of DROP participation (Phased in at 1% effective September 1, 2000 and 1% effective September 1, 2001).

Members can remain in the DROP for 13 years. However, the member's contributions to the Fund will only be credited to his DROP account for the first ten years. Additionally, a maximum of 20% will be added to his benefit at actual retirement.

If a DROP participant suffers an on-duty disability resulting in the inability to perform any gainful activity or dies in the line of duty, the death or disability annuity benefit would be calculated as though the participant had not entered the DROP. In addition, the DROP account would be payable to the participant or beneficiary.

HFRRF Appendix

Summary of Plan Provisions (Continued)

Service-Connected Disability Pension

Eligibility	No age or service requirements.
Benefit	50% of average monthly salary or service pension if greater and eligible. Firefighters who are not capable of performing any substantial gainful activity will receive 75% of average monthly salary, or service pension, if greater and eligible. In addition, a member will receive a \$5,000 lump sum.

Non-Service-Connected Disability Pension

Eligibility	No age or service requirements.
Benefit	25% of average monthly salary, plus 2.5% of average monthly salary per year of service.
Maximum	50% of average monthly salary or service pension, if greater and eligible. In addition, a member will receive a \$5,000 lump sum.

Vested Pension

Eligibility	At least 10 but less than 20 years of service.
Benefit	1.7% of average monthly salary per year of service, payable beginning at age 50 or optional refund of contributions with interest at a flat rate of 5% not compounded.

Death Benefits	Payable as specified below if survived by a spouse, dependent children, or dependent parents. Effective November 1, 1997 dependent children can continue to receive benefits between the ages of 18 and 22 if they are in college. <u>Service-connected:</u> Monthly benefit equal to 100% of your final average salary. <u>Non-service-connected:</u> Monthly benefit that would have been payable had the participant retired for non-service-connected disability on the date of his or her death (or service pension if greater).
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HFRRF Appendix

Summary of Plan Provisions (Continued)

Death Benefits (Continued)

Postretirement: Monthly benefit which was payable to the participant prior to his or her death. Effective July 1, 1998, a “graded” postretirement death benefit is payable to a surviving spouse if the retiree was not married at the time of retirement. This “graded” benefit is equal to 20% of the postretirement death benefit for each year of marriage to a maximum 100% after five years of marriage.

Preretirement: Refund of contributions made if no eligible survivors. If death occurs after 10 years of service, interest is credited on the contributions at the flat rate of 5% not compounded. If death occurs before 10 years of service, no interest is credited.

Lump sum: A one-time \$5,000 lump sum death benefit for any active or retired firefighter. This benefit applies to active members, current retirees, and disabled participants.

Additional Benefit

Effective on or after July 1, 2001, an extra monthly benefit of \$150 is payable for life to any retired or disabled member or to an eligible survivor of a deceased member. This benefit is not subject to the postretirement adjustment.

Excess Benefit

Benefit equal to the excess of any members’ standard service pension benefit over the limit imposed by Section 415 of the code.

Postretirement Adjustment

Pensions adjusted each year at a fixed rate of 3%. The adjustment is based on the amount of benefits payable at the time of adjustment.

Pension adjustment for participants who retire or terminate with a vested benefit begin at age 48. Pension adjustments begin immediately for participants who become disabled and cannot perform any substantial gainful activity (current and future) and qualify for general on-duty disability benefits. Participants whose benefits become payable upon 30 or more years of service are also eligible for pension adjustments to begin immediately.

HFRRF Appendix

Summary of Plan Provisions (Continued)

Refund of Contributions

Members that terminate before attaining 10 years of service receive a refund of contributions without interest.

Contribution Rates

Members

9% of salary.

City

The rate required to fund the Retirement Fund on an actuarial reserve basis, subject to a minimum contribution of two times the member contribution rate as required by statute.

HFRRF Appendix

Actuarial Assumptions and Methods

Valuation Date	The valuation date is July 1 st .
Actuarial Value of Assets	Gains and losses in the market value of assets, based on the difference between the actual rate of return and the assumed rate of return, are recognized in the actuarial value over five years.
Actuarial Cost Method	<u>The Entry Age Normal Actuarial Cost Method</u> The present value of the projected benefit (PVB) is determined as of the date the member entered the plan. The present value of future salary (PVFS) is also determined at entry age. The percentage of the PVFS represented by the PVB is the level percent of pay which, if contributed every year, would exactly fund the benefit if the valuation actuarial assumptions were realized. The actuarial accrued liability (AAL) is the theoretical value of assets which would result from the accumulation of these contributions from the plan entry until the valuation date.

KEY ECONOMIC ASSUMPTIONS

Investment Return	8.5%
General Inflation	3.0%
Payroll Growth Rate	3.0%
Individual Pay Increase Rate	

	<i>(Nominal = Real + Inflation)</i>	
Age	Nominal	Real
20	7.00%	4.00%
25	6.25%	3.25%
30	5.50%	2.50%
35	5.00%	2.00%
40	4.00%	1.00%
45	3.70%	0.70%
50	3.40%	0.40%
55	3.00%	0.00%

HFRRF Appendix

Actuarial Assumptions and Methods (Continued)

DEMOGRAPHIC ASSUMPTIONS

Mortality Rates

Active participants and nondisabled Pensioners

RP-2000 Combined Healthy Tables projected to 2022 using Scale AA.

Disabled pensioners

Age	Disabled Mortality Sample Rate per 100	
	Male	Female
20	2.30	0.70
25	2.60	1.30
30	2.90	1.90
35	2.80	2.20
40	3.10	2.30
45	3.50	2.30
50	4.10	2.60
55	5.30	3.00
60	6.50	3.40

Retirement Rates

Number of Years of Service	Probability of Retiring Within One Year
20 - 24	1%
25 - 29	5%
30 - 34	15%
35 - 39	25%
40+	100%

DROP Duration

Lesser of 9 years or the maximum eligible period

DROP Payout

It is assumed Active members with DROP balances will take their DROP balance immediately at retirement. Inactive members currently retired with DROP balances are assumed to take 8 equal annual installments from the valuation date.

HFRRF Appendix

Actuarial Assumptions and Methods (Continued)

Disability Rates

Disability per 100	
Age	All
20	0.75
25	0.75
30	0.75
35	1.50
40	1.50
45	1.50
50	1.50
55	1.50
60	3.00

Percentage of Deaths and Disabilities in the Line of Duty

- Deaths 100% of pre-retirement deaths are assumed duty related.

- Disabilities 50% of disabilities are assumed duty related.

Termination Rates

Sample Rates

<i>Age</i>	<i>Termination Rate</i>
20	1.3%
25	1.3%
30	1.2%
35	0.7%
40	0.4%
45	0.0%
50	0.0%

For participants terminating with at least 10 years but less than 20 years of service:

- 50% will elect a contribution refund
- 50% will elect a deferred monthly pension benefit

HFRRF Appendix

Actuarial Assumptions and Methods (Continued)

Percentage married	90% of participants are assumed to be married. No beneficiaries other than the spouse assumed.
Age difference	Husbands assumed to be three years older than wives.
Load of Nature of Average Monthly Salaries	Active liabilities and normal costs were increased 5% to account for differences between the plan's definition of average monthly salary (average of the highest 78 pay periods), and the average of the final 78 pay periods.
Development of Valuation Pay	Valuation pay is projected by increasing the prior year's pay with the nominal individual pay increase rate. Historical valuation pay was regressed with the nominal individual pay increase rate.
Age at First Payment for Vested Terminations:	50
Benefits Not Valued	The proportional retirement program between the Houston municipal, police and fire pension funds which allows for combining service credit from two or more City of Houston pension plans was not valued because its impact is expected not to be material. No reserve for the Supplemental Bonus Check was measured
Funding Policy	For all purposes of all forecasts, the City is assumed to contribute 23.9% of payroll for fiscal year beginning July 1, 2012 and 2013. In future years, the City is assumed to contribute the actuarially determined rate from the prior year. The actuarially determined rate is measured as the normal cost plus 30 year amortization of the unfunded actuarial liability (UAL) less the firefighter contributions – all adjusted with interest to mid-year. The 30 year amortization of the UAL is calculated as a level percentage of payroll with payroll growing by 3% per year. The minimum statutory City contribution rate of two times the firefighter contribution rate is ignored for purposes of this special study.

HPOPS Appendix

Active Data

July 1, 2012	HPOPS Valuation	RHI Duplication	Difference	Percentage
Post-2004 Active Members				
• Number	1,613	1,613	0	0.0%
• Average Age	32.0	32.1	0.1	0.3%
• Average Service	3.6	3.6	0.0	0.0%
• Average Prior Year Actual Pay	\$53,167	\$53,167	\$0	0.0%
• Total Valuation Compensation	\$85,758,740	\$85,758,897	\$157	0.0%
Pre-2004 Active Members in DROP				
• Number	1,751	1,751	0	0.0%
• Average Age	52.2	52.2	0.0	0.0%
• Average Service	27.5	27.6	0.1	0.4%
• Average Prior Year Actual Pay	\$85,689	\$85,689	\$0	0.0%
• Total Valuation Compensation	\$150,041,439	\$150,040,637	-\$802	0.0%
Other Pre-2004 Active Members				
• Number	1,962	1,962	0	0.0%
• Average Age	42.5	42.5	0.0	0.0%
• Average Service	15.2	15.2	0.0	0.0%
• Average Prior Year Actual Pay	\$78,534	\$78,534	\$0	0.0%
• Total Valuation Compensation	\$154,083,708	\$154,083,259	-\$449	0.0%
Total Active Members				
• Number	5,326	5,326	0	0.0%
• Average Age	42.5	42.5	0.0	0.0%
• Average Service	15.7	15.8	0.1	0.6%
• Average Prior Year Actual Pay	\$73,204	\$73,204	\$0	0.0%
• Total Valuation Compensation	\$389,883,887	\$389,882,793	-\$1,094	0.0%

HPOPS Appendix

Inactive Data

July 1, 2012	HPOPS Valuation	RHI Duplication
Retired Members		
• Number	2,478	2,478
• Average Age	63.6	64.0
• Average Annual Benefit	\$47,048	\$47,048
Beneficiaries in Pay Status		
• Number	574	574
• Average Age	68.9	69.0
• Average Annual Benefit	\$40,540	\$40,540
Disabled Members		
• Number	147	147
• Average Age	53.6	54.0
• Average Annual Benefit	\$41,087	\$41,087
Deferred Vested Members		
• Number	31	31
• Average Age	n/a	49.0
• Average Annual Benefit	\$27,162	\$27,162

HPOPS Appendix

Summary of Plan Provisions

Covered Members	All City of Houston police officers sworn by June 30, 2011.
Final Average Compensation	Average of the last three years of compensation (excluding exempt time, overtime and strategic officer staffing pay). This average will be phased in beginning October 9, 2004 until the new definition is fully phased in after 78 pay periods.
Service Retirement	
Eligibility	
▶ Sworn prior to October 9, 2004	20 years of service.
▶ Sworn on or after October, 2004	Age 55 with 10 years of service.
Benefit	2.25% of Final Average Compensation for each of the first 20 years of service plus 2% of Final Average Compensation for each year of service in excess of 20 years, with a maximum of 80% of Final Average Compensation
Additional Benefits	An extra monthly benefit of \$150.00 is payable for life. Effective November 28, 1998, a \$5,000 lump sum is payable upon retirement for members sworn prior to October 9, 2004.

HPOPS Appendix

Summary of Plan Provisions (Continued)

Terminated Vested Pension Benefit

Eligibility	More than 10 but less than 20 years of service and sworn prior to October 9, 2004.
Benefit	2.75% of final compensation times years of service. This benefit commences at age 60 or at termination of service if later.

Deferred Retirement Option Plan (DROP)

Eligibility	20 years of service and sworn in prior to October 9, 2004.
Benefit	Eligible participants may elect to participate in the DROP until they leave active service. The member's retirement pension will be calculated based on service and earnings at the time the DROP is elected.

A notional account will be maintained for each DROP participant. This account will be credited with the following amounts while the member is actively participating in DROP:

- 1) Member's monthly retirement pension, including applicable cost of living adjustments,
- 2) Member's contribution to the Pension System up to 8.75% of compensation (but no City contributions), and
- 3) Investment earnings equal to the Fund's five-year average return, subject to a 3.00% minimum and 7.00% maximum.

A benefit equal to the DROP account balance is paid at the time the member leaves active service. The payment is made as a single lump sum.

HPOPS Appendix

Summary of Plan Provisions (Continued)

DROP (Continued)

If a DROP participant suffers an on-duty disability resulting in the inability to perform his/her usual and customary duties as a police officer or dies in the line of duty, he (or his survivors) are allowed to revoke the DROP election and receive the more generous on-duty disability or death benefits.

Benefit Recalculation

Effective July 1, 2001, monthly benefit at retirement will be recalculated to be the greater of (i) current monthly benefit, or (ii) monthly benefit based on service at DROP entry and Final Compensation at retirement date.

Back DROP Option

Effective on July 1, 2001, a back DROP option is available for all eligible participants. The DROP account is recalculated under the option based on what the account balance would have been had the participant elected the DROP earlier than he/she actually did. The initial DROP entry date cannot be backdated prior to September 1, 1995 or prior to 20 years of credited service, and must be on the first of the month selected.

Postretirement Option Plan (PROP)

Eligibility

Retired from DROP and sworn in prior to October 9, 2004.

Benefit

The interest rate earned on PROP accounts will be the same as the interest rate credited to DROP accounts.

Partial Lump Sum Optional Payment (PLOP)

Eligibility

Participant on or after October 9, 2004.

Benefit

Up to 20% of the actuarial value of the accrued pension at retirement.

HPOPS Appendix

Summary of Plan Provisions (Continued)

Disability Retirement

Eligibility

Effective July 1, 2001, participant partially or totally disabled is eligible for Disability Retirement as defined below:

– Total: Disability is defined as “unable to perform his/her usual and customary duties as a police officer”.

– Partial: Disability is an impairment which renders the participant unable to work as a police officer and which is expected to last 12 months.

Benefit

▶ Duty-connected

Total: The service retirement benefit accrued to date of disability (or 20 years, if greater).

Partial: 35% of final compensation is payable for life or as long as the member remains incapacitated.

▶ Not duty-connected

Total or partial: The disability benefit is 2.75% of final compensation times years of service up to 20, minimum 27.5% of final compensation.

Additional Benefits

For participants sworn before October 9, 2004, education allowance equal to 100% of final compensation less disability benefit is payable for up to four years for off-duty or duty-related disability. Proportionate members injured while on-duty as a municipal worker will receive immediate off-duty benefit upon Board approval.

Survivor Benefits

Eligibility

Surviving spouses and dependent children and parents of participants, including surviving spouses of retired or disabled participants who were not married at the time of retirement or disability, provided the spouse was married to the participant for at least 5 years at the time of death.

HPOPS Appendix

Summary of Plan Provisions (Continued)

Survivor Benefits (continued)

Benefit

▶ Pre-Retirement

If duty-connected: monthly lifetime benefit equal to 100% of final compensation at date of death.

If not duty-connected: monthly lifetime benefit equal to 100% of the service retirement benefit the participant had accrued at the time of death.

▶ Post-Retirement

Spouse's benefit upon death after retirement: monthly lifetime benefit equal to actual benefit payable at time of death.

Dependent children's benefit if no surviving spouse: the benefit that would have been payable to the spouse is divided equally among the dependent children.

If there is a surviving spouse, the dependent children of Plan 1 and Plan 2 participants receive \$25 per month. Dependent children include unmarried children who are under age 18, and for Plan 3, full-time students under age 22, or permanently disabled children.

Dependent parent's income if no surviving spouse or children, but there is a dependent parent: the benefit that would have been payable to the spouse will be paid to the dependent parent.

Additional Benefits

Effective December 1, 1998, a \$5,000 lump sum is paid upon the death of an active member who was sworn in prior to October 9, 2004.

Effective July 1, 2001, an extra monthly benefit of \$150.00 is payable for life. Children receiving equivalent of the spouse's benefit do not receive this additional benefit.

HPOPS Appendix

Summary of Plan Provisions (Continued)

Benefit Adjustments

Cost-of-Living

Monthly benefits for participants receiving payments are increased each April 1 by 80% of the increase in the Consumer Price Index for All Urban Consumers (CPI-U) for the preceding year, with a minimum of 2.4% and a maximum of 8%.

13th Benefit Check

Effective November 28, 1998, a 13th benefit check is paid to current retirees and DROP members when:

- The assets on the fund equal or exceed the liabilities after the 13th benefit check is paid.
- The return on investments for the preceding fiscal year exceeds 9.25%.
- The payment of the benefit will not cause the City of Houston's contribution to the System to increase.
- Effective October 9, 2004, the funded ratio of the plan must be at least 120% for the 13th check to be paid out.

Service Adjustments

Effective November 28, 1998, participants with previous service with the City in non-classified positions may use that service to satisfy the service requirement of 20 years for retirement purposes only.

Effective July 1, 2001, participants who have service credit in more than one City of Houston Pension Plan may use their combined service to qualify for DROP participation.

Effective July 1, 2001, participants involuntarily transferred to the System from the Houston Municipal Employees System will receive service under this plan for years worked while serving as a City Marshall, Airport Police or Park Police.

HPOPS Appendix

Summary of Plan Provisions (Continued)

Contributions

Employee Contributions

– Members sworn in prior to October 9, 2004 Each participant contributions 9.00% of pay with additional 0.25% credited to the Plan’s general fund.

– Others Each participant contributes 10.25% of pay, which will be credited to the Plan’s general fund.

Refunds

Refunds of contributions are made if

- (i) The participant dies before 10 years of service and the death is not duty-connected,
- (ii) The participant dies with no eligible survivor,
- (iii) A Plan 1 or 2 participant leaves service before eligibility for retirement after completing 5 years of service, or
- (iv) A Plan 3 participant leaves service with less than 20 years of service.

Contributions are refunded without interest.

HPOPS Appendix

Actuarial Assumptions and Methods

Valuation Date	The valuation date is as of July 1 st , the first day of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.
Actuarial Cost Method	<u>The Projected Unit Credit Actuarial Cost Method</u> is used to determine the actuarial accrued liability in the calculation of the Maximum Deductible Limit and long-term funding progress. Under this method, the actuarial accrued liability is the actuarial present value of projected benefits allocated to all periods prior to the valuation year.
Funding Policy	<p>For all purposes of all forecasts, the City is assumed to contribute \$113 million for fiscal year beginning July 1, 2012 and \$123 million for fiscal year beginning July 1, 2013. In future years, the City is assumed to contribute an additional \$10 million until the prior year's actuarially determined rate is smaller.</p> <p>The actuarially determined rate is measured as the normal cost plus 30 year amortization of the unfunded actuarial liability (UAL) less the member contributions – all adjusted with interest to mid-year. The 30 year amortization of the UAL is calculated as a level percentage of payroll with payroll growing by 3.5% per year. The minimum statutory City contribution rate of 16% of payroll is ignored for purposes of this study.</p>
Actuarial Value of Assets	The preliminary actuarial value of assets equals the prior year actuarial value plus contributions less benefit payments, plus the expected return based on the long-term interest rate assumption. The final actuarial value equals the preliminary value plus 20% of the difference between the preliminary actuarial value and the market value of assets as of the valuation date.

HPOPS Appendix

Actuarial Assumptions and Methods (Continued)

Key Economic Assumptions

Investment return 8.50% per year, compounded annually, composed of an assumed 3.00% inflation rate and a 5.50% net real rate of return. This rate represents the assumed return, net of all investment and administrative expenses.

Salary increase rate A service-related component, plus a 2.50% inflation and productivity component, as follows:

Years of Service	Service-related Component	Total Annual Rate of Increase Including 2.50% Inflation & Productivity Component
(1)	(2)	(3)
1	12.00%	14.50%
2	9.00%	11.50%
3	7.25%	9.75%
4	6.00%	8.50%
5	5.50%	8.00%
6	5.00%	7.50%
7	4.25%	6.75%
8	4.00%	6.50%
9	3.50%	6.00%
10	3.25%	5.75%
11	3.00%	5.50%
12	2.75%	5.25%
13	2.50%	5.00%
14	2.25%	4.75%
15	2.00%	4.50%
16	1.75%	4.25%
17	1.50%	4.00%
18 and Over	0.00%	2.50%

HPOPS Appendix

Actuarial Assumptions and Methods (Continued)

COLA 2.80% COLA is assumed for future years.

Payroll growth rate In the amortization of the unfunded actuarial accrued liability, payroll is assumed to increase 3.50% per year. This increase rate is solely due to the effect of inflation on salaries, with no allowance for future membership growth.

Demographic Assumptions

Retirement Rates

Age	Service	
	<25	25+
40-49	3.0%	6.0%
50-54	5.0%	10.0%
55-59	12.0%	24.0%
60-64	15.0%	30.0%
65 +	100.0%	100.0%

DROP Participation 100% of eligible active participants are assumed to elect the DROP.

DROP Entry Date Active members (not already in DROP) are assumed to take advantage of the DROP and enter when first eligible. Participants are assumed to elect the maximum duration for the back DROP, up to 20 years.

DROP Interest Credit 7.00% per year

DROP Payout It is assumed Active members with DROP balances will take their DROP balance immediately at retirement. Inactive members currently retired with DROP balances are assumed to take 8 equal annual installments from the valuation date.

HPOPS Appendix

Actuarial Assumptions and Methods (Continued)

Mortality rates
(for active and retired members)

- Healthy males – Based on the 1994 Group Annuity Mortality Table for males. Multiplied by 75% for Active members
- Healthy females - Based on the 1994 Group Annuity Mortality Table for females. Multiplied by 75% for Active members
- Disabled males and females – 1987 Commissioners Group Disabled Mortality Table.

Sample rates are shown below:

Age	Healthy Active Males	Healthy Active Female	Healthy Retired Males	Healthy Retired Females	Disabled Males	Disabled Females
(1)	(2)	(3)	(2)	(3)	(4)	(5)
25	0.05%	0.02%	0.07%	0.03%	2.82%	2.82%
30	0.06%	0.03%	0.08%	0.04%	2.82%	2.82%
35	0.06%	0.04%	0.09%	0.05%	2.82%	2.82%
40	0.08%	0.05%	0.11%	0.07%	2.82%	2.82%
45	0.12%	0.07%	0.16%	0.10%	2.82%	2.82%
50	0.19%	0.11%	0.26%	0.14%	2.82%	2.82%
55	0.33%	0.17%	0.44%	0.23%	2.82%	2.82%
60	0.60%	0.33%	0.80%	0.44%	3.14%	3.14%
65	1.09%	0.65%	1.45%	0.86%	3.98%	3.98%
70	1.78%	1.03%	2.37%	1.37%	5.71%	5.71%
75	2.79%	1.70%	3.72%	2.27%	8.19%	8.19%
80	4.65%	2.95%	6.20%	3.94%	11.84%	11.84%

HPOPS Appendix

Actuarial Assumptions and Methods (Continued)

Termination Rates and Disability Rates

Termination rates (for causes other than death, disability or retirement): Termination rates are a function of the member's service.

Termination rates are not applied after a member becomes eligible for a retirement benefit, and disability rates are not applied for members in the DROP. Rates at selected ages and service levels are shown below.

Service Based Rates of Termination		
Service	Male	Female
1	2.46%	2.46%
3	2.22%	2.22%
5	1.98%	1.98%
7	1.74%	1.74%
9	1.50%	1.50%
11	1.26%	1.26%
13	1.02%	1.02%
15	0.78%	0.78%
17	0.54%	0.54%
19	0.30%	0.30%
20 +	0.25%	0.25%

Age Based Rates of Disability		
Age	Male	Female
20	0.1622%	0.1893%
25	0.1616%	0.1886%
30	0.1690%	0.1971%
35	0.1865%	0.2176%
40	0.2141%	0.2498%
45	0.2520%	0.2940%
50	0.3001%	0.3501%
55	0.3583%	0.4180%
60	0.4268%	0.4980%

Benefits Not Valued

The proportional retirement program between the Houston municipal, police and fire pension funds which allows for combining service credit from two or more City of Houston pension plans was not valued because its impact is expected not to be material.

Both the Service Retirement member received prior to October 9, 2004 and the Pre-2001 monthly DROP benefit recalculation were assumed to be immaterial.

No reserve for the disability education allowance was measured.

HPOPS Appendix

Actuarial Assumptions and Methods (Continued)

Percent married	90% of employees are assumed to be married. (No beneficiaries other than the spouse assumed.)
Age difference	Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.
Percent electing annuity on death (when eligible)	All of the spouses of vested, married participants are assumed to elect an annuity.
Probability of Recovery	There will be no recoveries once disabled.
Remarriage Assumption	No surviving spouse will remarry.
Assumed age for commencement of deferred benefits:	Members electing to receive deferred benefits are assumed to commence payment at the first age at which unreduced benefits are available.
Administrative expenses	The assumed investment return rate represents the anticipated net return after payment of all investment and administrative expenses.
Pay increase timing	Beginning of (fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
Decrement timing	Decrements are assumed to occur mid-year.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Benefit Service	All members are assumed to accrue one year of service each year. Exact fractional service is used to determine the amount of benefit payable.

HMEPS Appendix

Active Data

July 1, 2012	HMEPS Valuation	RHI Duplication	Difference	Percentage
Group A Active Members				
• Number	7,167	7,167	0	0.0%
• Average Age	48.9	48.8	-0.1	-0.2%
• Average Service	12.4	12.4	0.0	0.0%
• Average Prior Year Actual Pay	\$48,051	\$48,051	\$0	0.0%
• Total Valuation Compensation	\$344,381,517	\$344,384,309	\$2,792	0.0%
Group B Active Members				
• Number	1,759	1,759	0	0.0%
• Average Age	51.2	51.1	-0.1	-0.2%
• Average Service	18.8	18.7	-0.1	-0.5%
• Average Prior Year Actual Pay	\$43,681	\$43,681	\$0	0.0%
• Total Valuation Compensation	\$76,834,879	\$76,835,414	\$535	0.0%
Group D Active Members				
• Number	2,744	2,744	0	0.0%
• Average Age	38.8	38.8	0.0	0.0%
• Average Service	2.6	2.6	0.0	0.0%
• Average Prior Year Actual Pay	\$41,244	\$41,262	\$18	0.0%
• Total Valuation Compensation	\$113,173,536	\$113,222,836	\$49,300	0.0%
Total Active Members				
• Number	11,670	11,670	0	0.0%
• Average Age	46.8	46.8	0.0	0.0%
• Average Service	11.1	11	-0.1	-0.9%
• Average Prior Year Actual Pay	\$45,792	\$45,796	\$4	0.0%
• Total Valuation Compensation	\$534,392,640	\$534,442,559	\$49,919	0.0%

HMEPS Appendix

Inactive Data

July 1, 2012	HMEPS Valuation	RHI Duplication
Retired Members		
• Number	7,031	7,031
• Average Age	68.0	68.0
• Average Annual Benefit	\$23,116	\$23,116
Beneficiaries in Pay Status		
• Number	1,656	1,656
• Average Age	69.5	69.5
• Average Annual Benefit	\$12,786	\$12,786
Disabled Members		
• Number	391	391
• Average Age	64.0	64.0
• Average Annual Benefit	\$9,755	\$9,755
Deferred Vested Members		
• Number	3,237	3,237
• Average Age	n/a	56.5
• Average Annual Benefit	\$6,769	\$6,769

HMEPS Appendix

Summary of Provisions

Covered Members

Any person who is a participant of Group A under the original act continues to participate.

Persons who became employees of the City of Houston after September 1, 1981 and prior to September 1, 1999, and elected officials of the City of Houston who assumed office after September 1, 1981 and prior to September 1, 1999, participate in Group B, but may make an irrevocable election to participate in Group A instead.

Persons who become employees of the City and persons who are elected as City officials after September 1, 1999 and prior to January 1, 2008 become members of Group A. Certain persons who were or became a Director of a City Department, Chief Financial Executive, or Executive Director of HMEPS on or after September 1, 1999 and prior to January 1, 2005 participate in Group C. Effective January 1, 2005, all Group C participation ceased and all Group C participants became Group A participants. Accruals earned by Group C participants prior to January 1, 2005 are retained, but all future accruals are based on the Group A formulas.

All future references to Group C participants in this appendix are intended to reflect this change in the Group C status.

Covered employees newly hired on or after January 1, 2008 will be members of Group D.

A former employee who is rehired on or after January 1, 2008 is a member of the group in which such employee participated at the time of his/her immediately preceding separation from service.

HMEPS Appendix

Summary of Provisions (Continued)

Monthly Final Average Salary (FAS)

The sum of the seventy-eight highest biweekly salaries paid to a member during his period of credited service, divided by thirty-six. Salary includes base pay, longevity pay, and any shift differential pay.

Credited Service

All services and work performed by an employee, including prior service. For members of Group A and former Group C, all services and work performed after September 1, 1943 must have been accompanied by corresponding contributions to HMEPS by the employee or legally authorized repayments must have been made.

Credited service for former participants in Group C means the number of years of eligible service after the executive official's effective date of participation in Group C. A former Group C member receives two times the number of actual years of credited service in Group C solely for the purpose of fulfilling the eligibility requirements in Group C.

Normal Retirement

Eligibility

Prior to January 1, 2005 (with 68 points as of January 1, 2005):

The earliest of:

1. age 62 and 5 years of Credited Service
2. 5 years of Credited Service, and age plus years of Credited Service equal 70 or more
3. age 65 (Group C only)

On or after January 1, 2005 (less than 68 points as of January 1, 2005):

The earliest of:

1. age 62 and 5 years of Credited Service
2. 5 years of Credited Service, and age plus years of Credited Service equal 75 or more with minimum age 50

HMEPS Appendix

Summary of Provisions (Continued)

Normal Retirement (continued)

For employees newly hired on or after January 1, 2008 (Group D):

Age 62 and 5 years of Credited Service

Benefit

Prior to January 1, 2005:

Group A: 3.25% of FAS for each of the first 10 years of Credited Service plus 3.50% for Credited Service greater than 10 years but less than 20 years plus 4.25% for FAS for each year of Credited Service greater than 20 years (excludes current DROP participants). Maximum benefit is 90% of FAS for all future retirees.

Group B: 1.75% of FAS for each of the first 10 years of Credited Service plus 2.00% of FAS for each year of Credited Service from 10 through 20, and 2.75% of FAS for each year of Credited Service over 20. Maximum benefit is 90% of FAS for all future retirees.

Group C: Double the rate for Group A

All accruals after January 1, 2005:

All accruals under the prior multipliers were frozen as of January 1, 2005 and the following benefit multipliers apply to service after that date:

Group A: 2.50% of FAS for each of the first 20 years of Credited Service plus 3.25% of FAS for each year of Credited Service greater than 20 years. Maximum benefit is 90% of FAS for all future retirees.

Group B: 1.75% of FAS for each of the first 10 years of Credited Service plus 2.00% of FAS for each year of Credited Service from 10 through 20, and 2.50% of FAS for each year of Credited Service over 20. Maximum benefit is 90% of FAS for all future retirees.

Group D: 1.80% of FAS for each of the first 25 years of Credited Service, and 1.00% of FAS for each year of Credited Service over 25. Maximum benefit is 90% of FAS for all future retirees.

HMEPS Appendix

Summary of Provisions (Continued)

Vested Pension

Eligibility 5 years of Credited Service.

Benefit

Group A and Group C: Either the accrued normal retirement benefit with payments beginning at the normal retirement eligibility date or a refund of employee contributions, if any, without interest.

Group B and Group D: Accrued normal retirement benefit payable at the normal retirement eligibility date.

If the actuarial present value of a pension is less than \$20,000, a terminated participant who is not eligible to begin receiving a pension may request an early lump sum distribution of the pension. Such early lump sum distribution is irrevocable. Credited Service associated therewith can be reinstated after reemployment and pursuant to the rules of the plan.

Withdrawal Benefit

If a non-vested member withdraws from service with less than 5 years, a refund of the member's contributions is made without interest, upon request.

Service-Connected Disability Retirement

Eligibility Any age

Benefit

Group A: Accrued normal retirement benefit, but not less than 20% of final monthly salary at time of disability plus 1% of final monthly salary per year of Credited Service, to a maximum of 40% of final monthly salary.

Group B and Group D: Accrued normal retirement benefit, but not less than 20% of final monthly salary at time of disability.

HMEPS Appendix

Summary of Provisions (Continued)

Non-service-Connected Disability Retirement

Eligibility	5 years of Credited Service.
Benefit	Accrued normal retirement benefit payable immediately.

Service-connected Pre-retirement Survivor Benefits

Eligibility	Any age or Credited Service
Benefit	If there is a surviving spouse, 100% of FAS payable to the spouse. 10% of FAS is payable to each qualifying dependent to a maximum of 20% for all dependents. Surviving spouse's benefit will be reduced by the amount of dependent benefits. If no surviving spouse, dependent benefits are 50% of the amount a surviving spouse would have received for each dependent to a maximum of 100% for all dependents in the aggregate.

Non service-connected Pre-retirement Survivor Benefits

Eligibility	5 years of Credited Service
Benefit	<u>Benefits for survivorship and terminated vested Group D members after January 1, 2008:</u> If there is a surviving spouse, 50% of accrued normal retirement benefit is payable to the spouse plus 10% of accrued normal retirement benefit to each qualifying dependent to a maximum of 20% for all dependents. If there is no surviving spouse, dependent benefits are doubled.

HMEPS Appendix

Summary of Provisions (Continued)

Non-service-connected Pre-retirement Survivor Benefits (continued)

For all other Groups on or after August 1, 2001:

If there is a surviving spouse, 100% of accrued normal retirement benefit payable to the spouse and 10% of accrued normal retirement benefit to each qualifying dependent to a maximum of 20% for all dependents in the aggregate. The surviving spouse's benefit will be reduced by dependent benefits, if any. If there is no surviving spouse, each dependent will receive 50% of the benefit a surviving spouse would have received subject to a maximum of 100% of a surviving spouse's benefit for all dependents in the aggregate.

Postretirement Survivor Benefits

All Groups except

Option-Eligible Participants:

If there is a surviving spouse, 100% of the retirement benefit the deceased retiree was receiving at the time of death payable to the spouse and 10% of that retirement benefit payable to each qualifying dependent to a maximum of 20% for all dependents. The surviving spouse's benefit will be reduced by dependent benefits, if any. If there is no surviving spouse, each dependent will receive 50% of the benefit a surviving spouse would have received subject to 100% of a surviving spouse's benefit for all dependents in the aggregate.

Option-Eligible Participants:

Life only to the retiree. Option-Eligible Participants may elect other options based on actuarial factors.

All Group D members, Group A & B members who terminate after June 30, 2011 eligible for a normal retirement benefits and who are not married at their termination of service, and Group B members who terminated prior to September 1, 1977 and who are eligible for a normal retirement benefit are Option-Eligible Participants.

HMEPS Appendix

Summary of Provisions (Continued)

Benefit Adjustments

Before January 1, 2005:

Each year, effective February 1, monthly benefits will be increased 4.0%, not compounded, for all retirees and survivors whose benefit was effective on or before January 1 of the current year.

On or after January 1, 2005:

Each year, effective February 1, monthly benefits will be increased 3.0%, not compounded, for all retirees and survivors. This will affect all members currently in payment status and members who enter payment status in the future. For members hired on or after January 1, 2005 future increases will be 2.0%, not compounded. However, pre-2005 retirees who are rehired will receive a 3% COLA on their subsequent benefit instead.

Group D Members:

None assumed. Group D members may elect an actuarially equivalent optional form of payment with a COLA feature.

Contribution Rates

Members

5% of salary only for Group A members. None for Group B or Group D members.

City

As negotiated in the meet and confer agreement, the city contributions will be equal to 21.36% of payroll for FY2012 increasing by the lesser of 2% of payroll or the Actuarially Determined Rate.

HMEPS Appendix

Summary of Provisions (Continued)

Deferred Retirement Option Plan (DROP)

Eligibility	Participants (other than Group D) who are eligible to retire but who have not retired and who remain in service with the City may participate in the DROP.
Monthly DROP Credit	An amount equal to the accrued normal retirement benefit as of the effective date of DROP participation. The Monthly DROP Credit is credited to a notional account (DROP Account) on the last calendar day each month.
DROP Credits-Interest	Interest is credited to the DROP Account at the beginning of each day based on the DROP Account balance at the end of the previous day and posted monthly on the last calendar day of each month. Effective January 1, 2005, the annual interest rate effective beginning January 1 each year is half of HMEPS' investment return percentage for the prior fiscal year, not less than 2.5% and not greater than 7.5%.
DROP Credits-COLA	<p>On or after January 1, 2005:</p> <p>The Monthly DROP Credit for participants who entered the DROP effective on or before January 1 of the then current year will be increased effective February 1 each year by 3.0%, not compounded.</p> <p>The Monthly DROP Credit for participants who were first hired on or after January 1, 2005 who entered the DROP effective on or before January 1 of the then current year will be increased effective February 1 each year by 2.0%, not compounded.</p>
DROP Account Balance	The sum of a participant's Monthly DROP (DROP Benefit) Credits, Monthly DROP Credit Adjustments, applicable interest, and employee contributions as applicable.

HMEPS Appendix

Summary of Provisions (Continued)

DROP Benefit Pay-out

A terminated DROP participant may elect to:

- a. Receive the entire DROP Account Balance in a lump sum.
- b. Receive the DROP Account Balance in periodic payments as approved by the Pension Board.
- c. Receive a portion of the DROP Account balance in a lump sum and the remainder in periodic payments as approved by the Pension Board.
- d. Receive a partial payment of not less than \$1,000, no more than once each six months.
- e. Defer election of a payout option until a future date.

Post DROP Retirement

The Final Pension is the accrued normal retirement benefit as of the effective date of DROP participation, increased with COLAs since DROP entry.

HMEPS Appendix

Actuarial Assumptions and Methods

Valuation Date	<p>The valuation date is July 1st of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.</p>
Actuarial Cost Method	<p>A modified version of the Entry Age Normal (EAN) Actuarial Cost Method commonly referred to as “replacement life EAN” was used. Under this approach, a calculation is made to determine the constant percentage of payroll which, if applied to the compensation of each new participant during the entire period of his/her anticipated covered service, would be required to meet the cost of all benefits payable on his behalf based on the benefit provisions for new employees hired on or after January 1, 2008.</p> <p>The Actuarial Liability (AL) is determined by subtracting the present value of future normal costs (PVFNC) and the present value of future member contributions from the present value of the projected benefit (PVB). For this purpose, the PVB is calculated based on the plan provisions applicable to each member rather than those applicable to post 2007 hires, but the PVFNC is determined based on the provisions applicable to the post 2007 hires.</p>
Actuarial Value of Assets	<p>The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (less than) expected investment income on an aggregate basis. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of administrative and investment expenses.</p>

HMEPS Appendix

Actuarial Assumptions and Methods (Continued)

Funding Policy

For all purposes of all forecasts, the City is assumed to contribute 21.36% of member payroll for fiscal year beginning July 1, 2012. In future years, the City is assumed to increase its contribution rate by the lesser of 2% of payroll or the prior year's actuarially determined rate.

The actuarially determined rate is measured as the normal cost plus an open 30 year amortization of the unfunded actuarial liability (UAL) – all adjusted with interest to mid-year. The 30 year amortization of the UAL is calculated as a level percentage of payroll assuming 3% per year growth in payroll until the actuarially determined rate is met. In subsequent years, the amortization period will be a closed 29 year period. No minimum statutory City contribution rate is applied for purposes of this study.

Economic Assumptions

Investment return

8.50% per year, compounded annually, composed of an assumed 3.00% inflation rate and a 5.50% net real rate of return. This rate represents the assumed return, net of all investment and administrative expenses.

HMEPS Appendix

Actuarial Assumptions and Methods (Continued)

Economic Assumptions (continued)

Salary increase rate

A service-related component, plus a 3.00% inflation component, plus a 0.0% general increase, as follows:

Years of Service	Service-related Component	Total Annual Rate of Increase
1	3.00%	6.00%
2	2.75%	5.75%
3	2.50%	5.50%
4	2.00%	5.00%
5-6	1.75%	4.75%
7	1.50%	4.50%
8-9	1.25%	4.25%
10-14	1.00%	4.00%
15-19	0.75%	3.75%
20-24	0.50%	3.50%
25+	0.00%	3.00%

Payroll growth rate

In the amortization of the unfunded actuarial accrued liability, payroll is assumed to increase 3.00% per year. This increase rate is solely due to the effect of inflation on salaries, with no allowance for future membership growth.

HMEPS Appendix

Actuarial Assumptions and Methods (Continued)

Demographic Assumptions

Retirement Rates

Expected Retirements per 100 Lives				
	Group A & B Members		Group D Members	
Age	Males	Females	Males	Female
45-49	15	12	0	0
50-54	12	12	3	3
55	12	12	4	4
56	12	12	5	5
57	12	12	6	6
58	12	12	7	7
59	12	12	8	8
60	14	14	10	10
61	16	16	13	13
62	25	20	35	35
63	25	18	25	18
64	18	20	18	20
65	20	20	20	20
66-69	20	19	20	19
70-74	20	19	20	19
75+	100	100	100	100

DROP Participation

90% of eligible members are assumed to enter DROP at first eligibility. 10% of DROP eligible members are assumed to never elect DROP.

DROP Entry Date

Active members are assumed to take advantage of the DROP and enter when first eligible.

DROP Interest Credit

4.25% per year for past and future years of DROP participation.

HMEPS Appendix

Actuarial Assumptions and Methods (Continued)

DROP Payout

It is assumed Active members with DROP balances will take their DROP balance immediately at retirement. Inactive members currently retired with DROP balances are assumed to take 8 equal annual installments from the valuation date.

**Mortality rates
(for active and retired members)**

- Healthy males – Based on the Retired Pensioners 2000 Mortality Table (combined) for males. Rates are scaled by 110%.
- Healthy females - Based on the Retired Pensioners 2000 Mortality Table (combined) for females. Rates are scaled by 95%.
- Disabled males and females – 1965 Railroad Retirement Board Disabled Life Table. Rates are set-back two years for males and eight years for females.

Sample rates are shown below:

Expected Death per 100 Lives				
Age	Healthy Males	Healthy Females	Disabled Males	Disabled Females
25	0.04	0.02	4.41	4.41
30	0.05	0.03	4.41	4.41
35	0.09	0.05	4.41	4.41
40	0.12	0.07	4.41	4.41
45	0.17	0.11	4.42	4.41
50	0.24	0.16	4.48	4.42
55	0.40	0.26	4.67	4.46
60	0.74	0.48	5.09	4.62
65	1.40	0.92	5.76	4.98
70	2.44	1.59	6.84	5.60
75	4.16	2.67	8.62	6.58
80	7.08	4.36	11.40	8.21

For pre-retirement mortality, 90% of the rates shown above are assumed to be for non-service related deaths and 10% for service related deaths.

HMEPS Appendix

Actuarial Assumptions and Methods (Continued)

Termination Rates and Disability Rates

Termination rates are a function of the member's age and service. Termination rates are not applied after a member becomes eligible for a retirement benefit. Rates at selected ages are shown below.

Probability of Decrement Due to Withdrawal – Male Members											
Years of Service											
Age	0	1	2	3	4	5	6	7	8	9	10+
20	0.3244	0.2682	0.2300	0.2060	0.1926	0.1824	0.1617	0.1507	0.1400	0.1278	0.1639
30	0.2585	0.2146	0.1808	0.1563	0.1396	0.1275	0.1143	0.1057	0.0985	0.0919	0.0946
40	0.2003	0.1645	0.1351	0.1124	0.0954	0.0832	0.0750	0.0683	0.0634	0.0603	0.0427
50	0.1559	0.1258	0.1013	0.0824	0.0681	0.0577	0.0510	0.0454	0.0411	0.0383	0.0206
60	0.1341	0.1083	0.0887	0.0740	0.0634	0.0557	0.0469	0.0407	0.0344	0.0277	0.0199

Probability of Decrement Due to Withdrawal – Female Members											
Years of Service											
Age	0	1	2	3	4	5	6	7	8	9	10+
20	0.2811	0.2574	0.2344	0.2123	0.1912	0.1711	0.1506	0.1282	0.1040	0.0784	0.1385
30	0.2155	0.1943	0.1736	0.1539	0.1356	0.1188	0.1032	0.0879	0.0730	0.0585	0.0795
40	0.1688	0.1460	0.1250	0.1063	0.0903	0.0770	0.0664	0.0581	0.0517	0.0472	0.0367
50	0.1510	0.1223	0.0984	0.0791	0.0645	0.0544	0.0481	0.0452	0.0453	0.0481	0.0339
60	0.1794	0.1373	0.1049	0.0812	0.0653	0.0570	0.0540	0.0552	0.0601	0.0682	0.0339

Base Rates of Disability – Reduced to zero at retirement eligibility		
Age	Males	Females
20	.00000	.00001
25	.00006	.00002
30	.00050	.00008
35	.00219	.00013
40	.00448	.00029
45	.00868	.00066
50	.01514	.00157
55	.02187	.00253
60	.02888	.00304

Rates of decrement due to Ordinary Disabilities are assumed to be 120% of the base rates shown above. Rates of decrement due to Service Related Disabilities are assumed to be 10% of the base rates shown above.

HMEPS Appendix

Actuarial Assumptions and Methods (Continued)

Benefits Not Valued

The proportional retirement program between the Houston municipal, police and fire pension funds which allows for combining service credit from two or more City of Houston pension plans was not valued because its impact is expected not to be material.

Due to data limitations, the Group C provisions were not measured.

Other Assumptions

Percent married

70% of employees are assumed to be married. (No beneficiaries other than the spouse assumed.)

Age difference

Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.

Percent electing annuity on death (when eligible)

All of the spouses of vested, married participants are assumed to elect an annuity.

Percent electing deferred termination benefit

Vested terminating members are assumed to elect a refund or a deferred benefit, whichever is more valuable at the time of termination.

Probability of Recovery

There will be no recoveries once disabled.

Remarriage Assumption

No surviving spouse will remarry and there will be no children's benefit.

Assumed age for commencement of deferred benefits:

Members electing to receive a deferred benefit are assumed to commence receipt at the first age at which unreduced benefits are available.

Administrative expenses

The assumed investment return rate represents the anticipated net return after payment of all investment and administrative expenses.

Decrement timing

Decrements are assumed to occur mid-year.

Eligibility testing

Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date of assumed decrement occurs.

HMEPS Appendix

Actuarial Assumptions and Methods (Continued)

Benefit Service	All members are assumed to accrue one year of service each year. Exact fractional service is used to determine the amount of benefit payable.
Participant Data	<p>Participant data was based on the age\service grids shown in the HMEPS valuation report.</p> <p>All healthy and disabled retirees are assumed to have 100% joint and survivor, prorated by the 70% marriage assumption and reflecting the 3 year spousal age differential. All beneficiaries are assumed to have life only benefits.</p>
Group Transfers	We assume no current Group B members will transfer to Group A.