WASHINGTON SUBURBAN SANITARY COMMISSION
EMPLOYEES' RETIREMENT PLAN

ACTUARIAL VALUATION
AS OF
JUNE 30, 2018

∫bcg BOOMERSHINE CONSULTING GROUP, L.L.C.
ACTUARIAL & RETIREMENT PLAN SOLUTIONS

April 2019

CONTENTS

EXECUTIVE SUMMARY

This report contains the results of an actuarial valuation of the Washington Suburban Sanitary Commission Employees' Retirement Plan (the Plan) as of June 30, 2018. The contents of this report reflect generally accepted actuarial principles.

This study relies on the following information supplied by the Washington Suburban Sanitary Commission (WSSC, the Commission): data on plan participants, plan provisions, the amount of contributions, and a reconciliation of the plan's assets from the prior year.

Boomershine Consulting Group did not audit the participant data or financial information used in this report. Based on our review of this information, we believe that it is sufficiently complete and reliable, and that it is appropriate for the purposes intended.

It is our understanding that the Commission maintains a budget of 16.9% of covered payroll for cash contributions to the Plan. This rate continues to be adequate to finance benefits of the Plan and lead to improved funding. The funding ratio is now 83.8% (84.4% based on the market value of assets), and is expected to improve going forward, given continued contributions at the fixed rate, as shown in Section 3.2.

Section 1 herein contains the results of the valuation, including evaluation of the fixed contribution rate, per the Actuarial Funding Policy.

Plan experience since the prior valuation includes the following:

Favorable

- *Cost-of-Living Adjustments–Open Plan*. Benefits increased 2.11% for non-active participants in the open group. This is less than the assumed 2.50% cost-of-living increase for the open group.
- *Mortality.* There were 60 deaths among retirees including disabled retirees and beneficiaries, for the plan year, compared to 55 expected. There were 20 new beneficiaries associated with these deaths.
- *Retirements.* The number of active participants who retired during the plan year totaled 66, compared to the expected 67 retirements.
- *Investment Return* On a market-value basis, the Plan's return was 8.79% for the Plan year ended June 30, 2018. The smoothed value basis return was 7.89%. Each of them is favorable compared to the assumed rate of 7.00% per year.

The actuarial gains from all of the items listed above caused decreases in the actuarial cost and liability of the Plan.

Unfavorable

- *Cost –of-Living Adjustments – Closed Plan.* Benefits increased 3.53% for non-active participants in the closed group. This is more than the assumed 2.50% cost-of-living increase for the closed group.
- *Employee Turnover.* The number of active participants who terminated during the plan year for reasons other than retirement, disability, death or leave of absence, was 49, which is less than the expected 60 terminations.

- *New Entrants.* The number of active participants increased by 2.18% from 1,609 as of June 30, 2017 to 1,644 as of June 30, 2018.

- *Compensation.* This year's salary for continuing actives increased by 6.53% over the prior valuation, which is higher than assumed, based on a 26 pay period year. Note that the projected salary provided by WSSC for 2018 is based on 27 pay periods during the calendar year. In order to determine Plan liabilities and costs, we have adjusted the projected salary to reflect the more typical 26 pay periods for a calendar year.

The experience losses from above caused increases in the actuarial cost and liability of the Plan.

The net impact of the experience gains and losses for the prior Plan year is a slight decrease in actuarial cost as a percent of payroll.

As shown in Section 1.3, the basis for actuarial cost has been updated to reflect a more sound and conservative 20-year amortization. Previously, 30 years was used.

Section 2 describes the basis of the valuation. That section summarizes the plan provisions, as well as the actuarial assumptions and methods used to develop the figures herein.

To the best of our knowledge, the information contained in this actuarial valuation report as of June 30, 2018 is complete and accurate. The undersigned are available to provide further information and answer any questions with respect to this report. The first two undersigned are members of the American Academy of Actuaries, and meet the qualification standards required to render the actuarial opinions presented herein.

David S. Boomershine, EA, MAAA, FCA, MSPA
Senior Actuary and President

Gregory M. Stump, FSA, EA, MAAA, FCA
Chief Actuary

Darlene A. Morgan, CEBS

SECTION 1: SUMMARY OF VALUATION RESULTS

1.1: Plan Assets

An adjusted market value of assets, or Actuarial Value of Assets (AVA), is used for the valuation to gradually recognize investment gains and losses. This method reflects five-year smoothing, such that 20% of each gain or loss is recognized per year until the entire amount has been recognized.

To ensure that the adjusted market value of assets remains reasonably close to the market value, a corridor is applied that requires the adjusted market value of assets be no less than 80% and no more than 120% of the market value.

Historical Values

The following table shows the most recent five years of market values as well as smoothed asset values, and the accompanying annual returns.

Year Ending	Market Value		Actuarial Value	
June 30	Value	Annual Return	Value	Annual Return
2014	$760,767,767	16.56%	$698,549,442	12.89%
2015	$774,079,199	2.33%	$743,884,530	11.50%
2016	$708,236,238	-1.11%	$752,824,819	5.79%
2017	$775,046,158	14.12%	$777,857,053	7.97%
2018	$810,937,596	8.79%	$804,356,892	7.89%
Five Year Compound Return		7.94%		9.19%

As expected, some years the Adjusted Value is greater than the Market Value, and some years it is less. Therefore, the smoothing method has had the intended effect.

Included in the remainder of this section are: the reconciliation of the market value of assets from June 30, 2017 to June 30, 2018; development of the actuarial value of assets; a comparative summary of assets; and summary of historical returns and experience.

Earnings Experience for Fund on Plan Year Basis

Plan Year Ending

	6/30/2015	**6/30/2016**	**6/30/2017**	**6/30/2018**
Market Basis				
Net Investment Income*	$ 11,652,408	$ 9,862,883	$ 9,786,553	$ 13,395,239
Capital Gains (Losses)	5,684,593	(17,963,152)	88,018,680	53,396,826
Total Income	$ 17,337,001	$ (8,100,269)	$ 97,805,233	$ 66,792,065
Average Mean Market Value of Assets**	$ 745,254,983	$ 731,707,853	$ 692,738,582	$ 759,595,845
Rate of Return*				
Net Investment Income	1.56%	1.35%	1.41%	1.76%
Capital Gains (Losses)	0.76%	-2.45%	12.71%	7.03%
Total Investment Return	2.33%	-1.11%	14.12%	8.79%

* Net of investment expenses
** [Beginning of Year Value + End of Year Value - Total Income] divided by 2
Note: Percentages may not sum to total due to rounding.

Annual Compounded Market Value Rate of Investment Return

	Period Ending on June 30									
Period Beginning July 1	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
2008	-22.04%	-5.63%	3.07%	2.38%	4.32%	6.26%	5.70%	4.82%	5.81%	6.11%
2009		14.23%	18.51%	12.12%	12.20%	13.05%	11.20%	9.35%	9.93%	9.81%
2010			22.96%	11.09%	11.54%	12.77%	10.60%	8.56%	9.33%	9.27%
2011				0.33%	6.23%	9.58%	7.71%	5.89%	7.23%	7.44%
2012					12.47%	14.49%	10.29%	7.32%	8.65%	8.67%
2013						16.56%	9.21%	5.66%	7.71%	7.94%
2014							2.33%	0.60%	4.92%	5.87%
2015								-1.11%	6.26%	7.09%
2016									14.12%	11.43%
2017										8.79%

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Statement of Plan Assets (Market Value Basis)

	June 30, 2018	June 30, 2017
1. Cash	$0	$0
2. Investment	810,890,562	775,363,691
3. Subtotal (1 + 2)	810,890,562	775,363,691
4. Accrued Contributions		
a. Employer	0	0
b. Employee	263,956	137,039
c. Total	263,956	137,039
5. Accrued Income	476,578	493,535
6. Total Assets (3 + 4c + 5)	811,631,096	775,994,265
7. Accrued Liabilities	(693,500)	(948,107)
8. Net Plan Assets (6 + 7)	$ 810,937,596	$ 775,046,158

Statement of Receipts and Disbursements of Plan Assets

	Year ending June 30, 2018		Year ending June 30, 2017	
Market Value as of the beginning of the year	$ 775,046,158		$ 708,236,238	
Receipts				
Contributions:				
Employer Basic Contributions	$ 24,193,212		$ 22,545,314	*
Employer (Restoration Plan)	72,995		61,216	
Employee	5,403,481		4,349,318	
Subtotal	$ 29,669,688		$ 26,955,848	
Investment Income:				
Interest and Dividends	$ 16,044,922		$ 12,402,205	
Investment Expenses	(2,649,683)		(2,615,652)	
Capital Gain (Loss)	53,396,826		88,018,680	
Net Investment Income	$ 66,792,065		$ 97,805,233	
Total Additions	$ 96,461,753		$ 124,761,081	
Disbursements and Deferrals				
Benefit Payments	$ 60,570,315	**	$ 58,015,095	
Refund of Employee Contributions	0	**	(63,934)	***
Total Disbursements	$ 60,570,315		$ 57,951,161	
Market Value as of the end of the year	$ 810,937,596		$ 775,046,158	

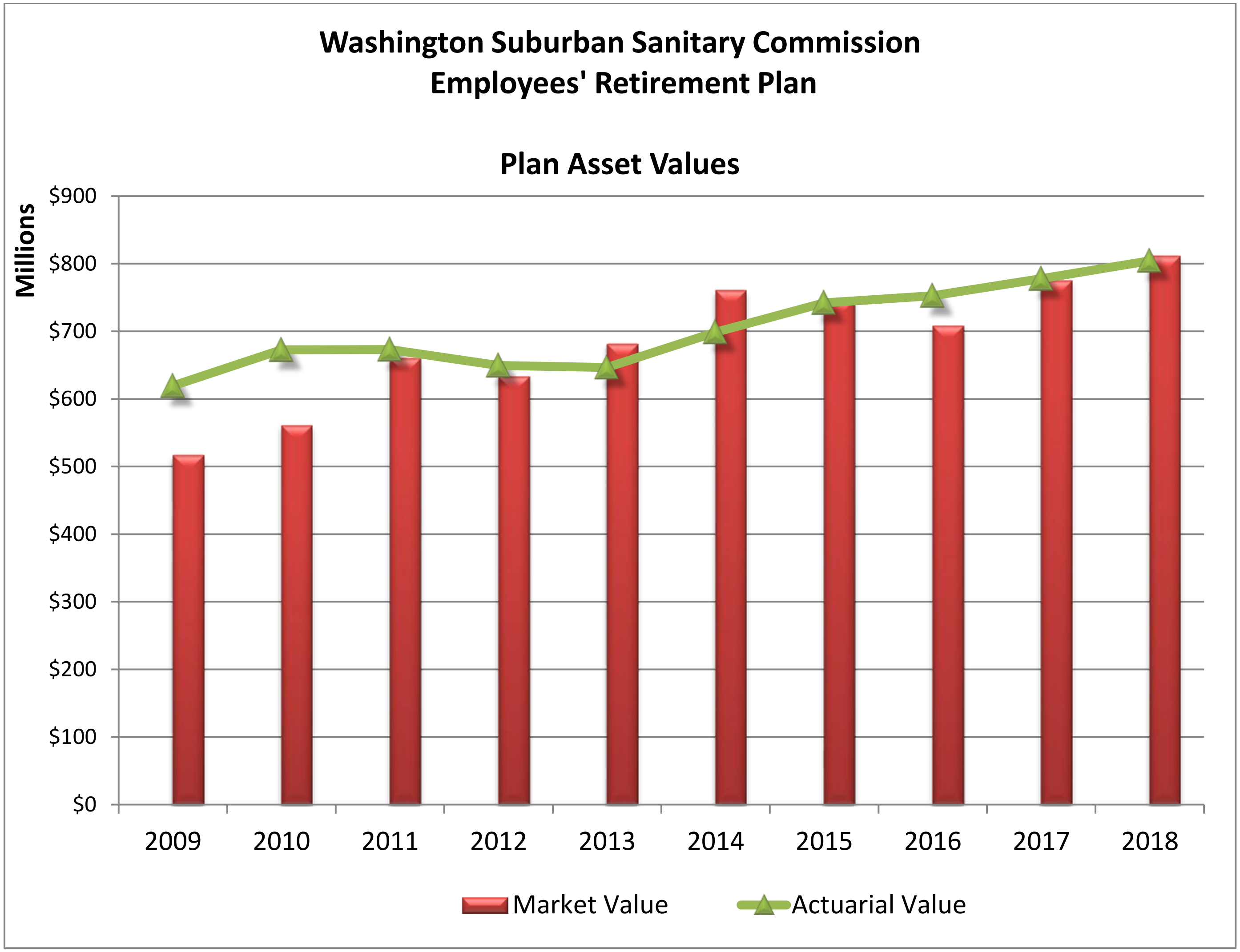
*The Employer contribution is equal to $22,606,530, less the Restoration Plan contribution of $61,216.

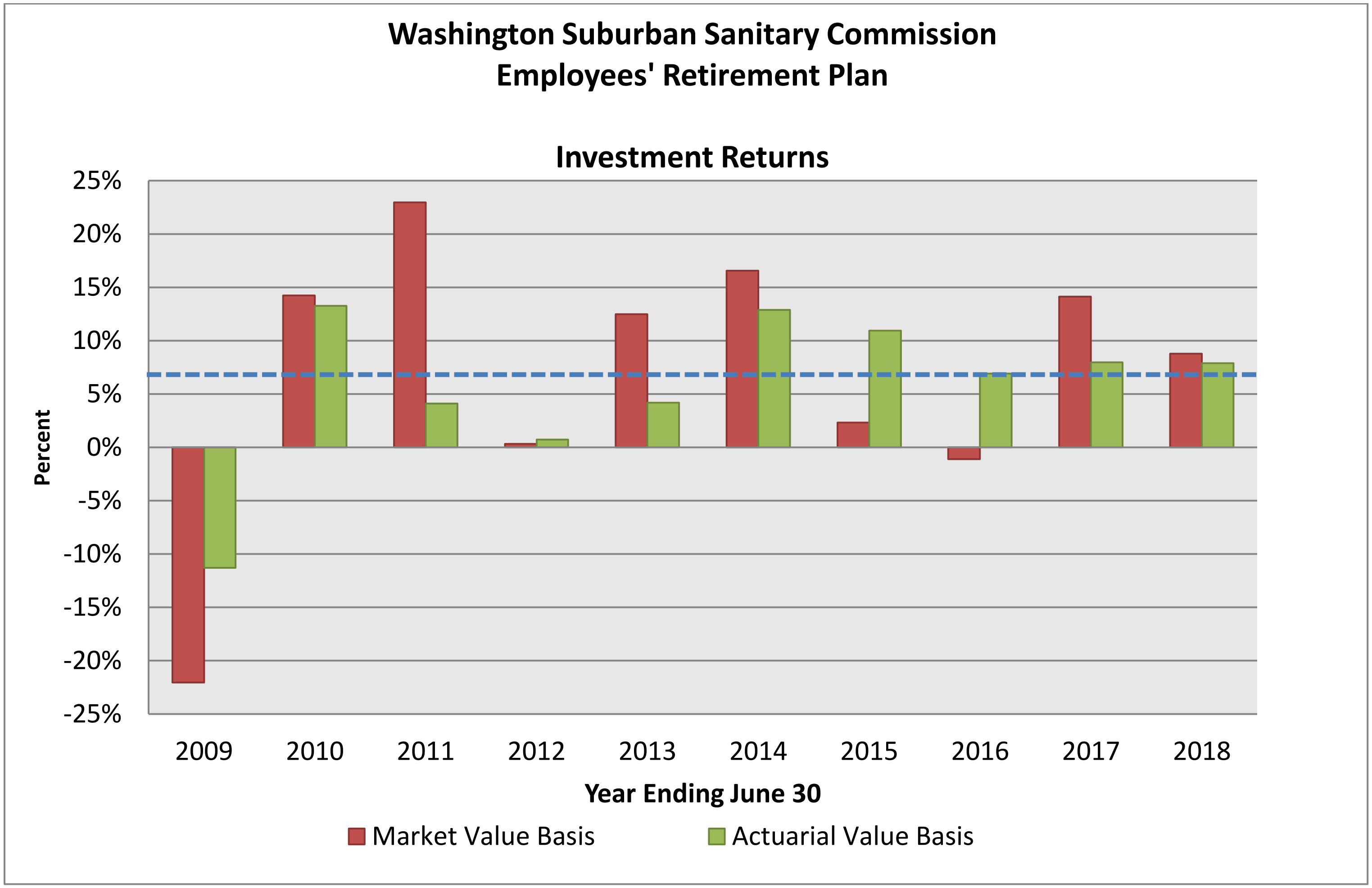
**Employee Contribution Refunds are included with Benefit Payments for the Plan Year ending June 30, 2018.
***For the Plan Year ended June 30, 2017 the Commission changed its procedure for accounting for liabilities for some terminated employees with a deferred vested benefit. Because these participants had not requested a refund, it was decided to retain their employee contributions in Plan assets rather than include them with the accrued employee contributions payable, as had been done in the past. This resulted in a negative refund of employee contributions for the Plan Year as accounting for the applicable employee contributions that had previously been part of accounts payable were moved to assets.

Development of Actuarial Value of Assets

The Actuarial Value of Assets equals the Market Value of Assets, adjusted for unrecognized gains and losses from prior years. Gains and Losses are determined by calculating the expected asset return based on Plan assumptions and subtracting the actual Plan return. Gains and losses are phased in 20% per year over a 5-year period. The Actuarial Value of Assets is adjusted, if necessary, to fall within a corridor of 80% to 120% of the Market Value of Assets on the valuation date.

	Year Ending 6/30/2018	**Year Ending 6/30/2017**
1. Market Value of Assets as of beginning of year	$775,046,158	$708,236,238
2. Total Contributions for the year	29,669,688	26,955,848
3. Total Disbursements during the year	60,750,315	57,951,161
4. Expected Return	54,021,027	49,282,929
5. Actual Return for the year	66,792,065	97,805,233
6. Investment Gain/(Loss)	12,771,038	48,522,304
7. Amount Unrecognized	10,216,830	38,817,843
8. Gains/(Losses) Unrecognized for Prior Years:		
First Prior Year	29,113,382	(36,231,119)
Second Prior Year	(24,154,080)	(17,190,855)
Third Prior Year	(8,595,428)	11,793,236
Total Unrecognized Gains/(Losses)	(3,636,126)	(41,628,738)
9. Market Value of Assets as of end of year	810,937,596	775,046,158
10. Actuarial Value of Assets as of end of year: [(9) - (7) - (8)]	804,356,892	777,857,053
11. Final Actuarial Value of Assets (AVA) with 80% - 120% Corridor Limitation Applied	$804,356,892	$777,857,053
Ratio of Actuarial Value to Market Value	99.2%	100.4%


Washington Suburban Sanitary Commission
Employees' Retirement Plan
Plan Asset Values
Millions
$900
$800
$700
$600
$500
$400
$300
$200
$100
$0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
Market Value
Actuarial Value



-------- Assumed Return (7%)

1.2: Development of Unfunded Actuarial Accrued Liability

	June 30, 2018
1. Actuarial Accrued Liability (AAL)	
a. Active Participants	
(i) Retirement (Immediate Pension)	$ 252,170,641
(ii) Vested Termination (Pension Deferred to Normal Retirement)*	(1,924,356)
(iii) Death - Spouse's Benefit*	3,910,990
(iv) Disability*	8,275,541
(v) Total Active Participants	$ 262,432,816
b. Retired and Disabled Participants Receiving Benefits	688,628,733
c. Terminated Participants with Deferred Benefits **	8,992,352
d. Refunds	
(i) Accumulated Employee Contributions Credited to Account of Terminated Participants who have not received a refund	$ 207,453
(ii) Participants on Leave of Absence or Military Leave	18,275
(iii) Total Refunds	$ 225,728
e. Total Actuarial Accrued Liability	$ 960,279,629
2. Actuarial Value of Assets	804,356,892
3. Funding Ratio (2 / 1e)	83.8%
4. Unfunded Actuarial Accrued Liability (UAAL) (1e - 2)	$155,922,737

*Including liability for refund of employee contributions for Active Participants.
**Including liability for vested Participants on Leave of Absence or Military Leave. Non-vested Participants who are on Leave of Absence or Military Leave are included with Refunds in line 1d(ii).

1.3: Actuarially Determined Contribution

1. Total Normal Cost, Entry Age Cost Method	$11,955,223
As a percentage of payroll	7.95%
2. 20-Year Amortization of Unfunded Actuarial Accrued Liability*	13,755,143
3. Expected Employee Contributions	4,526,452
4. Actuarially Determined Employer Contribution [(1) + (2) - (3)]	21,183,914
5. Expected Payroll for the Year	150,415,530
6. Net Employer Cost as a % of Payroll [(4) / (5)]	14.08%
7. Fixed Commission Contribution Rate, % of Payroll	16.90%
Equivalent Amortization Years Implied by Fixed Rate	12.4

Fixed Contribution Adequate to cover Actuarial Cost:	YES
Estimated Additional Contributions Needed:	N/A

*Updated from 30 years in prior valuation.

The calculation above is based on the Commission's current Actuarial Funding Policy for the Retirement Plan.

History of Equivalent Amortization Years

Year	Equivalent Years
2015	16.3
2016	14.2
2017	13.0
2018	12.4

The equivalent amortization period has decreased steadily since 2015, indicating strengthened funding of the Plan and continued adequacy of the fixed contribution rate.

1.4: Present Value of Plan Benefits

		June 30, 2018	June 30, 2017
Number of Plan Participants			
Active Participants		1,644	1,609
Retired and Disabled Participants Receiving Benefits		1,618	1,590
Terminated Participants with Deferred Benefits or Refunds Due		115	107
Participants on Leave of Absence or Military Leave		5	3
Total		3,382	3,309
Total Annual Earnings of Active Participants	$	151,595,466	$ 141,458,842
Total Annual Benefits of Retired and Disabled Participants		62,031,641	59,071,327
Present Value of Plan Benefits			
1. Active Participants			
a. Retirement (Immediate Pension)	$	333,886,785	$ 324,716,591
b. Vested Termination (Pension Deferred to Normal Retirement)*		8,698,491	7,753,996
c. Death - Spouse's Benefit*		5,461,786	5,302,705
d. Disability*		15,508,969	14,726,547
e. Total Actives (a + b + c + d)	$	363,556,031	$ 352,499,839
2. Retired and Disabled Participants Receiving Benefits		688,628,733	660,334,797
3. Terminated Participants with Deferred Benefits**		8,992,352	8,423,316
4. Refunds			
a. Accumulated Employee Contributions Credited to Account of Terminated Participants who have not received a refund	$	207,453	$ 199,351
b. Participants on Leave of Absence or Military Leave		18,275	39,102
c. Total Refunds (a + b)	$	225,728	$ 238,453
Total Present Value (1e + 2 + 3 + 4c)	$	1,061,402,844	$1,021,496,405

*Including liability for refund of employee contributions for Active Participants.
**Including liability for vested Participants on Leave of Absence or Military Leave. Non-vested Participants who are on a Leave of Absence or Military Leave are included with Refunds in line 4.

1.5: Present Value of Accumulated Plan Benefits

	June 30, 2018	June 30, 2017
1. Actuarial present value of vested benefits		
a. Participants currently receiving payments (retired and disabled participants and beneficiaries)	$ 688,628,733	$ 660,344,797
b. Other participants		
i. Active participants	192,593,273	193,450,776
ii. Deferred vested participants/refunds	9,218,080	8,661,769
iii. Total	201,811,353	202,112,545
c. Total (a. + b.)	$ 890,440,086	$ 862,447,342
2. Actuarial present value of non-vested benefits	15,621,044	14,296,182
3. Total actuarial present value of accumulated plan benefits (PVAB) (1.c. + 2.)	$ 906,061,130	$ 876,743,524
4. Market value of assets	810,937,596	775,046,158
5. Ratio of Assets to PVAB (4. ÷ 3.)	89.5%	88.4%

The calculation of the actuarial present value of accumulated plan benefits is based on the unit credit cost method and the actuarial assumptions shown in Section 2.3.

1.6: Change in Present Value of Accumulated Plan Benefits

1. Actuarial present value of accumulated plan benefits as of July 1, 2017	$ 876,743,524
2. Change due to plan amendment	0
3. Change due to changes in assumptions and/or methods	0
4. Change due to passage of time	59,252,086
5. Change due to benefits paid	(60,570,315)
6. Change due to benefits accumulated and actuarial experience	30,635,835
7. Actuarial present value of accumulated plan benefits as of June 30, 2018: (sum of above)	$ 906,061,130

SECTION 2: BASIS OF VALUATION

2.1: Summary of Plan Provisions

The salient features of the retirement plan are presented below.

1. Effective date	May 1, 1967. The most recent amendment was adopted January 1, 2016.
2. Closed version	Closed version means the retirement plan in effect on June 30, 1978. Membership in this version is mandatory for employees hired prior to July 1, 1978 who did not elect to transfer membership to the open version.
3. Participation	Each permanent full-time employee automatically becomes a participant on his hire date. A contract employee may be excluded by contractual agreement.
4. Gross compensation	Gross compensation is defined as total compensation paid to the employee by the Commission excluding merit bonuses, lump sum pay awards, and General Manager's awards, plus any amounts of compensation for which the employee has entered into a deferred compensation agreement and/or employer pick-up contributions. It does not include the employee's final pay period unless he receives compensation for the full pay period.
5. Final average monthly compensation	Final average monthly compensation is defined as an amount equal to the participant's gross compensation during each of the three years prior to termination which were the highest (to include 78 pay periods), divided by 36 months.
6. Credited service	Credited service means the years and fractional years (measured to the nearest month) of an employee's latest period of continuous service but excludes periods of non-military leaves of absence without pay which are not otherwise purchased. Additional "purchased" years of Commission service, military service, prior agency service and authorized leave(s) of absence are added. Credited service includes accumulated unused sick leave that counts at the rate of .000481 year's credited service for each hour of unused sick leave. For purposes of computing benefits, credited service, excluding credit for unused sick leave, is limited to a maximum of 36 years.
7. Closed version credited service	Closed version credited service means all credited service earned by an employee hired prior to July 1, 1978 until the date he transfers his membership to the open version. Also included is purchased service if the employee is a member at the time of purchase.

8. Open version credited service

Open version credited service means all credited service earned by an employee hired after June 30, 1978. Any employee hired prior to July 1, 1978 who transfers his membership to the open version shall have all credited service earned after his transfer counted as open version credited service. Also included is purchased service if the employee is a member at the time of purchase.

9. Employee contributions

- Mandatory: Each participant in the closed version is required to contribute 6% of his gross compensation with respect to each pay period. Each participant in the open version is required to contribute 3% of his gross compensation with respect to each pay period. All contributions are credited with 5% interest per annum.

10. Normal retirement

- Eligibility: A participant in the closed version is eligible to retire upon the earlier of (i) attainment of age 60 and completion of one year credited service and (ii) the completion of 30 years of credited service.

  A participant in the open version hired before March 31, 1994 is eligible to retire upon the earlier of (i) attainment of age 62 and completion of three years credited service, and (ii) the date on which he has completed at least 30 years credited service and the sum of his credited service and attained age total at least 85.

  A participant in the open version hired after March 31, 1994 is eligible to retire upon the earlier of (i) attainment of 65 and completion of five years credited service, and (ii) the date on which he has completed at least 30 years credited service and the sum of his credited service and attained age total at least 85.

- Monthly benefit amount: 2.1% x final average monthly compensation x closed version credited service plus 1.4% x final average monthly compensation x open version credited service.

11. Early retirement

- Any employee in the closed version may retire early provided he has completed 15 or more years of credited service and has attained age 45, and further provided that the sum of his age and credited service at termination total at least 65.

  Any employee in the open version may retire early provided he has completed 15 or more years of credited service and has attained age 50.

Early Retirement (continued)

Monthly benefit amount: The annual monthly benefit is determined in accordance with the normal retirement formula but using final average monthly compensation and credited service at the time of termination. This benefit is reduced to reflect early commencement. The percentage payable is as follows (provided, however, that the Open Version reductions for years 13, 14 and 15 shall be effective only with respect to Employees hired on and after January 21, 2009):

	Percentage of Benefit Payable	
Years Early	Closed Version	Open Version
1	98%	95%
2	95%	90%
3	91%	85%
4	86%	80%
5	80%	75%
6	74%	70%
7	68%	65%
8	62%	60%
9	56%	55%
10	50%	50%
11	44%	45%
12	38%	40%
13	32%	35%
14	26%	30%
15	20%	25%

If a participant defers the commencement of benefits, his benefit will be adjusted by any cost-of-living increases made effective during the deferral period.

12. Temporary supplemental benefit

- Any participant in the Open Version whose benefit commencement date is prior to age 62 shall receive a benefit equal to 0.6% of his final average monthly compensation at termination multiplied by his Open Version credited service at termination, reduced to reflect early commencement, if applicable. The percentage of benefit payable is determined in accordance with the percentages in the previous table. The benefit is payable through the month in which he attains age 62 or dies, if earlier.

13. Disability retirement

- Eligibility: A participant is eligible for a disability benefit if he has one year of credited service and is found by the Social Security Administration to be disabled under its criteria for a period of at least 24 months.

Disability Retirement

- Monthly benefit amount: The disability benefit is determined

(continued)

under the normal retirement formula using credited service and final average monthly compensation at the time of termination. This benefit is subject to a minimum of 35% of final average monthly compensation, or 50% of final average monthly compensation if disabled as a result of a job-related accident.

14. Deferred vested retirement

- Eligibility: Any participant of the plan who terminates after completing five years of credited service is eligible for a deferred vested benefit beginning on his normal retirement date.
- Monthly benefit amount: The deferred vested benefit is determined using the normal retirement formula based on final average monthly compensation and credited service at the time of termination.
- In lieu of this benefit the participant may elect a withdrawal benefit and thereby forfeit his deferred vested benefit.

15. Withdrawal benefit

- Eligibility: Each participant, who terminates before becoming eligible for a normal, early, disability or deferred retirement benefit, automatically receives a withdrawal benefit. Any participant eligible for a normal, early, disability or deferred vested retirement benefit, which will not commence within one month of termination, may elect a withdrawal benefit.
- Amount: The withdrawal benefit shall be the sum of all contributions made by the employee which have not been withdrawn previously, plus credited interest.

16. Pre-retirement death

If any employee completes at least 15 years of Credited Service, the spouse if named as beneficiary will receive a spousal benefit equal to the benefit payable had the participant retired on a joint and 100% survivor option on the day before death. Alternatively, the spouse may elect a refund of contributions and interest.

If not married at date of death, the sum of all contributions made by the employee plus credited interest will be paid to the employee's designated beneficiaries.

17. Consumer Price Index increase

All benefits payable to pensioners and beneficiaries retired under the Closed Version shall be increased following two months during which the Consumer Price Index is at least 3% higher than the Consumer Price Index of the base month.

All benefits payable to pensioners and beneficiaries retired under the Open Version shall be increased each March 1 following retirement in accordance with increases in the Consumer Price Index from the prior calendar year. In the event the participant retired during the preceding calendar year, a pro rata increase to reflect the partial year during which he was retired will be provided.

18. Normal and optional forms of payment	• Pensions are normally payable for the life of the participant; however, a participant may elect to receive any other form of benefit provided under the plan which is actuarially equivalent in value. The following optional forms of payment are available under the plan: • A reduced pension which is payable during the lifetime of the pensioner and continues to the surviving spouse at a rate equal to 100%, 75%, 66-2/3% or 50% of the reduced initial pension. • A reduced pension which is payable as long as both the pensioner and the spouse are surviving. In addition, if the spouse survives the pensioner, a lifetime pension will continue to the spouse at a rate equal to 100%, 75%, 66-2/3% or 50% of the reduced initial pension. However, if the pensioner survives the spouse, the lifetime benefit will be increased to the original standard form of pension. • A reduced pension to the participant during his lifetime with benefit payments guaranteed for at least 120 months or 180 months. If a participant marries following his Benefit Commencement Date, the Participant may revoke any existing election and in its place elect a joint and contingent survivor option, provided such election is made within one year of the date of marriage and the Participant names his spouse as contingent annuitant. A pensioner who elects a joint and contingent survivor option and subsequently divorces may revoke the existing election. After such revocation, a lifetime pension will continue to the pensioner at a rate equal to the unreduced initial pension.

There have been no changes in Plan provisions since the prior valuation.

2.2: Demographic Information

Participant Summary

	June 30, 2018		June 30, 2017
1. Closed Plan Active Participants			
a. Number	5		7
b. Average Age	66.72		64.92
c. Average Years of Service	42.82		41.99
d. Total Pay	$ 597,103	*	$ 781,012
e. Average Pay	119,421		111,573
2. Open Plan Active Participants			
a. Number	1,639		1,602
b. Average Age	47.43		47.68
c. Average Years of Service	12.35		12.94
d. Total Pay	$ 144,712,834	*	$ 134,860,986
e. Average Pay	88,293		84,183
3. All Active Participants			
a. Number	1,644		1,609
b. Average Age	47.49		47.75
c. Average Years of Service	12.43		13.06
d. Total Pay	$ 145,309,937	*	$ 135,641,998
e. Average Pay	88,388		84,302
4. Retired Participants and Beneficiaries			
a. Number	1,569		1,542
b. Average Age	70.46		70.25
c. Total Annual Pension	$ 61,131,496		$ 57,985,043
d. Average Annual Pension	38,962		37,604
5. Disabled Participants			
a. Number	49		48
b. Average Age	64.80		63.71
c. Total Annual Pension	$ 900,144		$ 868,753
d. Average Annual Pension	18,370		18,099
6. Deferred Vested Participants			
a. Number	118	**	107
b. Average Age	51.22		51.19
c. Total Annual Pension	$ 1,353,556		$ 1,234,753
d. Average Annual Pension	11,471		11,540

*The projected salary provided by WSSC for 2018 reflects 27 pay periods. The above Pay with salary limit has been adjusted to reflect a calendar year with 26 pay periods. The total projected limited salary with 27 pay periods is $620,068 for the closed group, $150,268,096 for the open group, for a total of $150,888,164.

**Including three vested Participants on Leave of Absence or Military Leave. Two non-vested Participants who are on a leave of Absence or Military Leave are not shown above.

Reconciliation of Closed Plan Participants

	Active*	Inactive	Retired and Beneficiaries	Deferred Vested	Disabled	Total
Census as of June 30, 2017	7	0	822	1	9	839
Retired	-2	0	2	0	0	0
Disabled	0	0	0	0	0	0
Died:						
With Beneficiary	0	0	-12	0	0	-12
Without Beneficiary	0	0	-28	0	0	-28
Refund Paid to Beneficiary	0	0	0	0	0	0
Refund Payable to Beneficiary	0	0	0	0	0	0
Beneficiaries Added	0	0	12	0	0	12
Terminated						
Vested	0	0	0	0	0	0
Nonvested-Refund Paid	0	0	0	0	0	0
Nonvested-Refund Payable	0	0	0	0	0	0
Vested and Paid Employee Contributions	0	0	0	0	0	0
Added	0	0	0	0	0	0
Went on Leave	0	0	0	0	0	0
Returned from Leave	0	0	0	0	0	0
Reinstated	0	0	0	0	0	0
Adjustments	0	0	0	0	0	0
Census as of June 30, 2018	5	0	796	1	9	811

*Those with retiree payments stopped while reemployed are included in the active count.

Reconciliation of Open Plan Participants

	Active*	**Inactive**	**Retired and Beneficiaries**	**Deferred Vested**	**Disabled**	**Total**
Census as of June 30, 2017	1,602	3	720	106	39	2,470
Retired	-64	0	67	-3	0	0
Disabled	0	-1	0	-1	2	0
Died:						
With Beneficiary	0	0	-7	0	-1	-8
Without Beneficiary	0	0	-13	0	-1	-14
Refund Paid to Beneficiary	0	0	0	0	0	0
Refund Payable to Beneficiary	0	0	0	0	0	0
Beneficiaries Added	0	0	8	0	0	8
Terminated						
Vested	-12	0	0	12	0	0
Nonvested-Refund Paid	-20	0	0	0	0	-20
Nonvested-Refund Payable	-29	-1	0	0	0	-30
Vested and Paid Employee Contributions	-1	-1	0	0	0	-2
Added	165	0	0	0	0	165
Went on Leave	-5	5	0	0	0	0
Returned from Leave	0	0	0	0	0	0
Reinstated	3	0	0	0	0	3
Adjustments**	0	0	-2	0	1	-1
Census as of June 30, 2018	1,639	5	773	114	40	2,571

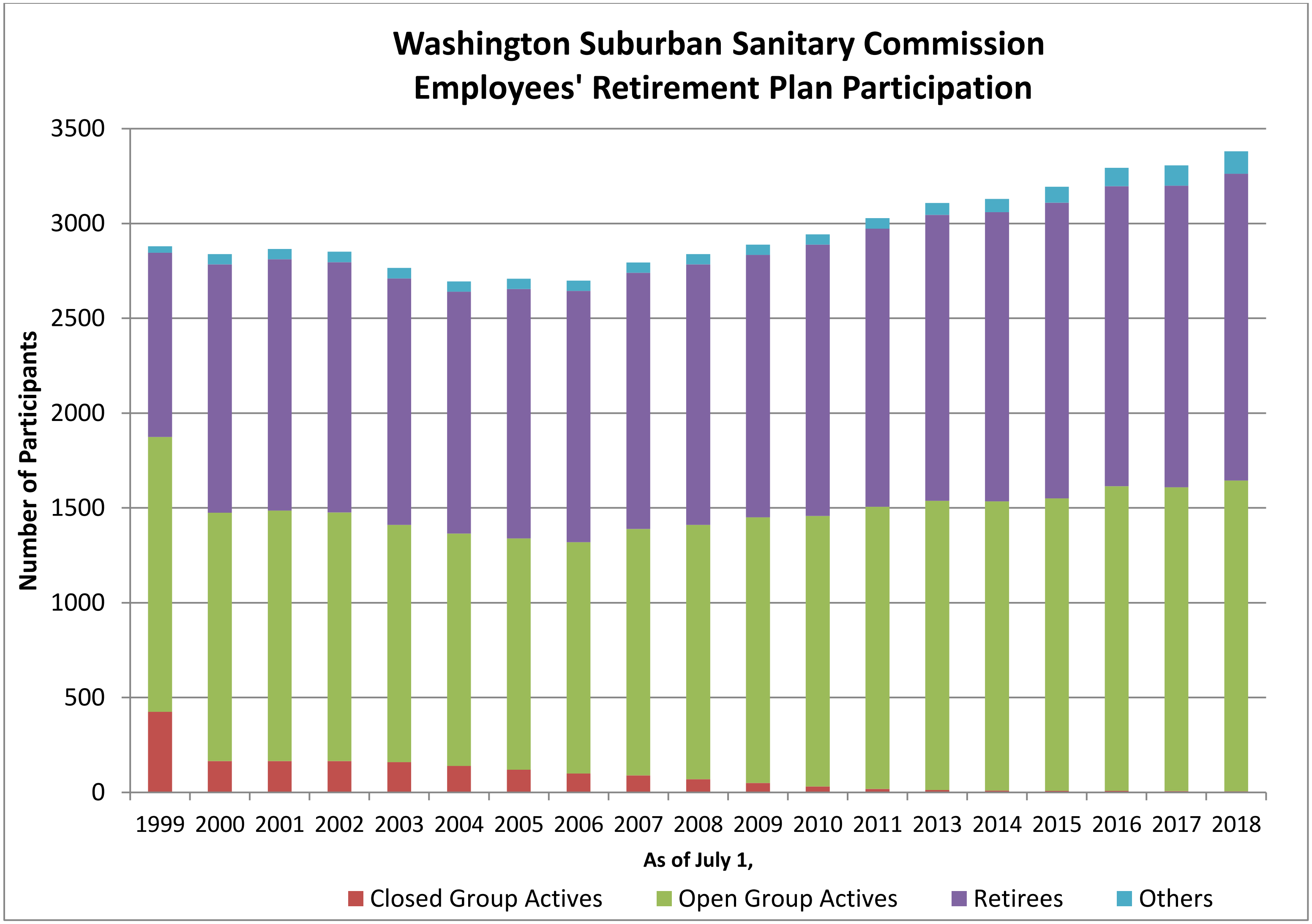
*Those with retiree payments stopped while reemployed are included in the active count.

**Payments to one Alternate Payee ended. One new Alternate Payee and one retired additional benefit added to original benefit.

Active Participant Age/Service Distribution

YEARS OF SERVICE

Age Group	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40+	Total
MALE										
0 - 19	1	0	0	0	0	0	0	0	0	1
20 - 24	20	1	0	0	0	0	0	0	0	21
25 - 29	55	9	1	0	0	0	0	0	0	65
30 - 34	67	29	9	0	0	0	0	0	0	105
35 - 39	59	53	28	4	1	0	0	0	0	145
40 - 44	49	39	24	2	18	1	0	0	0	133
45 - 49	40	37	29	18	23	20	2	0	0	169
50 - 54	27	36	25	6	17	42	26	0	0	179
55 - 59	29	42	20	12	20	41	32	7	0	203
60 - 64	14	19	13	7	12	22	22	3	1	113
65 - 69	5	1	5	3	3	4	3	2	3	29
70+	1	0	1	2	2	0	1	2	1	10
Total	367	266	155	54	96	130	86	14	5	1,173
FEMALE										
0 - 19	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0
25 - 29	15	1	0	0	0	0	0	0	0	16
30 - 34	25	9	0	0	0	0	0	0	0	34
35 - 39	31	16	8	2	0	0	0	0	0	57
40 - 44	24	9	8	4	3	0	0	0	0	48
45 - 49	22	14	13	5	5	8	0	0	0	67
50 - 54	22	12	12	6	9	14	12	1	0	88
55 - 59	14	7	12	8	12	14	16	3	0	86
60 - 64	6	6	6	3	7	11	13	5	1	58
65 - 69	2	1	5	1	2	2	2	1	0	16
70+	0	0	0	0	0	0	1	0	0	1
Total	161	75	64	29	38	49	44	10	1	471



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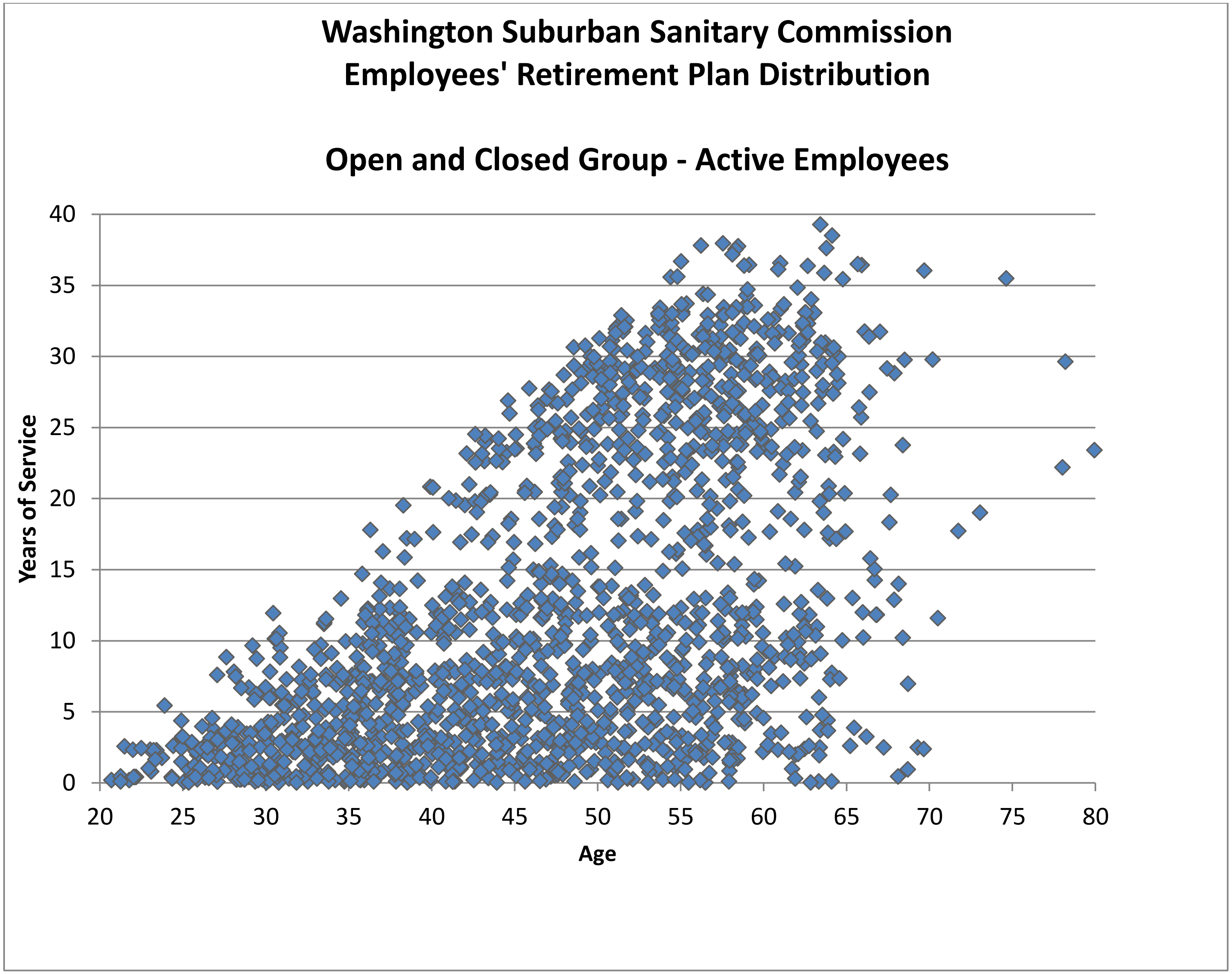

Washington Suburban Sanitary Commission
Employees' Retirement Plan Distribution
Open and Closed Group - Active Employees
Years of Service
Age
0
5
10
15
20
25
30
35
40
20
25
30
35
40
45
50
55
60
65
70
75
80

2.3: Actuarial Assumptions and Methods

The funding methods and assumptions are used in determining the actuarial costs and liabilities presented in this Report. The assumptions were developed from the actuarial assumption review and experience study prepared in 2016, covering Plan experience from July 1, 2011 through June 30, 2015. The assumptions are scheduled to be reviewed again during a study during 2020.

1. Employee data	The employee data used in the determination of cost estimates consist of pertinent information with respect to active participants and pensioners of the Washington Suburban Sanitary Commission Employee's Retirement Plan.
2. Valuation date	June 30, 2018
3. Actuarial funding method	The Entry Age Normal Cost Method is used. The contributions equal the Normal Cost plus an amount to amortize the Unfunded Actuarial Accrued Liability over a period no longer than 30 years. Beginning with the June 30, 2018 valuation, a 20-year amortization period is used for the purpose of comparing the actuarial cost to the Commission's contribution rate. The Normal Cost is the level annual payment that would be required to fund the Plan if paid from the date each employee became eligible to participate to the date of exit. The Actuarial Accrued Liability is the accumulated value of the Normal Cost for each employee from date of participation to the present. The Unfunded Actuarial Accrued Liability is the Actuarial Accrued Liability minus the Actuarial Value of Assets. Actuarial gains and losses reduce or increase the Unfunded Actuarial Accrued Liability.
4. Valuation of assets	The Average Value Method is used to determine the Actuarial Value of Assets. This method determines the value of assets so that asset appreciation or depreciation is only partially recognized in the year of occurrence. The result is a gradual recognition of 20% per year over a 5-year period of each year's appreciation or depreciation in excess of or less than that which was assumed. The Actuarial Value of Assets must be within 80% to 120% of the Market Value of Assets.
5. Rate of investment return	A rate of 7.00% per year, net of investment expenses, is assumed as the annual investment return for the trust.
6. Cost-of-living	An annual cost-of-living increase of 2.50% is assumed.
7. Expenses	No allowance has been made in the valuation for non-investment expenses because all non-investment related expenses are paid directly by the Commission.

8. Salary Increases

The total pay increase assumption, including wage growth and career increases, is:

Years of Service	Increase
Up to 5	7.50%
6+	2.75%

9. Mortality tables for employees and annuitants

For non-disability annuitant mortality, the RP-2000 Blue Collar Combined Healthy mortality tables (separately for males and females) with a one year set-forward and projected to 2025 with Scale BB.

Mortality for active employees is 50% of the annuitant mortality.

For disability retirement pension mortality, the RP2000 Disabled Retiree tables (males and females) are assumed, projected to 2025 with Scale BB.

10. Rates of age retirement

Age	Rate
50-59	7.5%
60	9.4%
61	11.7%
62	14.6%
63	18.3%
64	22.9%
65-69	28.6%
70+	100%

11. Withdrawal Rates

Years of Service	Male	Female
0	11.0%	16.5%
1	9.4%	14.0%
2	7.9%	11.9%
3	6.8%	10.1%
4	5.7%	8.6%
5	4.9%	7.3%
6	4.1%	6.2%
7	3.5%	5.3%
8	3.0%	4.5%
9	2.5%	3.8%
10	2.2%	3.2%
11	1.8%	2.8%
12	1.6%	2.3%
13	1.3%	2.0%
14	1.1%	1.7%
15	1.0%	1.4%
16	0.8%	1.2%
17	0.7%	1.0%
18	0.6%	0.9%
19	0.5%	0.8%
20+	0.0%	0.0%

12. Disability rates

The assumed rates of disability are illustrated by the following table:

	Rate per 100 Lives	
Age	Male	Female
20	.021	.026
25	.021	.035
30	.028	.041
35	.035	.055
40	.048	.069
45	.069	.104
50	.124	.179
55	.248	.338
60	.621	.835
64	1.532	1.994

13. Marital status

It is assumed that 70% of the participants are married. Husbands are assumed to be three years older than their wives.

14. Option election

It is assumed that one-half of retiring participants will elect a joint and two-thirds survivor pension.

Since the prior valuation, the amortization period for computing the actuarially determined employer contribution has decreased from 30 years to 20 years. This change was made to establish a more sound and conservative actuarial basis for the purpose of evaluating the fixed contribution rate.

SECTION 3: PROJECTIONS OF PLAN FUNDING

3.1: 15 Year Projection of Cash Flows

Based on 16.9% of Payroll Level Contribution Rate

Plan Year Beginning July 1	MVA at Beginning of Year	AVA at Beginning of Year	Contributions WSSC	Contributions Employee	Benefit Payments	Estimated Investment Income*	Net Increase in Fund
2018	$810,937,596	$804,356,892	$25,420,225	$4,526,452	$63,529,560	$55,610,110	$22,027,227
2019	832,964,823	817,970,318	25,920,847	4,608,253	64,989,512	57,121,822	22,661,410
2020	855,626,233	840,813,357	26,554,940	4,718,986	66,528,164	58,680,807	23,426,569
2021	879,052,801	876,498,593	27,273,915	4,845,222	68,109,510	60,295,338	24,304,965
2022	903,357,766	903,357,766	28,046,277	4,980,087	69,881,523	61,966,930	25,111,771
2023	928,469,537	928,469,537	28,934,505	5,136,782	71,624,030	63,700,751	26,148,008
2024	954,617,545	954,617,545	29,964,679	5,319,522	73,275,855	65,516,010	27,524,356
2025	982,141,901	982,141,901	31,136,337	5,527,160	74,968,701	67,431,926	29,126,722
2026	1,011,268,623	1,011,268,623	32,442,272	5,758,983	76,727,315	69,463,197	30,937,137
2027	1,042,205,760	1,042,205,760	33,913,701	6,020,184	78,440,880	71,629,453	33,122,458
2028	1,075,328,218	1,075,328,218	35,546,062	6,309,952	80,060,932	73,958,419	35,753,501
2029	1,111,081,719	1,111,081,719	37,340,865	6,628,556	81,516,597	76,483,795	38,936,619
2030	1,150,018,338	1,150,018,338	39,294,013	6,975,269	82,915,956	79,240,343	42,593,669
2031	1,192,612,007	1,192,612,007	41,426,914	7,353,890	84,025,835	82,270,128	47,025,097
2032	1,239,637,104	1,239,637,104	43,731,243	7,762,943	84,986,678	85,622,186	52,129,694

*Assuming 7.00% returns each year.

MVA = Market Value of Assets
AVA = Actuarial Value of Assets

Additional Assumptions for Projections:

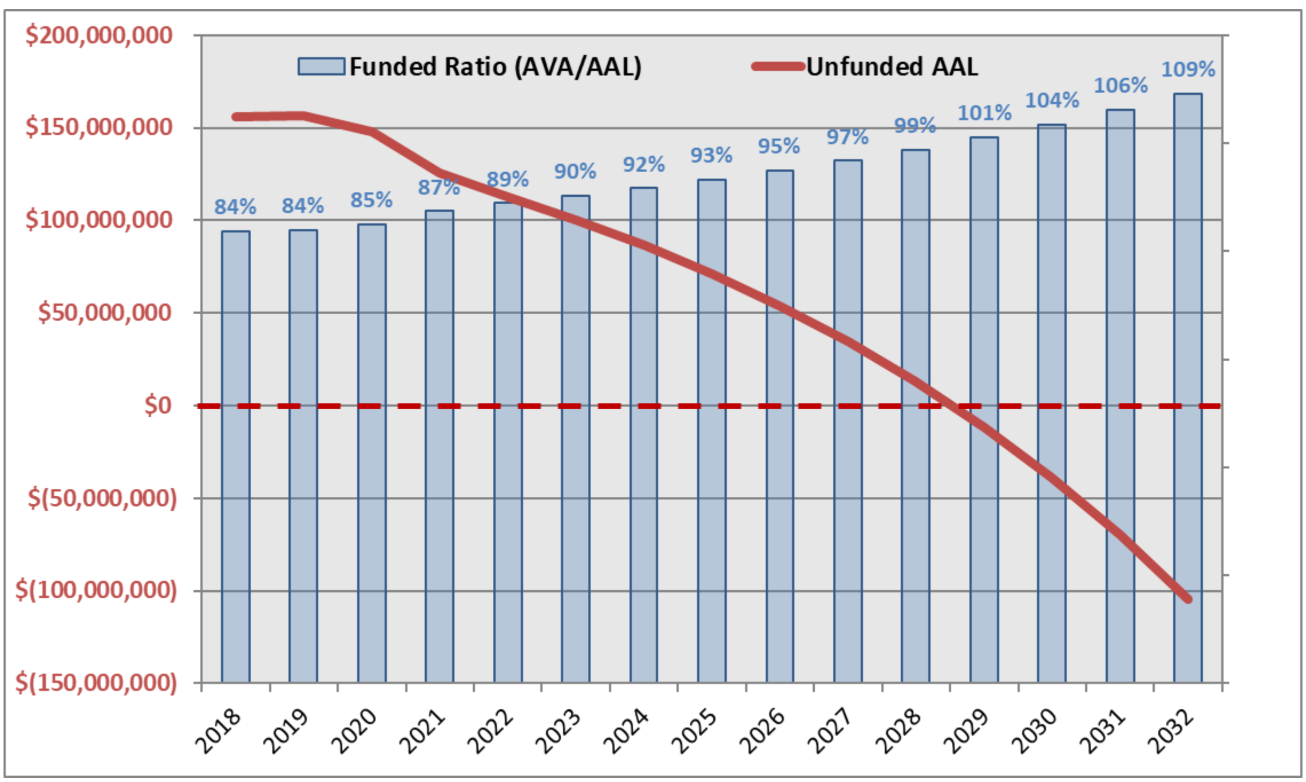
The cost of future entrants is estimated by projecting future replacements of assumed decrements (retirements, terminations, disablements or deaths).

We also assumed that future participants are similar to those who entered the plan since the last three actuarial valuation reports were issued, including this current report -- specifically 67% male and 33% female, with average age = 38, and a starting salary equal to the current average of $73,100. We assumed salary at entry would increase each year at the assumed salary scale.

3.2: 15 Year Projection of Funding Progress

Based on 16.9% of Payroll Level Contribution Rate

Plan Year Beginning July 1	AVA at Beginning of Year	Actuarial Accrued Liability (AAL)	Funded Ratio (AVA/AAL)	Unfunded AAL	Present Value of Future Benefits (PVFB)	Percent of PVFB Funded
2018	$804,356,892	$960,279,629	84%	$155,922,737	$1,061,402,844	76%
2019	817,970,318	974,575,804	84%	156,605,486	1,065,022,853	78%
2020	840,813,357	988,614,451	85%	147,801,094	1,079,425,447	79%
2021	876,498,593	1,002,363,299	87%	125,864,706	1,093,814,834	80%
2022	903,357,766	1,015,800,617	89%	112,442,851	1,108,361,048	82%
2023	928,469,537	1,028,734,234	90%	100,264,697	1,122,658,524	83%
2024	954,617,545	1,041,217,720	92%	86,600,174	1,137,043,466	84%
2025	982,141,901	1,053,384,797	93%	71,242,896	1,151,476,181	85%
2026	1,011,268,623	1,065,242,084	95%	53,973,461	1,166,053,468	87%
2027	1,042,205,760	1,076,767,435	97%	34,561,675	1,180,404,603	88%
2028	1,075,328,218	1,088,067,495	99%	12,739,277	1,194,871,720	90%
2029	1,111,081,719	1,099,304,209	101%	(11,777,510)	1,209,538,879	92%
2030	1,150,018,338	1,110,724,931	104%	(39,293,407)	1,224,518,736	94%
2031	1,192,612,007	1,122,480,469	106%	(70,131,539)	1,239,763,782	96%
2032	1,239,637,104	1,134,984,154	109%	(104,652,950)	1,255,738,186	99%



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