



Great Lakes Water Authority

Municipal Market Update and 2018 Outlook

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Municipal Market Update

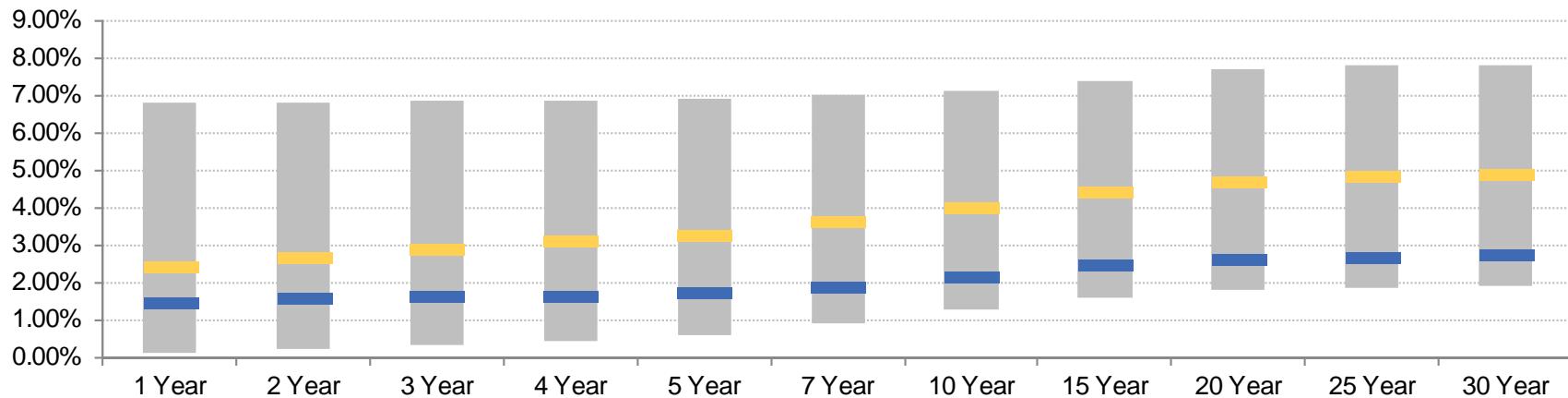


Benchmark Tax-Exempt Interest Rate Position

AAA MMD Rate Position

(January 12, 1988 to January 11, 2018)

■ MMD Range — Current MMD — Average MMD



Summary of January 11, 2018 vs. Historical MMD Rates (30 Year History)

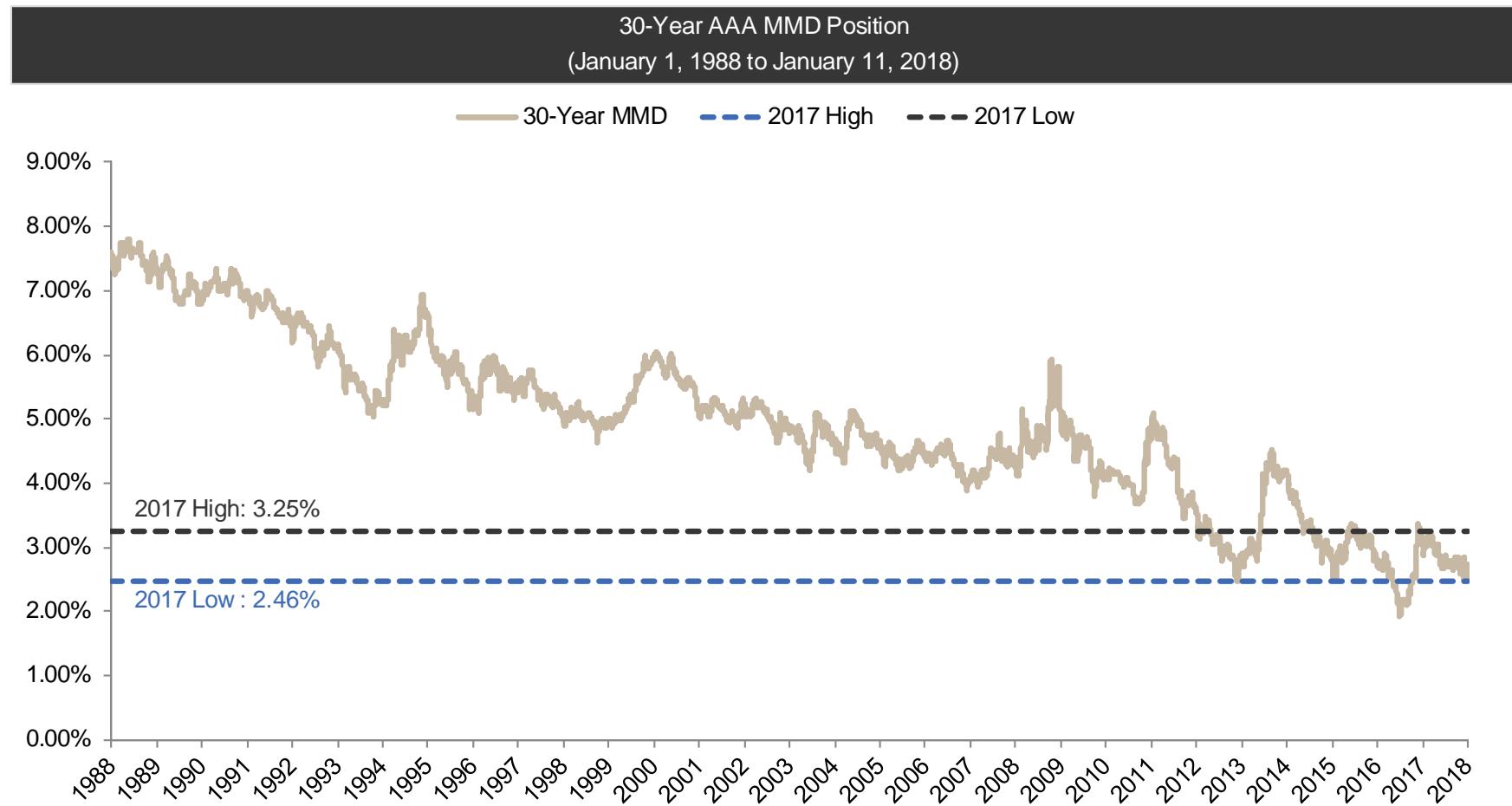
Statistic	1 Year	2 Year	3 Year	4 Year	5 Year	7 Year	10 Year	15 Year	20 Year	25 Year	30 Year
1/11/2018	1.42%	1.54%	1.58%	1.62%	1.70%	1.87%	2.12%	2.45%	2.60%	2.66%	2.71%
Average	2.38%	2.67%	2.88%	3.07%	3.24%	3.57%	3.95%	4.41%	4.67%	4.81%	4.85%
Spread to Avg.	-0.96%	-1.13%	-1.30%	-1.45%	-1.54%	-1.70%	-1.83%	-1.96%	-2.07%	-2.15%	-2.14%
Minimum	0.11%	0.25%	0.36%	0.44%	0.62%	0.89%	1.29%	1.57%	1.80%	1.88%	1.93%
Spread to Min.	1.31%	1.29%	1.22%	1.18%	1.08%	0.98%	0.83%	0.88%	0.80%	0.78%	0.78%
Maximum	6.80%	6.80%	6.85%	6.85%	6.90%	7.00%	7.10%	7.40%	7.70%	7.80%	7.80%
Spread to Max.	-5.38%	-5.26%	-5.27%	-5.23%	-5.20%	-5.13%	-4.98%	-4.95%	-5.10%	-5.14%	-5.09%
Percent of Market Days Lower	38.63%	36.83%	33.63%	31.29%	28.26%	21.21%	15.47%	11.81%	8.71%	4.18%	3.92%

Source: Thomson Reuters



Interest Rates in 2017

Long-term interest rates in 2017 remained within a historically low range, with the 30-year MMD remaining between a maximum of 3.25% and a minimum of 2.46%

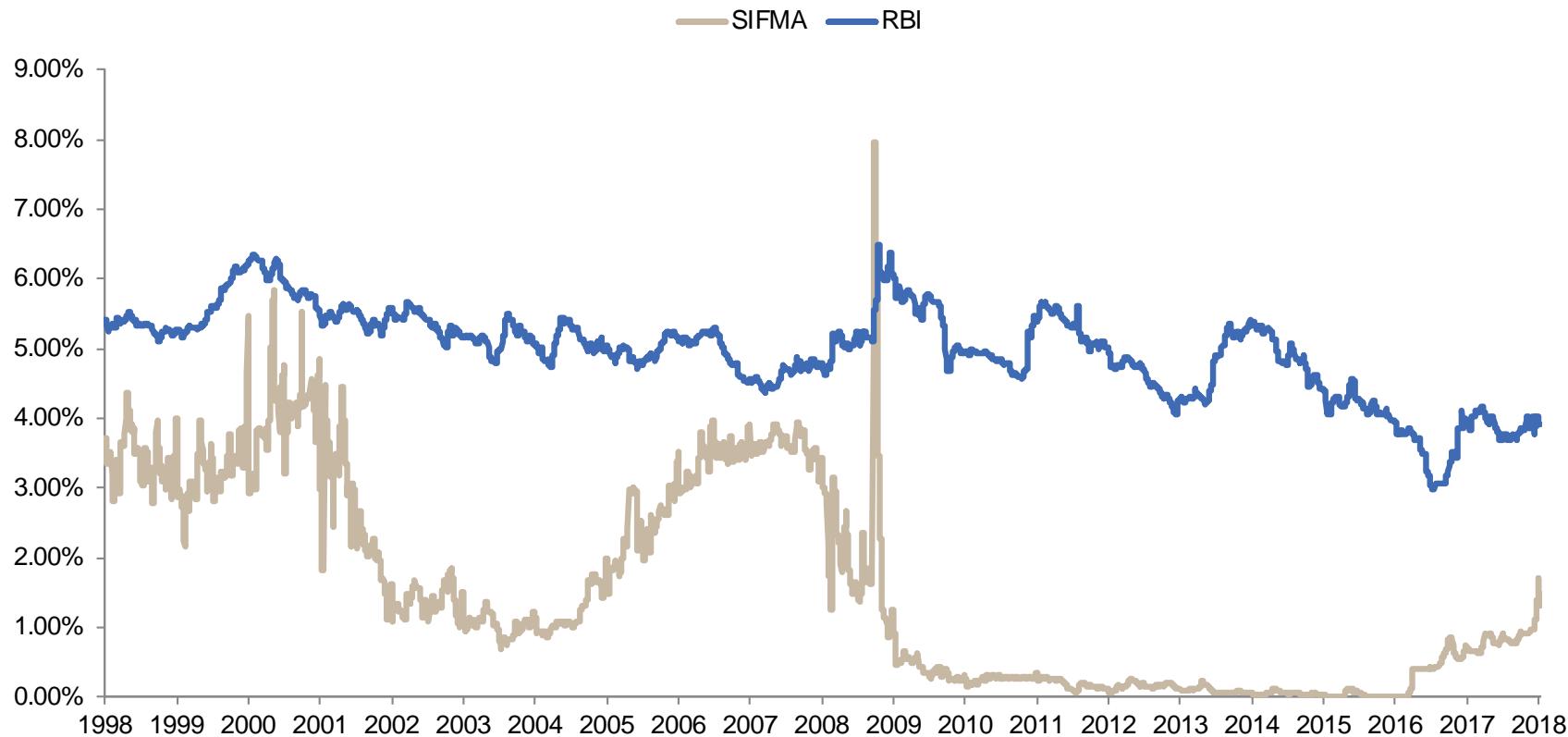




Short-Term and Long-Term Tax-Exempt Interest Rate History

SIFMA has remained at levels significantly below the Bond Buyer Revenue Bond Index since 2009, although short-term rates have ticked up during 2017

SIFMA vs. RBI (January 1, 1998 – January 11, 2018)





Taxable Interest Rate Forecasts

Wall Street consensus forecast is for slow and steady rate increases over the next 12-18 months

The Street's Interest Rate Forecast (As of January 11, 2018)							
Average Forecasts	Current	Q1 18	Q2 18	Q3 18	Q4 18	Q1 19	Q2 19
30-Year UST	2.91%	2.99%	3.15%	3.27%	3.40%	3.48%	3.58%
10-Year UST	2.57%	2.57%	2.70%	2.81%	2.91%	3.01%	3.14%
2-Year UST	1.98%	1.99%	2.17%	2.31%	2.44%	2.57%	2.73%
3M LIBOR	1.71%	1.76%	1.97%	2.13%	2.32%	2.44%	2.59%
Fed Funds Target Rate (Upper)	1.50%	1.65%	1.90%	2.05%	2.25%	2.35%	2.55%
Fed Funds Target Rate (Lower)	1.25%	1.42%	1.65%	1.81%	2.00%	2.09%	2.31%



Federal Tax Bill



Tax Cuts and Jobs Act

- President Trump signed the Tax Cuts and Jobs Act into law on December 22, 2017
- Major impact of bill for GLWA is the prohibition on tax-exempt advance refunding bonds after December 31, 2017
 - Under prior law, each issue of tax-exempt bonds could be advance refunded one time on a tax-exempt basis
 - Tax-exempt status of current refunding bonds (closing within 90 days of call date on refunded bonds) is not impacted
- The Bill also repeals the authority to issue tax credit bonds under various programs provided in the tax code (Qualified Zone Academy Bonds, Clean Renewable Energy Bonds and others) as of December 31, 2017
- While the bill will limit financing flexibility going forward, minimal impact on 2018 refunding strategy



Final Version of Tax Reform – Summary of Major Provisions

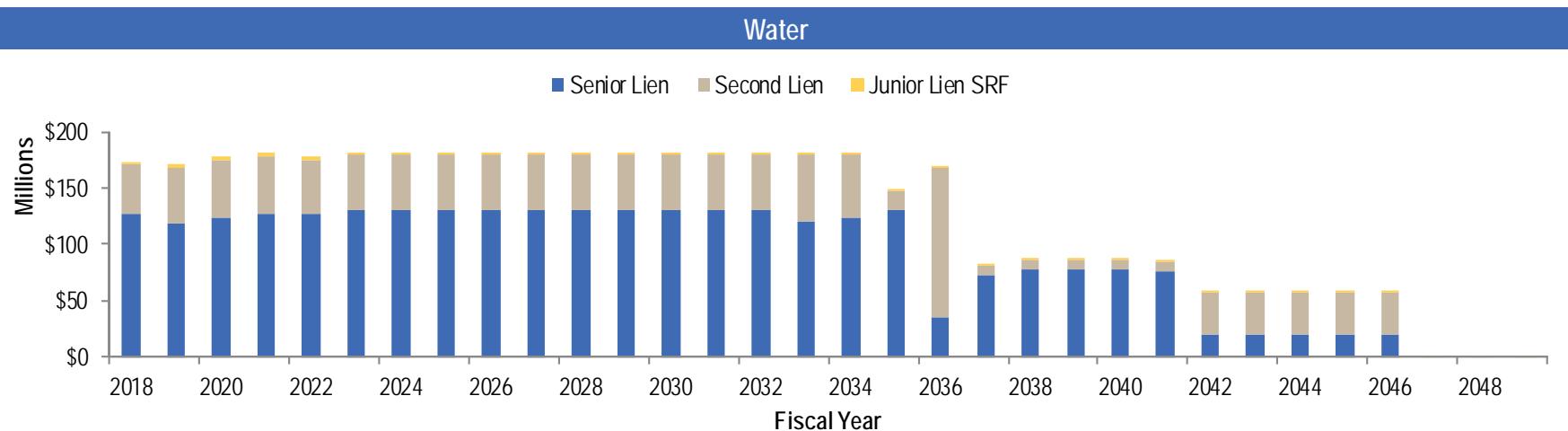
Issue	House Bill	Senate Bill	Final Bill
State and Local Tax Deduction	Partial repeal with property tax cap	Total repeal	Caps SALT Deduction at \$10k
Corporate Tax Rate Cut	Cut to 20% in 2018	Cut to 20% in 2019	Immediate and permanent cut to 21%
Standard Deduction	\$12,000 individual / \$24,000 married	\$12,000 individual / \$24,000 married	\$12,000 individual / \$24,000 married
Mortgage Interest Tax Deduction	Cap at \$500k and one home	Maintain \$1M cap	Capped at \$750k
Tax Credit Bond Authorization	Repealed	Repealed	Repealed
Private Activity Bonds	No longer tax exempt	Maintain tax exemption	Maintain tax exemption
Advanced Refunding	No longer tax exempt	No longer tax exempt	No longer tax exempt
Higher Education	1.4% excise tax on endowments at certain institutions, repeal student loan interest deduction	1.4% excise tax on endowments at certain institutions	1.4% excise tax on endowments at certain institutions; maintain student loan interest deduction
Historic Rehabilitation Tax Credit / New Market Tax Credit	Eliminated	Maintained	Maintained
Affordable Care Act	Not included	Amended to repeal individual mandate	Individual mandate repealed



Status of GLWA Debt Profile



GLWA Current Debt Structure



Note: Assumes Series 2006D Variable Rate Bonds calculated at 1.85% interest rate (GLWA planning rate). Funds for Estimated SRF Schedules have not been fully drawn. Debt service schedule reflects amortization of full authorized amount..



GLWA Fixed Rate Callable Debt (Call Dates Through 2022)

Water						
Series Name	Indenture	Lien	Tax Status	Outstanding	Next Call Date	Callable Par
Series 2011A Senior	Water	Senior	Tax-Exempt	293,970,000	7/1/2021	289,605,000
Series 2011B Senior	Water	Senior	Taxable	4,450,000	7/1/2021	2,295,000
Series 2011C Senior	Water	Senior	Tax-Exempt	75,145,000	7/1/2021	74,125,000
Series 2001C Second	Water	Second	Tax-Exempt	179,150,000	7/1/2018	178,735,000

Sewer						
Series Name	Indenture	Lien	Tax Status	Outstanding	Next Call Date	Callable Par
Series 1998A Senior	Sewer	Senior	Tax-Exempt	18,485,000	Current	18,485,000
Series 1998B Senior	Sewer	Senior	Tax-Exempt	18,260,000	Current	18,260,000
Series 2001C1 Senior	Sewer	Senior	Tax-Exempt	41,515,000	7/1/2019	40,705,000
Series 2001C2 Senior	Sewer	Senior	Tax-Exempt	107,425,000	7/1/2018	107,045,000
Series 2012A Senior	Sewer	Senior	Tax-Exempt	524,925,000	Current / 7/1/2022 ¹	462,810,000
Series 2014C-1 Senior	Sewer	Senior	Tax-Exempt	123,220,000		123,200,000
Series 2014C-2 Senior	Sewer	Senior	AMT	27,470,000	7/1/2022	27,450,000
Series 2005A Sec.(Call Mod) ²	Sewer	Second	Tax-Exempt	31,785,000	7/1/2021	31,785,000
Series 2006B Sec.(Call Mod) ³	Sewer	Second	Tax-Exempt	55,000,000	7/1/2021	55,000,000

Note: excludes series of debt with callable amounts of \$100,000 or less outstanding.

1. \$25.0 million of the Series 2012A Sewer Bonds are callable on 7/1/2017.

2. The call date on \$31.8 million of the series 2005A Sewer Bonds was modified to July 1, 2021.

3. The call date on \$55.0 million of the Series 2006B Sewer Bonds was modified to July 1, 2021.



Bond Sale Strategy Not Altered in the Wake of Tax Reform

- While the Tax Cuts and Jobs Act is adverse to GLWA via eliminating advance refundings, this development should not drive a different financing strategy than what has been contemplated by GLWA
- The bulk of the refinancing candidates on both the water and sewer credits are tax-exempt current refundings
 - Significant debt service savings will remain available on both credits, with ability to accelerate a portion of the savings
 - Additional series will become current refunding candidates in 2019 and 2021
- New money transactions are not impacted for GLWA
- Majority of savings in the universe of refinancing candidates are generated by bonds that will be currently callable by April 2018
 - Could also structure the refinancing today to accelerate savings and build in expectation of future current refunding savings after 2020
- Current refundings will be more efficient than advance refundings (no additional escrow cost) and ultimately could afford more savings than tax-exempt advance refundings that are no longer permissible due to tax reform
 - Does involve more interest rate risk for GLWA between now and current refunding date
 - GLWA would get the benefit of “moving down the curve” for financing rates, and could always look at taxable advance refunding options



Refunding Candidate Summary

Refunded Series	Sewer System Currently Callable Debt Generating Savings			Water System Currently Callable Debt Generating Savings		
	Series	Call Date	Par (\$000s)	Series	Call Date	Par (\$000s)
Senior	1998A	Current	18,485	-	-	-
	1998B	Current	18,260			
	2001C-2	7/1/2018	107,045			
	2012A	Current	17,635			
Total Senior			161,425			-
Second	-	-	-	2001C	7/1/2018	178,735
Total Second			-			178,735
Total Refunded			161,425			178,735

Note: Series 2012A Sewer Bonds partially funded Extraordinary Working Capital projects. The ability to refinance the portion of the Series 2012A Bonds related to the Extraordinary Working Capital on a tax-exempt basis is subject to opinion of Tax Counsel. Portion represented above was previously allocated to other projects.



Base Case Refunding – Water System

Savings Summary

- Over \$30 million in gross cashflow savings can be achieved (>\$25 million present value)
- Potential to accelerate savings as desired

Refunding Candidates

- Includes all currently callable bonds
- A larger refunding reflecting a broader universe of refunding candidates not an option on a tax-exempt basis with tax law changes

Assumptions

- Uninsured, matched lien refunding
- Interest rates as of January 11, 2018
- Contribution of accrued interest from DS fund
- Conservatively assumes no DSRF release
- SLGS escrow as of January 11, 2018
- Savings structured for level aggregate savings by lien
- 5% coupon structure

Refunding Results		Date	Prior Net Cashflow (\$)	Refunding DS (\$)	Savings (\$)
Delivery Date:	5/30/2018	7/1/2018	847,917	687,124	160,793
Call Date:	7/1/2028	7/1/2019	22,356,775	19,619,500	2,737,275
Current Refunded Par (\$):	178,735,000	7/1/2020	22,362,450	19,622,500	2,739,950
NPV Savings (\$):	25,939,261	7/1/2021	22,351,438	19,611,250	2,740,188
NPV Savings as % :	14.5%	7/1/2022	22,352,300	19,615,000	2,737,300
Negative Arbitrage (\$):	(211,035)	7/1/2023	21,221,875	18,481,500	2,740,375
Escrow Efficiency:	99.2%	7/1/2024	21,537,550	18,801,000	2,736,550
TIC:	2.79%	7/1/2025	20,947,100	18,207,000	2,740,100
Arbitrage Yield:	2.68%	7/1/2026	21,968,825	19,227,750	2,741,075
WAM:	6.67 yrs	7/1/2027	21,114,000	18,372,250	2,741,750
Refunded Bonds WAM:	6.20 yrs	7/1/2028	22,804,113	20,065,000	2,739,113
		7/1/2029	22,243,263	19,503,750	2,739,513
		7/1/2030	-	-	-
		7/1/2031	-	-	-
		7/1/2032	-	-	-
		7/1/2033	-	-	-
		7/1/2034	-	-	-
		7/1/2035	-	-	-
		7/1/2036	-	-	-

242,107,604 211,813,624 30,293,980



Base Case Refunding – Sewer System

Savings Summary

- Over \$30 million in gross cashflow savings can be achieved (>\$25 million present value)
- Potential to accelerate savings as desired

Refunding Candidates

- Includes all currently callable bonds
- A larger refunding reflecting a broader universe of refunding candidates not an option on a tax-exempt basis with tax law changes
- Taxable refunding of Series 2001C-1 (callable 7/1/19) would generate additional savings

Assumptions

- Uninsured, matched lien refunding
- Interest rates as of January 11, 2018
- Contribution of accrued interest from DS fund
- Conservatively assumes no DSRF release
- SLGS escrow as of January 11, 2018
- Savings structured for level aggregate savings by lien
- 5% coupon structure

Refunding Results		Date	Prior Net Cashflow (\$)	Refunding DS (\$)	Savings (\$)
Delivery Date:	5/30/2018	7/1/2018	2,551,059	2,266,400	284,659
Call Date:	7/1/2028	7/1/2019	11,924,163	8,640,750	3,283,413
Current Refunded Par (\$):	161,424,000	7/1/2020	12,563,275	9,278,750	3,284,525
NPV Savings (\$):	27,579,206	7/1/2021	13,562,450	10,275,500	3,286,950
NPV Savings as % :	17.1%	7/1/2022	14,807,425	11,521,250	3,286,175
Negative Arbitrage (\$):	(191,863)	7/1/2023	23,517,000	20,230,750	3,286,250
Escrow Efficiency:	99.3%	7/1/2024	18,720,025	15,437,250	3,282,775
TIC:	2.85%	7/1/2025	12,071,025	8,783,500	3,287,525
Arbitrage Yield:	2.72%	7/1/2026	5,941,175	4,882,750	1,058,425
WAM:	8.84 yrs	7/1/2027	5,940,025	4,882,750	1,057,275
Refunded Bonds WAM:	8.22 yrs	7/1/2028	52,342,975	49,057,750	3,285,225
		7/1/2029	59,439,938	56,154,000	3,285,938
		7/1/2030	-	-	-
		7/1/2031	-	-	-
		7/1/2032	-	-	-
		7/1/2033	-	-	-
		7/1/2034	-	-	-
		7/1/2035	-	-	-
		7/1/2036	-	-	-

233,380,534 201,411,400 31,969,134

Note: Assumes tax-exempt refunding of \$17.7 million of Series 2012A Bonds, which Series partially funded Extraordinary Working Capital projects. The ability to refinance the portion of the Series 2012A Bonds related to the Extraordinary Working Capital on a tax-exempt basis is subject to opinion of Tax Counsel. Portion assumed refunded above was previously allocated to other projects.



New Money Needs

- Current GLWA projections reflected in draft FY 2019 & FY 2020 Biennial Budget and Five Year Plan contemplate the next new money water and sewer revenue bonds issues to fund CIP needed in FY 2020

New GLWA Debt for CIP (\$ in Millions)	FY18	FY19	FY20	FY21	FY22
Water Revenue Bonds	-	-	\$145	-	\$140
Sewer Revenue Bonds	-	-	\$150	-	\$130

- Information about timing of DWSD new money needs expected next month



Rating Agency Water & Sewer Sector Views and Peer Comparisons



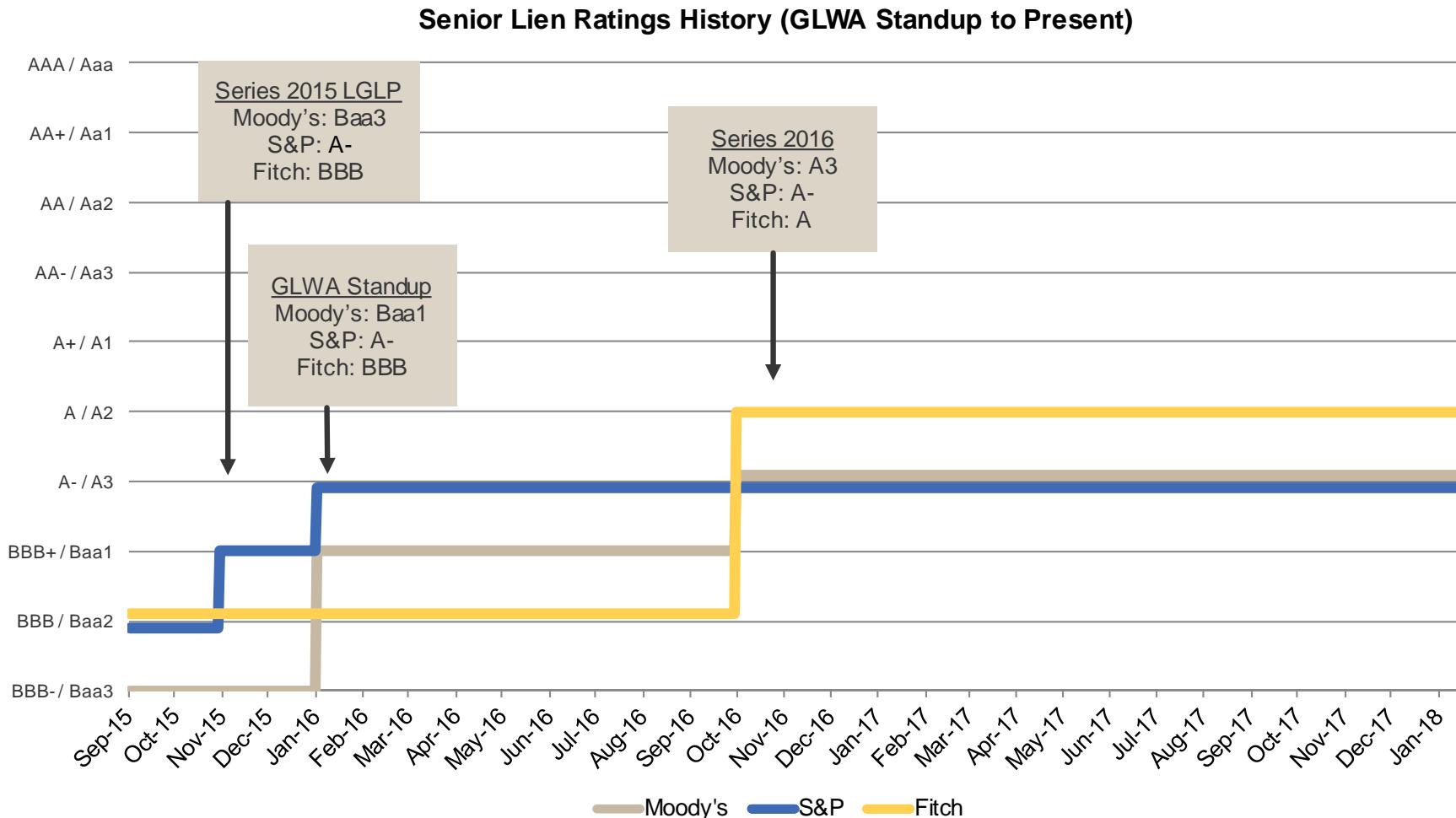
Current Water and Sewer Ratings

Water			
	Moody's	S&P	Fitch
Senior Lien	A3	A-	A
Second Lien	Baa1	BBB+	A-
Outlook	Stable	Positive	Stable

Sewer			
	Moody's	S&P	Fitch
Senior Lien	A3	A-	A
Second Lien	Baa1	BBB+	A-
Outlook	Stable	Positive	Stable



History of Senior Lien Water and Sewer Ratings





Moody's Water & Sewer Sector Outlook

- ◆ Anticipate **overall stability** in the sector, driven by strong rate management and liquidity
- ◆ Annual debt service coverage remains strong and in line with 2016 medians, as utilities have made proactive adjustments to rates
- ◆ Liquidity remains pivotal to the sector's stability, indicating necessary flexibility to absorb unanticipated revenue declines or spending increases
- Moody's expects the current upward trend of cash reserves to continue in the sector and Moody's expects the current upward trend of cash reserves to continue in the sector
- ◆ Moody's expects continued reliance on debt issuance for non-routine capital spending, as liquidity levels are insufficient to fund major capital requirements
- ◆ In 2018 and beyond, finding the right balance between capital investment, financial stability, and rate affordability will be key to sector credit quality
- ◆ While Moody's does not expect asset condition to worsen dramatically during the next 12-18 months, sufficiency of system investment is becoming an increasingly important sector trend as median asset useful life continues to decline



Fitch's Water & Sewer Sector Outlook

- **Stable outlook**, with the key factors in the sector's performance stability being essentiality of the services, monopolistic nature, and generally autonomous rate-setting authority
- Planned ongoing moderate rate adjustments should maintain consistent results through 2018, although headwinds from stagnant sales and rising costs are evident
- Fitch anticipates flat capital spending in 2018 which is favorable for debt metrics, but offset by concern over the increasing age of facilities (which are at their oldest in 15 years of Fitch tracking median data)
- Rates remain affordable but increases have outpaced inflation for many years, leaving diminished capacity
- Utilities face challenges in fully recovering capital replacement costs stemming from rate structures that traditionally generate the bulk of revenues from customer usage despite the vast majority of costs being fixed
- Sector cash reserves should continue to increase through 2018 and continue providing utilities flexibility in meeting operating and capital pressures
- Risk associated with uncertainty with environmental regulations, particularly related to the Lead and Copper Rule