



**Environmental  
Protection**

**COMBINED SEWER OVERFLOW  
LONG TERM CONTROL PLAN  
FINANCIAL CAPABILITY ASSESSMENT**

**FEBRUARY 2016**

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## 1.0 INTRODUCTION AND PURPOSE

New York City Department of Environmental Protection (DEP) manages a regional water supply system that serves New York City residents, commuters and visitors as well as one million persons who reside in nearby counties. DEP provides over 1 billion gallons of water each day from several watersheds that extend more than 125 miles from the City, through a network of 19 reservoirs, numerous aqueducts, and 6,600 miles of water mains and distribution pipes. The City of New York (NYC) owns, and DEP operates and is responsible for 14 municipal wastewater treatment plants (WWTPs), which process most of the sewage generated within NYC as well as the combined sewage system, related pump stations, sewer regulators, Combined Sewage Overflow (CSO) storage facilities and other related infrastructure. NYC is in the midst of an unprecedented period of investment to improve water quality in New York Harbor; more than \$10 billion of projects have been completed or are underway since 2002 alone. These investments are funded almost exclusively by NYC ratepayers.

To date, NYC has invested approximately \$2 billion in reducing CSO discharges, resulting in significantly reduced CSO discharges to Harbor waters. Some of the major projects include Paerdegat CSO storage facility, Flushing Creek CSO storage facility, Alley Creek CSO storage facility, Coney Island Pump Station, Newtown Creek aeration, Gowanus Canal pump station and flushing tunnel, and various sewer and regulator improvements in drainage areas throughout the City. NYC is also undertaking an ambitious program to utilize green infrastructure to further reduce CSOs. To this end, NYC will be spending \$1.5 billion in public funds (with an anticipated additional \$900 million in private funds) to achieve the goal of controlling the equivalent of stormwater generated by one inch of precipitation on 10 percent of the impervious surfaces in the City's combined sewer areas by 2030.

In an agreement reached with the New York State Department of Conservation (DEC) memorialized in the 2016 CSO Consent Order (DEC CO2-20150529-1) (2016 CSO Order), NYC will be expending an additional \$3.3 billion over the next 25 years for CSO pollution control, which includes up to \$500 million on projects to reduce the number of early tipping regulators, and/or the number or duration of early tipping events from the early tipping regulators. The remainder of the \$3.3 billion will be invested on projects which are in LTCPs approved under the 2016 CSO Order, and others which will be identified in future LTCPs to be submitted pursuant to the terms of the 2016 CSO Order. This \$3.3 billion is in addition to money that NYC has already spent or committed to spend on specific CSO control projects under pre-existing legal commitments. This additional spending was agreed to be based on projected benefits to water quality in terms of pathogen indicators, floatables and dissolved oxygen that are anticipated to result from such expenditure; and also takes into consideration historic and projected water rate increases and the relationship of water rates to various economic indicators, including median household income (MHI), impacts to certain segments of the population with income below MHI, and other financial capability indicators, and EPA's recognition that affordability to the community is a significant factor in determining an appropriate level of spending for CSO control.

This paper analyzes the financial capability NYC to make these additional investments in CSO control measures, in light of the relevant financial indicators, the overall socioeconomic conditions in NYC, and the need to continue spending on other water and sewer projects. The analysis is presented both in terms of the EPA's Financial Capability Guidance framework and by applying several additional factors of particular relevance to NYC's unique socioeconomic character.

NYC has over 1.7 million people living below the federal poverty line – representing almost 21 percent of the City's population, and comprising a population larger than the entire city of Philadelphia. This segment of the City is already shouldering a substantial financial burden when it comes to water rates. Twenty-seven percent of households are currently estimated to be spending more than 2 percent of household income on wastewater services alone. When taking into consideration future spending commitments, it is estimated that fifty percent of households will be paying 2 percent or more on wastewater spending and that the average household wastewater bill is estimated to be equal to

2 percent of the Median Household Income by 2040. When evaluating the City’s ability to afford additional investments in CSO control, it is important to consider the impacts of such spending on those segments of the population most vulnerable to the economic consequences of rising water rates. As demonstrated in this paper, DEP’s commitment to spend an additional \$3.3 billion on CSO control measures over a period of 25 years in addition to existing CSO-related spending previously committed under existing programs totals nearly \$7.5 billion, which represents a substantial commitment of both financial and human resources to meaningfully address water quality impacts while allowing DEP to be mindful and appropriately manage the rate impacts on its customers.

## 2.0 BACKGROUND ON FINANCIAL CAPABILITY GUIDANCE

### U.S. EPA’s Financial Capability Guidance for Combined Sewer Overflows

EPA has recognized the importance of taking a community’s financial status into consideration, and in 1997, EPA issued “Combined Sewer Overflows: Guidance for Financial Capability Assessment and Schedule Development.” EPA’s financial capability guidance contains a two-phased assessment approach. Phase I examines affordability in terms of impacts to residential households. This analysis applies the residential indicator (RI), which examines the average cost of household water pollution costs (wastewater and stormwater) relative to a benchmark of two percent of service area-wide median household income (MHI). The results of this preliminary screening analysis are assessed by placing the community in one of three categories:

- Low economic impact: average wastewater bills are less than one percent of MHI.
- Mid-range economic impact: average wastewater bills are between one percent and two percent of MHI.
- High economic impact: average wastewater bills are greater than two percent of MHI.

In NYC, the wastewater bill is a function of water consumption. Therefore, average household costs and the RI are estimated based on consumption rates by household type, as shown in Table 1.

**Table 1: Residential Water and Wastewater Costs compared to Median Household Income (MHI)**

	<b>Average Annual Wastewater Bill (\$/year)</b>	<b>Wastewater RI (Wastewater Bill/MHI<sup>(1)</sup>) (%)</b>	<b>Total Water and Wastewater Bill (\$/Year)</b>	<b>Water and Wastewater RI (Water and Wastewater Bill/MHI) (%)</b>
Single-family <sup>(2)</sup>	648	<b>1.22</b>	1,056	<b>1.98</b>
Multi-family <sup>(3)</sup>	421	<b>0.79</b>	686	<b>1.29</b>
<b>Average Household Consumption<sup>(4)</sup></b>	531	<b>1.00</b>	865	<b>1.62</b>
MCP <sup>(5)</sup>	617	<b>1.16</b>	1,005	<b>1.89</b>

Notes:

- (1) Latest MHI data is \$52,996 based on 2014 ACS data, estimated MHI adjusted to present is \$53,223.
- (2) Based on 80,000 gallons/year consumption and Fiscal Year (FY) 2016 Rates.
- (3) Based on 52,000 gallons/year consumption and FY 2016 Rates.
- (4) Based on average consumption across all metered residential units of 65,530 gallons/year and FY 2016 Rates.
- (5) Multi-family Conservation Plan is a flat fee per unit for customers who will implement certain conservation measures.

As shown in Table 1, the RI for wastewater costs varies between 0.79 percent of MHI to 1.22 percent of MHI depending on household type. Since DEP is a water and wastewater utility and the ratepayers receive one bill for both charges, it is also appropriate to look at the total water and wastewater bill in considering the RI, which varies from 1.29 percent to 1.98 percent of MHI.

Based on this initial screen, current wastewater costs pose a low to mid-range economic impact according to the 1997 EPA guidance. However, there are several limitations to using MHI as a financial indicator for a city like New York. NYC has a large population and more than three million households. Even if a relatively small percentage of households were facing unaffordable water and wastewater bills, there would still be a significant number of households experiencing this hardship. For example, more than 702,000 households in NYC (about 22 percent of NYC's total) earn less than \$20,000 per year and have estimated wastewater costs well above 2 percent of their household income. Therefore, there are several other socioeconomic indicators to consider in assessing residential affordability, as described later in this Paper.

The second phase of EPA's analysis framework develops the Permittee Financial Capability Indicators (FCI), which examine several metrics related to the financial health and capabilities of the impacted community. The indicators are compared to national benchmarks and are used to generate a score that is the average of six economic indicators, including bond rating, net debt, MHI, local unemployment, property tax burden, and property tax collection rate within a service area. Lower FCI scores imply weaker economic conditions and thus the increased likelihood that additional controls would cause substantial economic impact.

Table 2 summarizes the FCI scoring as presented in the 1997 CSO guidance.

**Table 2: Financial Capability Indicator Scoring**

<b>Financial Capability Metric</b>	<b>Strong (Score = 3)</b>	<b>Mid-range (Score = 2)</b>	<b>Weak (Score = 1)</b>
<b><i>Debt indicator</i></b>			
Bond rating (G.O. bonds, revenue bonds)	AAA-A (S&P) Aaa-A (Moody's)	BBB (S&P) Baa (Moody's)	BB-D (S&P) Ba-C (Moody's)
Overall net debt as percentage of full market value	Below 2%	2-5%	Above 5%
<b><i>Socioeconomic indicator</i></b>			
Unemployment rate	More than 1 percentage point below the national average	+/- 1 percentage point of national average	More than 1 percentage point of national average
MHI	More than 25% above adjusted national MHI	+/- 25% of adjusted national MHI	More than 25% below adjusted national MHI
<b><i>Financial management indicator</i></b>			
Property tax revenues as percentage of Full Market Property Value (FMPV)	Below 2%	2-4%	Above 4%
Property tax revenue collection rate	Above 98%	94-98%	Below 94%

NYC's FCI score based on this test is presented in Table 3 and further described below.

**Table 3: NYC Financial Capability Indicator Score**

<b>Financial Capability Metric</b>	<b>Actual Value</b>	<b>Score</b>
<b><i>Debt indicators</i></b>		
Bond rating (G.O. bonds)	AA (S&P) AA (Fitch) Aa2 (Moody's)	Strong/3
Bond rating (Revenue bonds)	AAA (S&P) AA+ (Fitch) Aa1 (Moody's)	
Overall net debt as percentage of FMPV	4.9%	Mid-range/2
G.O. Debt	\$41.6B	
Market value	\$858.1B	
<b><i>Socioeconomic indicators</i></b>		
Unemployment rate (2014 annual average)	1.0 percentage point above the national average	Mid-range/2
NYC unemployment rate	7.2%	
United States unemployment rate	6.2%	
MHI as percentage of national average	98.8%	Mid-range/2
<b><i>Financial management indicators</i></b>		
Property tax revenues as percentage of FMPV	2.5%	Mid-range/2
Property tax revenue collection rate	98.5%	Strong/3
<b><i>Permittee Indicators Score</i></b>		2.3

*Debt and Market Value Information as of June 30, 2014*

*Bond Rating*

The first financial benchmark is NYC's bond rating for both general obligation (G.O.) and revenue bonds. A bond rating performs the isolated function of credit risk evaluation. While many factors go into the investment decision-making process, bond ratings can significantly affect the interest that the issuer is required to pay, and thus the cost of capital projects financed with bonds. According to EPA's criteria – based on the ratings NYC has received from all three rating agencies [Moody's, Standard & Poor's (S&P), and Fitch Ratings] – NYC's financing capability is considered "strong" for this category.

NYC's G.O. rating and MWFA's revenue bond ratings are high due to prudent fiscal management, the legal structure of the system, and the Water Board's historical ability to raise water and wastewater rates. However, mandates over the last decade have significantly increased the leverage of the system, and future bond ratings could be impacted by further increases to debt beyond what is currently forecasted.

*Net Debt as a Percentage of Full Market Property Value (FMPV)*

The second financial benchmark measures NYC's outstanding debt as a percentage of FMPV. At the end of FY 2014, NYC had more than \$41.6 billion in outstanding G.O. debt, and the FMPV within NYC was \$858.1 billion. This results in a ratio of outstanding debt to FMPV of 4.9% and a "mid-range" rating for this indicator. If \$29.7 billion of MWFA revenue bonds that support the System are included, net debt as a percentage of FMPV increases to 8.3%, which results in a "weak" rating for this indicator. Furthermore, if NYC's \$39.5 billion of additional debt that is related to other services and infrastructure is also included, the resulting ratio further increases to 12.9% net debt as a percentage of FMPV.

### *Unemployment Rate*

For the unemployment benchmark, the 2014 annual average unemployment rate for NYC was compared to that for the U.S. NYC's 2014 unemployment rate of 7.2 percent is 1.0 percent higher than the national average of 6.2 percent. Based on EPA guidance, NYC's unemployment benchmark would be classified as "mid-range". It is important to note that over the past two decades, NYC's unemployment rate has generally been significantly higher than the national average. Due to the recession, the national unemployment is now closer to NYC's unemployment rate. Additionally, the unemployment rate measure identified in the 1997 financial guidance sets a relative comparison at a snapshot in time. It is difficult to predict whether the unemployment gap between the U.S. and NYC will once again widen further, and it may be more relevant to look at longer term historical trends of the service area.

### *Median Household Income (MHI)*

The MHI benchmark compares the community's MHI to the national average. Using American Community Survey (ACS) 2014 single-year estimates, NYC's MHI is \$52,996 and the nation's MHI is \$52,657. Thus, NYC's MHI is nearly 100 percent of the national MHI, resulting in a "mid-range" rating for this indicator. However, as discussed above in this section, MHI does not provide an adequate measure of affordability or financial capability. MHI is a poor indicator of economic distress and bears little relationship to poverty or other measures of economic need. In addition, reliance on MHI alone can be a very misleading indicator of the affordability impacts in a large and diverse City such as NYC.

### *Tax Revenues as a Percentage of Full Market Property Value*

This indicator, which EPA also refers to as the "property tax burden", attempts to measure "the funding capacity available to support debt based on the wealth of the community," as well as "the effectiveness of management in providing community services". According to the NYC Property Tax Annual report issued for FY 2014, NYC had billed \$21.3 billion in real property taxes against an \$858.1 billion FMPV, which amounts to 2.5 percent of FMPV. For this benchmark, NYC received a "mid-range" score. This figure does not include water and wastewater revenues; including \$3.6 billion of FY 2014 system revenues increases the ratio to 2.9 percent of FMPV.

However, this indicator (including or excluding water and wastewater revenues) is misleading because NYC obtains a relatively low percentage of its tax revenues from property taxes. In 2007, property taxes accounted for less than 41 percent of NYC's total non-exported taxes, meaning that taxes other than property taxes (e.g., income taxes, sales taxes) account for nearly 60 percent of the locally borne NYC tax burden.

### *Property Tax Collection Rate*

The property tax collection rate is a measure of "the efficiency of the tax collection system and the acceptability of tax levels to residents". The FY 2014 NYC Property Tax Annual report indicates NYC's total property tax levy was \$21.3 billion, of which 98.5 percent was collected, resulting in a "strong" rating for this indicator.

It should be noted, however, that the processes used to collect water and wastewater charges and the enforcement tools available to water and wastewater agencies differ from those used to collect and enforce real property taxes. The New York City Department of Finance (DOF), for example, can sell real property tax liens on all types of non-exempt properties to third parties, who can then take action against the delinquent property owners. DEP, in contrast, can sell liens on multi-family residential and commercial buildings whose owners have been delinquent on water bills for more than one year, but it cannot sell liens on single-family homes. The real property tax collection rate thus does not accurately reflect the local agency's ability to collect the revenues used to support water supply and wastewater capital spending.

## **Flexibility in CSO Guidance**

Importantly, EPA recognizes that the procedures set out in its guidance are not the only appropriate analyses to evaluate a community's ability to comply with CWA requirements. EPA's 2001 "Guidance: Coordinating CSO Long-term Planning with Water Quality Standards Reviews" emphasizes this by stating:

*The 1997 Guidance "identifies the analyses states may use to support this determination [substantial and widespread impact] for water pollution control projects, including CSO LTCPs. States may also use alternative analyses and criteria to support this determination, provided they explain the basis for these alternative analyses and/or criteria (U.S. EPA, 2001, p. 31).*

Likewise, EPA has recognized that its RI and FCI metrics are not the sole socioeconomic basis for considering an appropriate CSO compliance schedule. EPA's 1997 guidance recognizes that there may be other important factors in determining an appropriate compliance schedule for a community, and contains the following statement that authorizes communities to submit information beyond that which is contained in the guidance:

*It must be emphasized that the financial indicators found in this guidance might not present the most complete picture of a permittee's financial capability to fund the CSO controls. ... Since flexibility is an important aspect of the CSO Policy, permittees are encouraged to submit any additional documentation that would create a more accurate and complete picture of their financial capability (U.S. EPA, 1997, p. 7).*

Furthermore, EPA in 2012 released its "Integrated Municipal Stormwater and Wastewater Planning Approach Framework," which is supportive of a flexible approach to prioritizing projects with the greatest water quality benefits and the use of innovative approaches like Green Infrastructure (GI) (U.S. EPA, 2012). Additionally, in November of 2014, EPA released its "Financial Capability Assessment Framework" clarifying the flexibility within their CSO guidance.

This paper also explores additional socioeconomic indicators that reflect affordability concerns within the NYC context.

## **3.0 SOCIOECONOMIC CONSIDERATIONS IN NEW YORK CITY CONTEXT**

### **Income Levels**

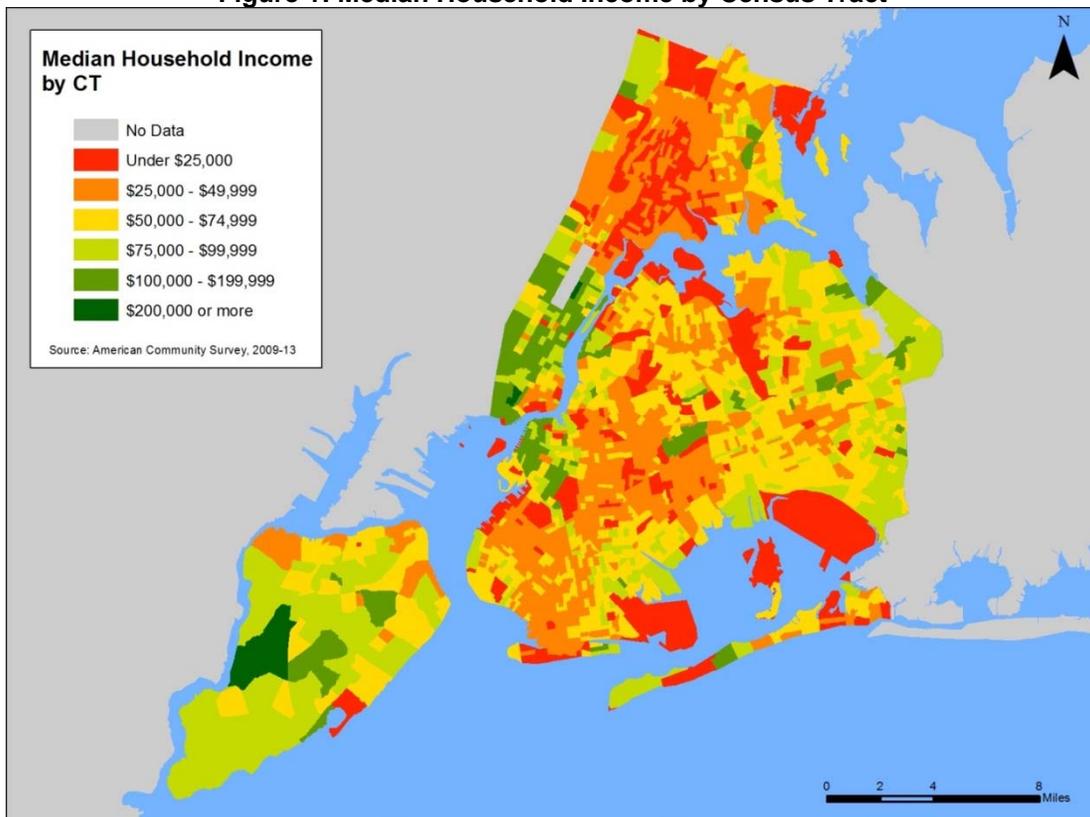
In 2014, the latest year for which Census data is available, the MHI in NYC was \$52,996. As shown in Table 4, across the NYC boroughs, MHI ranged from \$33,712 in the Bronx to \$76,089 in Manhattan. Figure 1 shows that income levels also vary considerably across NYC neighborhoods, and there are several areas in NYC with high concentrations of low-income households.

**Table 4 : Median Household Income**

Location	2014 MHI
United States	\$53,657
New York City	\$52,996
Bronx	\$33,712
Brooklyn	\$47,966
Manhattan	\$76,089
Queens	\$57,241
Staten Island	\$71,121

Source: U.S. Census Bureau 2014 ACS 1-Year Estimates.

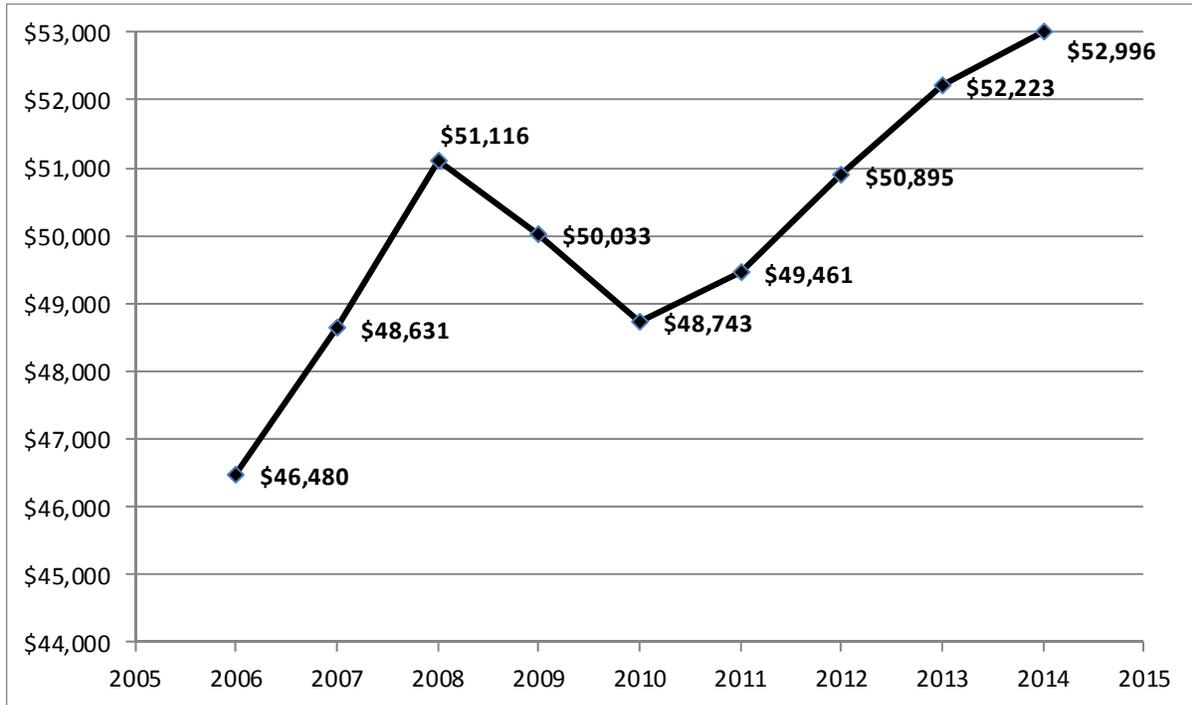
**Figure 1: Median Household Income by Census Tract**



Source: U.S. Census Bureau 2009-2013 ACS 5-Year Estimates.

As shown in Figure 2, after 2008, MHI in NYC actually decreased for several years, and it took several years to recover to the 2008 level. However, during this period, the cost of living continued to increase.

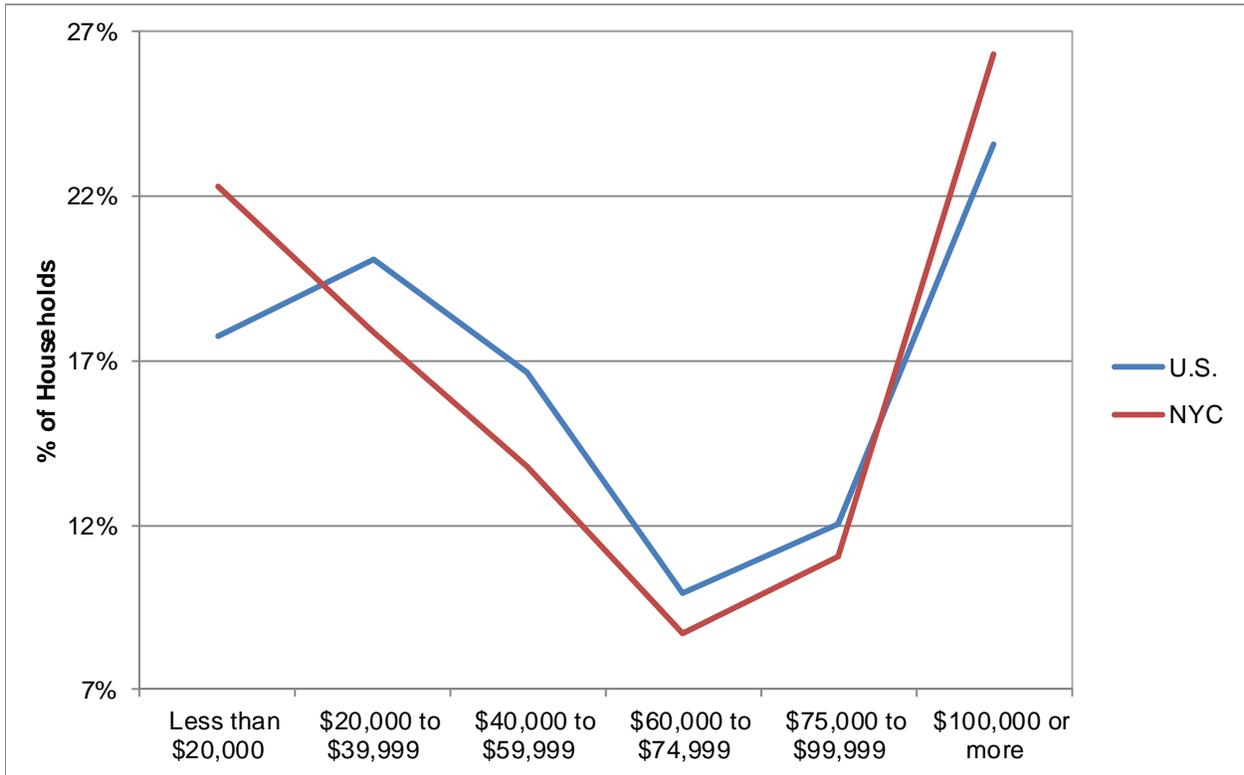
**Figure 2: NYC Median Household Income over Time**



**Income Distribution**

NYC currently ranks as one of the most unequal cities in the United States (U.S.) in terms of income distribution. NYC's income distribution highlights the need to focus on metrics other than citywide MHI in order to capture the disproportionate impact on households in the lowest income brackets. It is clear that MHI does not represent "the typical household" in NYC. As shown in Figure 3, incomes in NYC are not clustered around the median, but rather there are greater percentages of households at both ends of the economic spectrum. Also, the percentage of the population with middle-class incomes between \$20,000 and \$100,000 is 7.3 percent less in NYC than in the U.S. generally.

**Figure 3: Income Distribution for NYC and U.S.**



Source: U.S. Census Bureau 2014 ACS 1-Year Estimates.

**Poverty Rates**

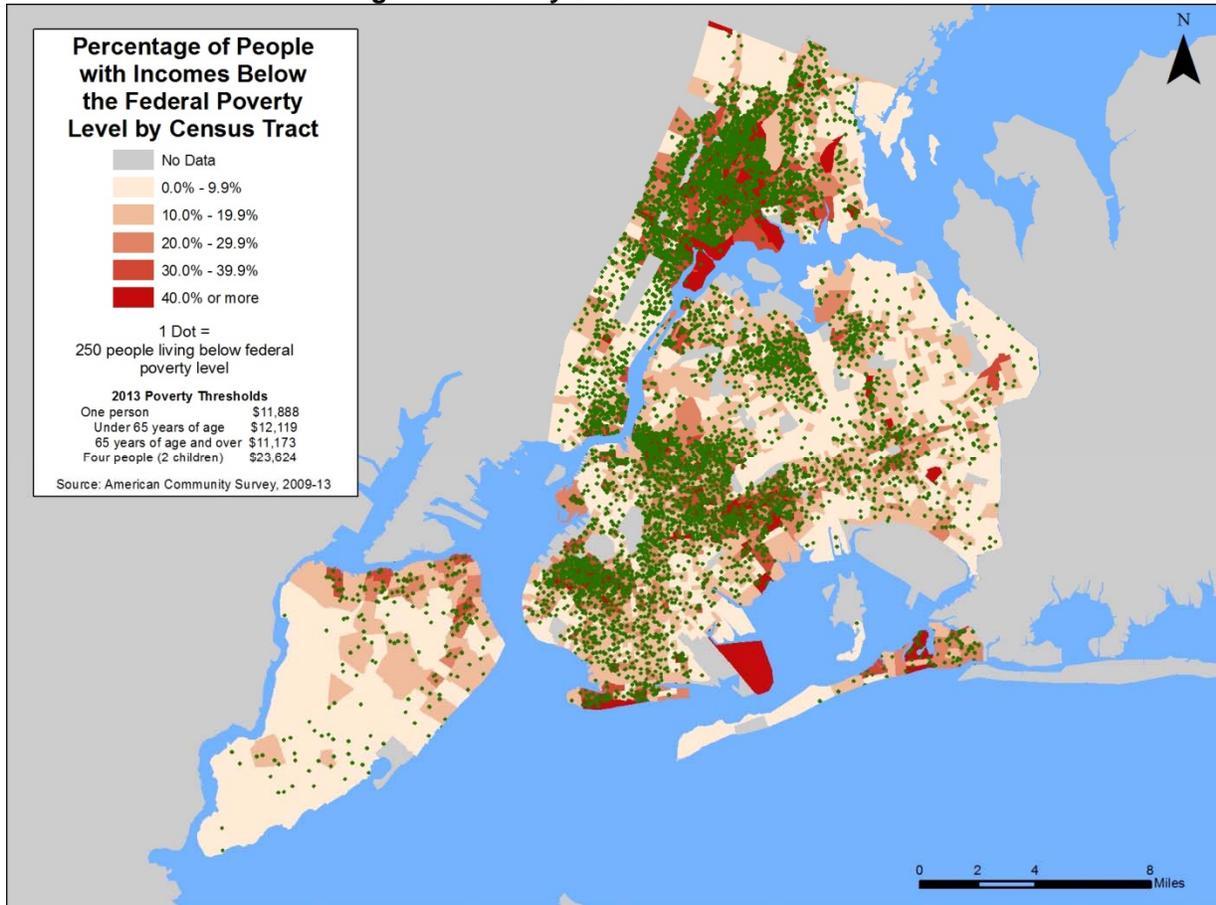
Based on the latest available Census data, 20.9 percent of NYC residents are living below the federal poverty level (more than 1.7 million people, which is greater than the entire population of Philadelphia). This compares to a national poverty rate of 15.5 percent despite the similar MHI levels for NYC and the U.S. as a whole. As shown in Table 5, across the NYC boroughs, poverty rates vary from 14.5 percent in Staten Island to 31.6 percent in the Bronx.

**Table 5: NYC Poverty Rates**

Location	Percentage of Residents Living Below the Federal Poverty Level (ACS 2014)
United States	15.5
New York City	20.9
Bronx	31.6
Brooklyn	23.4
Manhattan	17.6
Queens	15.2
Staten Island	14.5

Figure 4 shows that poverty rates also vary across neighborhoods, with several areas in NYC having a relatively high concentration of people living below the federal poverty level. Each green dot represents 250 people living in poverty. While poverty levels are concentrated in some areas, there are pockets of poverty throughout NYC. An RI that relies on MHI alone fails to capture these other indicators of economic distress. Two cities with similar MHI could have varying levels of poverty.

**Figure 4: Poverty Clusters and Rates in NYC**

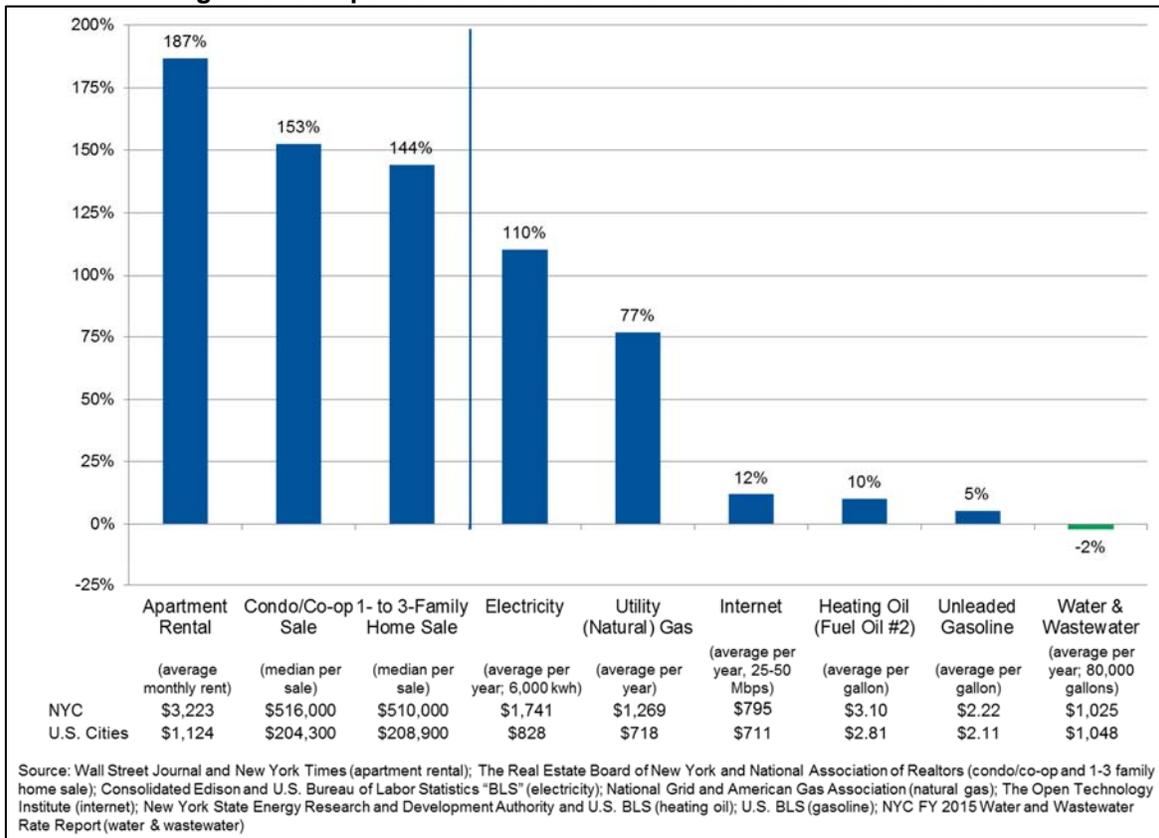


Source: U.S. Census Bureau 2009-2013 ACS 5-Year Estimates.

### **Cost of Living and Housing Burden**

NYC residents face relatively high costs for nondiscretionary items (e.g., housing, utilities) compared to individuals living almost anywhere else in the nation as shown in Figure 5. While water costs are slightly less than the average for other major U.S. cities, the housing burden is substantially higher.

**Figure 5: Comparison of Costs between NYC and other U.S. Cities**



Approximately 67 percent of all households in NYC are renter-occupied, compared to about 35 percent of households nationally. For most renter households in NYC, water and wastewater bills are included in the total rent payment. Rate increases may be passed on to the tenant in the form of a rental increase, or born by the landlord. In recent years, affordability concerns have been compounded by the fact that gross median rents have increased, while median renter income has declined.

Most government agencies consider housing costs of between 30 percent and 50 percent of household income to be a moderate burden in terms of affordability; costs greater than 50 percent of household income are considered a severe burden.

A review of 2014 ACS Census data shows approximately 18 percent of NYC households (close to 174,000 households) spent between 30 percent and 50 percent of their income on housing, while about 20 percent (193,000 households) spent more than 50 percent. This compares to 15 percent of households nationally that spent between 30 percent and 50 percent of their income on housing and 10 percent of households nationally that spent more than 50 percent. This means that 38 percent of households in NYC versus 25 percent of households nationally spent more than 30 percent of their income on housing costs.

The NYC Housing Authority (NYCHA) is responsible for 172,223 affordable housing units (9 percent of the total renter households in NYC). NYCHA paid about \$182 million for water and wastewater in FY 2015. This total represents about 5.8 percent of their \$3.14 billion operating budget. Even a small increase in rates could potentially impact the agency's ability to provide affordable housing and/or other programs, and NYCHA has experienced funding cuts and operational shortfalls in recent years.

In sum, the financial capability assessment for New York City, must look beyond the 1997 EPA FCA guidance and take into consideration the socioeconomic conditions discussed in this section including NYC's income distribution, water and wastewater rate impacts on households with income below the median level, poverty rates, housing costs, total tax burden, and long-term debt. As many utilities provide both drinking and wastewater services and households often pay one consolidated bill, financial capability and affordability should look at total water and wastewater spending. Scheduling and priorities for future spending should take into account the data presented here and below with respect to historical and future commitments.

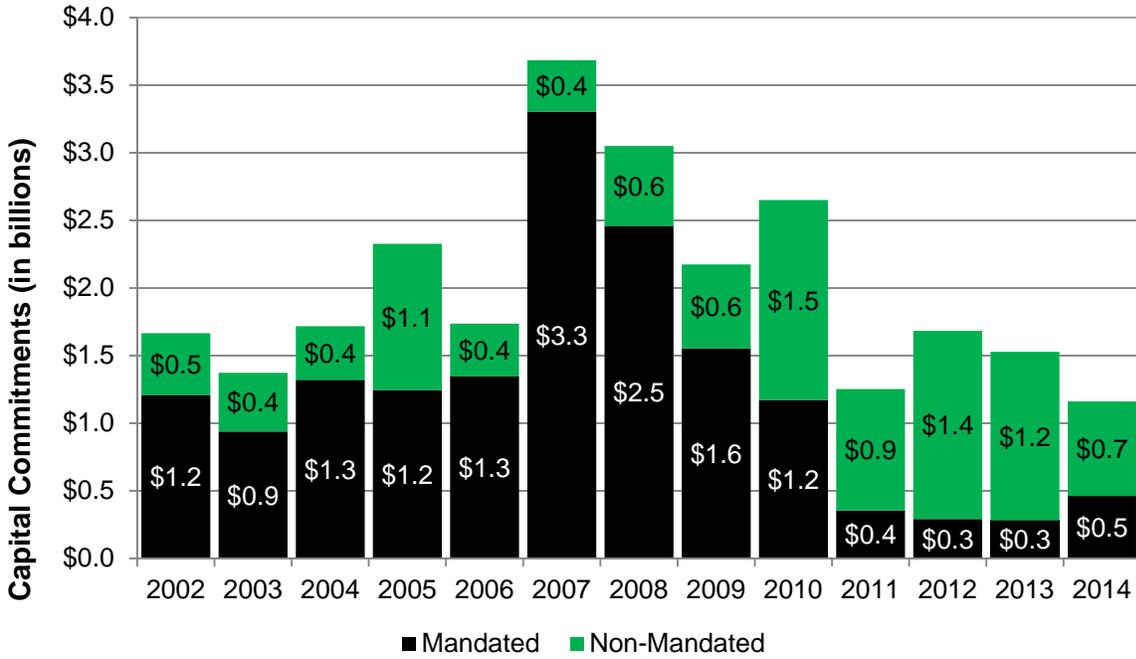
#### **4.0 BACKGROUND ON HISTORICAL DEP SPENDING**

As the largest water and wastewater utility in the nation, DEP provides more than a billion gallons of drinking water daily to more than eight million NYC residents, visitors, and commuters, as well as one million upstate customers. DEP maintains over 2,000 square miles of watershed comprised of 19 reservoirs, three controlled lakes, several aqueducts, and 6,800 miles of water mains and distribution pipes. DEP also collects and treats wastewater. Averaged across the year, the system treats approximately 1.3 billion gallons of wastewater per day collected through 7,500 miles of sewers, 95 pump stations and 14 in-City WWTPs. In wet weather, the system can treat up to 3.5 billion gallons per day of combined storm and sanitary flow. In addition to the WWTPs, DEP has four CSO storage facilities. In 2012, DEP launched a 20-year, \$2.4 billion GI program, of which \$1.5 billion will be funded by DEP, with the remainder funded through private partnerships.

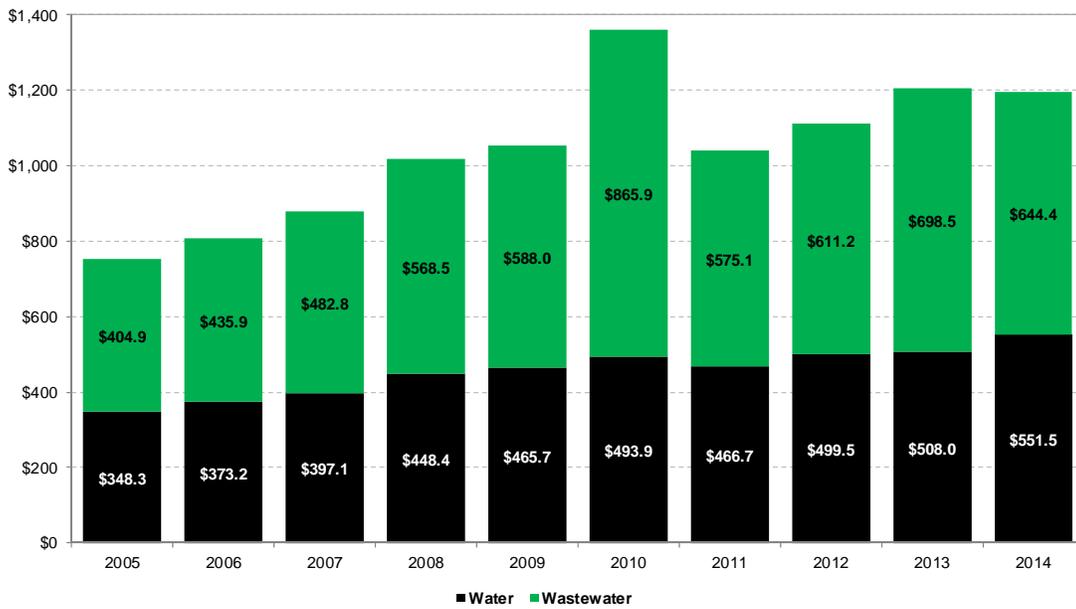
##### **Historical Capital and Operations and Maintenance (O&M) Spending**

As shown in Figure 6, from FY 2005 through FY 2014, 59 percent of DEP's capital spending was for wastewater and water mandates. Figure 7 identifies associated historical wastewater and water operating expenses from FY 2003 through FY 2014, which have generally increased over time reflecting the additional operational costs associated with the City's investments. Many projects have been important investments that safeguard our water supply and improve the water quality of our receiving waters in the Harbor and its estuaries. These mandates and associated programs are described below.

**Figure 6: Historical Capital Commitments**



**Figure 7: Historical Operating Expenses**



**Wastewater Mandated Programs**

The following wastewater programs and projects have been initiated to comply with federal and state laws and permits:

- CSO abatement and stormwater management programs

DEP has initiated a number of projects to reduce CSOs, including construction of CSO abatement facilities, optimization of the wastewater system to reduce the volume of CSO discharge, controls to prevent floatables and debris that enters the combined wastewater system from being discharged, dredging of CSO sediments that contribute to low DO and poor aesthetic conditions, and other water quality based enhancements to enable attainment of the Water Quality Standards (WQS). These initiatives impact both the capital investments that must be made by DEP and O&M expenses. Historical commitments and those currently in DEP's ten year capital plan for CSOs are estimated to be about \$3.4 billion. FY 2013 annual operating costs for stormwater expenses are estimated to have been about \$74.8 million. DEP expects that additional investments in stormwater controls will be required of DEP, as well as other City agencies, pursuant to MS4 requirements.

- Biological nitrogen removal

In 2006, NYC entered into a Consent Judgment (Judgment) with New York State Department of Environmental Conservation (DEC), which required DEP to upgrade five WWTPs by 2017 in order to reduce nitrogen discharges and comply with draft State Pollutant Discharge Elimination System (SPDES) nitrogen limits. Pursuant to a modification and amendment to the Judgment in 2011, DEP agreed to upgrade three additional WWTPs and to install additional nitrogen controls at one of the WWTPs included in the original Judgment. As in the case of CSOs and stormwater, these initiatives include capital investments made by DEP (over \$1 billion to-date and an additional \$50 million in the 10-year capital plan) as well as O&M expenses. (Chemicals alone in FY 2014 amounted to \$3.2 million per year and by FY 2017 are estimated to be about \$20 million per year.)

- Wastewater Treatment Plant Upgrades

The Newtown Creek WWTP has been upgraded to secondary treatment pursuant to the terms of a Consent Judgment with DEC. The total cost of the upgrade is estimated to be \$5 billion. In 2011, DEP certified that the Newtown Creek WWTP met the effluent discharge requirements of the CWA, bringing all 14 WWTPs into compliance with the secondary treatment requirements.

### **Drinking Water Mandated Programs**

Under the federal Safe Drinking Water Act and the New York State Sanitary Code, water suppliers are required to either filter their surface water supplies or obtain and comply with a determination from EPA that allows them to avoid filtration. In addition, EPA promulgated a rule known as Long Term 2 (LT2) that required that unfiltered water supplies receive a second level of pathogen treatment [e.g., ultraviolet (UV) treatment in addition to chlorination] by April 2012. LT2 also requires water suppliers to cover or treat water from storage water reservoirs. The following DEP projects have been undertaken in response to these mandates:

- Croton Watershed - Croton Water Treatment Plant

Historically, NYC's water has not been filtered because of its good quality and long retention times in reservoirs. However, more stringent federal standards relating to surface water treatment resulted in a federal court consent decree, which mandated the construction of a full-scale water treatment facility to filter water from NYC's Croton watershed. Construction on the Croton Water Treatment Plant began in late 2004, and the facility began operating in 2015. To-date, DEP has spent roughly \$3.2 billion in capital costs. Since commencement of operations, DEP is also now incurring annual expenses for labor, power, chemicals, and other costs associated with plant O&M. For FY 2015, O&M costs are estimated to be about \$23 million.

- Catskill/Delaware Watershed - Filtration Avoidance Determination

Since 1993, DEP has been operating under a series of Filtration Avoidance Determinations (FADs), which allow NYC to avoid filtering surface water from the Catskill and Delaware systems. In 2007, EPA issued a new FAD (2007 FAD), which requires NYC to take certain actions over a ten-year period to protect the Catskill and Delaware water supplies. In 2014, the New York State Department of Health (NYSDOH) issued mid-term revisions to the 2007 FAD. Additional funding was added to the Capital Improvement Plan (CIP) through 2017 to support these mid-term FAD revisions. DEP has committed about \$1.5 billion to-date and anticipates that expenditures for the current FAD will amount to \$200 million.

- UV Disinfection Facility

In January 2007, DEP entered into an Administrative Order on Consent (UV Order) with EPA pursuant to EPA's authority under LT2 requiring DEP to construct a UV facility by 2012. Since late 2012, water from the Catskill and Delaware watersheds has been treated at DEP's new UV disinfection facility in order to achieve *Cryptosporidium* inactivation. To-date, capital costs committed to the project amount to \$1.6 billion. DEP is also now incurring annual expenses for property taxes, labor, power, and other costs related to plant O&M. FY 2015 O&M costs were \$19.3 million including taxes.

#### **Other: State of Good Repair Projects**

In addition to mandated water and wastewater programs, the agency has invested in critical projects related to maintenance and repair of DEP assets and infrastructure.

#### **Initiatives to Reduce Operational Expenditures**

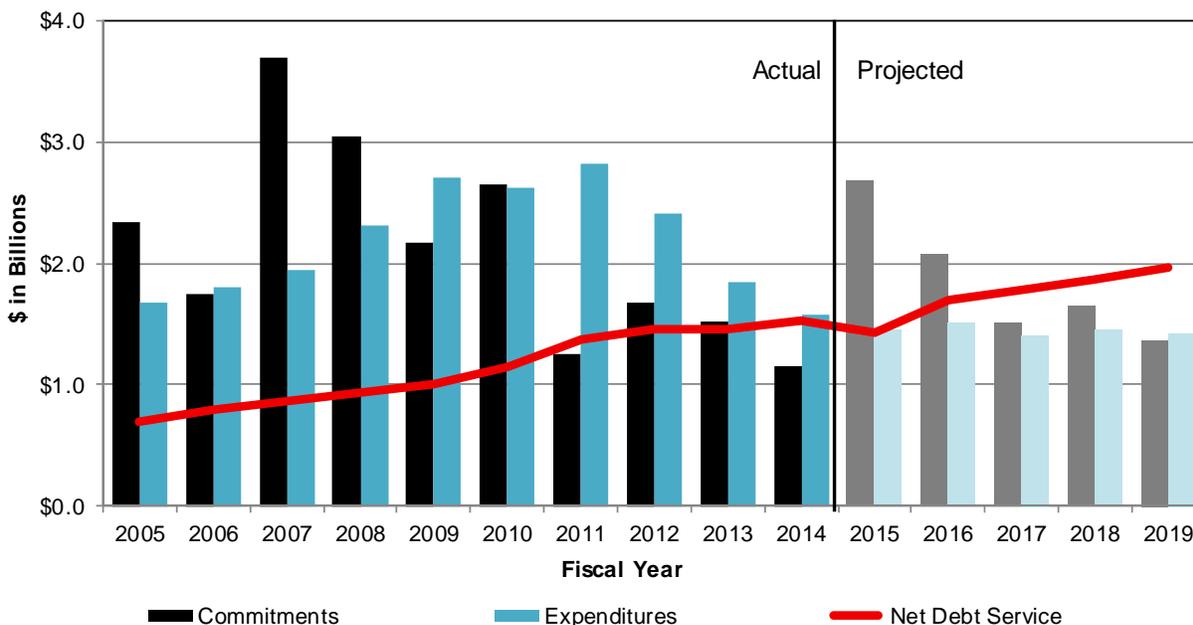
To mitigate rate increases, DEP has diligently managed operating expenses and has undertaken an agency-wide program to review and trim costs and improve the efficiency of the agency's operations. DEP has already implemented changes through this program that will result in a financial benefit of approximately \$98.2 million in FY 2016.

## **5.0 HISTORY OF DEP WATER AND SEWER RATES**

#### **Background on DEP Rates**

The NYC Water Board is responsible for setting water and wastewater rates sufficient to cover the costs of operating NYC's water supply and wastewater systems (the System). Water supply costs include those associated with water treatment, transmission, distribution, and maintaining a state of good repair. Wastewater service costs include those associated with wastewater conveyance and treatment, stormwater service, and maintaining a state of good repair. The NYC Municipal Water Finance Authority (MWFA) issues revenue bonds to finance NYC's water and wastewater capital programs, and the costs associated with debt service consume a significant portion of the system revenues. As shown in Figure 8, increases in capital expenditures have resulted in increased debt. While confirmed expenditures may decline over the next few years, debt service continues to be on the rise in future years, and will continue to do so with future spending commitments. In FY 2015, debt service represented a large percentage (approximately 44 percent) of the System's operating budget.

**Figure 8: Past Costs and Debt Service  
(From FY16 Rate Presentation)**

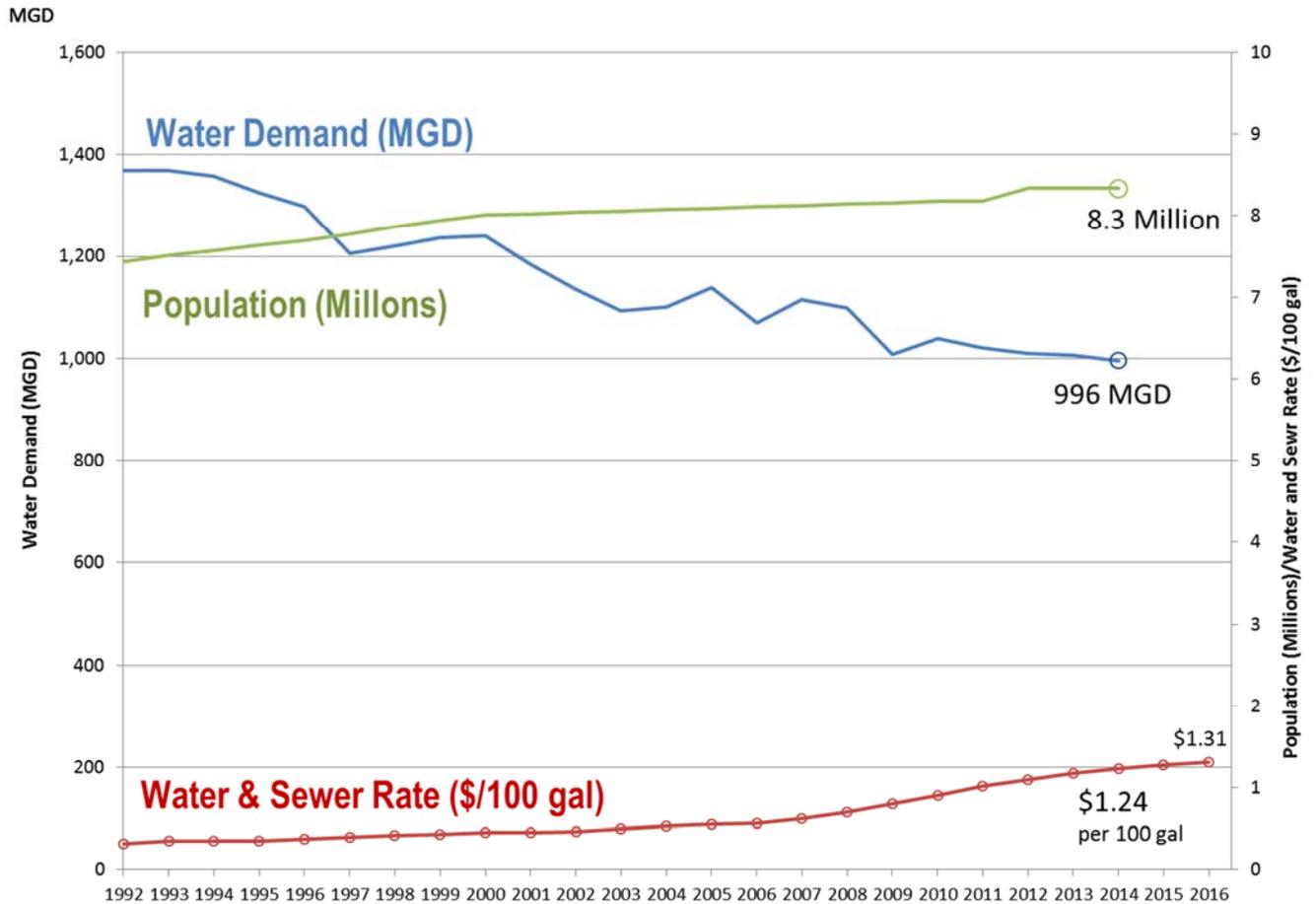


For FY 2016, most customers will be charged a uniform water rate of \$0.51 per 100 gallons of water. Wastewater charges are levied at 159 percent of water charges (\$0.81 per 100 gallons). There is a small percentage of properties that are billed a fixed rate. Under the Multi-family Conservation Program (MCP), some properties are billed at a fixed per-unit rate if they comply with certain conservation measures. Some nonprofit institutions are also granted exemption from water and wastewater charges on the condition that their consumption is metered and falls within specified consumption threshold levels. Select properties can also be granted exemption from wastewater charges (i.e., pay only for water services) if they can prove that they do not burden the wastewater system (e.g., they recycle wastewater for subsequent use on-site).

**Historical Rate Increases to meet Cost of Service**

Figure 9 shows how water and sewer rates have increased over time and how that compares with system demand and population. Despite a rise in population, water consumption rates have been falling since the 1990s due to metering and increases in water efficiency measures. At the same time, rates have been rising to meet the cost of service associated with DEP’s capital commitments. DEP operations are funded almost entirely through rates paid by our customers. From FY 2000 to FY 2016, water and sewer rates have risen 192 percent, almost tripling. This is despite the fact that DEP has diligently trimmed operating costs and improved the efficiency of the agency’s operations.

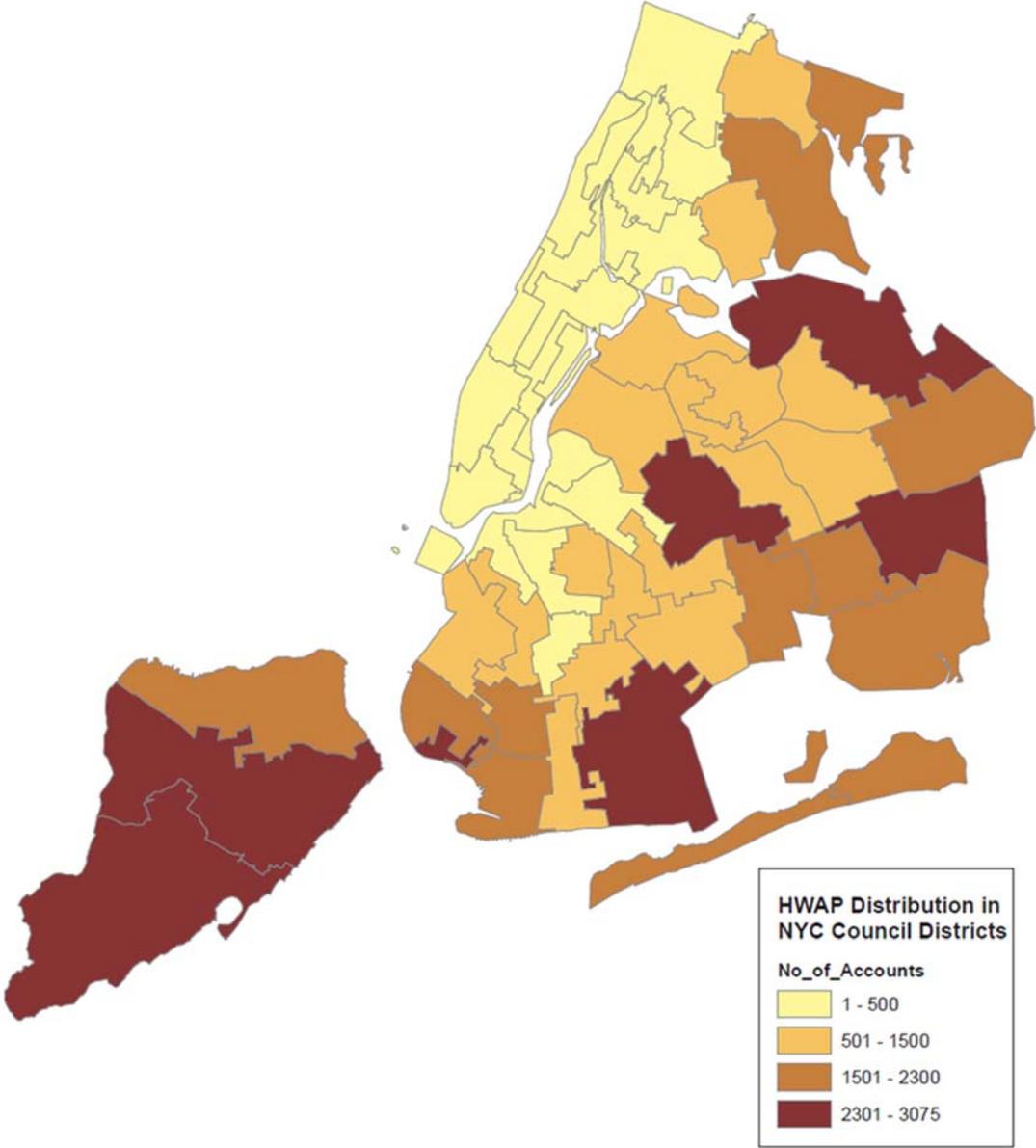
**Figure 9: Population, Consumption Demand, and Water and Sewer Rates over Time**



**Customer Assistance Programs**

There are several programs that provide support and assistance for customers in financial distress. The Safety Net Referral Program uses an existing network of NYC agency and not-for-profit programs to help customers with financial counseling, low-cost loans, and legal services. The Water Debt Assistance Program (WDAP) provides temporary water debt relief for qualified property owners who are at risk of mortgage foreclosure. While water and wastewater charges are a lien on the property served, and NYC has the authority to sell these liens to a third party for collection in a process called a lien sale, DEP offers payment plans for customers who may have difficulty paying their entire bill at one time. DEP and the Water Board also recently created a Home Water Assistance Program (HWAP) to assist low-income homeowners. In this program, DEP has partnered with the NYC Human Resources Administration (HRA), which administers the Federal Home Energy Assistance Program (HEAP), and NYC Department of Finance (DOF), which provides tax exemptions to senior and disabled homeowners, to identify low-income homeowners who receive HEAP assistance and/or tax exemptions and, thus, are automatically eligible to receive a credit worth approximately one-quarter’s minimum water and wastewater charge on their DEP bill. Figure 10 below shows the geographic distribution of the HWAP recipients. The agency has undertaken an aggressive communications campaign to ensure customers know about these programs and any exclusions they may be qualified to receive. In addition, about 58.5 percent of NYCHA customers are on the Multi-family conservation plan, where they pay a flat fee, provided they implement certain conservation measures.

Figure 10: Home Water Assistance Program Recipients



## 6.0 FUTURE SYSTEM INVESTMENT

Over the next decade, the percentage of already identified mandated project costs in the CIP is anticipated to decrease, but DEP will be funding critical state of good repair projects and other projects needed to maintain NYC's infrastructure to deliver clean water and treat wastewater. Accordingly, as of September 2015, DEP's capital budget for FY 2016 through FY 2025 is \$17.3 billion. This budget projects capital commitments averaging \$1.5 billion per year, which is similar to the average spending from FY 2011 through FY 2015 shown in Figure 6 above. Moreover, DEP anticipates that there will be additional mandated investments beyond those agreed to as part of the 2016 CSO Consent Order as a result of MS4 compliance, proposed modifications to DEP's in-City WWTP SPDES permits, Superfund remediation, and the 2014 CSO Best Management Practices (BMP) Order on Consent. It is also possible that DEP will be required to construct a cover for Hillview Reservoir, as well as other additional wastewater and drinking water mandates. Additional details for anticipated future mandated and non-mandated wastewater programs are provided below.

### Potential or Unbudgeted Wastewater Regulations

- Municipal Separate Storm Sewer System (MS4) Permit Compliance

DEC issued a new citywide MS4 permit to NYC, effective on August 1, 2015, that covers municipal separate stormwater systems for all City agencies.

DEP is required to coordinate efforts with other City agencies and to develop a stormwater management program plan for NYC to facilitate compliance with the permit. This plan will also determine the necessary legal authority to implement and enforce the stormwater management program, as well as develop enforcement and tracking measures and provide adequate resources to comply with the MS4 permit. Some of the stormwater control measures identified through this plan may result in increased costs to DEP, and those costs will be more clearly defined upon completion of the plan. The permit also requires NYC to conduct fiscal analysis of the capital and O&M expenditures necessary to meet the requirements of this permit, including any development, implementation and enforcement activities required, within three years of the Effective Permit date.

The full MS4 permit compliance costs are yet to be estimated. DEP's annual historic stormwater capital and O&M costs have averaged \$131.6 million. However, given the more stringent requirements in the MS4 permit, future MS4 compliance costs are anticipated to be significantly higher than DEP's current stormwater program costs. The future compliance costs will also be shared by other NYC departments that are responsible for managing stormwater. The projected cost for stormwater and CSO programs in other major urban areas such as Philadelphia and Washington DC are quite high, \$2.4 billion and \$2.6 billion, respectively. According to preliminary estimates completed by Washington District Department of Environment, the MS4 cost could be \$7 billion (green build-out scenario) or as high as \$10 billion (traditional infrastructure) to meet the Total Maximum Daily Loads (TMDLs). In FY 2014, Philadelphia reported \$95.4 million for MS4 spending, whereas Washington DC reported \$19.5 million as part of these annual reports (Philadelphia, 2014; Washington DC, 2014).

There is currently limited data for estimating future NYC MS4 compliance costs. Based on estimates from other cities, stormwater retrofit costs have been estimated on the low end between \$25,000 and \$35,000 per impervious area to between \$100,000 and \$150,000 on the high end. Costs would vary on the type and level of control selected. For the purposes of developing preliminary MS4 cost estimates for NYC for this analysis, a stormwater retrofit cost of \$35,000 per impervious acre was assumed, which results in estimated MS4 compliance costs of about \$2 billion for NYC.

- Draft SPDES Permit Compliance

On August 5, 2015, DEC published a Notice of Intent to Modify the 14 SPDES permits for the DEP WWTPs. These proposed modifications to the SPDES permits may have significant monetary impacts to DEP and include the following requirements:

- DEC is requiring new effluent ammonia limits at many of the DEP WWTPs, and it is likely that these new effluent ammonia limits will require upgrades at the North River, 26th Ward, and Jamaica WWTPs.
- Conduct monthly sampling for free cyanide with results submitted in a report 15 months after the effective date of the permits. After review of the results, DEC may reopen the permits to add a limit or action level for free cyanide.
- Maintain and implement an Asset Management Plan (AMP) covering the DEP's WWTPs, pump stations, and CSO control facilities to prioritize the rehabilitation and replacement of capital assets that comprise the AMP Treatment System.
- Develop, implement, and maintain a Mercury Minimization Program (MMP). The MMP is required because the 50 ng/L permit limit exceeds the statewide water quality based effluent limit (WQBEL) of 0.70 nanograms/liter (ng/L) for Total Mercury. The goal of the MMP will be to reduce mercury effluent levels in pursuit of the WQBEL.
- DEC has also advised DEP that fecal coliform, which is the parameter that has been historically used to evaluate pathogen kills and chlorination performance/control, will be changing to enterococcus in accordance with the requirements under the EPA Recreational Water Quality Criteria. This change could result in additional compliance costs.

- CSO BMP Order

On May 8, 2014, DEC and DEP entered into an agreement for the monitoring of CSO compliance, reporting requirements for bypasses, and providing notification of equipment out-of-service at the WWTPs during rain events. The 2014 CSO BMP Order on Consent incorporates, expands, and supersedes the 2010 CSO BMP Order by requiring DEP to install new monitoring equipment at identified key regulators and outfalls and to assess compliance with requirements to "Maximize Flow to the WWTP". The costs for compliance for this Order have not yet been determined, but DEP expects this program will require the expenditure of additional capital and expense dollars.

- Total Residual Chlorine (TRC) Consent Order

As part of the new TRC Consent Order, DEP is required to construct alternate disinfection at 6 WWTPs and will need to develop TRC Facility Plans for the remaining 8 WWTPs that may require further upgrades to the disinfection facility at these WWTPs.

- Superfund Remediation

There are two major Superfund sites in NYC that may affect DEP's Long Term Control Plans and which are at various stages of investigation. The Gowanus Canal Remedial Investigation/Feasibility Study (RI/FS) is complete, and remedial design work will take place in the next three to five years. The Newtown Creek RI/FS completion is anticipated for 2018.

DEP's ongoing costs for these projects are estimated at about \$50-60 million for the next ten years, not including design or construction costs. EPA's selected remedy for the Gowanus Canal requires that NYC build two combined sewage overflow retention tanks. Potential Superfund costs for the Gowanus Canal range from \$5650 million to \$1 billion. Similar Superfund mandated CSO controls at Newtown Creek could add costs of over \$1 billion. A portion of these costs may be credited toward CSO control under the 2016 CSO Consent Order.

### **Potential, Unbudgeted Drinking Water Regulation**

- Hillview Reservoir Cover

LT2 also mandates that water from uncovered storage facilities, including DEP's Hillview Reservoir, be treated or that the reservoir be covered. DEP has entered into an Administrative Order with the NYSDOH and an Administrative Order with EPA, both of which mandate NYC to begin work on a reservoir cover by the end of 2018. In August 2011, EPA announced that it would review LT2 and its requirement to cover uncovered finished storage reservoirs such as Hillview. DEP has spent significant funds analyzing water quality, engineering options, and other matters relating to the Hillview Reservoir. Potential costs affiliated with construction are estimated to be on the order of \$1.6 billion.

### **Other: State of Good Repair Projects and Sustainability/Resiliency Initiatives**

#### *Wastewater Projects*

- Climate Resiliency

In October 2013, on the first anniversary of Hurricane Sandy, DEP released the NYC Wastewater Resiliency Plan, the nation's most detailed and comprehensive assessment of the risks that climate change poses to a wastewater collection and treatment system. The groundbreaking study, initiated in 2011 and expanded after Hurricane Sandy, was based on an asset-by-asset analysis of the risks from storm surge under new flood maps at all 14 WWTPs and 58 of NYC's pumping stations, representing more than \$1 billion in infrastructure.

DEP estimates that it will spend \$447 million in cost-effective upgrades at these facilities to protect valuable equipment and minimize disruptions to critical services during future storms. It is estimated that investing in these protective measures today will help protect this infrastructure from over \$2 billion in repeated flooding losses over the next 50 years. DEP is currently pursuing funding through the EPA State Revolving Fund Storm Mitigation Loan Program for these upgrades.

DEP will coordinate this work with the broader coastal protection initiatives, such as engineered barriers and wetlands, described in the 2013 report, "A Stronger, More Resilient New York," and continue to implement the energy, drinking water, and drainage strategies identified in the report to mitigate the impacts of future extreme events and climate change. This includes ongoing efforts to reduce CSOs with GI as part of LTCPs and build-out of high level storm sewers that reduce both flooding and CSOs. It also includes build-out of storm sewers in areas of Queens with limited drainage and continued investments and build-out of the Bluebelt system.

- Energy projects at WWTPs

NYC's blueprint for sustainability, *PlaNYC 2030: A Greener, Greater New York*, set a goal of reducing NYC's greenhouse gases (GHG) emissions from 2006 levels by 30 percent by 2017. This goal was codified in 2008 under Local Law 22. In April 2015, NYC launched an update to PlaNYC called *One New York: The Plan for a Strong and Just City* (OneNYC), which calls for reducing the city's greenhouse gas emissions by 80 percent below 2005 levels by 2050. In order to meet the OneNYC goal, DEP is working to reduce energy consumption and GHG emissions through reduction of fugitive methane emissions; investment in cost-effective, clean energy projects; and energy efficiency improvements. DEP has approximately \$500 million allocated in its CIP to make additional system repairs to flares, digester domes, and digester gas piping, in order to maximize capture of fugitive emissions for beneficial use or flaring. A 12 megawatt cogeneration and electrification system is currently in design for the North River WWTP and is estimated to be in operation in winter 2020. The total project cost is estimated at \$278 million. To reduce energy use and increase energy efficiency, DEP has completed energy audits at all 14 in-City WWTPs. Close to 150 energy conservation measures (ECMs) relating to operational and equipment improvements to aeration, boilers, dewatering, digesters, HVAC, electrical, thickening, and main sewage pumping systems have been identified and accepted for implementation. Energy reductions from these ECMs have the potential to reduce greenhouse gas emissions by over 160,000 MT of carbon emissions at an approximate cost of \$140 million.

#### *Water Projects*

- Water for the Future

In 2011, DEP unveiled Water for the Future, a comprehensive program to permanently repair the leaks in the Delaware Aqueduct, which supplies half of New York's drinking water. Based on a 10-year investigation and more than \$200 million of preparatory construction work, DEP is designing a bypass for a section of the Delaware Aqueduct in Roseton and internal repairs for a tunnel section in Wawarsing. Since DEP must shut down the Aqueduct when it is ready to connect the bypass tunnel, DEP is also working on projects that will supplement NYC's drinking water supply during the shutdown, such as implementing demand reduction initiatives, such as offering a toilet replacement program, replacing municipal fixtures, and providing demand management assistance to the wholesale customers located north of NYC. Construction of the shafts for the bypass tunnel is underway, and the project will culminate with the connection of the bypass tunnel in 2022. The cost for this project is estimated to be about \$1.5 billion.

- Gilboa Dam

DEP is currently investing in a major rehabilitation project at Gilboa Dam at Schoharie Reservoir. Reconstruction of the dam is the largest public works project in Schoharie County, and one of the largest in the entire Catskills. This project is estimated to cost roughly \$440 million.

- Kensico Eastview Connection 2

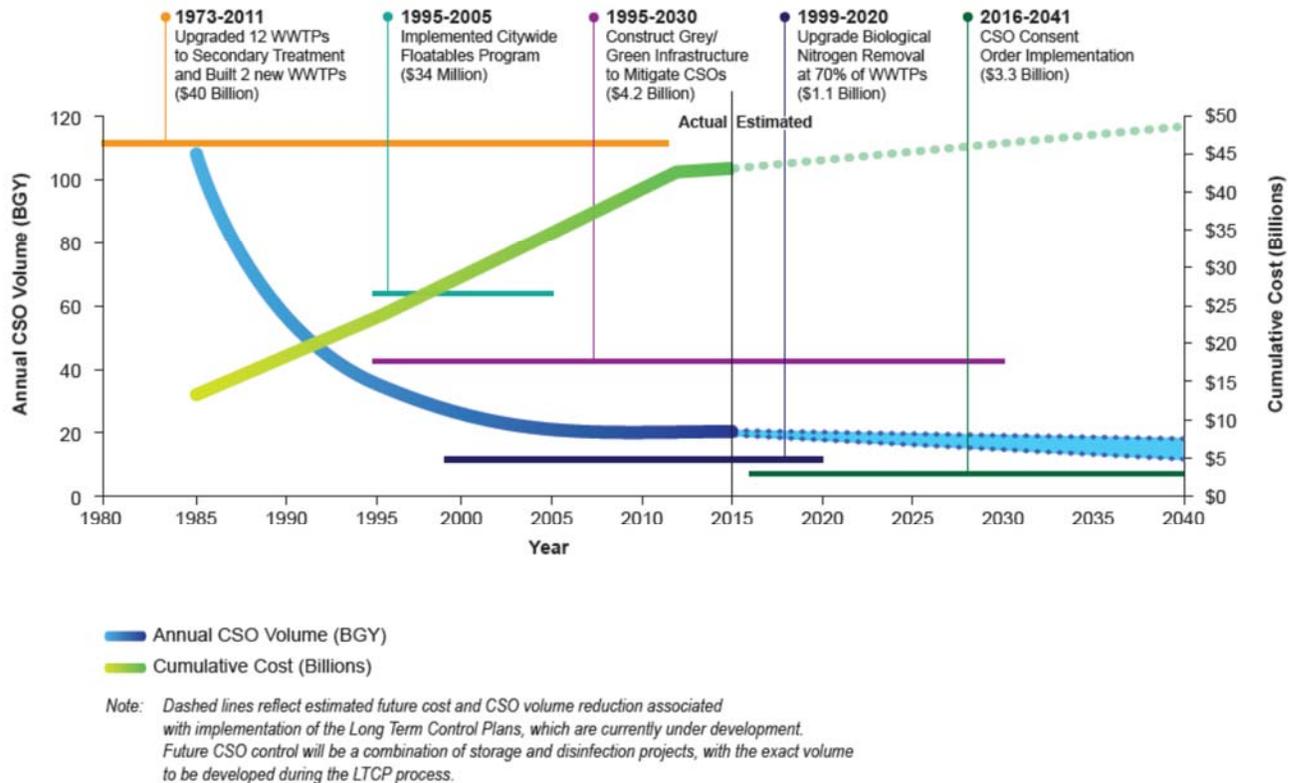
To ensure the resilience and provide critical redundancy of infrastructure in NYC's water supply system, DEP will be constructing a new tunnel between the Kensico Reservoir and the Ultraviolet Disinfection Facility. The cost for this project is estimated to be about \$511 million in the current 10-year capital improvement plan.

## 7.0 DEC-DEP SETTLEMENT: WATER QUALITY GOALS AND LTCP SPENDING COMMITMENTS

Since 2002, NYC has invested almost \$10 billion in grey and green infrastructure, resulting in documented water quality benefits in the Harbor and its tributaries. Currently, approximately 95 percent of the Harbor is available for boating and kayaking and 14 of NYC's beaches provide access to swimmable waters in the Bronx, Brooklyn, Queens, and Staten Island.

Figure 11 shows the historical timeline of DEP's investments in wastewater infrastructure since the Clean Water Act of 1972. Of the \$10 billion already invested since 2002, roughly 20 percent has been dedicated to controlling CSOs and stormwater. That investment has resulted in NYC capturing and treating over 70 percent of the combined stormwater and wastewater that otherwise would be directly discharged to our waterways during periods of heavy rain or runoff. Projects that have already been completed include: GI projects in 26<sup>th</sup> Ward, Hutchinson River and Newtown Creek watersheds; area-wide GI contracts; Avenue V Pump Station and Force Main; Gowanus Canal Pumping Station and Force Main; Gowanus Canal Flushing Tunnel; Alley Creek CSO Retention Facility (RTF); Paerdegat Basin CSO RTF; Flushing Bay CSO RTF; Spring Creek CSO RTF; and the Bronx River Floatables Control. Several other major projects are in active construction or design. The water quality improvements already achieved have allowed greater access of the waterways and shorelines for recreation as well as enhanced environmental habitat and aesthetic conditions in many of NYC's neighborhoods.

**Figure 11: Historical Timeline for Wastewater Infrastructure Investments and CSO Reduction over Time**



As illustrated in Figure 11, CSOs have decreased from about 110 billion gallons per year in 1985 to 20 billion gallons per year in 2015. DEP currently has a wet weather capture of about 80 percent.

Although significant investments have been made for water quality improvements Harbor-wide, more work is needed. DEP has committed to working with DEC to further reduce CSOs and make other infrastructure improvements to gain additional water quality improvements. The 2016 Consent Order incorporates a combined grey and green approach to reduce CSOs. A major component of the CSO Order that DEP and DEC developed is GI stormwater control measures. DEP is targeting a 10 percent application rate for implementing GI in combined sewer areas citywide. The GI will take multiple forms including green or blue roofs, bio-infiltration systems, right-of-way bioswales, rain barrels, and porous pavement. These measures provide benefits beyond the associated water quality improvements including recharging groundwater, providing localized flood attenuation, providing sources of water for non-potable use such as watering lawns or gardens, reducing heat island effects on streets and sidewalks, improving air quality and enhancing aesthetic quality. With the Waterbody/Watershed Facility Plan (WWFP) grey projects and 10 percent Green Infrastructure implementation, it is projected that CSO discharges would be reduced to 18 billion gallons per year (BGY) after implementation of the WWFP. As part of its adaptive management approach, DEP is also committed to extensive water quality monitoring throughout the Harbor, which will allow better assessment of the effectiveness of the controls implemented.

From FY 2002 to FY 2014, DEP has committed about \$2 billion to CSO control. The 2016 CSO Order commits DEP to investing an additional \$3.3 billion toward LTCP improvements over the next 25 years on top of existing commitments. This investment could be a combination of storage and treatment options that will be identified through the LTCP process. In addition, DEP has already committed to \$1.5 billion of green infrastructure investments, over \$900 million of which are included in the current 10 year capital plan. In total, DEP commitments would be nearly \$7.5 B towards CSO controls and water quality improvements.

Table 6 presents the range of historical spending already committed to CSO controls through the WWFP process, along with projected spending on proposed LTCP alternatives for several of NYC's CSO waterbodies where LTCPs have been completed. Future Capital Commitments reflect estimates from September 2015.

**Table 6: Committed Costs and Range of Future CSO Program Costs and Water Quality Improvements**

Waterbody / Watershed	Historical and Current CIP Commitments	Incurred Cost FY2002-FY2014	Committed Cost FY2015-FY2025	Total Existing CSO Program Cost	LTCP Costs <sup>(5)</sup>	CSO Reductions from LTCP	
						CSO Volume Reduced (Million Gallons)	CSO Volume Treated (Million Gallons)
Alley Creek and Little Neck Bay	CSO Abatement Facilities and East River CSO	\$139,131,521	\$12,000,000	\$151,131,521	\$7,600,000	0	131
Westchester Creek	Hunts Point WWTP Headworks, Regulator Modification, Pugsley Creek Parallel Sewer	\$7,800,000	\$78,062,000	\$85,862,000	\$0	0	0
Hutchinson River	Hunts Point WWTP Headworks	\$2,876,930	\$108,000,000	\$110,876,930	\$90,000,000	0	584
Flushing Creek	Flushing Bay Corona Avenue Vortex Facility, Flushing Bay CSO Retention, Flushing Bay CSO Storage	\$357,015,599	\$10,549,000	\$367,564,599	\$6,890,000	0	82
Bronx River	Installation of Floatable Control Facilities, Hunts Point WWTP Headworks	\$46,989,901	\$0	\$46,989,901	\$110,100,000	170	0
Gowanus Canal	Gowanus Flushing Tunnel Reactivation, Gowanus Facilities Upgrade	\$176,165,050	\$314,463,000	\$490,628,050	Included in Superfund Costs <sup>(6)</sup>	90	0
Coney Island Creek	Avenue V Pumping Station, Force Main Upgrade	\$200,899,634	(\$958,000)	\$199,941,634			
Jamaica Bay	Improvements of Flow Capacity to 26th Ward Drainage Area, Hendrix Creek Canal Dredging, Shellbank Destratification, Spring Creek AWCP Upgrade, 26 Ward Wet Weather Improvements	\$173,711,633	\$397,389,000	\$571,110,633			
Flushing Bay <sup>(2)</sup>	High Level Regulator Mods, Low Level Diversion Sewer (See Flushing Creek for Costs)	\$0	\$60,094,000	\$60,094,000			
Newtown Creek	English Kills Aeration, Newtown Creek Headworks, Bending Weirs, & Floatables Control	\$159,639,614	\$91,103,000	\$250,742,614			
East River and Open Waters	Bowery Bay Headworks, Inner Harbor In-Line Storage, Port Richmond Throttling Facility, Tallman Island Conveyance Improvements, Outer Harbor CSO Regulator Improvements	\$153,145,476	(\$69,000)	\$153,076,476			
Bergen and Thurston Basins <sup>(3)</sup>	Warnerville Pumping Station and Force Main, Bending Weirs	\$41,771,863	(\$187,000)	\$41,584,863			
Paerdegat Basin	Retention Tanks, Paerdegat Basin Water Quality Facility	\$397,046,297	(\$5,019,000)	\$392,027,297			
Green Infrastructure Program	<i>Miscellaneous Projects Associated with City-wide Green Infrastructure Program</i>	\$176,118,589	\$ 989,645,000	\$1,165,763,589			
	Other CSO Controls	\$10,429,814	\$ 940,050,000	\$ 950,479,814			
	Total Grey	\$1,866,623,333	\$2,005,477,000	\$3,872,100,333			
	Total Grey + Green	\$ 2,042,741,921	\$ 2,995,122,000	\$ 5,037,863,921			

Notes:

- (1) All costs reported in this table reflect estimated capital costs only (i.e., probable bid cost). Projected O&M costs are not included in this analysis. Capital costs are based on estimates from September 2015 and will be updated as DEP prepares its 2016 January Plan.
- (2) Committed costs for Flushing Bay are captured in the committed costs reported for Flushing Creek;
- (3) Bergen and Thurston Basins and Paerdegat Basin are not part of the current LTCP effort; thus, no LTCP detail is provided for them.
- (4) Negative values reflect de-registration of committed funds.
- (5) LTCP Construction Costs are based on 2015 dollars and aren't escalated out to mid-point of construction.
- (6) Potential Superfund costs for the Gowanus Canal range from \$650M to \$1B.

The development of the additional \$3.3 billion CSO investment agreed to by DEC and DEP under the 2016 CSO Order relied on historical information, previous water quality modeling analysis, and Harbor survey data to identify where additional investment is most likely to achieve meaningful additional improvements in water quality, with an estimated allotment for each waterbody based on this analysis. As illustrated in Table 7, it is anticipated that the majority of the open waters (NY Bay, East River, Hudson River, and Harlem River) will be able to comply with DEC's proposed primary contact standards for fecal coliform, which were publicly noticed on December 3, 2014, while attainment in confined tributaries is expected to be lower, particularly in the Hutchinson River, Flushing Creek, Bergen Basin and Newton Creek. This additional investment of \$3.3 billion for additional CSO controls is projected to fund new projects that will improve water quality as shown in Tables 6 and 7 for the LTCPs completed to date. Each waterbody poses unique watershed characteristics and local conditions; hence, selection of specific projects under each waterbody LTCP will consider CSO reductions expected through a variety of engineering alternatives including storage, hydraulic relief, and/or disinfection, along with a more detailed cost and constructability analysis. A detailed breakdown of LTCP-proposed projects and associated costs is provided on Table 6.

**Table 7: Projected CSO Volume Reductions and Water Quality Attainment**

	Pre-WWFP	LTCP Baseline	Post-WWFP	Pre-WWFP	LTCP Baseline (Post WWFP)	Post-LTCP
	CSO Volume (MGY)	CSO Volume (MGY)	%CSO Volume Reduction	Primary Contact Attainment	Primary Contact Attainment	Primary Contact Attainment
Alley Creek <sup>(2,3)</sup>	502	131	74%	25%	50%	90%
Bergen Basin	617	459	26%	8%	8%	TBD
Bronx River <sup>(1)</sup>	940	455	52%	58%	67%	TBD
Coney Island Creek	301	62	79%	33%	42%	TBD
Flushing Bay	2,187	1,160	47%	42%	75%	TBD
Flushing Creek	2,395	1,201	50%	0%	17%	67%
Fresh Creek <sup>(2)</sup>	450	158	65%	0%	100%	TBD
Gowanus Canal	404	137	66%	25%	100%	TBD
Hendrix Creek	13	64	-402%	100%	100%	TBD
Hutchinson River	436	339	22%	25%	25%	77%
Little Neck Bay	0	0	0%	100%	100%	97%
Newtown Creek	1,472	1,266	14%	8%	25%	TBD
Paerdegat Basin <sup>(2)</sup>	1,833	645	65%	25%	75%	75%
Spring Creek <sup>(2)</sup>	143	213	-49%	100%	100%	TBD
Thurston Basin	1,366	1,074	21%	16%	42%	TBD
Westchester Creek	751	282	63%	25%	67%	93%
Hudson River Bronx	16,155	12,226	24%	100%	100%	TBD
Hudson River Manhattan				100%	100%	TBD
Upper NY Bay				100%	100%	TBD
Western LI Sound				100%	100%	TBD
Upper East River				83%	100%	TBD
Bowery Bay				67%	92%	TBD
Harlem River				100%	100%	TBD
Lower East River				100%	100%	TBD
Kill Van Kull				100%	100%	TBD
Arthur Kill				83%	100%	TBD
Lower Bay Raritan Bay				100%	100%	TBD

(1) Attainment for the Hutchinson River and Bronx River assumes Westchester County complies with WQS in the upstream portion of these waterbodies.

(2) A portion of these CSO overflows receive some additional floatables and preliminary settling within the CSO RTF.

(3) The entire CSO overflow volume from the Alley Creek CSO RTF will be disinfected.

## **8.0 RATE IMPACTS**

This section presents the impact of the additional \$3.3 billion investment required under the 2016 CSO Order on water and sewer rates and household costs, when coupled with DEP's current and future investments. As described below, estimating the future rate and income increases through 2040 based on the cumulative impacts of this investment and DEP's other future spending, up to 50 percent of households could be paying more than two percent of their income on wastewater services when all future spending scenarios are in place.

### **Cumulative Future Rate Impacts**

The potential future rate impacts of the \$3.3 billion funding commitment were assessed looking at capital investments in the current 10 year capital plan; estimated future DEP investments from 2026 to 2040 of \$1.9 billion per year, which is based on the current CIP average of \$1.5 billion per year, inflated by 3 percent per year beginning in 2026; and the remainder of the \$3.3 billion LTCP investment (\$1.2 billion of which is already included in the 10-year capital plan).

A 4.75 percent interest rate was used to determine the estimated annual interest cost associated with the capital costs, and the annual debt service was divided by the FY 2016 Revenue Plan value to determine the resulting percent rate increase. This also assumes bonds are structured for a level debt service amortization over 32 years. Note that interest rates on debt could be significantly higher in the future. For illustration purposes, future annual O&M increases and other incremental costs were estimated based on historical data.

As Table 8 shows, without any capital investment and the only cost increases being O&M growing at 3 percent per year inflation, the impact by 2040 would be a rate increase of 47 percent. Adding capital investment, the Current CIP would result in a 55 percent rate increase; additional potential mandates and CIP investments from 2026 to 2040 could add an additional 91 percent; and by the time the full \$3.3 billion is spent in addition to other costs, cumulatively, the rates could increase on the order of 201 percent higher than 2016 values. For illustrative purposes, estimates for future spending from 2026 to 2040 have been assumed to be \$28.7 billion in capital investments (the current CIP average of \$1.5 billion per year, inflated by 3 percent per year beginning in 2026) in Table 8 and Table 9; these are subject to change.

**Table 8: Potential Future Spending Incremental Additional Household Cost Impact**

Spending Scenarios	Projected Capital Cost (\$M)	Incremental Annual Costs (\$M) <sup>1</sup>	% Rate Increase from FY 2016 Rates	Additional Annual Household Cost	
				Single-family Home	Multi-family Unit
2025: O&M Baseline Inflation Increase	\$0	\$443	14%	\$146	\$95
Current CIP (FY2016-2025) (Includes \$904M for GI and \$1.2B for LTCP and early tippers)	\$17,312	\$1,757	55%	\$580	\$377
2040: O&M Baseline Inflation Increase	\$0	\$1,058	33%	\$349	\$227
Potential Future Spending (2026-2040) <sup>(2)</sup>	\$28,735	\$2,917	91%	\$962	\$626
Additional LTCP costs outside of CIP. (additional \$2.1B for LTCP and early tippers and additional \$600M for GI)	\$2,700	\$274	9%	\$90	\$59
<b>Total</b>	<b>\$48,747</b>	<b>\$6,450</b>	<b>202%</b>	<b>\$2127</b>	<b>\$1384</b>

Notes:

(1) Incremental annual costs include debt service, O&M and other incremental costs. Assumed O&M and incremental costs were based on historical averages. Assumes bonds are structured for a level debt service amortization over 32 years at a 4.75% interest rate.

(2) DEP will face additional future spending costs and have other capital commitments from 2026 to 2040. While these costs aren't finalized. It was assumed that there would be an additional \$1.5B per year in capital spending.

Table 9 presented below shows the potential range of future spending and its impact on household cost compared to MHI. While these estimates are preliminary, as noted above, comparing household cost to MHI alone does not tell the full story since a large percentage of households below the median could be paying a larger percentage of their income on these costs.

**Table 9: Total Estimated Cumulative Future HH Costs/MHI**

Year	Total Projected Annual Household Cost <sup>(2)</sup>		Projected MHI	Total Water and Wastewater HH Cost / MHI		Total Wastewater HH Cost / MHI <sup>(3)</sup>	
	Single-family Home	Multi-family Unit		Single-family Home	Multi-family Unit	Single-family Home	Multi-family Unit
FY 2016 Rates	\$1,056	\$686	\$53,223	1.98%	1.29%	1.22%	0.79%
2025: Baseline O&M Increase	\$1,202	\$781	\$53,223	2.26%	1.47%	1.39%	0.90%
2025: (Current CIP, includes \$1.2B LTCP on top of \$904M in GI)	\$1,782	\$1,158	\$61,237	2.91%	1.89%	1.79%	1.16%
2040: Baseline O&M Increase	\$2,131	\$1,385	\$74,578	2.86%	1.86%	1.75%	1.14%
2040: CIP + Potential Future Spending (2026-2040)	\$3,093	\$2,011	\$74,578	4.15%	2.70%	2.55%	1.66%
2040: CIP +Potential Future Spending + Additional LTCP costs (\$2.7B in additional green and grey infrastructure)	\$3,183	\$2,070	\$74,578	4.27%	2.78%	2.62%	1.70%

## Notes:

(1) Projected household costs are estimated from rate increases presented in Table 8.

(2) Costs were compared to assumed MHI projection which was estimated using Census and Consumer Price Index data.

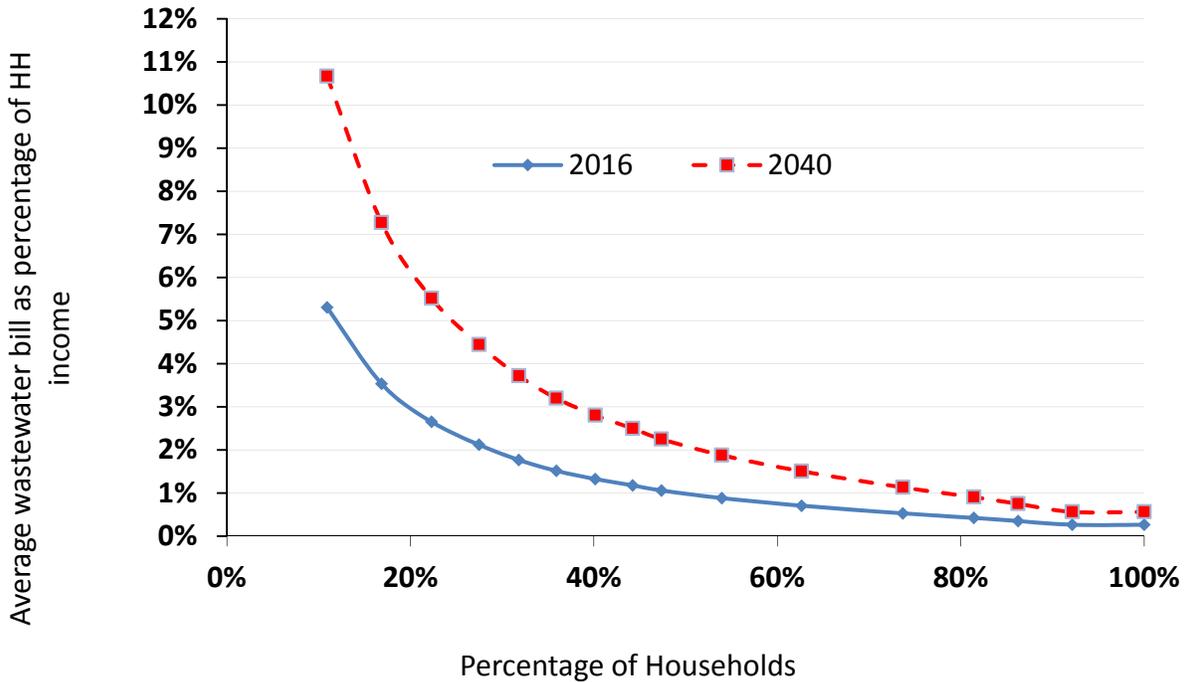
**Cumulative Future Potential Rate Impact across Income Levels**

Figure 12 shows the average estimated household cost for wastewater services compared to household income, versus the percentage of households in various income brackets for the current rate (FY 2016) and a future rate set at a 202 percent increase from FY 2016 based on Table 8. As shown, roughly 27 percent of households are estimated to pay two percent or more of their income on wastewater service alone in 2016. Estimating the future rate and income increases to 2040 (based on the projected costs in Table 6 and historic Consumer Price Index data, respectively), up to 50 percent of households could be paying more than two percent of their income on wastewater services when all future spending scenarios would be in place—the average wastewater bill is estimated to be about 2 percent of MHI in 2040. This is summarized in Table 10.

**Table 10: Average Household Wastewater Bill/Income Snapshot over Time**

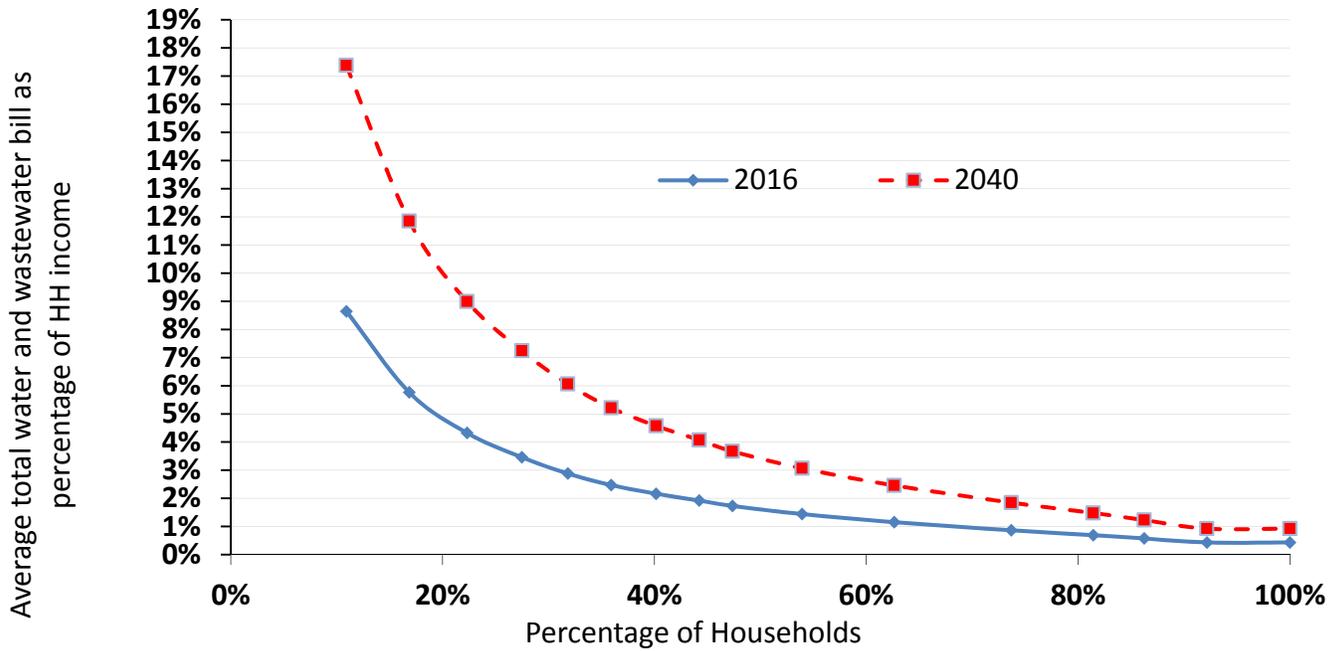
	Average Wastewater Bill/MHI	% of Household (HH) estimated to be paying more than 2% of HH income on Wastewater Services*
<b>2016</b>	1%	27%
<b>2025</b>	1.5%	40%
<b>2040</b>	2%	50%

**Figure 12: Estimated Average Wastewater Household Cost Compared to Household Income (FY 2016 & FY 2040)**



DEP, like many utilities in the nation, provides both water and wastewater service, and its rate payers see one bill. Currently the average combined water and sewer bill is around 1.6 percent of MHI, but approximately 22 percent of households are estimated to be paying more than 4.5 percent of their income, and that could increase to about 40 percent of households in future years by 2040 as shown in Figure 13.

**Figure 13: Estimated Average Total Water and Wastewater Cost as a Percentage of Household Income (FY 2016 and FY2040)**



## 9.0 CONCLUSIONS

As part of the LTCP process, DEP will continue to develop and refine the affordability and financial capability assessments for each individual waterbody as it works toward an expanded analysis for the citywide LTCP. In addition to what is outlined in the Federal CSO guidance on financial capability, DEP has presented in this paper a number of additional socioeconomic factors for consideration in the context of affordability and assessing potential impacts to our ratepayers. Furthermore, it is important to include a fuller range of future spending obligations and DEP has sought to present an initial picture of that here. Ultimately the environmental, social, and financial benefits of all water-related obligations should be considered when priorities for spending are developed and implementation of mandates are scheduled, so that resources can be focused where the community will get the most environmental benefit.