

CREDIT OPINION

9 November 2017

New Issue

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New York City Municipal Water Finance Authority, NY

New Issue – Moody's Assigns Aa1 to NYC Water's Revenue Bonds, 2018 Series CC; Outlook Stable

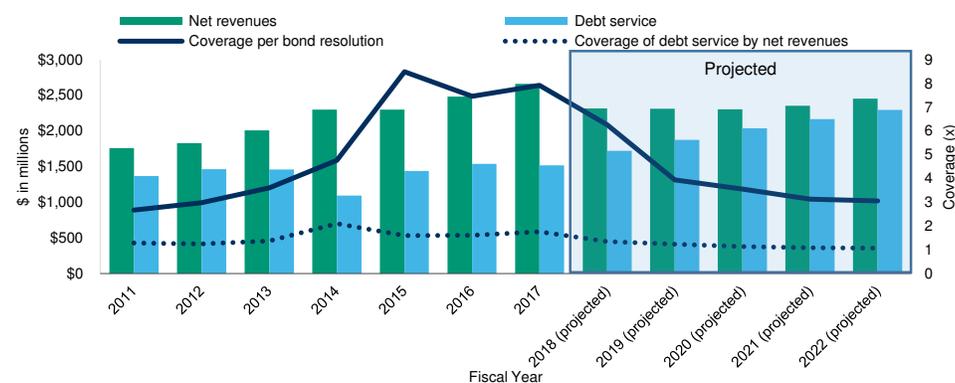
Summary Rating Rationale

Moody's Investors Service has assigned an Aa1 rating to the New York City Municipal Water Finance Authority, NY's \$400 million Water and Sewer System Second General Resolution Revenue Bonds, Fiscal 2018 Series CC. We maintain Aa1 ratings on approximately \$2.2 billion of senior lien bonds and \$27.6 billion of subordinate lien bonds.

The authority's bonds enjoy a strong claim on an essential service in a vast and healthy metropolitan area, and solid coverage of debt service by pledged revenues.

We rate both liens the same. While the senior lien has a priority position, both liens benefit from the strong legal structure including a gross revenue pledge, remoteness from a city bankruptcy, and a bondholder-friendly flow of funds.

Exhibit 1

NYC Water Maintains High Coverage in the Face of Rising Debt Service
 (Projections are based on authority's projections of revenues, expenditures, and debt service)


Source: New York City Municipal Water Finance Authority; Moody's Investors Service

Credit Strengths

- » Strong legal structure
- » Large and economically healthy service area
- » Demonstrated willingness to raise rates
- » Solid coverage of debt service by pledged revenues

Credit Challenges

- » Large and ongoing capital needs likely to be funded with authority debt
- » High debt levels relative to pledged revenues and system size

Rating Outlook

The stable outlook recognizes the New York City Water Board's proven willingness to raise rates continually to assure strong coverage of debt service, a dynamic we expect to continue.

Factors that Could Lead to an Upgrade

- » Upgrade of New York City
- » Stronger limitations on leveraging the pledged funds

Factors that Could Lead to a Downgrade

- » Inability to maintain strong coverage while absorbing capital-driven debt
- » Departure from long track record of rate increases
- » Regulations creating especially large capital needs

Key Indicators

Exhibit 2

NYC Water	2013	2014	2015	2016	2017
Revenues	\$3,469	\$3,686	\$3,866	\$3,914	\$3,931
Debt Service	\$1,458	\$1,095	\$1,441	\$1,537	\$1,518
Coverage per bond resolution	3.61	4.76	8.49	7.46	7.92
Coverage of debt service by gross revenues	2.38	3.37	2.68	2.55	2.59
O&M	\$1,460	\$1,386	\$1,569	\$1,432	\$1,269
Net Revenues	\$2,009	\$2,300	\$2,297	\$2,481	\$2,661
Coverage of debt service by net revenues	1.38	2.10	1.59	1.61	1.75
Debt outstanding	\$28,865	\$30,145	\$29,942	\$30,251	\$30,030

Note: All \$ in millions. See the coverage section under Debt Service Coverage and Liquidity for more details about what's included in revenues, expenditures, and debt service, and how the authority's coverage is calculated under the bond resolution.

Source: New York City Municipal Water Finance Authority; Moody's Investors Service

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Recent Developments

Since our last report, the authority released its [audited financial report](#) for fiscal 2017 (ended 6/30/2017). Coverage in 2017 according to the authority's bond ordinance was 7.9x. Coverage of debt service by net revenues was 1.75x, based on Moody's calculation, which was a modest improvement from prior years.

A draft [Filtration Avoidance Determination](#), released in July, would extend the system's ability to avoid filtering most of its water supply until 2027.

Detailed Rating Considerations

Service Area and System Characteristics

The authority is part of a broader nexus of entities designed to finance and manage the water supply and wastewater treatment in [New York City](#) (Aa2 stable) and some of its surrounding suburbs. We refer throughout this report to the New York water and sewer system, which describes not only the authority but all of the entities collectively responsible for water provision and wastewater treatment in the city. See "Management and Governance" and "Legal Security" sections below for more details of the authority's role in this nexus.

Service Area

The size of New York City and its criticality to the US economy are key strengths for the water and sewer system, which provides essential services to a city with an economy bigger than all but four states.

New York City's economy is doing really well. Moody's Analytics [notes](#) that the New York metro area (which includes areas not served by the system) is "defying gravity." Education, healthcare and technology are driving job creation, and the city remains a global destination for tourists.

A [report](#) published by the city comptroller in August showed that the city's economy has been outpacing the US, and positive trends abound in job growth, the unemployment rate and labor force participation.

The System

This system is big. It delivers 1 billion gallons per day of water to 9.5 million people, mostly in the city but also in [Westchester County](#) (Aa1 stable) and some other suburban counties. It treats 1.25 billion gallons per day of wastewater.

The capital assets necessary to furnish water to nearly half the population of the [State of New York](#) (Aa1 stable) and treat such large quantities of wastewater are vast. The system operates 14 wastewater treatment plants, and owns 19 reservoirs upstate with storage capacity of 580 billion gallons. It also owns much of the land surrounding these reservoirs, in the interests of preserving water quality. The system is the largest property taxpayer in many communities around the reservoirs, and expects to pay \$165 million of property taxes in fiscal 2018 (ended 6/30/2018). Water is transported from the upstate reservoirs to city customers through an extensive network of tunnels and aqueducts.

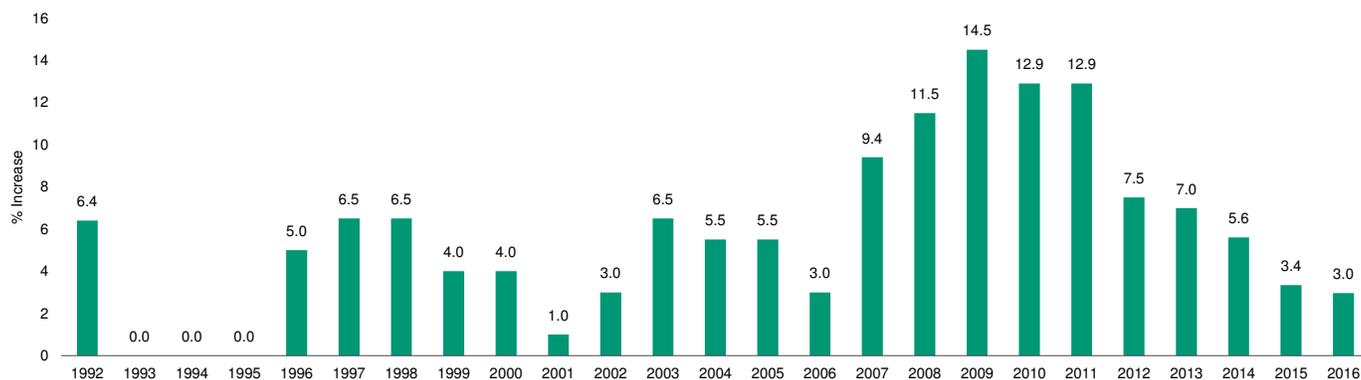
Considering the size and complexity of the water and sewer system, some of which was built more than 100 years ago, the cost of maintaining the system in good repair is substantial.

Debt Service Coverage and Liquidity

The New York City Water Board's willingness to continue raising user rates is vital to the system's long-term financial health. Without such rate increases, the combination of declining consumption and increasing debt service would eventually pressure debt service coverage.

Exhibit 3

NYC Water Board's History of Rate Increases



Note: Fiscal 2016 rate remained in place for fiscal 2017 due to ongoing litigation. The board took no action to increase rates in 2018. We do not see the litigation as hampering the board's autonomy to raise rates, only its legal ability to raise rates without a rational basis.

Source: New York City Water Board

The rate increases shown above are critical. Even as debt service increases each year because of debt-funded capital projects, water usage is in long-term decline because of conservation efforts and more water-efficient appliances. Consider that in the time captured in the above chart, consumption has decreased by almost 35%, and debt service in nominal terms has quintupled.

Two of the assumptions in the system's financial projections illustrate this tension: annual consumption declines of 1% annually, and rate increases each year, reaching as high as 5% in 2022. Even if these projections are conservative, the fact remains that the system will likely need to continue increasing rates to maintain strong coverage.

Favorably, even with the history of rate increases, New York's water rates are not particularly high compared with other cities. A consultant in February examined annual water and sewer costs in 30 large cities, and found New York's to be below-average.

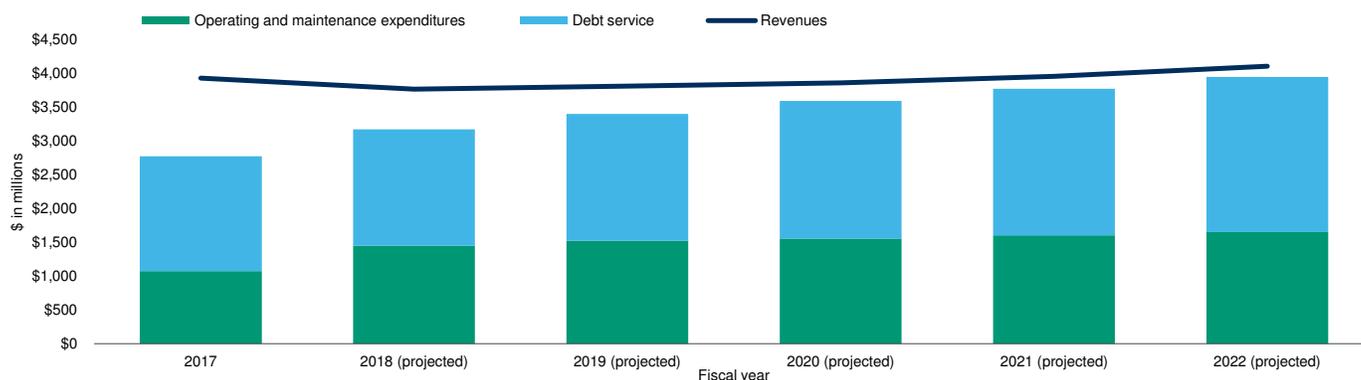
Since utilities across the country face similar dynamics of flat-to-declining consumption and increasing debt service, New York is unlikely to rocket much higher on the list. In a similar survey conducted in 1991, New York's user charges were in the same place relative to other big utilities – a little bit below-average.

That said, the system's currently healthy financial position would likely weaken quickly if the water board were not to keep raising rates. In recent years, the system has been generating a surplus after debt service of around \$1 billion each year, which provides both cash and debt service capacity to fund future capital projects.

However, the authority's financial projections show debt service increasing by almost \$600 million through 2022, and operating and maintenance expenditures an additional \$200 million. Without additional revenues, rising expenses would begin to consume that surplus.

Exhibit 4

Expenses Could Soon Begin Pressuring Coverage



Source: New York City Municipal Water Finance Authority; Moody's Investors Service

Coverage

We recognize that the New York water and sewer system's legal structure is unlike most other utilities, in that bondholders have a claim on the gross revenues of the authority, before any operating expenses are paid. We therefore evaluate coverage in three different ways to get a sense of the system's financial health.

Exhibit 5

Coverage Shown Three Different Ways

Fiscal Year	Revenues (net of authority expenses)	O&M	Net Revenues	Debt Service	Coverage Under Bond Resolution	Gross Coverage	Net Coverage
2011	\$3,006	\$1,247	\$1,760	\$1,369	2.67	2.20	1.29
2012	\$3,237	\$1,406	\$1,831	\$1,462	2.98	2.21	1.25
2013	\$3,469	\$1,460	\$2,009	\$1,458	3.61	2.38	1.38
2014	\$3,686	\$1,386	\$2,300	\$1,095	4.76	3.37	2.10
2015	\$3,866	\$1,569	\$2,297	\$1,441	8.49	2.68	1.59
2016	\$3,914	\$1,432	\$2,481	\$1,537	7.46	2.55	1.61
2017	\$3,931	\$1,269	\$2,661	\$1,518	7.92	2.59	1.75
2018 (projected)	\$3,767	\$1,450	\$2,317	\$1,721	6.26	2.19	1.35
2019 (projected)	\$3,837	\$1,526	\$2,311	\$1,874	3.94	2.05	1.23
2020 (projected)	\$3,859	\$1,556	\$2,303	\$2,039	3.56	1.89	1.13
2021 (projected)	\$3,958	\$1,603	\$2,355	\$2,168	3.13	1.83	1.09
2022 (projected)	\$4,106	\$1,651	\$2,455	\$2,294	3.06	1.79	1.07

Note: Revenues exclude expenses of the authority. O&M includes the expenses of the water board and rental payments made to the city. Debt service is obtained in each year from the debt service schedule shown in the Comprehensive Annual Financial Report of the prior year.

Source: New York City Municipal Water Finance Authority; Moody's Investors Service

- » **Coverage under bond resolution (7.9x).** After paying debt service in a given year, the authority carries forward a surplus into the following year (known as a carryforward revenue) and uses it to pay the following year's debt service. Coverage calculated under the bond resolution reduces debt service by the amount of the carryforward revenue. Because the system has been running large surpluses, the carryforward revenues have had the effect of reducing debt service for coverage purposes and increasing coverage.
- » **Gross coverage (2.6x).** This Moody's adjustment recognizes bondholders' claim on gross revenues of the authority, but does not reduce debt service by the carryforward revenues. It is simply gross revenues divided by debt service.
- » **Net coverage (1.75x).** This Moody's adjustment evaluates coverage of debt service by net revenues, or gross revenues net of operating and maintenance expenditures. We do not assume that the water and sewer system would continue to operate if it

couldn't cover operating and maintenance expenditures. Therefore, we evaluate net coverage, as it is more typically calculated for other Moody's-rated utilities.

Net coverage of 1.75x is healthy, and fits right in with other major water and sewer utilities, most of which are similarly highly rated and have similar coverage.

Exhibit 6

Coverage for the 10 Largest US Utilities by Revenue

Utility	Rating	Net Debt Service Coverage (x)
New York City Municipal Water Finance Authority, NY	Aa1	1.8
Houston Water and Sewer Enterprise, TX	Aa1	1.5
Massachusetts Water Resources Authority, MA	Aa1	1.2
Miami-Dade County Water and Sewer Enterprise, FL	Aa3	2.6
Philadelphia Water and Sewer Enterprise, PA	A1	1.4
San Antonio Water and Sewer Enterprise, TX	Aa1	1.8
Atlanta Water and Sewer Enterprise, GA	Aa2	1.8
Dallas Waterworks and Sewer Enterprise, TX	Aa1	1.7
Austin Water and Sewer Enterprise, TX	Aa1	1.7
District of Columbia Water and Sewer Authority, DC	Aa1	2.0

In each case, coverage shown is from the last Moody's report on the utility.

Source: Moody's Investors Service

LIQUIDITY

As the first stop of all New York water revenues, the authority always has huge amounts of cash on hand. The authority's flow of funds ensures that water revenues are deposited first with the authority, where it is applied toward debt service, often well in advance of the debt service date. In the past few years, annual debt service was fully funded only two months into the fiscal year.

As of the end of fiscal 2017, the authority reported nearly \$1.5 billion of cash, which was restricted for debt service. The authority's cash is equal to about 330 days of the system's O&M, although we note that the system does not have recourse to this cash ahead of bondholders.

Debt and Legal Covenants

The New York water and sewer system is a high-debt utility. As an old system with an \$18.8 billion, mostly debt-funded 10-year capital plan, it is likely to remain so.

The system's debt of \$30 billion is equal to 7.6x revenues, which is the highest for any Moody's-rated water and sewer utility in the United States with at least \$50 million of revenues. The debt burden is high even compared with other old urban utilities on the East Coast.

Exhibit 7

NYC Water Has a High Debt Burden

Utility	Seniormost Rating	Debt to Revenues
New York City Municipal Water Finance Authority, NY	Aa1 stable	7.6
Massachusetts Water Resources Authority	Aa1 stable	7.4
Atlanta Water and Wastewater Enterprise, GA	Aa2 stable	4.9
District of Columbia Water and Sewer Authority	Aa1 stable	4.9
Philadelphia Water and Sewer Enterprise, PA	A1 stable	2.6

In each case, coverage shown is from the last Moody's report on the utility.

Source: Moody's Investors Service

To help finance the system's massive capital plan, the authority expects to issue about \$2 billion of debt annually. Meanwhile, anticipated principal repayments are less than \$1 billion each year.

As a result, current projections of future debt service requirements show increases from about \$1.7 billion last year to nearly \$2.3 billion in debt service by 2022.

DEBT STRUCTURE

Most of the system's debt is fixed rate revenue bonds, with the majority of those issued under the second resolution and secured by a subordinate claim on gross revenues. The system also issues commercial paper and bond anticipation notes, both of which are designed to begin funding capital projects ahead of long-term borrowings.

Exhibit 8

NYC Water's Debt Portfolio

Debt	6/30/2017
First Resolution Bonds	\$2.43 billion
Second Resolution Bonds	\$27.24 billion
Notes issued to the Environmental Facilities Corp.	\$0.359 billion
Total	\$30.03 billion

Source: New York City Municipal Water Finance Authority

DEBT-RELATED DERIVATIVES

The authority has two outstanding swap agreements with two different counterparties in an aggregate notional amount of about \$400 million. As of 6/30/2017, the mark-to-market value was approximately negative \$100 million. Termination of the swaps by the counterparties is limited to highly unlikely events. In the event that the authority should owe a termination payment, the swaps include provisions that allow the rate setting process to occur before the payment is due.

PENSIONS AND OPEB

The New York water and sewer system is operated by the New York City Department of Environmental Protection. Pension liabilities related to those employees are included in our calculations of the city's pension burden. The city's pension system includes three multiemployer cost-sharing plans (the New York City Employees Retirement System, Teachers Retirement System, and Board of Education Retirement System), and separate plans for fire and police. The city's shares of the multi-employer plans are 55.5%, 97.3% and 99.9%, respectively. Reflecting those plans, the city's fiscal 2016 Moody's-adjusted net pension liability (ANPL) is \$144.5 billion, or 18.2% of operating revenues. While the city's three-year adjusted ANPL as a percentage of full value is the fourth largest of the 50 largest local governments, at 11%, the burden is more moderate as percentage of operating revenue: 129%, ranking 34th (based on fiscal 2015 data, the most current available to make this comparison). Our adjustments improve comparability of reported pension liabilities, but the adjustments are not intended to replace the city's reported liability information.

Management and Governance

The authority fits into a larger nexus of state-created entities designed to finance and operate the New York water and sewer system.

Under state law and a variety of agreements, the city [leases](#) its water and sewer system to the [New York City Water Board](#), whose members are appointed by the mayor. The board sets water rates.

The city's Department of Environmental Protection operates the system itself, and collects water revenues.

The authority issues bonds to fund the system's capital needs, and these bonds are secured by a lien on the revenues collected by DEP.

The management of these entities has collectively been strong, showing clear will to increase rates and keeping coverage of debt service solid despite big increases in debt and debt service.

Legal Security

The authority's bonds are secured by a lien on revenues collected by the New York water and sewer system.

The authority holds both a statutory and contractual lien on the system's revenues. Only after the board has provided for debt service on the authority's bonds is the remainder released to DEP to operate the system. Therefore, unlike most municipal utilities in the United States whose bonds are secured by net revenues, New York water bondholders are secured by a gross revenue pledge. Furthermore, bond counsel has opined that the authority is bankruptcy-remote from the City of New York.

The State of New York has covenanted by law not to limit or alter the rights of the authority until its obligations to bondholders are met.

Use of Proceeds

Proceeds of the 2018 Series CC bonds will be used to fund the system's capital plan and also to refund certain series of previously issued bonds in advance of their maturities.

Obligor Profile

The obligor for the bonds is a network of entities we refer to collectively as the New York water and sewer system.

Methodology

The principal methodology used in this rating was US Municipal Utility Revenue Debt published in October 2017. Please see the Rating Methodologies page on www.moody.com for a copy of this methodology.

Ratings

Exhibit 9

NEW YORK CITY MUNICIPAL WATER FINANCE AUTH., NY

Issue	Rating
Water and Sewer System Second General Resolution Revenue Bonds, Fiscal 2018 Series CC	Aa1
Rating Type	Underlying LT
Sale Amount	\$400,000,000
Expected Sale Date	11/29/2017
Rating Description	Revenue: Government Enterprise

Source: Moody's Investors Service

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