

**Engineering Feasibility Report
Public Utility Senior Lien Revenue Bonds,
Series 2009A**



**District of Columbia
Water and Sewer Authority**

January 15, 2009

URS

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Mr. Olu Adebo
Chief Financial Officer
District of Columbia Water and Sewer Authority
5000 Overlook Avenue, SW
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Subject: Engineering Feasibility Study for Public Utility Senior Lien Revenue Bonds, Series 2009A (“Series 2009A Bonds”)

Mr. Adebo:

URS Corporation (“URS”) is pleased to present this Engineering Feasibility Study pertaining to the issuance by the District of Columbia Water and Sewer Authority (“Authority”) of its Series 2009A Bonds, in part, to pay a portion of the costs of certain capital improvements to the System. This letter summarizes the methodology used in preparing this Engineering Feasibility Study and the findings and conclusions of our work. The Financial Feasibility Study including the assessment of the Authority’s organization was prepared by the Amawalk Consulting Group LLC. The terms used herein and not otherwise defined have the meanings ascribed to such terms in the Official Statement.

Study Methodology

URS conducted interviews with key operating and engineering staff of the Authority. These interviews included discussions of the goals and objectives of the Authority, actual measured performance versus planned activities, permit requirements, current operations and maintenance activities as well as potential changes that are planned for the future, regulatory compliance for all Authority activities and related matters. We have reviewed the Capital Improvement Program (“CIP”) and related information, including the report on the “Independent Engineering Inspection of the District of Columbia Water and Sewer Authority’s Wastewater and Water Systems” prepared by PB Consult, Inc. dated July 31, 2008 (the “PB Report”). The PB Report provides a report on the inspection of the System and their findings and recommendations as to the maintenance of the System and the construction of additions, extensions, replacements and improvements to the System. URS is very familiar with the Authority’s Systems and performed site visits of key above ground facilities as part of the firm’s Independent Comprehensive Budget Review of the Authority in February 2008.

Findings and Conclusions

Based on our studies, we offer the following statements and conclusions:

- The Authority has continued implementing its vision and strategic plan that focus on increasing the operational efficiency of the water and sewer systems and providing satisfactory service to its customers.
- Authority staff, including both management and key operations and maintenance personnel, is well qualified, effectively organized and sufficient to meet the mission of

providing a safe and dependable drinking water and sanitary sewer service while striving to sustain the environment.

- The existing water and sewer systems of the Authority are effectively maintained and operated.
- The Authority has developed and continues to implement thorough programs for ensuring the integrity of the water and sewer systems.
- Through appropriate management, operational practices, technology, staffing, tools and equipment, and selective outsourcing, the Authority has developed capital, operations and maintenance programs that should ensure the continued effective operation of the systems for the foreseeable future. The systems should continue to provide high levels of service with minimal disruption.
- The Authority's wastewater and drinking water facilities are in material compliance with all applicable permits and regulations and continue to provide uninterrupted service to its wholesale and retail customers. Such compliance is anticipated to continue through the foreseeable future.
- Substantial progress has been made by the Authority in improving the operating condition of existing facilities. The CIP is structured to provide a systematic program to replace and rehabilitate aging infrastructure on a priority basis.
- Implementation of the Authority's CIP is intended to address identified system needs and priorities and is within budget.

In addition to the above findings and conclusions, we note the following findings and conclusions of the PB Report as to the inspection of the System and their findings and recommendations as to the maintenance of the System and the construction of additions, extensions, replacements and improvements to the System that have been relied on in realizing the conclusions and recommendations set forth herein:

- The fundamental indicator of the adequacy of system operations at a water and wastewater entity is compliance with prevailing permit requirements. The Authority has consistently operated above the requirements of its permits and has demonstrated reassuring foresight in planning for future requirements. Meeting and exceeding this minimum threshold is a function of the condition of the system components, expertise of operating staff, and commitment to rehabilitation and replacement of vital assets.
- Currently, the Authority's Blue Plains facility provides adequate treatment as measured by permit compliance. If the Authority continues to implement its planned rehabilitation, replacement and other capital improvements, it should remain permit compliant. All major components of the sewer pumping stations are kept operational, even as modifications and improvements are being designed or constructed.
- The Authority's sewer collection system seems to be typical of older sewer collections systems commonplace along the east coast of the United States. The Authority has retained the services of a consultant to undertake a comprehensive evaluation of the condition of the sewer system. It is essential that the Authority plan follow-up activities to address any deficiencies that may be identified in the sewer system evaluation effort.

The proposed plan for the combined sewer system needs to be implemented as budgets permit and as required by EPA.

- The aspects of the water system under the auspices of the Aqueduct are well maintained. The most significant issue facing the Aqueduct is the possibility of having to construct new solids handling and backwash treatment facilities, in addition to whatever steps are deemed necessary to reduce the corrosiveness of its treated water.
- In general, the portions of the water system owned and operated by the Authority are in good condition. Due mostly to the age of the assets, major projects have had to be initiated to repair or replace pumping stations, replace pipes, and eliminate cross-connections. These projects seem to be progressing well. Security of critical infrastructure in recent years has taken on greater prominence and the Authority responded by increasing security personnel and measures and improving physical deterrents.
- The Authority's capital planning process is robust, comprehensive and is in accord with the requirements of an aging system operating in the context of increasingly more stringent environmental regulations.

URS Corporation

URS Corporation is a multi-disciplined engineering firm that has provided its clients with a full range of architectural and engineering design, stormwater program management, planning, programming, and construction management services for over 50 years. With a resource pool of nearly 54,000 professionals located in over 300 offices worldwide, URS leads the industry in the areas of design, planning, programming, construction management, and development of such infrastructure elements as utility infrastructure, roadways, bridges, mass transit facilities, power, airports, ports and marine facilities, and buildings of all types. The firm provides a full range of environmental management services, including water resources engineering, natural systems management, pollution control, and solid and hazardous waste management. Our goal is to help clients meet the challenges of developing and maintaining a sound infrastructure and a clean environment.

URS greatly appreciates the opportunity to be of service to the Authority in this important matter. The firm has no responsibility to update this letter or accompanying report for events and circumstances occurring after the date of this letter.

Very truly yours,
URS Corporation

Robert M. Beringer, P.E.
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ENGINEERING FEASIBILITY STUDY

1.1 Introduction

The Feasibility Study reviews the Authority's progress in implementing capital projects and its plans to initiate additional capital improvements. In conjunction with prior work performed by URS as well as consideration of the work performed by other consultants, it assesses the adequacy of the Authority's CIP to maintain its water and wastewater infrastructure and to continue providing reliable service of a high quality to its customers.

The Authority utilizes an annually adopted CIP to plan and manage investments necessary to fulfill its service mission, comply with regulatory requirements and preserve its infrastructure. Capital improvements included in the CIP, covering FY 2008 through FY 2017, total \$3.2 billion, as shown in Table 3.1 (Table 3.1 as presented in the Financial Feasibility Report prepared by the Amawalk Consulting Group LLC). The three largest components of the current \$3.192 billion CIP are \$1.495 billion for wastewater treatment projects at Blue Plains, \$612 million for implementing the CSO LTCP and \$480 million for major water distribution system improvements.

Table 3.1 Capital Improvement Program Disbursements (\$Millions)

| Fiscal Year | Actual 2008 | Projected | | | | | | | | | |
|-------------------------------|----------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|----------|
| | | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Total |
| Wastewater Treatment Projects | 85.28 | 95.83 | 105.91 | 235.31 | 334.98 | 287.38 | 111.78 | 79.32 | 91.38 | 67.49 | 1,494.67 |
| Sanitary Sewer Projects | 15.77 | 18.87 | 21.97 | 38.92 | 19.66 | 10.14 | 7.17 | 7.54 | 7.38 | 6.65 | 154.08 |
| Combined Sewer Projects | 25.30 | 25.43 | 51.19 | 28.86 | 19.01 | 4.77 | 0.50 | 0.04 | 1.27 | 3.81 | 160.18 |
| CSO LTCP Projects | 13.32 | 16.44 | 21.35 | 45.84 | 75.68 | 66.01 | 95.52 | 102.14 | 94.32 | 80.98 | 611.61 |
| Stormwater Projects | 2.53 | 1.96 | 2.16 | 1.04 | 1.68 | 1.48 | 1.25 | 0.42 | 0.45 | 0.44 | 13.40 |
| Washington Aqueduct Projects | 76.42 | 23.16 | 5.58 | 7.02 | 7.50 | 8.06 | 8.02 | 8.00 | 8.00 | 8.00 | 159.76 |
| Water Projects | 68.66 | 63.74 | 49.86 | 51.38 | 52.50 | 46.10 | 39.19 | 34.47 | 33.54 | 40.73 | 480.16 |
| Capital Equipment | 14.63 | 19.28 | 15.79 | 12.29 | 8.75 | 6.62 | 6.91 | 6.95 | 6.73 | 6.69 | 104.63 |
| Meter Replacement/AMR | 1.48 | 1.24 | 1.28 | 1.29 | 1.29 | 1.30 | 1.31 | 1.32 | 1.33 | 1.33 | 13.16 |
| Total Uses of Funds | 303.39 | 265.96 | 275.10 | 421.94 | 521.05 | 431.84 | 271.65 | 240.20 | 244.40 | 216.13 | 3,191.66 |

The major components of the CIP are reviewed below.

1.2 Wastewater System

1.2.1 Wastewater Treatment Projects - Overview

Wastewater treatment investments are for the projects at Blue Plains, the largest advanced wastewater treatment plant in the United States, with a design capacity of 370 million gallons per day (MGD) and a peak capacity of 1,076 MGD. The original plant was constructed in 1938 as a primary treatment plant consisting of raw wastewater pumping, grit removal, grease separation, primary sedimentation, digestion, elutriation, and sludge dewatering facilities. Current liquid treatment processes include debris screening, grit removal, primary sedimentation, secondary treatment and settling, nitrification/denitrification for biological nitrogen removal and final effluent filtration/disinfection/dechlorination. The treatment plant also has extensive solids

handling and treatment processes, including solids thickening, lime stabilization and biosolids dewatering.

Several major capital improvement projects to rehabilitate, replace, or add new processes and capacity at Blue Plains were completed in recent years, including upgrades to the grit and screen facilities, primary treatment facilities and secondary treatment facilities. Additional dewatering facilities improvements, including seven new centrifuges and expanded storage facilities are complete. Construction of the new chemical handling facilities for metal salts, polymers, and sodium hypochlorite are complete, eliminating bulk chlorine and sulfur dioxide gas storage which was a major safety risk to workers and the surrounding neighborhood. The Process Computer Controls System (PCCS) projects associated with each phase of these long-term improvements have been completed and are operational.

The CIP components for Blue Plains include \$1.4 billion for continuing liquid and solids process improvements with annual spending levels ranging from \$67 million to \$335 million. The primary emphasis of the long-term CIP at Blue Plains is for the Blue Plains Total Nitrogen Program (BTN). BTN addresses the United States Environmental Protection Agency (“EPA”) requirement to improve treatment processes to achieve advanced treatment with nitrification and denitrification facilities. Effluent filtration and disinfection facilities also are underway. PCCS projects complementing the advanced treatment facilities are being implemented to enable monitoring and control of the improved processes.

1.2.2 Wastewater Treatment Projects - Biosolids

Projects that are part of the Biosolids Management Program approved by the Board of Directors (“the Board”) in 1999 are continuing, including major improvements to solids dewatering and thickening facilities. There are over \$303 million in solids processing projects in the 10-year plan. The Authority currently hauls away from Blue Plains more than 1,300 wet tons or 70 truck loads of biosolids on a daily basis. In June 2008, the Authority approved a proposal to proceed with a feasibility study for a thermal hydrolysis solids digestion process. The two-staged process includes flat-bottomed digesters, allowing for an approximate reduction in digester size of 50%. The preliminary cost estimate for these facilities is \$100 million higher than the amount included in the FY 2007-2016 CIP. The FY 2008-2017 CIP Solids Processing Program includes the increased cost estimate. The preliminary estimates will be refined during the feasibility study.

The increased performance of the proposed digestion process would enhance the level of solids reduction – thereby reducing hauling and disposal costs. It also is intended to produce a Class A biosolids – thereby increasing beneficial reuse options; and will recover energy for plant operations – thereby reducing demand from the power grid. An independent economic assessment projected methane gas production could provide one-third of Blue Plains’ 30 megawatt demand. The feasibility study will evaluate this preliminary percentage.

Biosolids generated at Blue Plains currently are considered Class B and are land-applied at farms, mine reclamation sites, forest land, and a tree farm. The majority of the sites are in Virginia, with a small percentage in Maryland. The Authority has recognized that the land application of Class B biosolids is becoming increasingly challenging because of changes in regulations and higher costs. The increasing cost is exemplified by the legislation adopted by the

Commonwealth of Virginia that allows Virginia counties to impose a fee for biosolids that are land applied in that state. The two-staged digestion process the Authority is considering would reduce the volume of biosolids by approximately 50 percent and produce Class A biosolids. Beneficial reuse of the Class A biosolids is being reviewed to include geographical diversification to West Virginia and Pennsylvania, expanded use of biosolids in silviculture, mine reclamation and site restoration.

1.2.3 Wastewater Treatment Projects – Permit Compliance

Total Maximum Daily Load

The 2003 NPDES permit as amended in 2007, expired on February 28, 2008. The requirements remain in effect according to the EPA. TMDLs (Total Maximum Daily Load) for Total Suspended Solids (TSS) and Biochemical Oxygen Demand (BOD) are expected to be issued by EPA in early 2009 in a new permit. The limits established in the permit modification, as expressed in concentration limits, are 7.0 mg/l TSS and 5.0 mg/l BOD. The modified permit has undergone a public comment period.

Total Nitrogen Improvements

The Authority is currently meeting the very stringent nutrient removal goal of its expired NPDES permit (8.467 million pounds of total nitrogen annually or 7.6 mg/l at plant capacity of 370 MGD) and was the first agency to meet the voluntary nutrient reduction goal stipulated in the Chesapeake Bay Program Nutrient Reduction Agreement. In April 2007, the USEPA issued a second modification to the January 2003 NPDES permit. The April 2007 permit modification replaced the existing goal by establishing a new Total Nitrogen effluent limit of 4.689 million pounds (4.2 mg/l) annually. The effective date of the modification is June 4, 2007. The modification stipulates a compliance date of January 1, 2015, for the Total Nitrogen effluent limit. The new limit matches the 2010 goal of the Chesapeake Bay Program Nutrient Reduction Agreement. This reduction from 8.467 million pounds (7.6 mg/l) to 4.689 million pounds (4.2 mg/l) represents a 45% reduction over the existing NPDES permit goal. Chesapeake Bay Program Nutrient reduction goals were anticipated to be met by 2010, but due to a variety of issues the compliance dates for all point discharge users will likely be met at a later date. The Authority plans to meet the new effluent limit by January 1, 2015, which is the anticipated date to be established in the permit modification.

The Authority appealed the re-issuance of the current permit that established a Total Nitrogen effluent limit rather than a goal to the EPA Environmental Appeals Board but the Authority's challenge was rejected by the EPA Environmental Appeals Board. The Authority has appealed the EPA Environmental Appeals Board's decision to the United States Court of Appeals for the District of Columbia Circuit.

There are other major process improvements with significant operating/maintenance cost savings in the long-term Blue Plains upgrade plan, including conversion of secondary treatment aeration basins from coarse bubble to fine bubble processing. The first fine-bubble reactor is in operation and will result in a 30% reduction in energy use according to the draft Independent Engineering Inspection: Findings and Recommendations, dated July 31, 2008. An Energy Manager has been hired and an Energy Conservation Plan is expected to be drafted in September 2009.

1.2.4 Wastewater Projects – CSO LTCP

Combined Sewers

One-third or about 600 miles of the District's sewers are combined systems, which means they convey both sanitary sewer flows and storm sewer flows. Excess flows during high rainfall periods result in overflows called Combined Sewer Overflows (CSO). The Authority's NPDES permit lists 53 sewer outfall points where overflow may be discharged. One outfall (001) discharges treated excess flow at Blue Plains, with the remaining points located throughout the District.

CSO LTCP

In FY 2002, The Authority submitted its proposed CSO LTCP to the EPA, marking a major milestone after almost two decades of studying combined sewer overflows by the Authority and its predecessor agency. The Authority's 2003 NPDES permit was challenged by an environmental group. The January 2003 NPDES permit addressed the discharge limits on treated municipal wastewater from Blue Plains as well as treated and untreated storm water from the District's of combined sewer system. In December 2004, the Authority reached agreement with the environmental plaintiffs, the EPA and the U.S. Department of Justice on the long-term CSO LTCP resulting in some modifications to the NPDES permit. The agreement has been formalized in a judicial consent decree entered in U.S. District Court in March 2005 and calls for the Authority to implement the CSO LTCP over a 20-year period. The primary purpose of the CSO LTCP is to control combined sewer overflow discharges by approximately 96%, improving water quality in Rock Creek and the Anacostia and Potomac Rivers and exceeding the EPA standard of 85%.

The Authority's overall CSO LTCP plan is to construct combined sewage storage/conveyance tunnels that are designed to intercept and store water until Blue Plains can receive and treat the combined sewage. The March 2005 consent decree contains provisions that allow the Authority and EPA to renegotiate elements of the CSO LTCP. Modifications to the consent decree are permitted only if there are changes in the regulatory, technical, financial, or institutional bases used to develop the CSO LTCP. The Total Nitrogen improvements meet the requirements of this provision, thus permitting the Authority to negotiate modifications to certain CSO LTCP controls.

The Authority does not anticipate a schedule extension or significant cost changes for the CSO LTCP through renegotiations. In an effort to meet the new Total Nitrogen discharge limits, the Authority has developed an approach that integrates the design and construction of the CSO LTCP and the Total Nitrogen Improvements. This integrated approach will reduce the anticipated cost of the Total Nitrogen improvements by approximately \$500 million while not significantly affecting the cost of the CSO LTCP. Key project components of the modified CSO LTCP include: 1) Improved treatment at Blue Plains to increase excess flow treatment capacity with project completion in FY 2018; 2) a \$1.4 billion eleven-mile tunnel system to control Anacostia River overflows with the first phase of the project operational by FY 2018; 3) a \$420 million three-mile tunnel system to control Potomac River overflow with project completion by FY 2025; and 4) a \$70 million one-mile tunnel system to control Piney Branch and Rock Creek

overflows with project completion by FY 2025. The total long-term cost of the CSO LTCP is estimated at \$2.2 billion.

When the Authority's proposed plan is fully implemented, the total system combined sewer capture rate is projected to be 96 percent. This rate compares favorably to the EPA guideline capture rate of 85 percent.

Construction has been completed on the CSO Nine Minimum Controls projects that were included and agreed to in the CSO LTCP settlement in 2004. The outstanding control yet to be completed is the replacement of a deteriorated segment of outfall sewer discovered during the project. This work is anticipated to be completed by 2010. These projects, which have an anticipated completion cost of \$170 million, were previously budgeted and planned by the Authority prior to the litigation and are projected to reduce CSO overflows by 40 percent. These improvements include rehabilitation to increase the capacity of four major pumping stations. The rehabilitation of the Potomac, East Side, Main and "0" Street, pumping stations is essentially complete with the certification of the Potomac Pumping Stations pumping capacity remaining to be resolved. Certification is expected by the Authority by the Spring 2009. The Authority has notified EPA of the certification delay citing a force majeure event. Monthly updates are being submitted apprising the EPA of progress towards the Spring 2009 certification.

1.2.5 Wastewater Projects – Sanitary Sewers

A sanitary sewer system serves two-thirds of the District. The system includes 1,200 miles of interceptor and sewer collection pipes with eight sanitary pumping stations. The typical operation is a gravity flow system with a few pumping stations to pump across higher grades in the District.

The Authority's 10-year CIP contemplates spending \$149.4 million for sanitary sewer improvement projects. The CIP includes the rehabilitation of three small sanitary sewer pumping stations at a cost of \$4.4 million. The three stations are the Rock Creek, Earl Place, and the Upper Anacostia Sewage Pumping Stations. The Upper Anacostia Station is essentially a replacement of the existing station. In light of the system's age, with portions dating back to the late 1800s, the Authority will have to continually invest in replacement, rehabilitation and renovation. The Authority has begun a comprehensive assessment of its sewer system. The Facilities Plan was completed in Summer 2008. The 10-year CIP includes \$2.2 million per year, on average, for sewer condition assessments that cover 90 miles of the system per year through year 2017. The Authority continues to develop capital projects as necessary to keep the system operating efficiently, such as the rehabilitation of the East Sewer Interceptor and sewer cured-in-place piping projects to reduce infiltration and inflow.

The 10-year CIP contains \$122.8 million for interceptor and on-going sewer improvements. The plan includes projects to design and reconstruct major sections of the 50-mile Potomac Interceptor in Fairfax and Loudoun counties. Additional funding is provided for an on-going assessment that includes repairs, rehabilitation, and replacement of manholes and improvements to access roads. Design of the upper Potomac Interceptor rehabilitation project is scheduled to be completed in 2009. The Authority expects to begin the installation of a \$13 million permanent odor control program at the Potomac Interceptor in mid-2010. Cleaning and inspection of the

Anacostia Main Interceptor recently was completed and construction of the Georgetown Sewer rehabilitation began mid-2008. These improvements are designed to substantially improve the integrity of the interceptor, reduce tide-related flows into Blue Plains and reduce the discharge of odorous gas emissions.

1.2.6 Stormwater Projects

The CIP identifies \$13.4 million for stormwater projects. The Authority is responsible for the design, construction and maintenance of public facilities that convey stormwater runoff to the Anacostia and Potomac Rivers, Rock Creek and other receiving streams. The stormwater system includes approximately 600 miles of storm sewer piping, catch basins, inlets, special structures, pumping stations and related facilities. The Authority specifically provides for the maintenance and replacement of certain public facilities within the District's combined sewer service area. The storm sewer piping is constructed of a variety of materials, including pre-cast concrete, brick, cast-in-place concrete, vitrified clay, ductile iron, plastic, steel and cast iron. Some components of the storm sewer system are over 100-years old. Current CIP projects include extensions to the system and relief of certain storm sewers as well as projects to rehabilitate or replace storm sewers that have experienced serious structural deterioration.

Coordination between compliance with the Municipal Separate Storm Sewer System (MS4) Permit and the CSO LTCP is on-going. This coordination among the Authority, the DC Department of the Environment (DDOE), which is the MS4 Administrator, and the MS4 task force has improved the definition of roles, responsibilities and funding sources to manage the stormwater activities. The MS4 Task Force is comprised of representatives from the District Government, business and development interests, and environmental organizations to assess and make recommendations regarding the District's stormwater management priorities, the organization of the District's stormwater administration, and the adequacy of the District's funding mechanisms for stormwater management. DDOE has central responsibilities for stormwater responsibilities since February 2007. The Authority's transition from being the previous MS4 Administrator is continuing to ensure that full compliance is maintained.

1.3 Drinking Water System

1.3.1 Washington Aqueduct

The Washington Aqueduct manages, operates and maintains the raw water intake facilities and treatment plants that supply drinking water to the distribution systems of the Authority, the City of Falls Church, Arlington County, and portions of the federal government. The Aqueduct has been providing wholesale water to the District since 1859, to Arlington County since 1926, and to the City of Falls Church since 1947. The Aqueduct's system has a raw water capacity of 700 MGD, treatment capacity of 350 MGD, and treated water storage capacity of 125 MG.

The Washington Aqueduct draws water from the Potomac River. Two water intakes, Great Falls and Little Falls offer redundancy and reliability. The Aqueduct owns and operates two water treatment facilities, the Dalecarlia and McMillan WTPs. Both WTPs serve the Authority. The Aqueduct is managed by the US Army Corps of Engineers (COE).

The Potomac River is the water supply for most of the Washington Metropolitan Area. The Interstate Commission on the Potomac River Basin, (ICPBR) along with the Metropolitan Washington Council of Governments, (MWCOG) has maintained a drought plan, in place since 1978. The Potomac River, a reliable water supply, is supplemented by three storage reservoirs, off river, (located on tributaries of the Potomac River) that store a combined 23.5 billion gallons of water. The off-river impoundments have three purposes: 1) reserve water supply 2) water quality, and 3) flood control storage. The three reservoirs' dams are regulated by the State of Maryland's Dam Safety Program.

The ICPBR's June 2005 *Water Supply Reliability Forecast for the Washington Metropolitan Area Year 2025* states in its executive summary: "The current assessment of future water demand and water supply reliability for the Metropolitan Washington Area demonstrates that even with a high growth (MWCOG Round 6 high growth scenario), the water supply system developed twenty-five years ago is adequate to meet 2025 demand under repeat of the worst meteorological and stream flow conditions in the historical record. ... Furthermore, the system is able to meet estimated future water supply demand in 2045 given a repeat of the same drought conditions."

The Authority purchases approximately 75 percent of the water produced by the Aqueduct and pays approximately 75 percent of the Aqueduct's operating and capital costs. The Authority's FY 2008 - 2017 CIP includes \$160 million for Aqueduct capital projects.

The Aqueduct has successfully piloted, designed and constructed a new orthophosphate corrosion control system at both of its water treatment plants to meet the optimal corrosion control treatment (OCCT) requirements under the Safe Drinking Water Act Lead and Copper Rule. Current periodic sampling by the Authority shows that lead levels are now below the action level, indicating that OCCT has been successfully reestablished. This success was achieved in 2005. Prior to the successful reestablishment of OCCT, the Authority experienced water quality parameters that created elevated lead levels within the potable water system, primarily due to the significant number of lead pipe service lines. The Lead Service Lines are discussed further in section 1.3.5.

1.3.2 Water Treatment Projects – Residuals Management

One of the major Aqueduct projects is a new sediment dewatering facility at the Dalecarlia Water Treatment Plant. The Aqueduct draws raw water from the Potomac River, extracts residuals, and treats it to produce drinking water for the Authority. These residuals are generally considered to be non-toxic and are typically permitted to be applied on various types of lands, including agricultural sites, forestland, and in lagoons. The Aqueduct's current NPDES permit was originally issued on March 19, 2003, and amended and reissued on February 27, 2004. The EPA and the Washington Aqueduct entered into a Federal Facilities Compliance Agreement (FFCA) to provide an enforceable compliance schedule for achieving the effluent limitations in the Aqueduct's NPDES Permit. The FFCA provides a legally mandated plan and timeline for the Washington Aqueduct to achieve and maintain compliance with the NPDES Permit. Under the Aqueduct's NPDES permit and related FFCA, the Aqueduct is required to remove 85 percent of incoming sediments and dispose of them through land disposal. Additionally, the permit limits

the concentration levels of TSS and aluminum in the effluent, which has the net effect of requiring the Aqueduct to remove 100 percent of the incoming sediments.

An Environmental Impact Statement that evaluated numerous residuals collection, conveyance, processing, and disposal alternatives was completed by the Aqueduct in September 2005. An October 28, 2005 Record of Decision was executed that described the selected alternative. The design for this project is complete and the construction contract has been awarded and a Notice to Proceed issued. The project is to be completed by December 30, 2010. Key project components of the selected alternative include: 1) modifications to existing sedimentation basins at the Dalecarlia Water Treatment Plant to permit the installation of new continuous residuals collection equipment; 2) construction of three new residuals pumping facilities required to pump the collected residuals to a central processing facility; 3) expansion of an existing booster control station to provide power for new residuals dredging and pumping facilities; 4) installation of several new underground liquid residuals conveyance pipelines; and 5) construction of a new central residuals processing facility. The Authority's share of the projected cost of the project is \$94 million.

1.3.3 Water Treatment Projects – Security Measures

The Aqueduct has on-going projects which address security improvements. The Aqueduct completed a Vulnerability Assessment after the terrorists' attacks of September 11, 2001. One major improvement has been the conversion to Sodium Hypochlorite from Chlorine gas. According to the Aqueduct, \$500,000 was expended in FY 2007 on security improvements. In FY 2009, the projected amounts are \$1.3 Million at the Dalecarlia WTP and \$600,000 at the McMillan WTP.

1.3.4 Water Distribution Projects

Drinking water is delivered to the Authority's customers through a distribution network consisting of underground reservoirs, elevated tanks, pipes, valves and various system appurtenances. The Authority and the Aqueduct each operate aspects of the distribution network. Pumping facilities have been a major priority of past capital plans as reflected in \$100 million of completed improvements.

The CIP includes \$480 million in funding for improvements to the Authority's pumping facilities, water distribution facilities, and metering assets. Almost \$3 million of upgrades to the Fort Reno Pumping Station will commence in FY 2009. The Authority, currently is designing the replacement facilities for the existing Anacostia Pumping Station.

The Authority's CIP includes major investments in its water distribution system assets. These include \$15.5 million in new system storage facilities and \$266.6 million for a wide range of water distribution piping improvements, including new main extensions, a major valve replacement program, water main dead end elimination, and a large number of water transmission and distribution main rehabilitation/replacement projects. Included in the CIP is \$43 million for fire hydrant replacement and DDOT-related water main projects necessitated by street and highway projects. The lead water service line replacement program is also continuing in a modified form and is discussed in the next section.

Additional funds are included in the CIP for continued AMR system improvements and large meter replacement in the current CIP. Beginning in FY 2002, the Authority initiated a comprehensive meter replacement and AMR implementation program. The AMR program is 99 percent complete with approximately 120,000 meters installed. The replacement of the remaining meters is scheduled for completion in FY 2009. Additional funding is included in the CIP for ongoing meter replacements and other AMR improvements.

1.3.5 Water Distribution Projects – Lead Service Lines

The Authority previously instituted a lead water service line replacement program in response to an Administrative Order issued by the EPA on June 17, 2004. The Administrative Order required the Authority to take action to reduce lead contamination by controlling the corrosiveness of water and replace lead service lines that carry water from the water main in the street to the property. Through FY 2008, the Authority had replaced a total of approximately 17,000 lead water service lines. The lead water service line replacement program is continuing in modified form as stipulated in Resolution #08-75 of the Board of Directors. The Authority is no longer under the Administrative Order to replace lead services as the Authority and the Aqueduct undertook appropriate measures and lead levels since 2005 have been consistently below the action level established in EPA's Lead and Copper Rule promulgated in 1991. Under Resolution #08-75, which is to undergo biannual review, lead service lines will be replaced in conjunction with water main replacement/rehabilitation activities. Lead services will also be replaced where the owner agrees to pay for the replacement of the private side or where the private side is already non-lead in advance of DDOT paving. The current 10-year CIP (FY 2008 to FY 2017) contains \$144.6 million as opposed to the \$310 million proposed to be spent in the previous 10-year CIP.

1.4 Capital Equipment

In addition to projects specific to wastewater and drinking water facilities, approximately \$105 million of the CIP is budgeted for various capital equipment investments, including information technology projects, fleet upgrades, minor utility equipment, and high priority rehabilitation projects at Blue Plains that are tied to the completion of long-term capital projects.

1.5 Issues Impacting the CIP

The current 10-year CIP (FY 2008 to FY 2017) reflects a well-established long-term capital planning process. However, it does not address a number of regulatory uncertainties and risks that are material from a financial perspective. These regulatory uncertainties were introduced earlier and are summarized as follows:

CSO LTCP Capital Improvement Impacts

A past U.S. Court of Appeals for the District of Columbia decision on a lawsuit filed by an environmental group may have an impact on the CSO LTCP schedule. The suit involved interpretation of the TMDL measurement for discharge into the Anacostia River and whether it is

to be based on an annual or daily average. The court's interpretation of the TMDL measurement as a daily maximum could affect the design basis of the CSO LTCP which is based on measuring TMDL as an annual average. The re-issuance of the permit as modified, expected in early 2009, would establish the limits as concentrations at levels that should not require altering the CSO LTCP schedule.

Total Nitrogen Reduction Program

The Authority is proceeding with planning the Total Nitrogen Reduction Program, budgeted at a cost of \$950 million (inflated to year-of-expenditure), which is designed to meet the new effluent limits that become effective on January 1, 2015. Amendments or modifications beyond those experienced to date could impact the planning and budgeting as established.

Biosolids Management Program

As described in the wastewater section, the biosolids management program is progressing towards a two-stage digestion process that will produce Class A biosolids. The projected cost is \$100 million above the current CIP and has been included in the FY 2008 – 2017 CIP, submitted to the Board October 23, 2008. Until the Biosolids Management Program is complete, The Authority continues to operate a lime stabilization process that is chemical and energy dependent.

The Authority continues engineering work associated with the CSO LTCP with the completion of the Anacostia River Facilities planning effort and plans to develop the Anacostia CSO LTCP projects to an advanced conceptual design sufficient to meet the Consent Decree requirements. The Anacostia River Facilities plan was submitted to EPA in September 2008 and implementation has begun.

1.6 Conclusions

Based on the results of our studies, URS offers the following findings and conclusions:

- The Authority has continued implementing its vision and strategic plan that focus on increasing the operational efficiency of the water and sewer systems and providing satisfactory service to its customers.
- Authority staff, including management and key operations and maintenance personnel, is well qualified, effectively organized and sufficient to meet the mission of providing a safe and dependable drinking water and sanitary sewer service while striving to sustain the environment.
- The existing water and sewer systems of the Authority are effectively maintained and operated.
- The Authority has developed and continues to implement thorough programs for ensuring the integrity of the water and sewer systems.
- Through appropriate management, operational practices, technology, staffing, tools and equipment, and selective outsourcing, the Authority has developed capital, operations and maintenance programs that should ensure the continued effective operation of the

systems for the foreseeable future. The systems should continue to provide high levels of service with minimal disruption.

- The Authority's wastewater and drinking water facilities are in material compliance with all applicable permits and regulations and continue to provide uninterrupted service to its wholesale and retail customers. Such compliance is anticipated to continue through the foreseeable future.
- Substantial progress has been made by the Authority in improving the operating condition of existing facilities. The CIP is structured to provide a systematic program to replace and rehabilitate aging infrastructure on a priority basis.
- Implementation of the Authority's CIP is intended to address identified system needs and priorities and is within budget.

These conclusions are in general agreement with the previously – referenced Independent Engineer's Report prepared in 2008 by PB Consult pursuant to stipulations in the Indenture. This report generally found all facilities to be operating at levels allowing the Authority to comply with permit requirements and to meet service commitments. The Authority appears to be diligent in its efforts to meet all challenges. Where areas were identified for improvement, the report noted specific responses in the Authority's CIP or specific mitigation underway, which mirror the findings of URS. The next Independent Engineer's Report is scheduled to be prepared in 2013.