District of Columbia Water and Sewer Authority

DC Water and Sewer Authority
SERVING THE PUBLIC • PROTECTING THE ENVIRONMENT

Independent Comprehensive Budget Review

Final Report

URS Corporation
Amawalk Consulting Group LLC
April 2008

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1. Executive Summary

1.1 Background

The District of Columbia Water and Sewer Authority ("DCWASA" or the "Authority") based on the current 10 year plan is anticipating that increases in rates and charges for water service and sewer service will be needed each year through the year 2016. In light of anticipated rate increases, the Council of the District of Columbia through its Fiscal Year 2008 Budget Support Act of 2007 directed that the DCWASA Board contract with an consultant to conduct an independent comprehensive review of the Authority's budget. This review is to include operating and capital budgets, plans, and programs, as well as the merits of and the timetable for all planned capital expenditures. Through this review, the DCWASA Board of Directors will receive recommendations for maximizing potential savings to the Authority's customers. Both the Board and management enthusiastically endorsed the concept of the review and set forth to accomplish this task well in advance of the deadline contained in the Act. DCWASA contracted with the URS team to obtain independent advice regarding ways to contain rising rates while providing responsible water supply and wastewater services. URS Corporation, in association with Amawalk Consulting Group, reviewed the Authority's operating budgets, Ten Year Capital Improvement Program, and related information to prepare this Report to the Board of Directors of the Authority. This Executive Summary provides an overview of the purpose of the review, our study methodology and approach, the key findings of our work, and the recommendations of our team.

DCWASA personnel provided significant information and assistance to our team throughout the study. We wish to acknowledge, with thanks, the cooperation that was provided.

1.2 Purpose

The principal purpose of our analysis is to identify ways for DCWASA to contain rising rates for District of Columbia (retail) customers and suburban (wholesale) customers. In addition, the Board requested that we focus attention on the following:

- Ensure that DCWASA is not only doing financial things right (i.e., being efficient) but that it is also doing the right things (i.e., being effective);
- Identify risks and benefits associated with potential savings;
- Review the merits and timetable for planned capital expenditures;
- Determine how much of the Capital Improvement Program (CIP) is based on existing or reasonably anticipated regulatory requirements;
- Determine that the 10 year financial plan is appropriately aligned with capital disbursements and financial plans such that expenditures are minimized; and
- Review current staffing levels for potential cost savings recommendations based on generally accepted best-in-class public utility practices.

1.3 Methodology and Approach

Our study methodology consisted of the following:

- Interviewing key personnel of DCWASA;
- Reviewing documents produced by DCWASA including the Ten Year Capital Improvement Program (FY 2007-16), the Revised FY 2008 and Proposed FY 2009 Operating Budgets, Official Statements for Authority bonds, reports to the Board, etc.;
- Reviewing documents prepared by consultants to the Authority including rate studies and various capital-related studies;
- Conducting a half day walk through inspection of the Blue Plains Treatment Plant (the project team was familiar with some other DCWASA facilities and was also time limited for detailed inspections);
- Comparing DCWASA's efficiency and effectiveness with other water and wastewater utilities. We benchmarked a variety of elements including, but not limited to, the following: staffing levels (at the functional level), operating costs (at the functional level) and measures relating to the five business activities (for the purposes of benchmarking) of the Authority (Management, Customer Service, Finance, Water Operations and Wastewater Operations). The performance indicators and benchmarks employed in this analysis came from a variety of sources including the joint American Water Works Association (AWWA)/Water Environment Federation (WEF) Qualserve program, benchmarks recommended by the Research Foundations of the industry (AWWA Research Foundation (AWWARF) and Water Environment Research Foundation) as well as benchmarks developed by the consulting team in the process of evaluating other water and wastewater utilities.
- Conducting a Best Practice analysis to help understand the benchmarking results and to facilitate an assessment of the effectiveness of operations and capital program management. The Best Practice analysis is based on our industry experience and knowledge of practices at other large water and wastewater systems;
- Interviewing selected people outside of DCWASA including contractors that do business with the Authority; and
- Reviewing special studies conducted for the Authority including customer satisfaction surveys and employee surveys.

Since the overall goal of the study is to identify opportunities to contain rates, our approach looked at both Authority revenues and expenditures, including operating expenses and the cash and financing needs for capital improvements. Recognizing the Board's emphasis on the responsible delivery of services, we examined the effectiveness of DCWASA's operations and capital program management.

Our Report is presented in a concise manner with many tables and charts comparing DCWASA's characteristics with those of other large water and wastewater systems in the

U.S. We believe that the comparative data supports many of our observations and recommendations since the data reflects the experience of other water and wastewater systems.

1.4 Overall Assessment

It is readily apparent from our work that DCWASA has made significant progress in recent years towards being a high-performing water and sewer utility. This conclusion considers both the efficiency of the Authority as well as its effectiveness. Just a few examples of the Authority's successes include:

- The operation of the largest advanced wastewater treatment plant (at its level of treatment) in the world with one of the lowest staffing ratios among large cities;
- A new automated meter reading (AMR) system and accompanying customer service practices that are among the best in the industry;
- A revenue collection rate that rivals the performance of investor-owned water utilities;
- Engineering and construction management capabilities and techniques that provide a structured, disciplined approach, with metrics and practices that are equal to or better than peer utilities, The inclusion of Operations personnel in the planning and design of facility improvements is a noteworthy achievement within the industry; and
- A strong credit rating from the major credit rating agencies enabling DCWASA to borrow funds at attractive rates.

From our experience, no utility ranks highest in every category and even the better water and wastewater utilities typically have at least some opportunities for improvement. Our Report presents a number of findings and recommendations that are intended to assist what we believe to be a very good organization to become even better. A number of achievements accomplished, to date, by DCWASA (e.g., AMR and CIS implementation and enhancement of bill collection strategies) can be studied by other utilities committed to improving performance in the delivery of services.

1.5 Findings and Conclusions

The principal findings and conclusions of our study are summarized below by category. To support our conclusions we utilized data from a number of peer groups. These groups are detailed in the appropriate following sections – the wastewater treatment plant peer group described on page 2-3 includes 19 other systems; the collection system peer group consists of 19 (slightly different) other systems; the large city rate comparison group described on page 3-1 contains 23 other systems; a different large city peer group consisting of 14 other systems described on page 3-4 was used to compare projected rate increases, other comparisons were made to Qualserve utilities described on pages 2-2 and 2-3. There are 193 Qualserve utilities, for some comparisons we used subsets of the Qualserve utilities, such as only those serving more than 500,000 people. Capital program metrics and practices were compared to a group of 27 other utilities surveyed as

part of an AWWA Research Foundation study. More details on our sources can be found on pages 2-2 and 2-3.

Revenues and Rates

Comparisons were performed of the Authority's rates with other utilities using multiple tests:

- A comparison of DCWASA's rates to a peer group consisting of large utilities and utilities in the region place it in the middle of that peer group.
- In comparison to twenty-three (23) other large systems, DCWASA rates and charges are higher than the median.
- Compared to the Qualserve group, DCWASA's charges are lower than median values for the defined average water bill and at about the median for wastewater.
- Comparing DCWASA's single family residential charge as a percentage of median household income against the 23 large utilities, DCWASA is in the second quartile (better than the average), indicating a reasonable level of affordability.
- The fixed portion of DCWASA's rate structure is in the bottom quartile (less than half of the average) of fixed charges compared to the other large systems surveyed that have fixed charges. DCWASA's customer base is exhibiting a long-term trend of declining per capita consumption, similar to other northern and eastern U.S. cities. A higher fixed component of the user charge can provide greater revenue stability and reduce the size of rate increases needed to offset declining consumption. Alternative fixed charges were examined in the Authority's 2006 study of the cost of service and alternative rate structures. The study made similar recommendations, but it was decided to postpone implementation.
- Approximately 24% of total operating revenues are currently received from wholesale customers. Charges to wholesale customers under the inter-municipal agreement (IMA) allocate capital costs based on reserved capacity and operating and maintenance expenses based on measured flows.
- Recent percentage increases in rates at DCWASA were somewhat lower than the average percentage increases of 9.1% (2005-6) and 7.2% (2006-7) experienced by other large cities.
- DCWASA's projected percentage increases in rates are not unusual compared to the projections of several other large cities. DCWASA and several other cities are facing regulatory mandates for capital improvements that are the principal driving forces behind future increases in user rates.
- The Authority has implemented aggressive bill collection strategies that, coupled with enhanced billing techniques, have significantly improved cash collections and reduced outstanding receivables to relatively low levels.
- The water meter at the Pentagon is under the control and read by the Pentagon. Since the water meter is the Authority's cashbox we recommend that the Authority renew efforts to have the Pentagon permit the Authority to control the water meter reading.
- The measuring devices involved in metering wholesale wastewater flows are old, and in a number of cases, are not uniform in construction. As these also are

cashboxes for the Authority, we recommend a thorough review of all wastewater meters with replacement and telemetry installation for those installations found in need of upgrading.

Other Revenues and Related Issues

- DCWASA's rate structure includes a number of miscellaneous fees and charges for services other than basic water service and sewer service. There appears to be an opportunity to expand the number and type of services for which fees are charged including fees for restaurants. In addition, there may be opportunities to raise the price of existing fees so that revenues better match the cost of service. A matter that requires further review is the possibility of collecting revenues from high strength surcharges in suburban communities. Additional revenue from miscellaneous fees, surcharges or other sources helps reduce the revenue that has to be raised from user charges.
- DCWASA currently earns about $7 million in interest income on reserve funds and other deposits. DCWASA appears to be aggressive, but responsible, in attempting to optimize the interest earnings on its available monies.
- DCWASA most recently reported that non-revenue water (i.e., the difference between water purchased and water billed) is 24% of water purchased. To permit comparison to the Qualserve utilities, which use a different measure, we made the assumption that water used in fire fighting, flushing, other municipal activities, such as catch basin cleaning, and street sweeping, and provided at no cost (under agreements) accounted for 10% of purchased water. The non-revenue water percentage is above the Qualserve median (a lower rate of performance compared to other utilities). Given the customer billing and service initiatives undertaken by DCWASA, this is more likely to be an expense issue associated with water losses than a lost revenue matter. This point is discussed further in the Report.
- The Authority maintains a very substantial cash reserve equivalent to about six months of operation and maintenance expenses. This amount is larger than the reserves typically maintained by large water and wastewater systems. There may be an opportunity to utilize a portion of the reserve for rate mitigation.

Operating Expenses

The following observations are offered based on a number of measurements of operating efficiency:

- Wastewater plant staffing is in the lowest quartile (highly efficient) based on both plant capacity and average daily flow. Blue Plains staffing and costs are better (i.e., lower) than the peer utilities.
- The amount of wastewater processed per employee is in the top quartile (highly efficient) compared to other utilities.
- Wastewater collection system staffing is the below the average (more efficient than average) but above the median staffing levels (an opportunity for improvement).
- Operations and maintenance cost per account is below the Qualserve median results (more efficient) for all utilities and for large utilities.

- The water system cost per account (i.e., the cost of purchased water plus operations of the water distribution system) is above the median (less efficient) for both all Qualserve and large Qualserve utilities.

Specific findings on the components of Operation and Maintenance Expenses are provided below.

- The cost of utilities is the single biggest non-labor expense for DCWASA at about $37.8 million in FY 2009. The Authority is very sophisticated and aggressive in its purchasing techniques for electricity. From a consumption perspective, there is an opportunity to optimize energy use through a comprehensive energy audit and the implementation of the audit recommendations. Based on the experiences of other utilities, it would not be unusual to achieve savings of up to 5% of energy costs.
- Chemicals are procured through Metropolitan Washington Council of Governments ("COG") contracts, a good mechanism for achieving economies of scale in purchasing. From a consumption perspective, there appear to be opportunities to reduce the quantities of chemicals being used through enhanced automation and other techniques. The Authority has initiated work on this issue.
- The staffing and facilities/equipment for operating and maintaining the interceptors and sewers of DCWASA are separate from the staffing and facilities/equipment for operating and maintaining the water transmission and distribution mains. It is understood that the Authority is considering combining the separate units into one. New York City had separate sewer and water main operations until the 1990s and then consolidated the staffing and facilities/equipment. The higher than average staffing ratio for water operations and a number of other factors suggest that there would be cost-saving opportunities through such a merger of responsibilities and resources.
- Overtime is above the industry target percentage of 5%. In part this may be attributable to lean staffing levels at the Authority, but it may represent an opportunity for some reduction in personnel related expenses.
- DCWASA is required to make a PILOT (payment in lieu of taxes) payment and right of way (ROW) fee to the District of Columbia of $19.3 million for FY 2009. This is the second largest PILOT payment reported by NACWA utilities. Since this amount is labeled PILOT it is not an includable expense in the IMA. However, the January 29, 1998 MOU referred to the PILOT payment as reimbursement for police, fire, EMS, protection, etc. It is our understanding that if the components of the PILOT payment are broken out and quantified, the dollars associated with specific services would be an includable expense for wholesale rate-making purposes under the IMA. No renegotiation of the agreement would be required if implemented.
- The Authority has a Board required 180-day operations and maintenance reserve of $118.6 million (FY08). This level appears to be high when looked at from a number of viewpoints. Revenues derived from IMA customers are received in advance and the Federal government which is informed of estimates payments years in advance is a low revenue risk. Also, other large comparably rated systems have substantially lower operations and maintenance reserves. DCWASA

should review this with its financial advisor and credit rating agencies to ensure that no negative implications are raised regarding the Authority's credit and to quantify amounts that could be accessed to moderate rates.

Capital Expenditures

The following observations are offered based on a number of measurements of capital efficiency:

- DCWASA's capital intensity rating is 7.1, which is slightly below the median. While this is a complex ratio that combines assets and revenues, it reflects prices paid for revenue generating assets, such as plant and equipment.
- The five year Capital Improvement Plan (CIP) cost as a percentage of net asset value of plant and equipment is below the median value for 28 utilities surveyed by an AWWARF study, which is described in more detail on page 2-4.
- DCWASA's 5 year CIP costs as a percentage of outstanding debt are at about the median value of the AWWARF utility sample.
- A capital program best practice survey was performed. Overall DCWASA was close to the median value for the larger full service utilities. DCWASA exhibited better than median practices in Planning and QA/QC and slightly below median in Design, Construction Management (CM), Program Management (PM) and consultant selection and use. (Note: the lower CM and PM scores reflect DCWASA's capital outsourcing strategy and should not be considered a negative. The consultant selection and use score reflects contract terms which are being improved).

Specific findings regarding Capital Expenditures are provided below.

- Four project initiatives represent 64% of the value of the total 10-Year CIP budget.
    - CSO LTCP
    - Lead Service Replacement
    - New Digestion Facilities
    - Blue Plains Total Nitrogen Removal Program
- The commitments for the above projects and estimates of the resulting cash flow from those commitments are reasonably aligned with the Authority's Financial Plan.
- About 45% of the 10-Year CIP budget is being driven by court-ordered mandates.
- The Authority uses multiple information systems to support the management of the CIP. It is suggested that one comprehensive system could help DCWASA by enabling: the preparation of master schedules; the development of seamless reports; and the performance of many other tasks.
- In order to be considered a customer of choice, the administrative duties placed on the contractors should be reviewed with the intent to improve the construction manager/contractor dynamic. The use of industry contract language (EJCDC or AIA) documents to reflect professional/industry practices should be considered. Proactive outreach to the contracting community to address concerns and ability to bid on appropriately sized contracts is encouraged.

Financing of Capital Improvements

The following observations are offered based on a number of measurements relating to capital financing:

- DCWASA has a higher debt ratio than the Qualserve average. (Note: this is a value that reflects financing strategy so a higher or lower than average value should not be deemed to be good or bad by itself).
- DCWASA's capital intensity (ratio of net asset value to operating revenues) is 7.1 which is slightly better than medians for municipal water (7.03) and municipal wastewater (7.85). Capital intensity is essentially the number of dollars of assets in the ground needed to earn one dollar of revenue.
- DCWASA's return on assets is close to the median value for large Qualserve utilities (1.57% vs. 1.6%) and below the median for all Qualserve utilities.

Specific findings regarding the Financing of Capital Improvements are provided below.

- The Finance Department exhibits best industry practices in cash management, the use of commercial paper for short-term financing and the Owner Controlled Insurance Program ("OCIP").
- Reasonable tests are used to determine whether the refinancing of outstanding bonds is warranted. The annual debt service on outstanding bonds is relatively level in future years. Although there are not opportunities to refinance certain bonds the current markets for auction rate securities suggest a refunding of the 2004 series and the remarketing of 2007 B series.
- Under the guidance of the Board, DCWASA management and finance professionals, together with other Authority personnel, have chosen to implement strategies intended to earn a good bond rating (which they have done).

Operating Practices

Specific findings on the water and sewer components of Operation and Maintenance Practices are provided below.

- During our visits to the Blue Plains facility, we conducted a facility maintenance and upkeep best practice survey. The resulting score was just under the best practice scores from nearly 200 plants.
- Operating best practice scores were mixed. Good practices are exhibited in operations involvement in the capital program, ongoing efforts to increase planned maintenance, worker recognition, standardization, etc. Opportunities for improvement include higher rates of planned maintenance (vs. corrective maintenance).
- DCWASA is populating the Maximo Asset Management system with asset and maintenance records with completion anticipated in twelve months.

Findings relating to other components of Operation and Maintenance Practices are provided below.

Management

- Compared to all Qualserve utilities and utilities serving more than 500,000 people, DCWASA's Management Best Practices are better than median values (as self-assessed by those utilities) and should be much better than average in two years when current initiatives are completed. Areas in which DCWASA is better than the median are: strategic planning, long-term financial planning, customer involvement, and continuous improvement. DCWASA is at the median in optimized asset management and risk management and below median in performance management systems (this is an area that the Authority is currently addressing).
- DCWASA has done well in health and safety incidence rates but can improve with respect to duration (total days lost). If it has not already done so, it can investigate developing lighter work alternatives for such incidents as back injuries. DCWASA can also add health and safety duration as a benchmark comparing to Qualserve utilities.
- DCWASA appears to be doing well in training and should consider adding training hours as a performance measure.
- Human Resources and Procurement are undertaking Best Practice initiatives
- Despite the high debt ratio, the low percentage of annual debt cost to revenue requirement does not make this a high level concern.

Customer Service

- A review of four call center metrics shows that DCWASA is above industry medians and at target for the other two.
- Customer service complaints per 1,000 customers placed DCWASA in the third quartile (good) when compared to the Qualserve utility group.
- Technical quality complaints placed DCWASA in the 4th quartile (best) compared to Qualserve utilities.
- Billing accuracy is 99.6%, which while good, is below median for Qualserve utilities. We expect this to improve to above median once AMR installation is complete. This number will improve once the AMR installation is complete.

Procurement

- DCWASA has a number of initiatives underway that should move it from a below median position to an above median position based on practices.

Human Resources

- DCWASA's Knowledge Capture and Succession Planning programs reflect Best Practices.

Health and Safety

- DCWASA is at the median in incidence rate.
- DCWASA is in the fourth quartile (lowest rated) in severity (days lost from work).

Training

- At more than 2% of payroll, DCWASA is above private sector targets.
- DCWASA does not currently track training hours, but we would expect, given the growth in certified operators and maintenance personnel and the level of training on expenditures, that DCWASA is likely in the top quartile.

1.6 Recommendations

The URS team respectfully offers the following recommendations for consideration by the Authority:

1. Consider implementing a higher fixed component of the user charge to provide greater revenue stability and reduce the percentage size of rate increases needed to offset declining consumption.
2. Conduct a comprehensive review of services provided to customers for other than basic water and sewer services to achieve the following: identify and price needed new fees (services being provided but no fee currently exists) and adjust the price of existing fees to achieve full cost recovery.
3. Assess the possibility of collecting revenues from high strength surcharges in suburban communities.
4. Utilize the resulting additional revenue to offset user charge revenue requirements.
5. Review all wastewater measuring devices and, where needed, replace/upgrade existing devices and install telemetry for those installations that are found to be in need of upgrading.
6. Continue efforts to have the Pentagon permit DCWASA to control water metering and readings to safeguard revenue.
7. Expand current initiatives to identify and eliminate or reduce unaccounted-for water to enable the Authority to reduce its water purchases (and payments).
8. Working with the Authority's financial advisor and in consultation with the bond rating agencies, consider some reduction in the cash reserves of the Authority with the proceeds used for rate stabilization, cash-financed capital or a combination of uses.
9. Optimize energy use through a comprehensive energy audit and the implementation of the audit recommendations. Hire an energy manager and create an energy conservation culture.
10. Optimize the quantities of chemicals being used through enhanced automation and other techniques.
11. Review the causes of overtime and, where appropriate, implement measures to reduce overtime expenses.
12. Evaluate alternative work assignments and other options to reduce days lost from work.
13. Consolidate staffing, equipment and vehicles for water main and sewer operations and maintenance into one organizational unit.

14. Request assistance from the District of Columbia in quantifying the components of the PILOT in order to allocate appropriate expenses for support services such as police and fire to wholesale customers.
15. Select and implement a comprehensive Capital Program Management System to provide efficient support for all CIP-related activities.
16. In order to be considered a customer of choice, the administrative duties placed on the contractors should be reviewed with the intent to improve the construction manager/contractor dynamic. The use of industry contract language (EJCDC or AIA) documents to reflect professional/industry practices are being considered. Proactive outreach to the contracting community to address concerns and ability to bid on appropriately-sized contracts also assist in promoting contractor interest and competition. Current initiatives should be continued.
17. Continue the aggressive conversion of asset/maintenance records to Maximo Asset Management. The completion of Maximo will assist the Authority in its efforts to optimize inventory, utilize asset management data as a source of input to CIP development, and implement other best practice initiatives.
18. Suggest developing recordkeeping for water service outages for metric analysis of service interruptions & maintenance priorities. This metric captures the extent and duration of "no-water" events. It is valuable in quantifying school cancellations due to "a water main break" as reported by media. It identifies areas prone to interruptions.

2. Background and Methodology

2.1 Background

The District of Columbia Water and Sewer Authority was established by a law that became effective on April 18, 1996 and activated as of October 1, 1996. The independent authority supplies water, collects wastewater, and treats wastewater for approximately half a million residential, commercial and government accounts residing in the Washington metropolitan area. In addition, it also treats wastewater on a wholesale basis for portions of Montgomery and Prince George's counties in Maryland and portions of Fairfax and Loudoun Counties in Virginia. In support of its operations, DCWASA has the authority and the responsibility to establish rates and charges for all services it provides in order to recover the cost of providing service. A Board of Directors comprised of 11 members and 11 alternates oversees the Authority's operations and decisions. The Mayor appoints six (6) of the Board members with the consent of the Council and has the authority to appoint five (5) Board members with recommendations from the other participating jurisdictions.

2.2 Overview

In September, 2007 DCWASA issued a Request for Proposals for an Independent Comprehensive Budget Review. DCWASA was seeking advice on ways to contain rising rates and to conduct a review of DCWASA's Operating and Capital Budgets, Ten-year Financial Plan, and programs. Proposed future rate increases of 8% to 12% per year for each year through 2016 (Figure 3-D) are being driven primarily by the Capital Improvement Program (CIP) and prompted this review.

2.3 Study Purpose

The principal purpose of our analysis is to identify ways for DCWASA to contain rising rates for District of Columbia (retail) customers and suburban (wholesale) customers. In addition, the Board requested that we focus attention on the following:

- Ensure that DCWASA is not only doing financial things right (i.e., being efficient) but that it is also doing the right things (i.e., being effective);
- Identify risks and benefits associated with potential savings;
- Review the merits and timetable for planned capital expenditures;
- Determine how much of the Capital Improvement Program (CIP) is based on existing or reasonably anticipated regulatory requirements;
- Determine that the 10 year financial plan is appropriately aligned with capital disbursements and financial plans such that expenditures are minimized; and
- Review current staffing levels for potential cost savings recommendations based on generally accepted best-in-class public utility practices.

2.4 Methodology and Approach

Our methodology consisted of the following steps:

- Preparing data requests for specific items. These included copies of OSHA Form 300A, call logs from the Customer Service Call Center, electricity and chemical usage logs and many additional materials;
- Interviewing key personnel of DCWASA;
- Reviewing documents produced by DCWASA including the Ten Year Capital Improvement Program (FY 2007-16), the Revised FY 2008 and Proposed FY 2009 Operating Budgets, Official Statements for Authority bonds, reports to the Board, etc.;
- Reviewing documents prepared by consultants to the Authority including rate studies and various capital-related studies;
- Conducting a walk-through inspection of the Blue Plains Wastewater Treatment Plant;
- Comparing DCWASA's efficiency and effectiveness with other water and wastewater utilities. As described herein, we benchmarked a variety of elements including, but not limited to, the following: staffing levels (at the functional level), operating costs (at the functional level), and measures relating to the five business activities of the Authority (Management, Customer Service, Finance, Water Operations, and Wastewater Operations).
- Conducting a Best Practice analysis to help understand the benchmarking results and to facilitate an assessment of the effectiveness of operations and capital program management. The Best Practice analysis is based on our industry experience and knowledge of practices at other large water and wastewater systems;
- Interviewing selected people outside of DCWASA including contractors that do business with the Authority; and
- Reviewing special studies conducted for the Authority including customer satisfaction surveys and employee surveys.

Since the overall goal of the study is to identify opportunities to contain rates, our approach looked at both Authority revenues and expenditures, including operating expenses and the cash and financing needs for capital improvements. Recognizing the Board's emphasis on the responsible delivery of services, we examined the effectiveness of DCWASA's operations and capital program management.

2.4.1 Benchmarking

To make benchmarking as appropriate as possible, we established a number of peer utilities to perform comparisons. The peer group data came from the following sources:

- An annual survey of 24 of the largest utilities (one of which is DCWASA) performed by Amawalk Consulting.
- The tri-annual survey performed by the National Association of Clean Water Agencies (NACWA). This survey has been performed since the early '80s and has twice been managed by a member of the project team. Approximately 140

wastewater agencies participate in this survey, with an aggregate served population of close to half the sewered population of the United States.

- The Qualserve benchmarking study. Qualserve is a joint American Water Works Association/Water Environment Federation effort. The 22 key benchmark metrics were developed by a team that included managers from close to 30 utilities. This survey has been performed 4 times with 193 utilities participating in the most recent survey. The survey itself is a joint effort of Qualserve and the American Productivity and Quality Center.

Peer Groups

A common approach to benchmarking is to form peer groups with common characteristics to permit, as much as possible, apples-to-apples comparisons. The following is a listing of the various peer groups utilized.

For Rate Comparisons

This peer group consisted of the water and sewer systems serving the following cities:

- Atlanta
- Baltimore
- Boston
- Chicago
- Cleveland
- Columbus
- Dallas
- Detroit
- Honolulu
- Houston
- Indianapolis
- Jacksonville
- Los Angeles
- Milwaukee
- New Orleans
- New York
- Newark
- Philadelphia
- San Antonio
- San Diego
- San Francisco
- San Jose
- St. Louis

Note on Population Served

The populations served by any given utility may vary between the types of services provided. DCWASA provides wastewater collection services to customers within the District of Columbia. Areas in Northern Virginia and Maryland also are served by collection system services via the Potomac Interceptor. Including the population served by the Potomac Interceptor allows for a more reasonable comparison of operating data with other utilities.

Likewise, comparing wastewater treatment populations, DCWASA's population is the entire population served by Blue Plains AWTP, which is approximately 2.2 million people, or an additional population of one million beyond collection system responsibilities. The two population estimates: 1.2 million for collection system and 2.2 million for wastewater treatment are referenced in DCWASA FY08-FY09 Operating Budgets and in Official Statements for Series 2007A and 2007B bonds.

For Wastewater Treatment Plant & Collection System Comparisons

Figure 2-A: Peer Group for Wastewater Treatment Plants

System	Population Served	Number of Plants	Plant Capacity (MGD)	Treatment Level
City of Phoenix	2,551,000	3	250.3	Tertiary
Orange County SD	2,400,000	2	480	Secondary
City of Los Angeles	4,000,000	4	580	3 Tertiary, 1 Secondary
East Bay MUD	640,000	1	320	Secondary
City of Indianapolis DPW	860,454	2	245	Tertiary
MWRA		2	543	1 Secondary, 1 Tertiary
Detroit WSD	3,897,603	1	930	Secondary
MCES	2,475,000	8	349.8	1 Secondary, 7 Advanced Secondary
Metro St. Louis SD	1,400,000	8	412.3	Secondary
NYC Dept. of Env. Prot.	8,000,000	14	1804.9	1 Primary, 8 Secondary, 5 Advanced Secondary
MSD of Greater Cincinnati	800,000	12	222	11 Secondary, 1 Tertiary
NE Ohio Reg. Sewer Dist.	1,162,098	3	365	2 Secondary, 1 Advanced
Philadelphia Water Dept.	2,218,000	3	522	Secondary
City of Memphis, DPW	995,000	2	225	Secondary
MWS, Nashville & Davidson County	553,000	3	391.5	Secondary
Dallas Water Utilities	1,400,000	2	310	Tertiary
San Antonio Water System	1,447,791	4	225	Advanced Secondary
Hampton Roads San. Dist.	1,600,000	12	231.3	10 Secondary, 2 Advanced
King County DNR	1,400,000	3	359.3	Secondary
DCWASA	2,200,000	1	370	Tertiary / BNR

Figure 2-B: Peer Group for Wastewater Collection System

System	Population Served	Collection System Length (Miles)
City of Phoenix	2,551,000	4,487
Orange County SD	2,400,000	650
City of Los Angeles	4,000,000	6,500
City of Indianapolis DPW	860,454	2,774
MWRA		203
Detroit WSD	3,897,603	3,458
MCES	2,475,000	601
Metro St. Louis SD	1,400,000	6,342
NYC Dept. of Env. Prot.	8,000,000	6,600
MSD of Greater Cincinnati	800,000	2,962
NE Ohio Reg. Sewer Dist.	1,162,098	265
Philadelphia Water Dept.	2,218,000	2,342
City of Memphis, DPW	995,000	4,506
MWS, Nashville & Davidson County	553,000	2,753
Dallas Water Utilities	1,400,000	4,200
San Antonio Water System	1,447,791	5,164
Hampton Roads San. Dist.	1,600,000	501
King County DNR	1,400,000	414
Milwaukee MSD	2,117,190	746
DCWASA	1,200,000	1,800

For All Other Metrics

Comparisons were made using the Qualserve utility group. Data is reported for combined (i.e., water and wastewater) utilities (111 utilities) and for utilities serving more than 500,000 people (30 utilities). Some comparisons, such as customer service, were made using the entire sample.

Capital Program Best Practices

The source of data for the capital program best practice analysis was the AWWA Research Foundation study "Improving Water Utility Capital Efficiency." The two major sources of capital program best practices are the California Multi-Agency Benchmarking Study, which has gone through five rounds of surveys, and the Construction Industry Institute which utilizes a data base of 2,000 projects to establish best practices. The survey form itself is based on the California study, however the project team has developed a cross walk between the two sets of best practices, so the survey can be said to incorporate both set of best practices. Capital program comparisons are made against a group of 28 utilities that were surveyed.

2.4.2 Important Notes about Benchmarking

Benchmarking and metrics are focused on numbers (cost, staffing, etc.) and can address both efficiency (costs) and effectiveness (how good is the effort), but:

- Benchmarking is a measurement at one point in time; direction is also important – are things getting better or worse?
- Don't expect to be best in all categories. Comparisons are to a self selected group of utilities that are diligently trying to get better.
- In any grouping, only half, no matter how good, can be better than average.
- The best utilities are ones that are pretty good at most things not ones that expend a great deal of effort at being the best in one or two areas.

Best practice analysis is focused on the things that the utility is doing. In most cases best practices represent expert opinion (the utilities that benchmark best seem to employ the following practices), in some cases a statistical analysis verifies that use of a practice leads to improved performance. The management best practice analysis is based on self-assessments made by peer utilities and should be evaluated with care.

A Benchmarking and Best Practice Analysis should complement each other. A utility that benchmarks well should also be employing some best practices. If not, good numbers today can mean bad numbers in the future.

3. Revenues and Rates

This section will examine rates, revenues and revenue-related matters. We will begin this evaluation by comparing average bills using multiple metrics and peer groups. Then we will look at revenue sources other than retail user charge rates and also examine areas related to revenue efficiency. The reason why we begin with rate comparisons is to provide a foundation for considering the components of the cost of service, efficiency and the drivers for rate increases.

3.1 Retail Rates and Average Bills

Rates and average bills are methods that are commonly used in comparing utilities. DCWASA compares itself against a group of peer and regional utilities, with the results being at about the average for that group. We considered a peer group of 23 other large utilities (the largest in the U.S., DCWASA would be the 24th member of that group). The results are shown below:

Figure 3-A: Annual Water and Wastewater (Combined) Bill for Single Family Residential

	Single Family Residential		
	City	Annual Charge	2006-7 % Change
1	Chicago	$243	2.5%
2	Indianapolis	$529	9.5%
3	Milwaukee	$530	-0.7%
4	St. Louis	$569	0.0%
5	Newark	$608	5.9%
6	San Jose	$623	3.1%
7	San Antonio	$626	0.5%
8	Baltimore	$626	9.0%
9	New York	$627	9.7%
10	Dallas	$649	7.5%
11	Los Angeles	$674	3.8%
12	Houston	$687	3.5%
13	Detroit	$707	15.1%
14	Jacksonville	$721	6.9%
15	Honolulu	$725	10.9%
16	Columbus	$729	13.4%
17	**Washington, D.C.**	**$771**	**4.2%**
18	Cleveland	$782	12.5%
19	New Orleans	$790	1.6%
20	San Diego	$1,021	2.7%
21	Boston	$1,077	9.5%
22	Philadelphia	$1,157	6.7%
23	San Francisco	$1,229	13.7%
24	Atlanta	$1,265	9.8%
	Average	**$748**	**7.1%**

Notes to Figure 3-A

- User charges in the preceding table are based upon information provided by the identified cities and standardized assumptions. Actual charges in each city will vary in accordance with local usage patterns.
- Standardized assumptions are made regarding residential water consumption, wastewater discharge, stormwater drainage area and other factors. We have assumed 100,000 gallons of annual water consumption and respective wastewater discharge and averaged meter charges for 5/8" and 3/4" meters. Residential stormwater and ROW/PILOT fees are also included in the annual bill calculation.
- Charges for all cities reflect rate schedules in effect on April 1, 2007

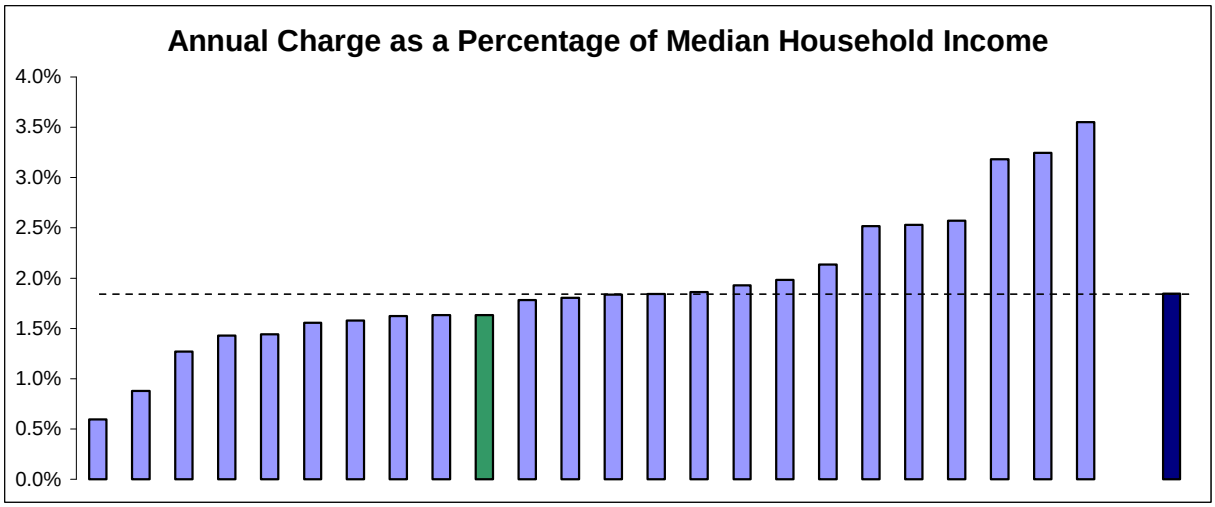
It should be noted that DCWASA (at the retail level) is towards the smaller end of the spectrum in the preceding list and, since scale is an important factor in average bill comparisons, its position on that list should not be viewed negatively. Our next comparison is to Qualserve utilities, keeping in mind that Qualserve uses 7,500 gallons per month as its basis for comparing average bills and DCWASA uses 6,800 gallons per month to develop average bills:

Figure 3-B: Monthly Average Water and Wastewater Bill for Qualserve Utilities

Bill (Qualserve 2006)	All Combined (water and wastewater)	Utilities serving more than 500,000	DC WASA 2006
Monthly residential water bill (7,500 gallons)	$24.06	$21.91	$20.99
Average residential water bill for one month	$23.95	$20.66	$17.58
Monthly residential sewer bill (7,500 gallons)	$29.55	$31.20	$30.60
Average residential sewer bill for one month	$25.03	$23.58	$25.49

In this comparison, DCWASA's charges are a little lower for water service and comparable to the average charges for sewer charges. The next comparison, also against the 23 systems used for comparison purposes on the previous page, compares an average single family bill as percent of median household income. This is the ratio used in affordability tests. Here, DCWASA ranks in the second (better than average) quartile:

Figure 3-C: Annual Bill as a Percentage of Median Household Income Comparison

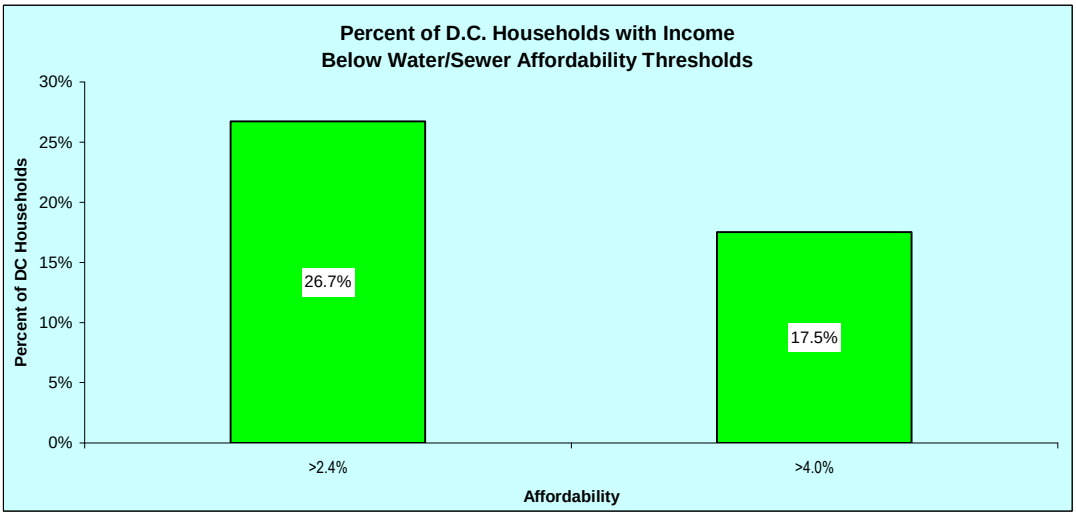


* DC WASA is highlighted in green; average of surveyed cities is highlighted in dark blue

The ranking of the utility in an average bill comparison is a function of the peer group chosen. Utilities should be compared against similarly sized utilities (such as the Qualserve utilities serving more than 500,000 people) and against regional utilities to reflect regional economic and regulatory factors (as DCWASA does in their rate comparisons). Calculating average bill as percent of median household income is a commonly used affordability measure. Also regional income levels will reflect utility's labor costs making this a useful comparison. It should be noted that, even with this calculation, many people, especially a large percentage of customers earning below-the-median incomes, will find it difficult to afford the bills.

Figure 3-D shows the percentage of DC households with incomes that would require more then 2.4% and 4% of the income towards an average DC water and sewer bill.

Figure 3-D Percent of D.C. Households with Income below Water/Sewer Affordability Thresholds



Source: 2006 Census for District of Columbia and assuming residential consumption of 6,800 gallons monthly.
Note: Industry affordability metrics generally fall in between 2% to 4% of Median Household Income.

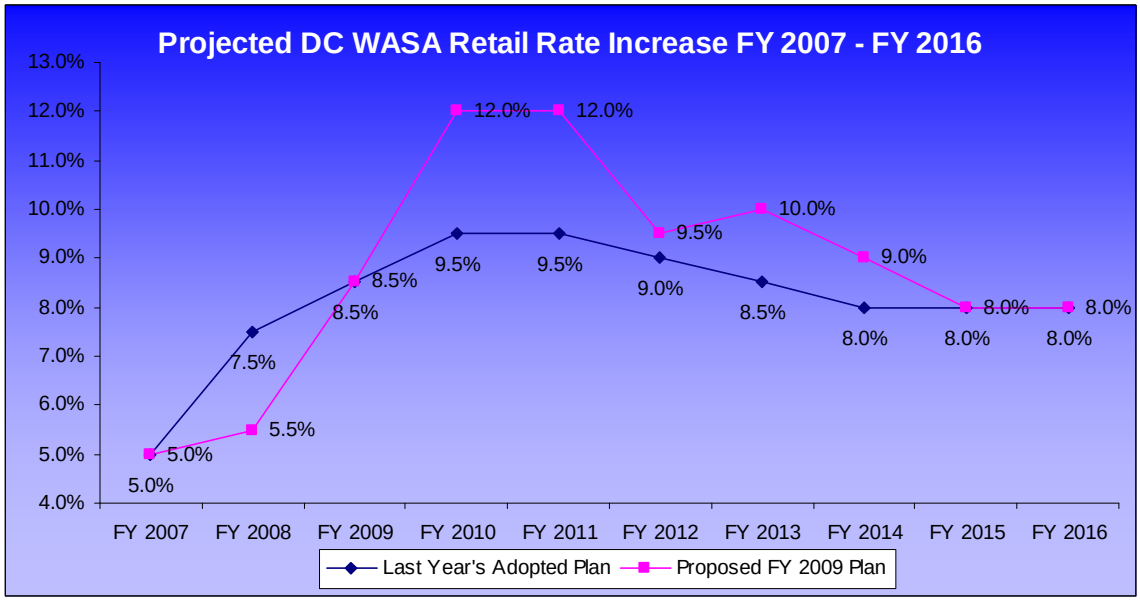
3.2 Rate Direction

In Section 3.1, we presented comparisons at one point in time. However, capital costs are at the beginning of a long upward climb for all systems. Taking a look at recent rate increase percentages and projected rate increase, percentages will provide a better picture of industry trends. The following data provides a comparison of recent rate increases:

- DCWASA's rate increases from 2005-6 to 2007-8 have been: 5.5%, 5.0% and 5.5%
- The average increase of 24 major cities from 2005-6: 9.1%
- The average increase of 24 major cities from 2006-7: 7.2%

DCWASA's projected rate increases for fiscal year 2009 to 2016 are illustrated in the table below.

Figure 3-E: Projected Retail Rate Increase for DCWASA from FY 2007 – FY 2016



How did DCWASA's rate increase percentage compare to other large systems in the '07-'08 cycle? DCWASA's rate increase percentage, highlighted in orange in Table 3-E, was in the bottom quartile (lowest percentage rate of increase) of the large systems. Note that utility names are coded because this information has not been made public elsewhere. This sample is drawn from the 24 large city utilities that Amawalk surveyed:

Figure 3-F: Projected Annual Water and Wastewater (Combined) Bill Comparison

Single Family Residential

Utility	Projected 2007-8 % Change
K	-0.6%
F	2.7%
M	4.7%
J	5.3%
L	5.6%
G	7.0%
C	8.2%
N	9.1%
O	9.8%
D	11.6%
E	12.6%
I	12.7%
B	14.0%
A	15.6%
H	21.0%
Average	**8.4%**

Percentage increases provided in Figure 3-E are based upon information provided by the identified cities in February 2008 and standardized assumptions regarding water consumption, wastewater discharge, stormwater drainage area and other factors.

Several cities are projecting double digit rate increases in the next year or two.

Based on the results presented in 3.1 and 3.2, we offer the following observations:

- DCWASA compares favorably to other systems in terms of retail rates and average bills.
- As a percentage of median household income DCWASA's rate are more affordable, on average, than its peers. We understand, however, that an average figure for median income does not address the affordability concerns of those customers with below average median incomes.
- Recent percentage increases in rates have been lower than its peers.
- Forecasted percentage increases in rates are projected to be comparable relative to peer utilities.

3.3 Retail Rate Structure

In its last rate study, DCWASA performed an alternative rates structure analysis – a Best Practice. Of the large systems we examined, DCWASA has one of the lowest percentages of revenues from the fixed portion of its rate structure. Figure 3-F illustrates the Authority's position relative to other systems.

Figure 3-G: Comparison of Fixed Charge as a Percentage of Annual Bills

Single Family Residential Monthly Fixed Rate Schedule

City	Total Monthly Fixed	Annual Bill (Fixed and Volume Based)	Total Fixed as % of Annual Bill
Chicago		$243	0%
Newark		$608	0%
Baltimore		$626	0%
New York		$627	0%
Los Angeles		$674	0%
Boston		$1,077	0%
Atlanta***		$1,265	0%
Houston	$1.06	$687	2%
Cleveland***	$2.33	$782	4%
Washington, D.C.**	**$2.64**	**$771**	**4%**
San Francisco	$6.95	$1,229	7%
Dallas	$7.43	$649	14%
Columbus	$10.80	$729	18%
Detroit	$14.82	$707	25%
Milwaukee	$11.22	$530	25%
New Orleans	$17.95	$790	27%
Indianapolis	$12.31	$529	28%
Jacksonville**	$17.33	$721	29%
St. Louis	$13.96	$569	29%
San Diego	$28.14	$1,021	33%
San Antonio*	$12.50	$626	38%
Philadelphia	$53.94	$1,157	56%
Honolulu	$36.26	$725	60%
San Jose	$32.96	$623	64%
Average	**$16.62**	**$748**	**19%**

(A) User Charges are based upon information provided by the identified cities and standardized assumptions regarding water consumption, wastewater discharge, stormwater drainage area and other factors.

(B) Charges for all cities reflect rate schedules in effect on April 1, 2007.

* Not shown San Antionio's water rate for July - Oct of $1.81 per Ccf.

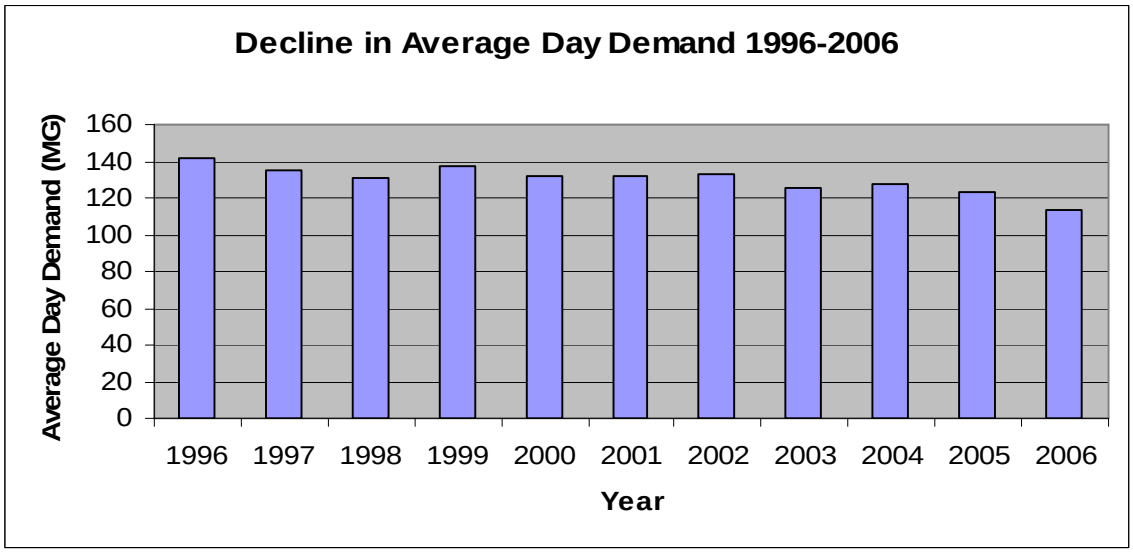
** Jacksonville sewer volume rates for April - Sept includes 10% discount to $2.99 per Ccf.

*** Cleveland and Atlanta both have minimum monthly charge not shown here.

**** DCWASA fixed charges include meter charge and stormwater fees and exclude ROW fees.

The above observation is significant because average day demand and, most likely, per capita demand have been in a long term decline, a situation common to many parts of the U.S. Figure 3-G illustrates the long-term trend in demand. This reduction in per capita demand is typically the result of newer, more efficient water using fixtures replacing older less efficient fixtures. There is also likely some elasticity of demand occurring as the cost of water service and sewer service increase across the country.

Figure 3-H: Average Day Demand: 1996-2006



The above results are significant because, as demand declines, DCWASA will have to increase its rates at a higher percentage than other cities that have modified their rate structure to increase the portion of the revenue generated from the fixed component of the rate schedule – a process known as "decoupling" rates. Decoupling is a term used when moving to a rate structure that makes the size of the bill less sensitive to usage, i.e., increases the portion of the bill that is fixed. DCWASA could consider increasing the percentage of its revenues from fixed charges as a way of reducing the portion of future rate increases that are attributable to declining consumption.

3.4 Meter Reading

The water meter is the "cash register" of the utility. Making sure that meters are correct and correctly read is important to the revenue efficiency of the utility.

Retail Water Meters

DCWASA has achieved excellent results with its retail meters. The automated meter reading ("AMR") installation is about 99% complete and, as one outcome, the percentage of non-revenue water has been declining (newer meters read more accurately than the older meters that were replaced that slow down, i.e., read less, as they age). This has been coupled with a new Customer Information System and more aggressive collection measures that have significantly lowered outstanding balances and delinquencies.

DCWASA provides water at no cost to Howard University and the Soldier's Home under a longstanding agreement in exchange for lease-free presence of underground tanks onsite. DC WASA also does not read 100% of its meters (particularly the water meter for the Pentagon).

Wholesale Sewer Meters

The Blue Plains Plant receives approximately 314 MGD on an annual basis using data presented in the Standard Procedures for Flow Measurement and Reporting document dated April 2003. The billing meter network consists of multiple flow metering configurations and various recording devices with a total of 54 billing meters. Considering these factors, the URS team reviewed DCWASA's sewer billing meter maintenance program. Documents reviewed as part of this task included the following.

- Wastewater Flow Meter Analysis & Management Plan, April 2000
- DCWASA Standard Procedures for Flow Measurement and Reporting, February 2003
- Various system maps depicting metering locations provided by EPMC III consultant

Key findings from this review are summarized below.

- Several of these metering locations are known to be conducive to inaccurate data collection for multiple reasons including, but not limited to, the age and condition of the equipment, the metering configuration (or primary device) is not suitable for the intended purpose, and the site hydraulics of the metering location are not favorable to accurate data recordation and collection. As an example, approximately 55% of the metering sites were noted as having acceptable/good hydraulics, and approximately 23% of the locations were noted with marginal hydraulics with estimated potential error ranges of 10% to over 20%.

- Real-time metering verifications at 53% of the sites were conducted as part of the April 2000 report. The results of those observations show the combined metering error during the one hour observation period as a net 57 gallons/hour under billing (0.5 million gallons per year or MGY).

- Observation of deviations between real time level measurements and billing meter recorded measurement at additional locations indicated errors averaging around 6% in the form of under billing. (There is not a straight line correlation between this percentage and revenue.)

- Only half of the metering sites are currently set up for wireless data transfer and four sites do not have access to AC power.

- In addition the majority of the billing meters are maintained and operated by entities other than DCWASA, and the methods for meter calibration and maintenance at these locations do not appear to be consistent.

- While it is difficult to ascertain the total annual revenue impact of eliminating or reducing the errors in the current metering network, the overall result will be a more accurate and fair accounting of flow contribution to the Blue Plains Plant.

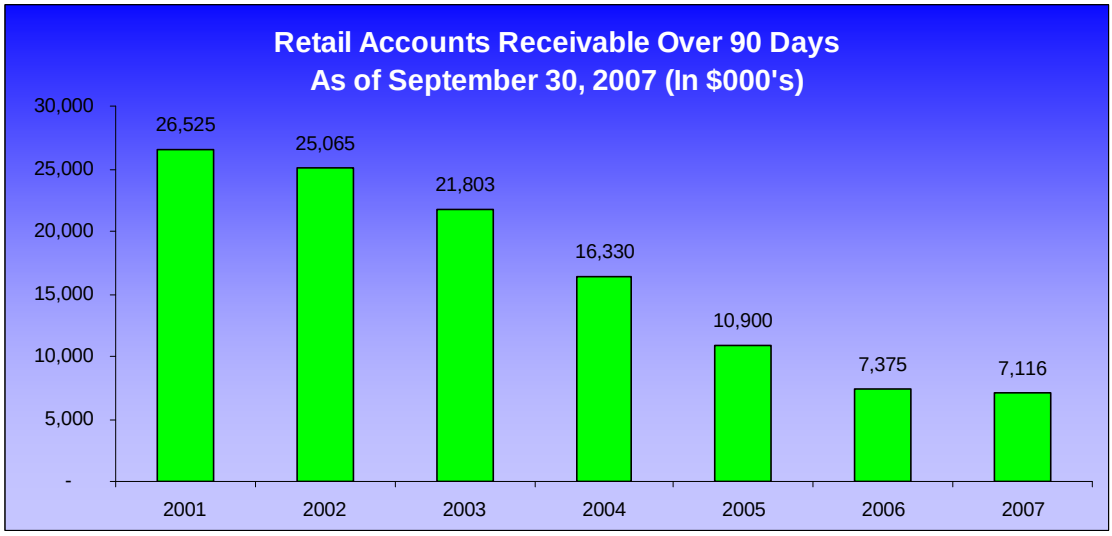
As costs for operating Blue Plains are expected to increase with the impact of ENR upgrades and the Long Term Control Plan (LTCP), it is prudent to review the accuracy of measurement of wastewater flow contributions from DCWASA customers and constituents of the inter-municipal agreement (IMA). Based on the preceding observations and the time since the last report, it is suggested that DCWASA conduct an analysis of its wastewater flow meters to develop and implement plans to upgrade metering facilities, where appropriate, to ensure that wastewater flows are effectively quantified.

3.5 Billing and Collections

The first important question in evaluating the adequacy of customer billing is how confident is the utility that everyone who should be receiving a bill is actually receiving a bill? DCWASA representatives advised that measures are taken (including cross-checks with property records) to ensure that all users of the Authority's system are being billed. A second question relates to the accuracy of the bills being issued. With the implementation of AMR and the new Customer Information System, the Authority can access customer usage data at any time and can alert customers to apparent leaks before such leaks turn into large bills.

The third step in the evaluation of billings and collections is the assessment of collection performance. The Authority collects a very high percentage of the bills that it issues. This level of performance minimizes the allowance for non-collectibles that must be recovered from all ratepayers, thus helping to keep rates lower. DCWASA has significantly improved its collection efforts in recent years. It has implemented initiatives which have helped to collect $5.1 million in outstanding receivables and to achieve all-time lows in delinquent accounts and receivable balances. In 2006, DCWASA's retail accounts receivable over 90 days outstanding were less than 30% of what they were in 2001. Figure 3-H depicts the amount of receivables over 90 days outstanding for DCWASA from 2001 to 2006.

Figure 3-I: DCWASA Over 90 Days Outstanding Retail Accounts Receivable



3.6 Miscellaneous Fees and Charges

Any review of rates and the rate structure would be incomplete without looking at fees and charges for services other than basic water service and sewer service. If charges are not being applied for all services provided and/or the charges are set at less than full cost (within the bounds of administrative efficiency), it means that retail and wholesale rates will have to be higher than they should be. The following schedule of miscellaneous fees and charges is representative of the numerous ancillary charges for service DCWASA has established.

- Water Taps and Connections
- Sewer Taps
- Meter Purchase and Installation
- Fire Hydrant Charges
- Water Bubbler Install and Removal
- Engineering Reviews and Sale of Documents
- Sheeting and Shoring Reviews
- Sales of Manuals and Maps

The typical utility of DCWASA's size and scope will have more miscellaneous fees and charges and will generate more revenues from them. However, determining what those should be and their levels will require a separate study that will take more time than was available to this study. However, we would note the following:

- The last rate study identified private fire lines as a fee in need of review
- Interviews with personnel involved in working with developers agreed that some developer-related fees were too low
- DCWASA does not have a high strength surcharge for wastewater customers discharging higher than normal strength

It is suggested that the Authority conduct a comprehensive review of miscellaneous fees. The review should include the investigation of high-strength surcharges for Food Service Establishments (FSE). The additional costs associated with FSE discharges of fats, oils, and greases affect both collection and treatment. High-strength surcharges, as required by U.S. EPA Construction Grants funding acceptance, are required for the IMA service areas as well. The Washington Suburban Sanitary Commission (WSSC) is a best practice leader in miscellaneous fees and charges. WSSC's annual review of fees and charges is quite comprehensive. The Town of Leesburg, VA followed similar practices and was able to significantly increase revenues derived from these charges.

3.7 Investment Income

Interest income on available funds provides a source of revenue to the system that reduces the amount of revenue that has to be raised through user charges. Available

funds include: required reserves such as the Debt Service Reserve Fund and the Operation and Maintenance Reserve Fund; Board-designated reserves including additional Operation and Maintenance Reserves and the Rate Stabilization Fund; monies accumulated during the year to pay for debt service or operating expenses; and cash designated for construction and working capital. During the last year or so, fluctuations in investment rates, financial market volatility and other factors have presented a challenge for money managers seeking to optimize returns on investments. Based on the results of our interviews with Finance Department personnel and the results achieved, it appears that DCWASA is effectively managing its cash and doing the things necessary to optimize investment earnings.

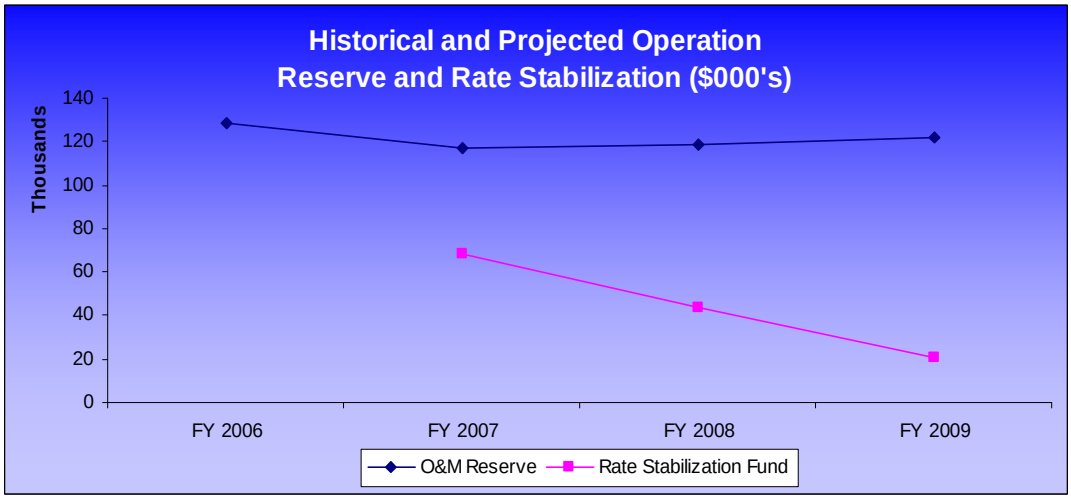
3.8 Reserves

The cash balances of the Authority totaled $253 million at the end of FY 2007. This total was comprised of the following major components:

- A Board-required six-months operating and maintenance reserve of $111.3 million (FY07).
- A rate stabilization fund of $68.5 million
- $67.8 million for the special Congressional appropriation WASA received in FY 2003 through FY 2007 towards the cost of the CSO LTCP

The Authority projects that the operating and maintenance reserve will be maintained for the foreseeable future while the rate stabilization fund will be drawn down. Figure 3-I summarizes the assumed levels in each fund through 2009.

Figure 3-J: Historical and Projected Balances of Operation Reserve and Rate Stabilization Fund



From our experience, the level of the DCWASA operation and maintenance reserve is high compared to other large water and wastewater systems. For example, the required and actual operation and maintenance reserve for the New York City system is one-sixth of annual operation and maintenance expenses. The credit rating of the New York City

Municipal Water Finance Authority is comparable to that of DCWASA. We believe that comparisons with other comparably-rated systems will yield similar results. Since IMA payments are made in advance and the Federal government should be viewed as a good credit risk, we believe that the operation and maintenance reserves could be reduced with the freed-up funds used for rate stabilization, cash-financed capital or other appropriate uses. We suggest that DCWASA review this with its financial advisor and the credit rating agencies to ensure that no negative implications are raised for the Authority's credit and to quantify the amounts that could be reasonably accessed.

If DCWASA adopted a policy of having a 120 day operating reserve (still conservative relative to industry standards), the required reserve could be reduced to $74.2 million versus $111.3 million. By maintaining the O&M reserve to remain a six-month reserve, but subtracting the advanced IMA payments and the Federal Government payments, the reserve can be reduced to $68.8 million with no discernable risk.

It should be noted that a regulated utility would be allowed a 45-day reserve (working capital). The rate payers of a regulated utility are not expected to finance a reserve of over 45 days.

4. Operation and Maintenance Expenses

This Section will review Operations and Maintenance Expenses and Practices for the three principal operating functions:

- Wastewater Treatment
- Collection System
- Distribution System

Benchmarking and best practices information is provided to present a general assessment of operating efficiency. Specific observations are provided on major components of operation and maintenance expenses including energy and chemicals. This section also includes information regarding operating practices to assess the effectiveness of water and sewer service delivery.

4.1 Wastewater Treatment

4.1.1 Comparisons with Other Utilities

As a large regional treatment facility, Blue Plains required the formation of a peer group of systems that serve large metro regions for benchmarking purposes. We selected 19 systems. Blue Plains is among the largest plants in the U.S. (giving it the benefit of economies of scale), but it is also one of the most complex plants (partially or completely offsetting that benefit). Figure 4-A identifies the wastewater treatment systems whose data we used to conduct comparisons with Blue Plains. It is important to recognize that we are comparing Blue Plains statistics as of today versus the most recent data from the 19 systems that is about 2-3 years old (thus understating their current cost of operations).

Figure 4-A: Benchmarking Peer Group for Blue Plains

System	Population Served	Number of Plants	Plant Capacity (MGD)	Treatment Level
City of Phoenix	2,551,000	3	250.3	Tertiary
Orange County SD	2,400,000	2	480	Secondary
City of Los Angeles	4,000,000	4	580	3 Tertiary, 1 Secondary
East Bay MUD	640,000	1	320	Secondary
City of Indianapolis DPW	860,454	2	245	Tertiary
MWRA		2	543	1 Secondary, 1 Tertiary
Detroit WSD	3,897,603	1	930	Secondary
MCES	2,475,000	8	349.8	1 Secondary, 7 Advanced Secondary
Metro St. Louis SD	1,400,000	8	412.3	Secondary
NYC Dept. of Env. Prot.	8,000,000	14	1804.9	1 Primary, 8 Secondary, 5 Advanced Secondary
MSD of Greater Cincinnati	800,000	12	222	11 Secondary, 1 Tertiary
NE Ohio Reg. Sewer Dist.	1,162,098	3	365	2 Secondary, 1 Advanced
Philadelphia Water Dept.	2,218,000	3	522	Secondary
City of Memphis, DPW	995,000	2	225	Secondary
MWS, Nashville & Davidson County	553,000	3	391.5	Secondary
Dallas Water Utilities	1,400,000	2	310	Tertiary
San Antonio Water System	1,447,791	4	225	Advanced Secondary
Hampton Roads San. Dist.	1,600,000	12	231.3	10 Secondary, 2 Advanced
King County DNR	1,400,000	3	359.3	Secondary
DCWASA	2,200,000	1	370	Tertiary / BNR

As illustrated in Figures 4-B and 4-E which follow, the operations at Blue Plains compare very favorably with other systems in the following areas:

- Wastewater Plant Staffing
- Wastewater Processed per Employee
- Wastewater Plant Effectiveness

Wastewater Plant Staffing

Two ratios are used to measure staffing levels: Full time equivalents (FTEs) divided by average daily flow through the plant and FTE/Capacity of the Plant. The staffing levels include both operations and maintenance personnel, so it combines wastewater treatment personnel and allocated personnel from maintenance. The following two graphs show DCWASA relative to the peer group (Blue Plains is in green).

Figure 4-B: FTE/Average Daily Flow (MG)

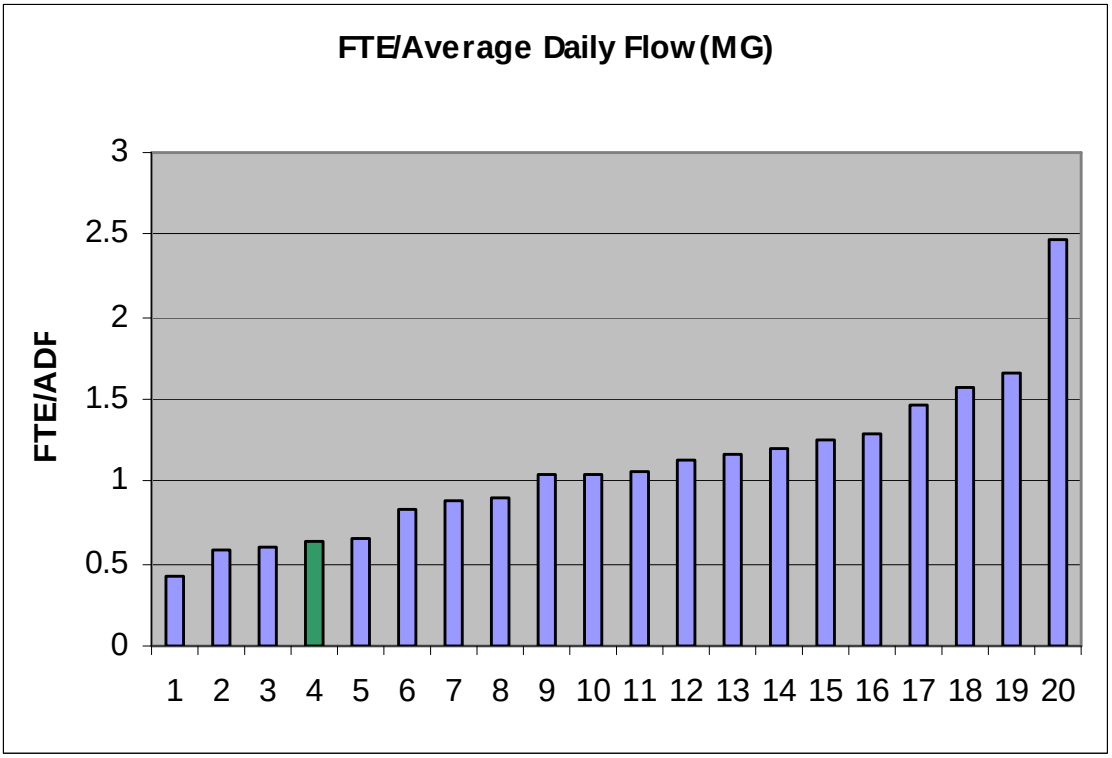
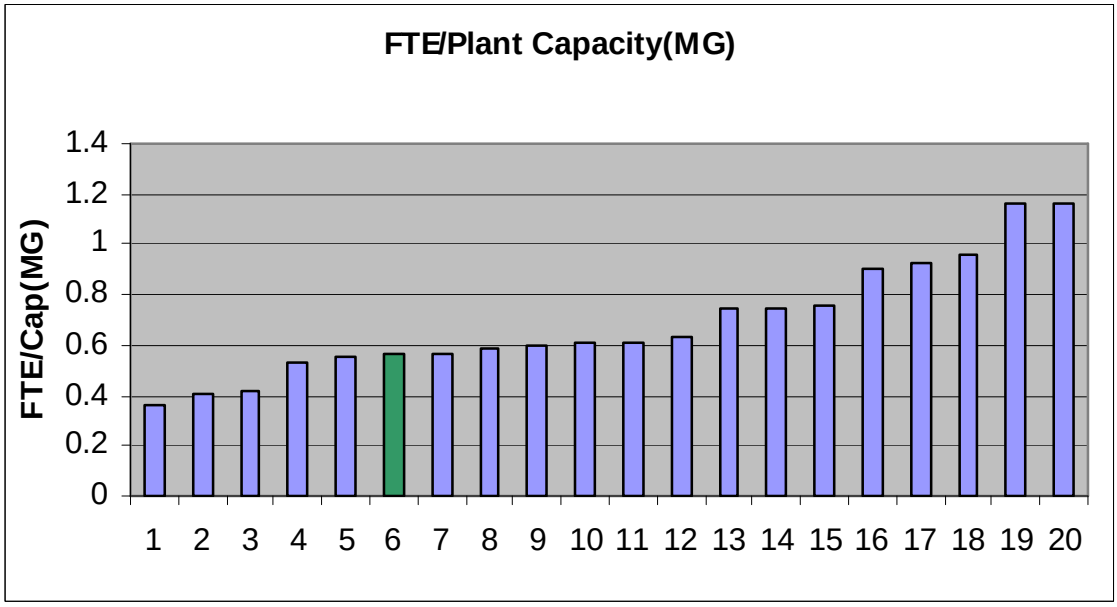


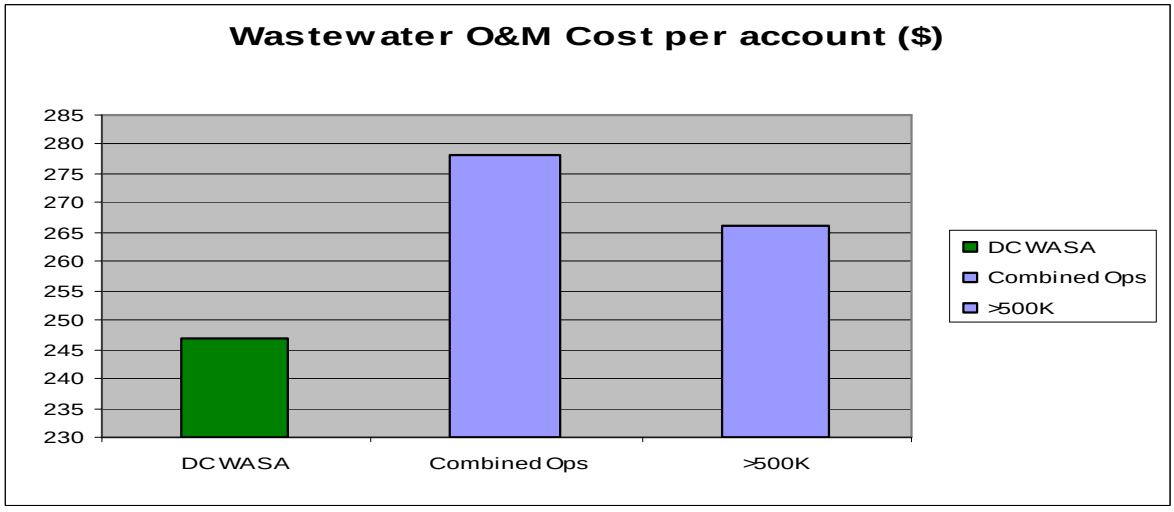
Figure 4-C: FTE/Plan Capacity (MG)



Both ratios show DCWASA to be in the lowest quartile (most efficient) in wastewater plant staffing.

Comparing the ratio of wastewater treatment costs to the number of accounts served by the plant places Blue Plains in the second quartile (more efficient than the average) when compared to the Qualserve utilities. This calculation was done by calculating DCWASA only costs at the plant and dividing by DCWASA retail accounts served.

Figure 4-D: Wastewater Operation and Maintenance Cost/Account



To summarize our conclusions regarding wastewater treatment operations:

- Bottom quartile (most efficient) in unit staffing.

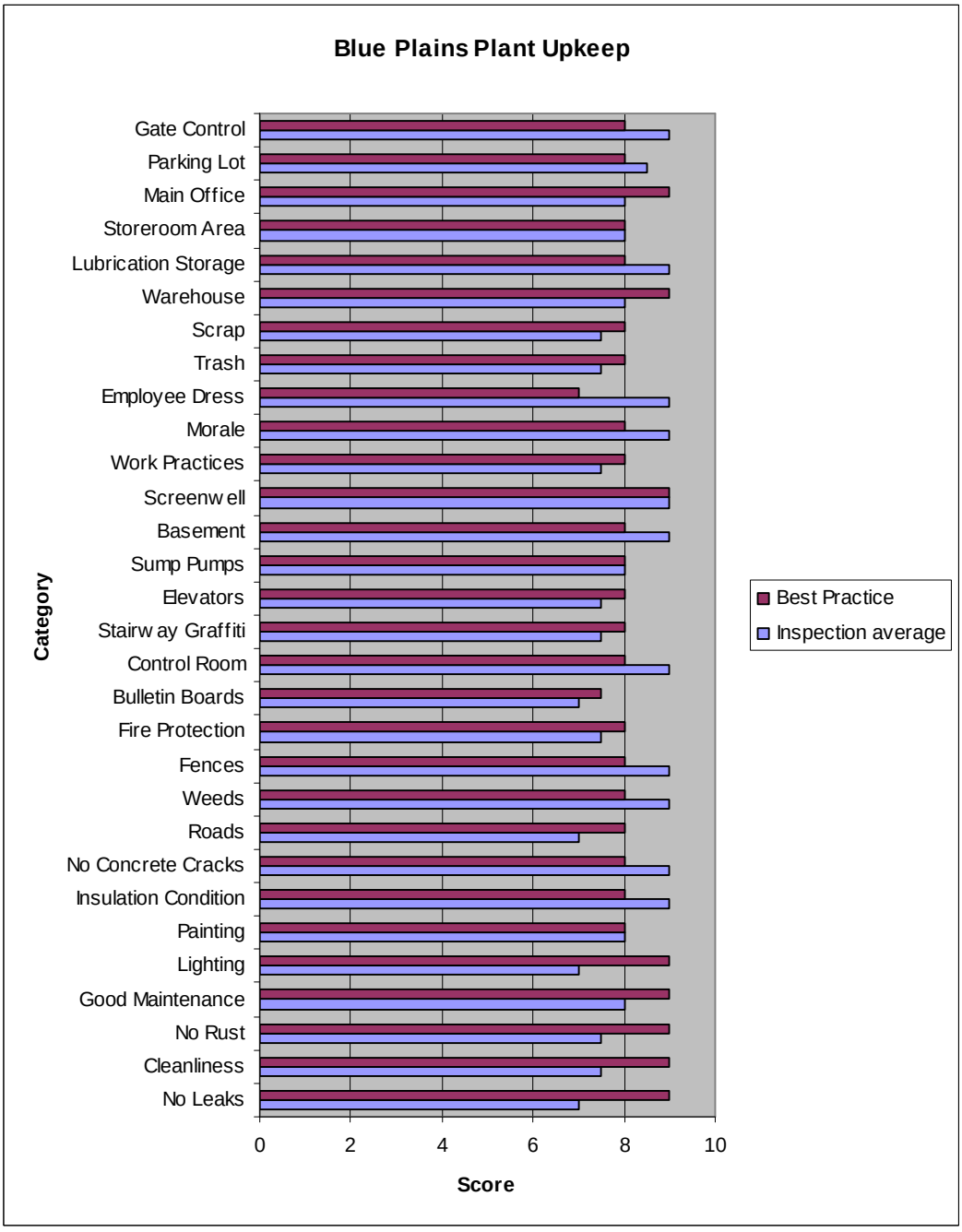
- Top quartile in MGD processed per employee (most efficient).
- Second quartile (more efficient than average) in O&M cost per account,

4.1.2 Measures of Wastewater Plant Effectiveness

One measure of operating effectiveness is recognition by peer utilities. Blue Plains is a NACWA Gold Medal winner.

As a further step in the evaluation of the effectiveness of wastewater operations, a facility survey was conducted by the URS team. The established survey focuses on maintenance and upkeep best practices. The results are presented by category in Figure 4-E. The resulting score was just under best practices scores from nearly 200 plants (i.e., a very good rating). In some categories, Blue Plains exceeded the expectations under Best Practices. The assessment was conducted by two members of the URS team that collectively have over 70 years of experience and have visited many wastewater treatment facilities in the region and across the nation.

Figure 4-E: Evaluation Results for Blue Plains against Industry Best Practices



4.1.3 Chemical Purchasing and Usage

DCWASA participates in the Washington Council of Government's (COG's) Cooperative Purchasing Program. The Fairfax County Water Authority bids the chemical contracts on behalf of the COG and participating utilities. Participation in purchasing pools is a best practice in the industry, taking advantage of the economies of scale by having utilities join together. Price escalations are incorporated in multi-year contracts

because of chemical market volatility. Particularly volatile is the methanol market. Methanol is a more recent addition to the suite of chemicals used in wastewater treatment.

To compare pricing efficiencies thought to be gained by regional purchasing economies of scale, the contract prices of a non-participating utility in the region were examined. Comparable prices were found for three chemicals:

- Lime (Granular) had an identical price.
- An approximate 12% discount in price was realized for Sodium Hypochlorite through COG.
- Roughly 17% discount in price was realized for Sodium Hydroxide through COG.

The effectiveness of pooled purchasing in optimizing unit prices is demonstrated by the above results.

A critical cost in most wastewater operations is polymer costs within the sludge dewatering process. Polymer – Blend (CF) can have a significant variance from expectations as has been experienced by DCWASA. More polymer is being required while the expected results are not being achieved. A dewatering expert has been retained by DCWASA to study and optimize the use of chemicals in dewatering at Blue Plains. This is a standard and good practice. An interview with the expert confirmed the variances in usage. The dewatering expert detailed potential solutions that are under consideration.

The escalating usage and cost of chemicals warrants retaining an expert to advise on optimizing all aspects of chemical usage at the facility. The recommendations offered by retained experts could include the enhanced use of technology to optimize chemical dosing and increased testing of chemicals as they are received to ensure adherence to specifications and Standard Operating Procedures. A major component is the long range strategy for efficient operations is DCWASA's Process Control & Computer System (PCCS). The project upgrades technology to improve treatment control and optimize chemicals and power costs. The goal is to provide improved operations with central monitoring, decision making and controlled responses.

4.1.4 Energy Purchasing and Consumption

Energy Purchasing

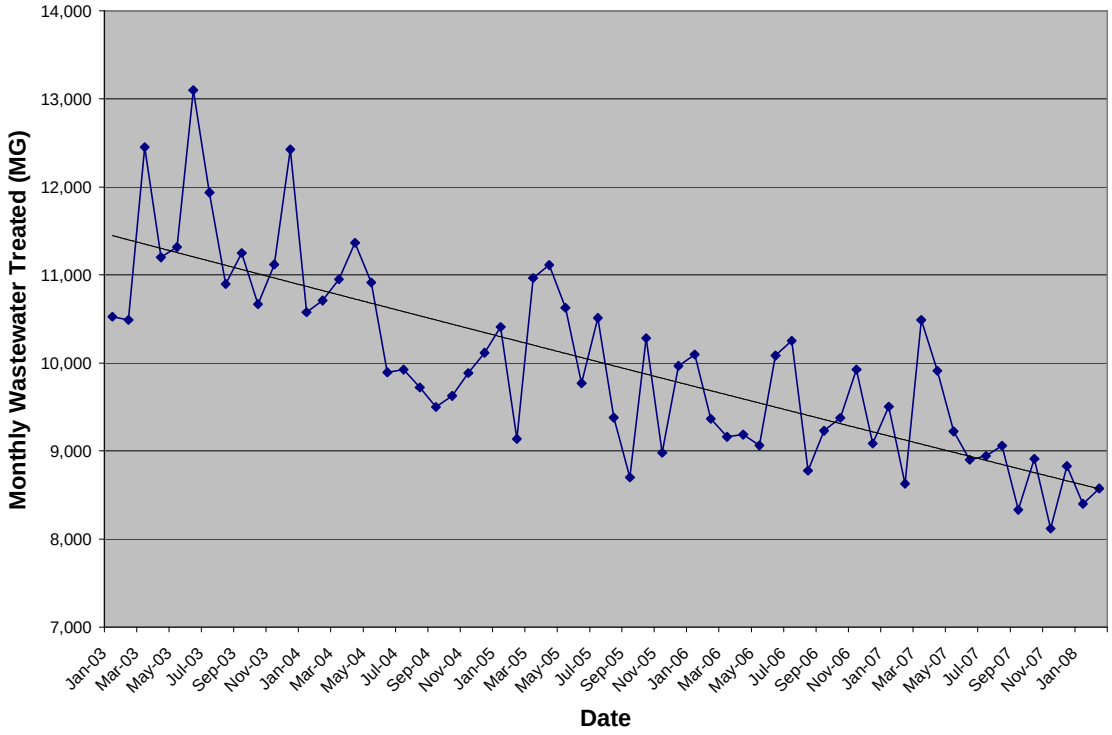
DCWASA recognizes its role within the community as a major user of energy. The energy purchasing strategy was reviewed during staff interviews. DCWASA has entered into successive five-year contracts for energy generation and delivery services. This allows DCWASA the flexibility to lock in blocks of power at fixed price when futures pricing meets budget targets. Another tier of the contract grants DCWASA access to the wholesale market for energy. This access allows DCWASA pricing knowledge while reviewing bids from energy wholesalers. The DCWASA Department of Finance and Budget monitors the energy market on a continuous basis.

Energy Consumption

An analysis of energy consumption (expressed as kWh or kilowatt-hours) was conducted by the URS team for Blue Plains. This analysis involved evaluating wastewater flow data and energy use patterns to determine base and variable rates of usage and costs. Also, the energy intensity[1] of the facility was analyzed and compared to national benchmarks.

Data on the number of gallons of wastewater treated were analyzed from 2003 through 2008. During that period, a total of 619,825 million gallons of wastewater was treated. The average total monthly wastewater treated was 9,997 million gallons with a maximum amount of 13,100 million gallons in June 2003 and a minimum amount of 8,117 million gallons in November 2007. The highest monthly averages for wastewater are typically reported in the months of March and April. The following chart shows the total monthly quantities of wastewater for the period of analysis. The trend line on the chart shows that quantities of wastewater are decreasing over time.

Figure 4-F: Wastewater Flow Trend

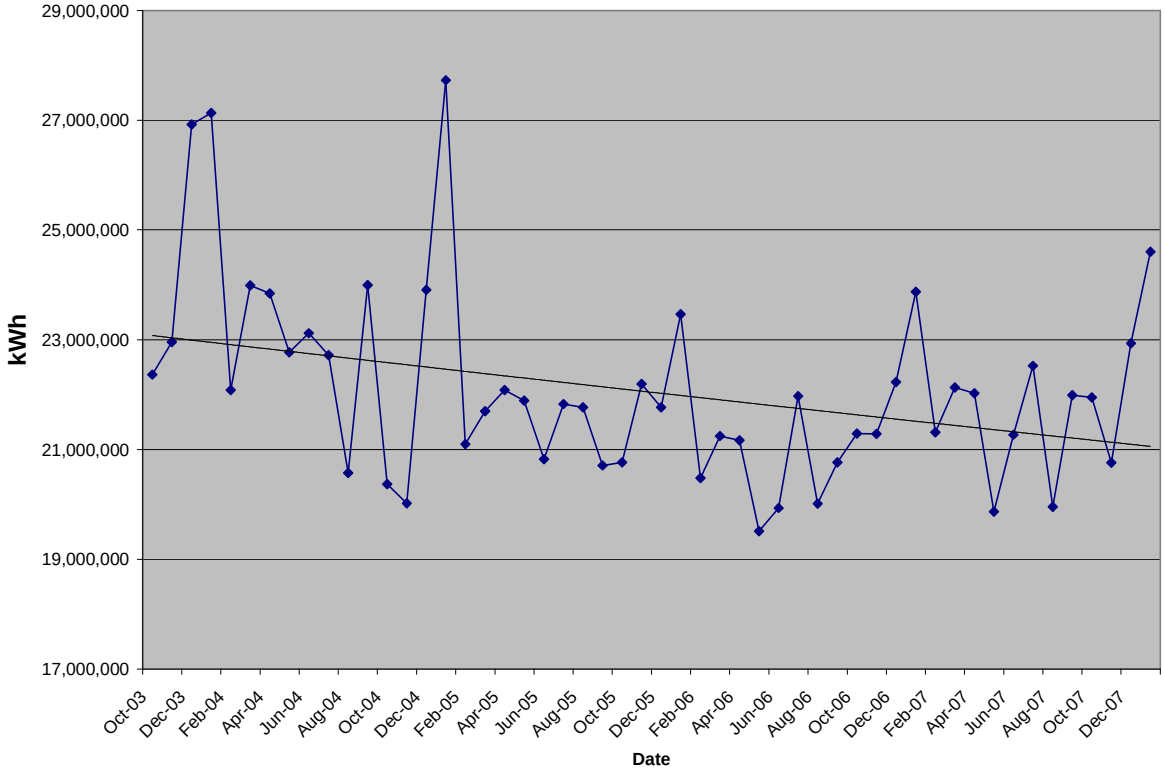


Energy consumption data was provided by DCWASA and analyzed from October 2003 through January of 2008. During that period, 1,147,906,659 kWh of electricity were used at Blue Plains. The average monthly electrical use was 22,075,128 kWh with a maximum usage of 25,790,586 kWh in January 2005 and a minimum usage of 19,512,726 kWh in May 2006. The months with the highest average electricity usage

[1] Energy intensity is defined as the amount of energy needed (kWh) per million gallons of wastewater treated.

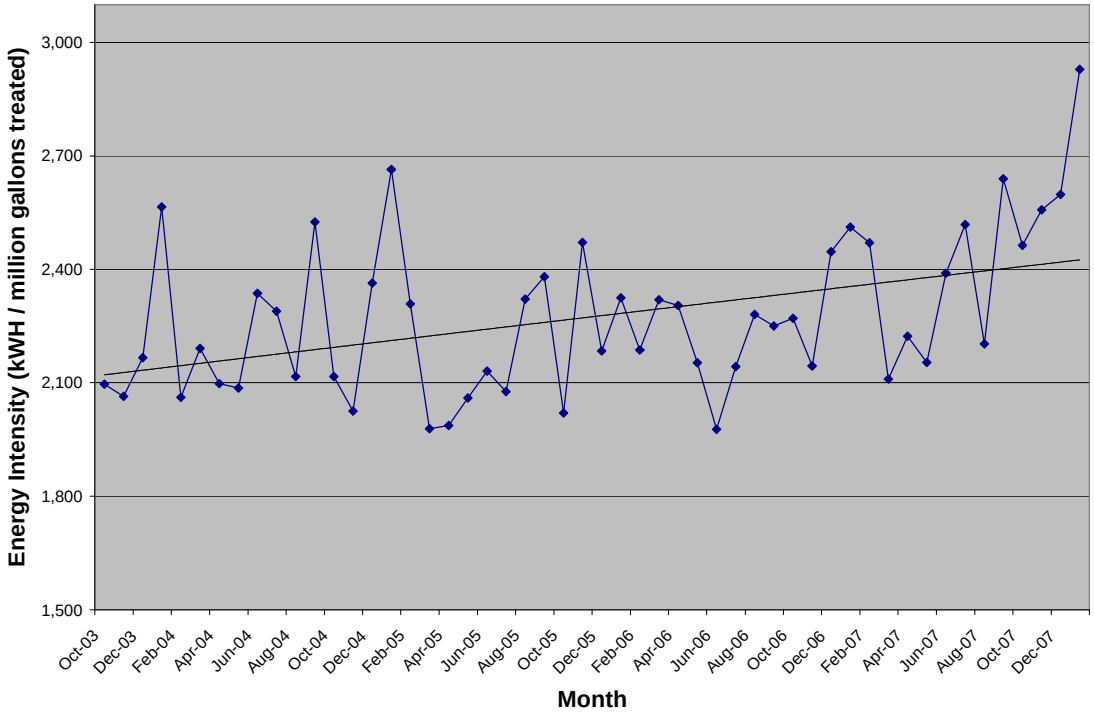
were January and December. The following chart shows the monthly energy use. As the trend line shows, energy use, like flows, is generally decreasing over time.

Figure 4-G: Energy Use Trend



Based on the energy use and flow data, the energy intensity for this facility was determined. The energy intensity is the amount of energy (kWh) required to treat one million gallons of wastewater (one unit of flow). To calculate this value, the amount of energy used in a month was divided by the amount of flow for the month. The average energy intensity was 2,271 kWh per million gallons of water treated with a maximum of 2,929 and a minimum of 1,977. The chart below shows the energy intensity over time at Blue Plains. The trend line on the chart shows that energy intensity is increasing over time. That means that the rate of decrease in flow is greater than the rate of decrease in energy use.

Figure 4-H: Energy Intensity Trend



The energy intensity at Blue Plains was then compared to the energy intensity for wastewater treatment to determine the efficiency of the facility. The national average for energy intensity, as calculated in the Electric Power Research Institute (EPRI) paper *Managing the 21st Century: Water and Sustainability - Electricity*, is 1,800 kWh per million gallons of wastewater treated. The energy intensity at Blue Plains was about 25 percent higher than the national average. One possible explanation for this result is the need for energy intensive Biological Nutrient Removal (BNR) treatment at Blue Plains.

It is suggested that further studies should be conducted to analyze energy usage and look for efficiencies. A good starting point for information on potential energy efficiencies is the paper "A National Program Initiative to Support Energy Savings in the Municipal Wastewater Sector" published in 2007 by the Water Environment Foundation.

Interviews with DCWASA personnel indicate that no formal energy audit has been conducted in the past five years. Energy-saving mechanical systems are planned for projects in the CIP. Also the Enhanced Nutrient Reduction (ENR) initiatives at Blue Plains incorporate processes that have been assessed for energy impacts. The ten-year CIP renewal/replacement projects will impact positively on the overall energy intensity. A major component is the long range strategy for efficient operations is the Process Control & Computer System (PCCS). This project upgrades technology to improve treatment control and optimize chemical and power costs.

In the interim, the URS team respectfully suggests that DCWASA should hire the advertised Energy Manager as a priority. At Blue Plains and other pumping facilities, DCWASA should adopt procedures that promote energy-conserving measures. The conserving practices expected of staff can be aided by installing improved controls such as automatically closing doors, automatic lighting sensors and more efficient lighting. It is also recommended that the Energy Manager initiate a comprehensive energy management study.

The size of Blue Plains and level of treatment achieved do not allow for meaningful comparisons with other large plants, however, energy optimization studies typically produce savings of 5-10%. This may result in a $1 million savings for DCWASA annually.

4.2 Wastewater Collection System

The Peer Group for our assessment of the performance of the Collection System is essentially the same as for wastewater treatment.

Figure 4-I: Benchmarking Peer Group Overview for Wastewater Collection System

System	Population Served	Collection System Length (Miles)
City of Phoenix	2,551,000	4,487
Orange County SD	2,400,000	650
City of Los Angeles	4,000,000	6,500
City of Indianapolis DPW	860,454	2,774
MWRA		203
Detroit WSD	3,897,603	3,458
MCES	2,475,000	601
Metro St. Louis SD	1,400,000	6,342
NYC Dept. of Env. Prot.	8,000,000	6,600
MSD of Greater Cincinnati	800,000	2,962
NE Ohio Reg. Sewer Dist.	1,162,098	265
Philadelphia Water Dept.	2,218,000	2,342
City of Memphis, DPW	995,000	4,506
MWS, Nashville & Davidson County	553,000	2,753
Dallas Water Utilities	1,400,000	4,200
San Antonio Water System	1,447,791	5,164
Hampton Roads San. Dist.	1,600,000	501
King County DNR	1,400,000	414
Milwaukee MSD	2,117,190	746
DCWASA	1,200,000	1,800

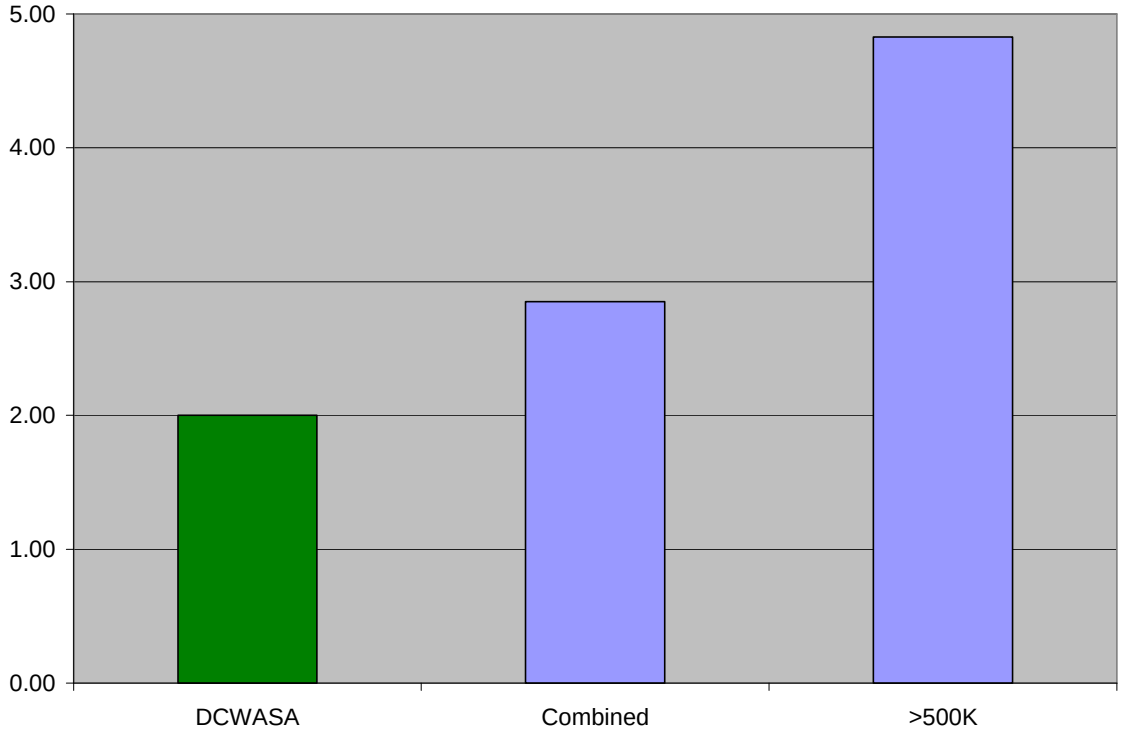
Collection System Staffing Levels
Two metrics have been employed to measure the efficiency of the collection system. The first is the ratio of FTEs per mile of collection mains which indicates the intensity of staffing.

Sewer Overflow Rates
An overflow refers to a discharge from a sewer through a manhole, pumping facility, clean-out, customer floor drain, or the drain in a fixture. Sewer overflows indicates the healthiness of the condition of the wastewater collection system and the effectiveness of the maintenance activities. The ratio provides an easy and quantified comparable among utilities. It is intended to include overflows created by conditions within the collection system components that are under the control of the utility. For example, it will include overflows from sanitary sewers and dry weather overflows from combined sanitary and storm sewers. Exclusions are those that are deemed outside utility's control such as:

- General flooding that results in overflows in an otherwise separate sanitary sewer,
- Conditions within facilities for which a customer is responsible,
- Wet weather conditions.

Sewer overflow rate is expressed as the ratio of the number of overflow events per 100 miles of sanitary and combined collection system piping. A sewer overflow rate comparison among DCWASA, its peers and the industry is depicted below.

Figure 4-J: Sewer Overflow Rate Comparison

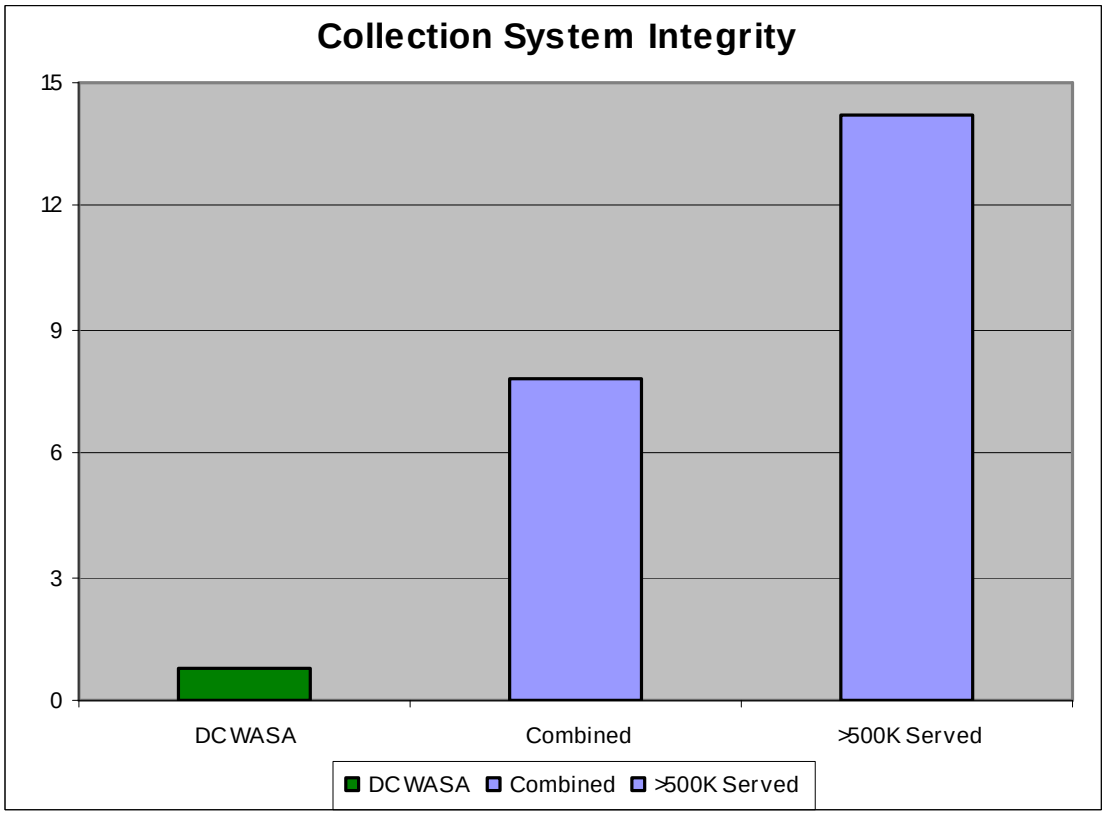


DCWASA's sewer overflow rate is lower than that of the industry and its peers. It is an indication that DCWASA's wastewater collection system is well managed and maintained.

Collection System Integrity

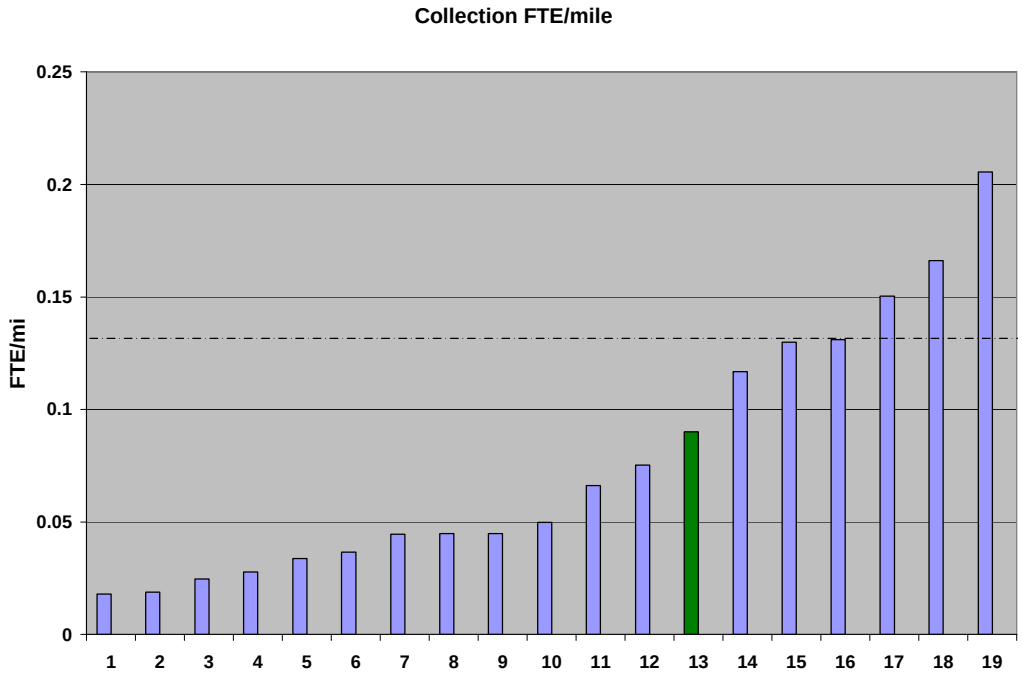
Collection system integrity is an indicator that assesses the frequency of collection system failures per 100 miles of collection piping. When tracked over time, the utility can benchmark against itself to evaluate progression overtime in addition to benchmarking to the industry. A better understanding of the number, types and history of collection system failures can help the utility to make better decisions regarding routine maintenance and replacement/renewal. A collection system failure refers to a loss of capacity resulting from a flow restriction in gravity or pressurized sewer systems. Exclusion are non-collection system caused failures such as electrical and mechanical lift station failures, electrical power outrages, and failures that occur on customer properties.

Figure 4-K: Collection System Integrity Comparison



DCWASA's collection system is well managed and maintained as indicated by its significantly lower collection system failure rate.

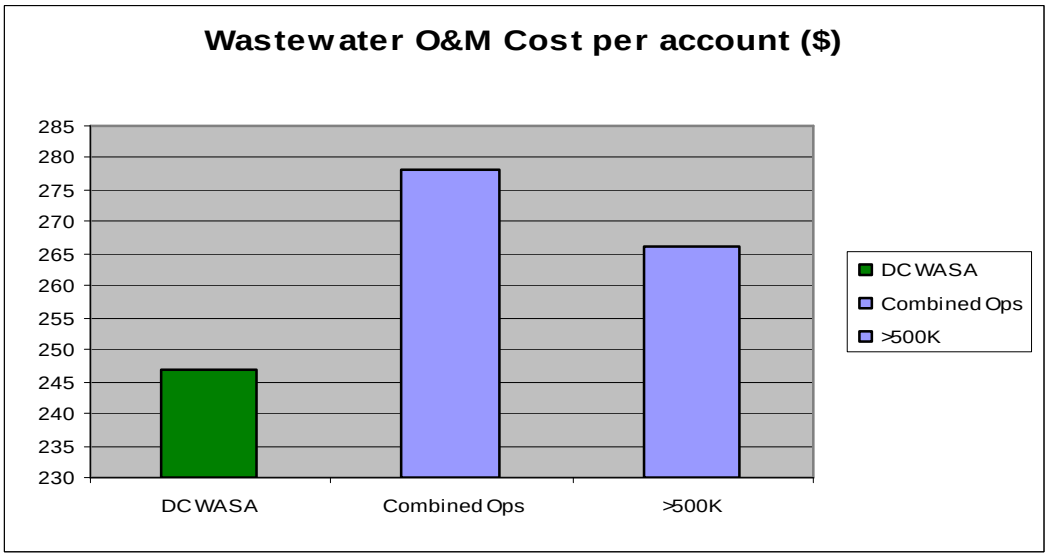
Figure 4-L: Collection FTE/Miles



As illustrated above, DCWASA's collection system staffing level is below the average compared to peer utilities It is important to note that the above graph does not include the FTE/mile figures of the highest three utilities which would exceed the maximum rate on the scale .

The ratio of O&M costs per the number of accounts is another indicator of the efficiency of staffing levels.

Figure 4-M: Wastewater Operation and Maintenance Costs/Account



The above results show that DCWASA's competitive staffing levels are reflected in O&M cost per account. DCWASA is below the median for all utilities and for large utilities in O&M cost per account.

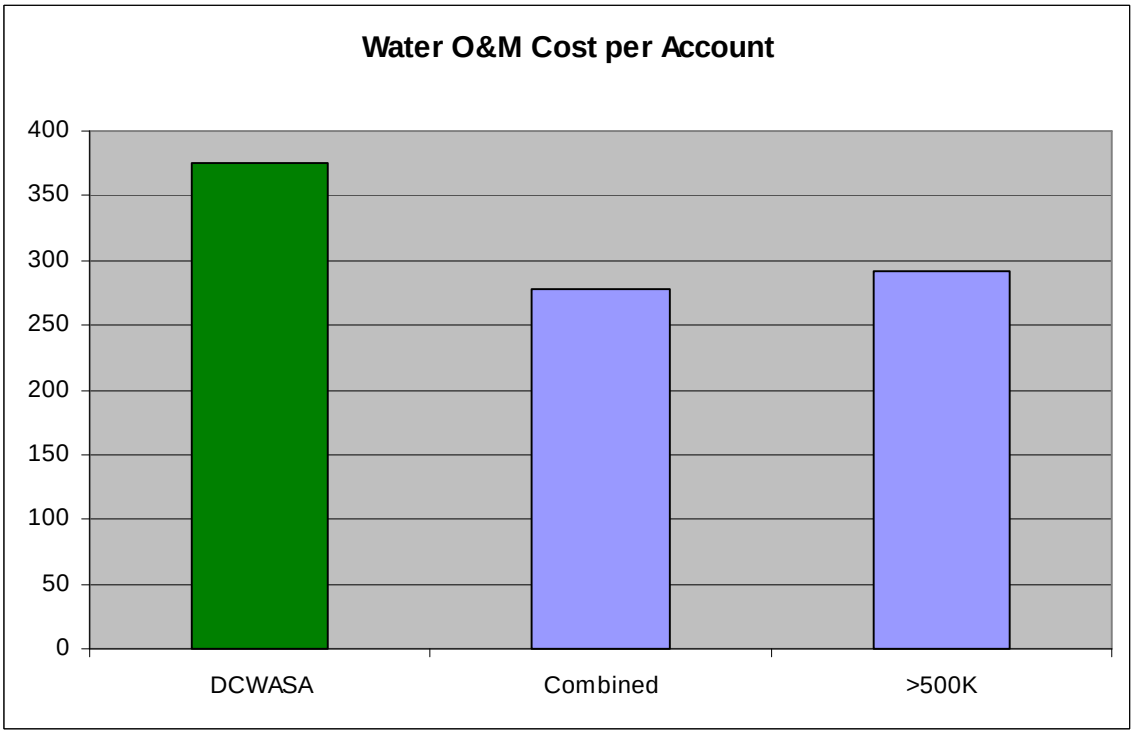
4.3 Water Operations and Maintenance

Four metrics were employed to assess operation and maintenance for water distribution:

- O&M cost per account
- Distribution system water loss
- Water system integrity
- Planned maintenance ratio

O&M Cost
As with the other functions, the ratio of cost per account is one measure of efficiency.

Figure 4-N: Water Operation and Maintenance Cost/Account



Including water purchase costs from the Washington Aqueduct, DCWASA is in the third quartile of all utilities and the large utilities.

The comparison of costs relating to the Washington Aqueduct to other utilities, both operating and capital, is not straightforward. Combining costs per million gallons ("MG")

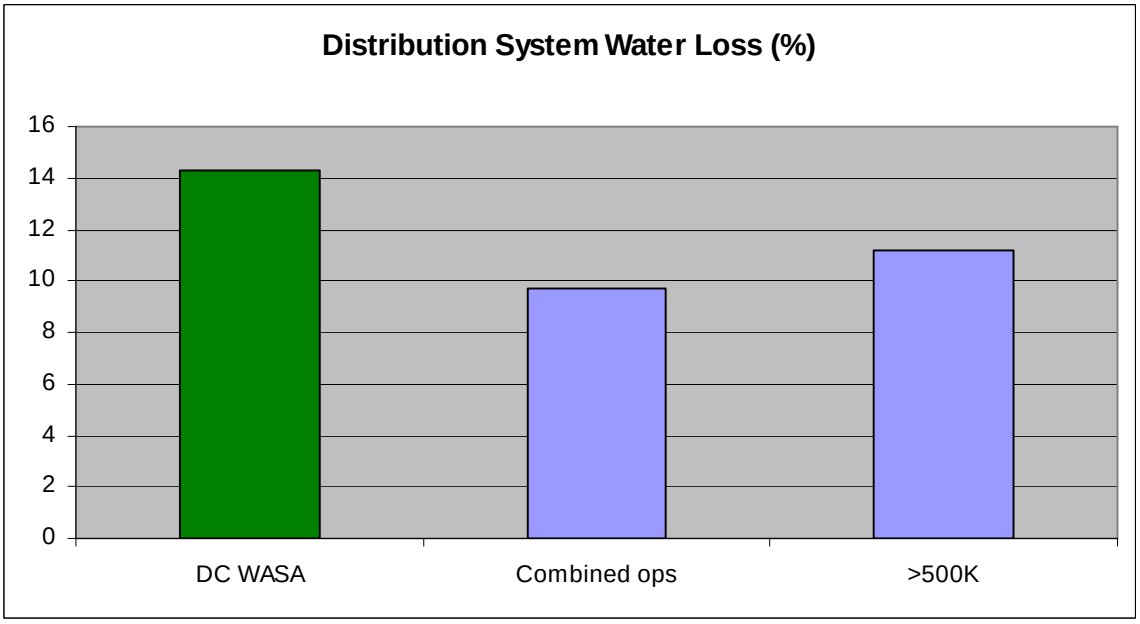
purchased results in approximately $1,500/MG wholesale for DCWASA. The City of Boston is charged by Massachusetts Water Resources Authority (MWRA) approximately $2,000/MG. MWRA has protected watersheds for reservoirs, but has extensive transmission facilities. The Washington Aqueduct has more severe water quality issues with river water as a source, but, perhaps, a more straightforward transmission system.

Water Losses

Water loss quantifies the percent of purchased water from Washington Aqueduct that does not reach customers and cannot be otherwise be accounted for through authorized usage. For purposes of definition:

[The volume of purchased water minus (volume of water sold to customers + volume of authorized use not billed)] divided by the quantity of water purchased provides the percent of water that is unaccounted for. Assuming an additional 10% can be accounted for through fire fighting, system flushing, and other municipal activities, such as catch basin cleaning and street sweeping. The DCWASA water loss is in the third quartile compared to other utilities.

Figure 4-O: Distribution System Water Loss (%)

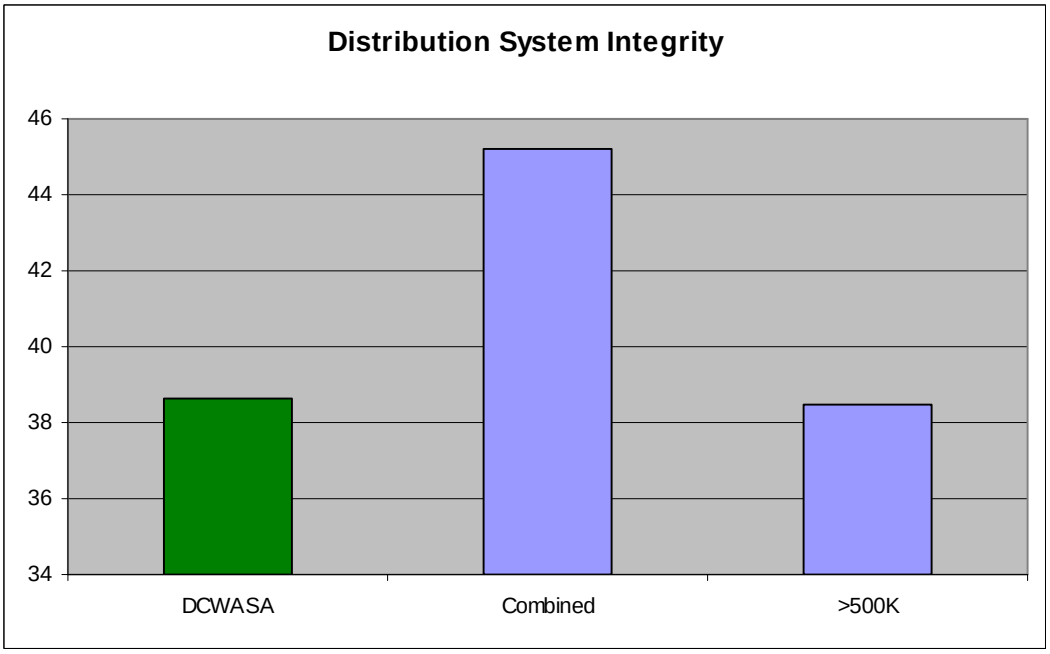


The preceding results suggest that there is an opportunity for improvement by bringing down the level of unaccounted-for water.

Distribution System Integrity

Distribution System Integrity is a metric described by Qualserve as indicator of the condition of the water distribution system. Systems, such as DCWASA, that have a high percentage of cast iron pipes are more susceptible to water main breaks. At slightly less than 0.4 breaks per mile of pipe per year, DCWASA is at the median for comparable utilities.

Figure 4-P: Distribution System Integrity



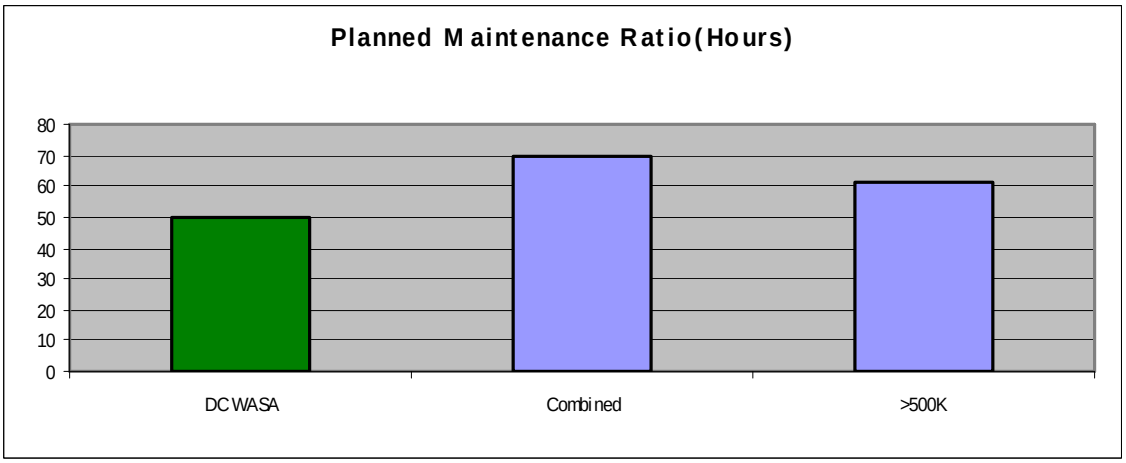
Graph units are water main breaks per 100 miles of pipe per year.

DCWASA's characteristics of predominately cast iron pipe, surface water supply, and frequent excursions above and below freezing temperatures on a seasonal basis are conducive to pipe failure. The actual results are somewhat better than would be expected under the conditions the Authority has to work with.

Planned Maintenance Ratio

Qualserve designed this ratio to allow a comparison of how effectively utilities are investing in planned maintenance. Planned maintenance is preferable for assets where the cost of repairs is high relative to the cost of planned maintenance. Therefore, not all maintenance should be planned. On a utility-wide basis, corrective maintenance might be appropriate up to 30% of the time, according to Qualserve.

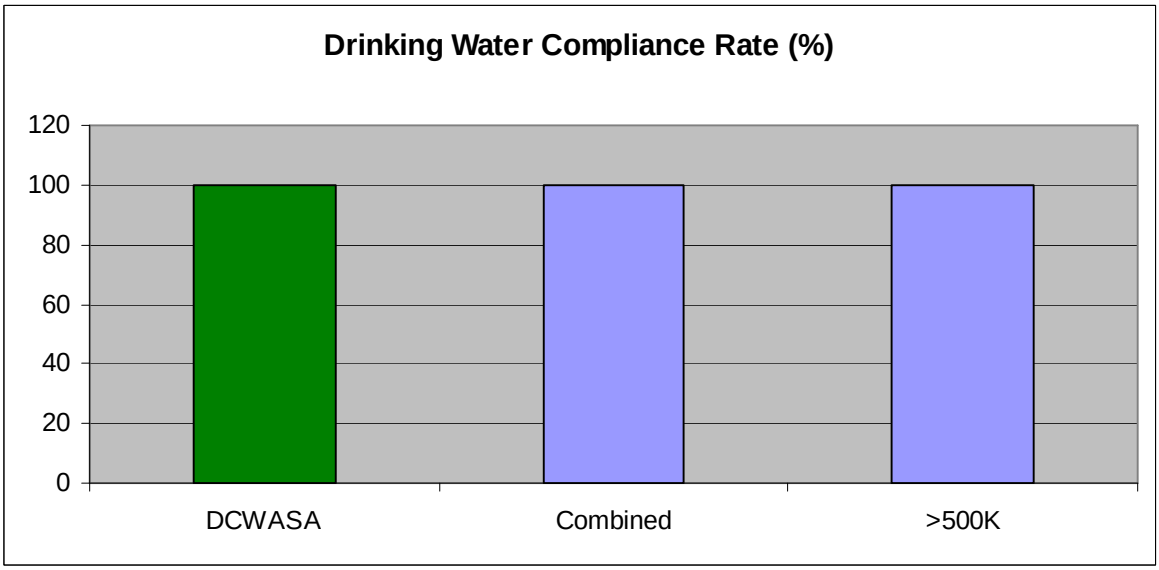
Figure 4-Q: Planned Maintenance Ratio (Hours)



At an estimated level of 50%, DCWASA is below the 60-70% range of combined utilities and large utilities. This comparison is not firm in that utilities typically report by maintenance hours and DCWASA reported by work order numbers. The conversion requires acceptance of a general standard of five hours for corrective repair for every one hour of preventive maintenance. This places DCWASA in the third quartile.

Drinking Water Compliance
DCWASA and all of the peer utilities report 100% drinking water compliance.

Figure 4-R: Drinking Water Compliance Rate (%)



4.4 Increasing Maintenance Efficiency

Many utilities operate with a combined water distribution and wastewater collection system organization which maintains all the pipe networks. Collection system and water distribution work are countercyclical. The distribution system experiences more water main breaks in the winter, whereas, collection system work is more prevalent during the typical construction season. Unit staffing reductions of 10% have been reported by other utilities.

5. Capital Improvement Plan (CIP)

Large water and wastewater utilities have to make significant capital investments to support the services they provide. A Capital Improvement Plan ("CIP") assists them in making sound choices about which projects should be implemented, when they should be implemented, and how they should be financed. A comprehensive CIP is a key document which provides information and guidance for facility management and budget allocations. Utility managers use the CIP to assess the long-term capital project requirements of the utility and to establish funding of high-priority projects in a timely and cost-effective fashion. The development of a CIP is intended to ensure that decision makers are responsible to residents and businesses of the community as well as investors with respect to the expenditure of rate revenue funds and bond funds.

The written plan identifies and describes capital projects, the years in which funding each project is to occur and the method of funding. While a CIP may be designed to forecast any period of time, it generally extends beyond the current operating cycle and usually covers a five- to ten-year time frame.

This chapter will review several aspects of DCWASA's CIP as outlined below:

- Overview of CIP Components
- Regulatory-Driven Components
- CIP Development and Implementation
- Financing of Capital Improvements

5.1 Overview of CIP Components

DCWASA utilizes a ten-year CIP for its water and wastewater systems. The most recent CIP projects $3.1 billion on disbursement basis for FY 2007 – FY 2016, presenting an increase of $880 million over prior year's plan. The increase is largely attributable to the newly proposed Blue Plains Total Nitrogen Program. DCWASA prioritizes capital projects based on specific criteria. These criteria are fundamental in developing a CIP based on needs us wants. DCWASA vets the capital projects based on:

1A. Court Ordered stipulated agreements, etc. – court orders, agreements, regulatory issues and permit requirements.

2A. Health Safety – projects required to address public health and safety.

2B. Board Policy, WASA's commitment to outside agencies – projects undertaken as a result of the Boards commitment to outside agencies.

2C. Potential Failure/Ability to continue meeting permit requirement – projects to construct or rehabilitate facilities or equipment in danger of failing or critical to ensuring meeting permit requirements

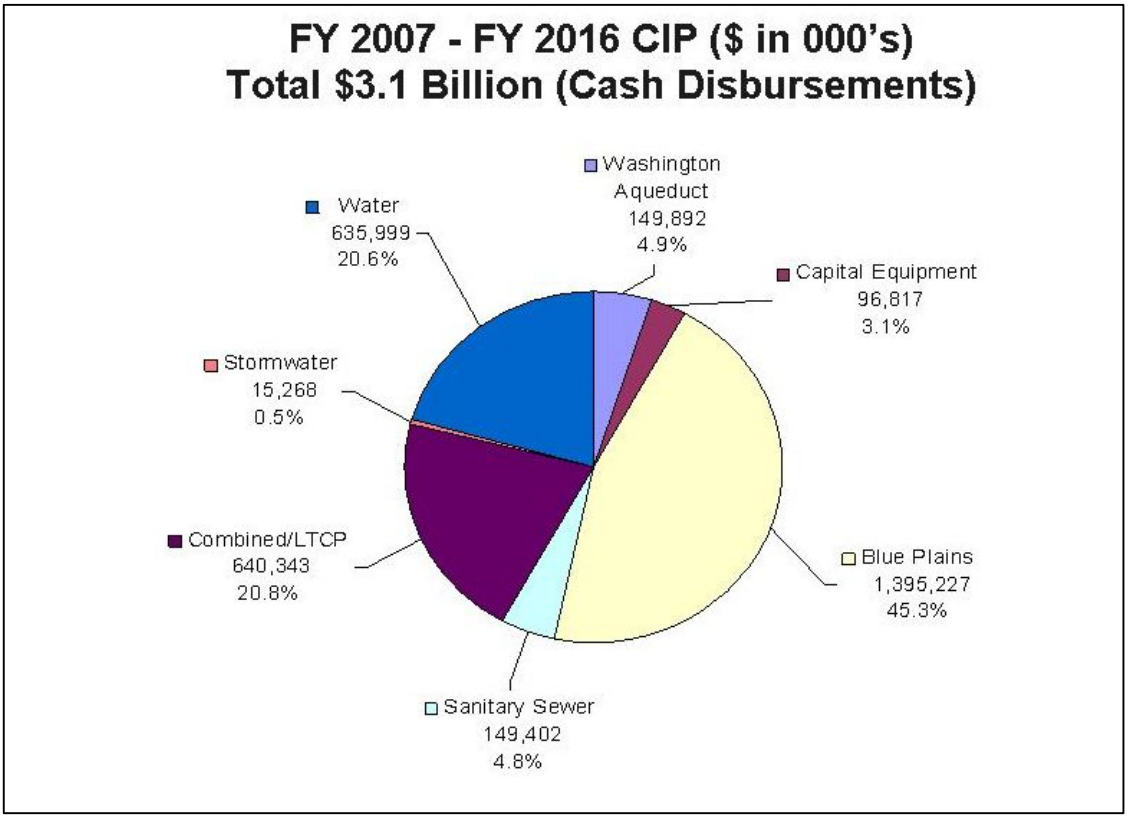
2D. High Profile, Good Neighbor Policy – projects addressing concerns communicated by citizens or public officials.

3A. Good Engineering, High Payback, Mission/Function – Projects needed for existing facilities and infrastructure required for DCWASA to fulfill its mission as well as resolving operational issues.

3B. Good Engineering, Low Mission/Function Over Long term – lower priority projects which are needed for rehabilitation and upgrading of facilities and infrastructure.

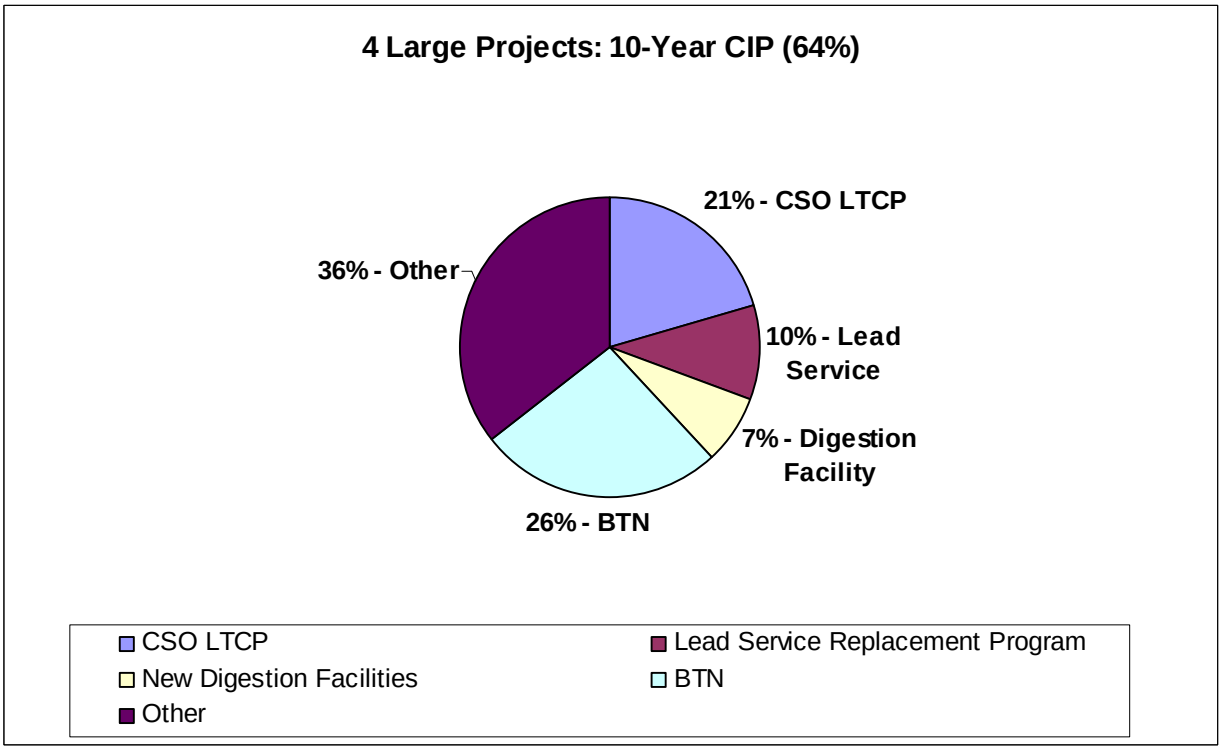
The CIP is broken out into seven components: Wastewater Treatment, Combined Sewer Overflow, Stormwater, Sanitary Sewer, Water, Washington Aqueduct, and Capital Equipment. The graph below shows the weight of each of the components of the current ten-year CIP in expected disbursements. The three largest components of the CIP include: the Blue Plains Wastewater Treatment Plant, the Combined Sewer Overflow (Long Term Control Plan), and Water (lead line replacement program) representing 45%, 21% and 21% of the disbursements, respectively.

Figure 5-A: Components Ten-Year CIP ($ in 000's)



Based on our experience, DCWASA's CIP is not unusual in size compared with other large water & wastewater utilities.

Figure 5-B 10-Year CIP and 4 Project Initiatives

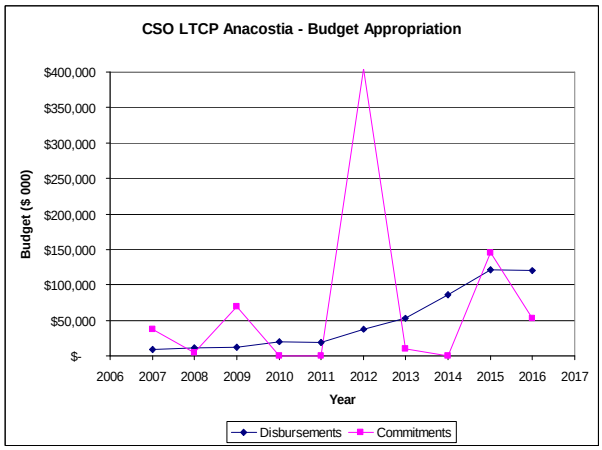


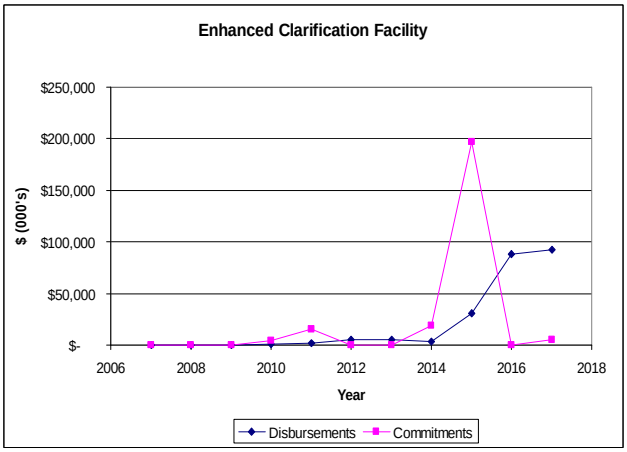
As the above pie chart indicates, four major project initiatives dominate the 10-year CIP. The requirement, or need for these initiatives, drives the size and timing of the CIP. In the absence of regulatory relief or alleviation of determined needs, the CIP, as developed, addresses the fundamental criteria. The vetting of projects by in-house expertise, in conjunction with consulting program managers, has yielded a detailed CIP based on facilities' plans developed for the various service areas of the CIP.

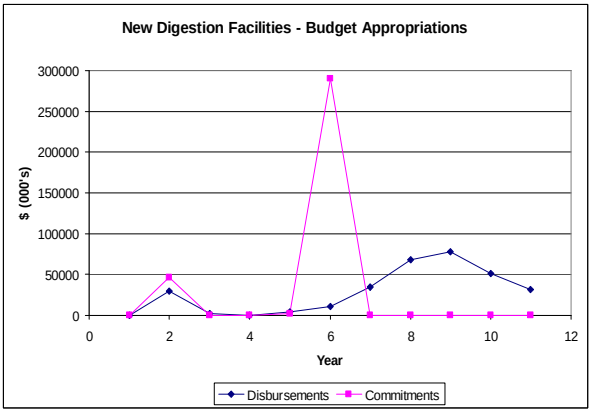
The cost estimates and scheduling follow industry practices. It is important for the many projects to remain on schedule to meet regulatory requirements and to maintain balance within the CIP. Interdependencies among many projects require coordinated scheduling. If an early component within a facilities plan is delayed, then subsequent projects are further delayed, most likely causing increased costs and disruption in the 10-year Financial Plan.

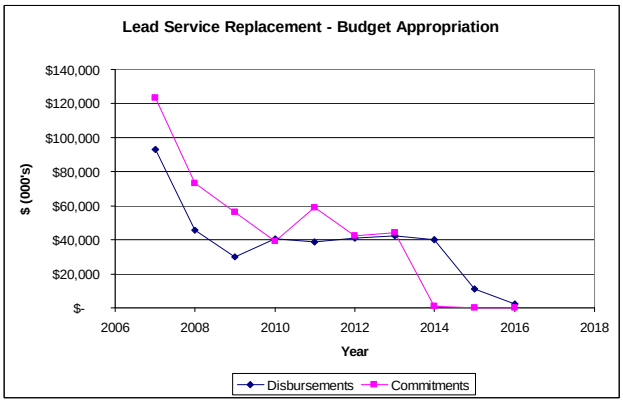
The Board requested that the URS team assess the planned appropriations and disbursements for major projects in the CIP. The results of this comparison are shown graphically below.

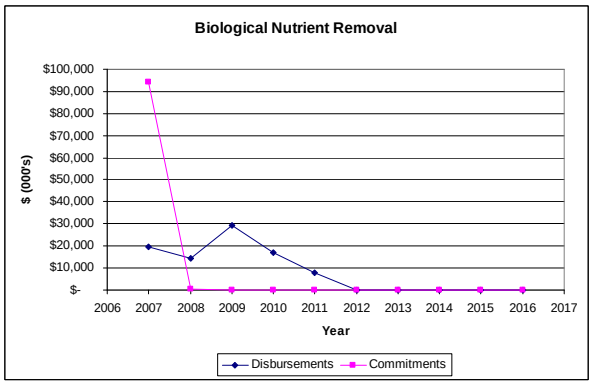
Figure 5-C: Planned Appropriations and Disbursements











A review of the appropriations and disbursement for these projects indicated there were slightly different approaches to project funding. In four of the projects, a large appropriation is followed by an average 4-year disbursement. Financing of the cash flow related to project commitments is common in the industry. However for the lead service

replacement project, multiple appropriations are being planned reflecting the quicker drawdown of cash for such projects.

5.2 Regulatory-Driven Components

The ten-year CIP budget is presented by Priority Code in the tables below. The impact of regulations on the CIP and consequently to the ratepayer is significant, especially going forward starting in FY 2010.

Figure 5-D: Priority Classifications of Capital Projects for the Ten-Year Budget

Priority Classifications CIP Funding $(000s)											
PRIORITY CODES	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	TOTAL
1A - Court Ordered Stipulated Agreements, etc.	52207	42247	40307	69640	52378	178018	291648	222380	216793	250652	1416270
2A - Health Safety	5314	6794	4777	6317	1282	11349	9236	1186	1016	693	47964
2B - Board Policy WASA's Commitment to Outside Agencies	37812	71982	52290	58526	49415	45013	44895	41928	11381	4219	417461
2C - Imminent Failure/Ability to Meet Permit Requirements	72786	131759	111733	96749	55683	21723	11764	13191	10967	15384	541739
2D - High Profile Good Neighbor Policy	2399	15565	13219	4778	1119						37080
3A - Good Engineering High Payback Mission/Function	24595	36877	50035	44812	42235	65650	93348	103647	77895	57718	596812
3B - Good Engineering Low M&F Over Long-Term	3778	6415	19478	15546	11247	10823	14075	6581	5613	14020	107576
	198891	311639	291839	296368	213359	332576	464966	388913	323665	342686	3164902

Figure 5-E: Weight of the Capital Projects in the CIP Budget in the Order of Priority

Percent of Total CIP											
PRIORITY CODES	FY07	FY08	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	TOTAL
1A - Court Ordered Stipulated Agreements, etc.	26%	14%	14%	23%	25%	54%	63%	57%	67%	73%	45%
2A - Health Safety	3%	2%	2%	2%	1%	3%	2%	0%	0%	0%	2%
2B - Board Policy WASA's Commitment to Outside Agencies	19%	23%	18%	20%	23%	14%	10%	11%	4%	1%	13%
2C - Imminent Failure/Ability to Meet Permit Requirements	37%	42%	38%	33%	26%	7%	3%	3%	3%	4%	17%
2D - High Profile Good Neighbor Policy	1%	5%	5%	2%	1%	0%	0%	0%	0%	0%	1%
3A - Good Engineering High Payback Mission/Function	12%	12%	17%	15%	20%	20%	20%	27%	24%	17%	19%
3B - Good Engineering Low M&F Over Long-Term	2%	2%	7%	5%	5%	3%	3%	2%	2%	4%	3%

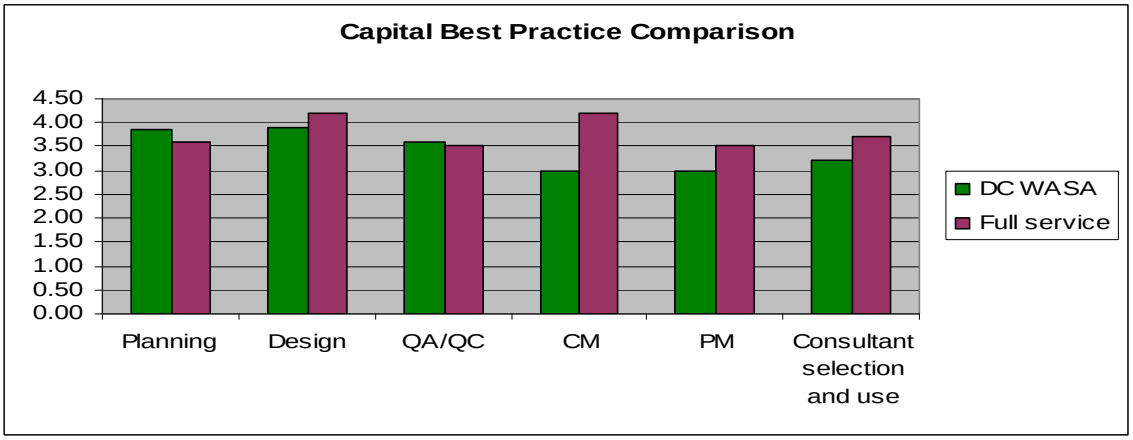
Note: Priority Code 1A does not include Washington Aqueduct Compliance Agreement Projects

5.3 CIP Development and Implementation

Our assessment of DCWASA's performance in CIP development and implementation begins with a review of best practices and benchmarks. It continues with observations on specific activities within the program.

Program Best Practice Analysis
DCWASA's capital program was surveyed for best practices utilizing a survey based on the California Multi-Agency Benchmarking study. The following is a summary best practice comparison to other utilities with a similar range of in-house capabilities. DCWASA exhibited better practices in planning and QA/QC. The lower ranking among the peer group in Construction Management (CM) and Program Management (PM) is probably reflective of DCWASA strategic approach to capital program development.

Figure 5-F: Capital Program Best Practice Comparison



DCWASA was also slightly better than its peers in the use of benchmarks and metrics. The size of their capital program for the next five years was also comparable to its peers. We compared 5 year CIP to net asset value and to total indebtedness.

We interviewed personnel involved in capital program development to see how rigorous their approach to the capital program was. A well developed capital program should go through the following steps:

- A rigorous method of developing needs (possibly for a well developed asset management system which identifies critical assets that are below target condition levels).
- A process that develops alternatives, including a do nothing baseline and, where possible, non-construction alternatives (such as demand management) and low construction alternatives.
- A data validation step to ensure that that the data upon which capital decisions are made is unbiased and accurate.
- Well developed selection and prioritization methods with clearly defined criteria (such as triple bottom line analysis).
- An efficient and effective in house or contracting program. For work contracted out, an understanding of the local market and steps to become a client of choice.
- Risk identification and management to minimize the impact of adverse events encountered during construction.

DCWASA has a rigorous process for conducting their capital program and has been documenting their procedures to guard against tacit knowledge loss as key personnel retire. Authority personnel believe that because many capital needs are so evident (due to age and lack of maintenance pre WASA and inclusion in the AWTP 2000 Facilities Plan) that rigorous project identification was not needed. The level of alternatives development depends on the process and equipment involved. All projects over $10 million have a VE prior to concept finalization. DCWASA's past difficulty attracting bidders for a high profile contract (Egg-shaped digesters) has galvanized interest in becoming a customer of choice. DCWASA is addressing procurement strategies by updating "front-end" documents to reflect improved methods and specifications. Additional procurement policies and procedures are planned. Risk avoidance by sureties can adversely affect bidding dynamics.

Project Selection and Scheduling

Having surveyed DCWASA's capital program for best practices, the URS Team considers DCWASA's approach and work plans for project selection to be rigorous as previously stated. The structured approach considers alternative projects and designs after having established the justification for projects. Particularly with the significant sector of the CIP driven by regulatory requirements, the level of study, negotiations, and decision making have produced a well defined CIP that compares favorably with CIPs of other large utilities facing regulatory requirements and aging infrastructure. The scheduling of the series of projects is responsive to requirements and addresses a program for replacement/renewal of the aging infrastructure.

Although DCWASA includes Operations in project planning, which is very desirable in CIP development, the approach incorporating outside consultants may have a tendency to address needs through engineered solutions. Including operational and maintenance alternatives to address a particular need may reduce capital costs.

Project scheduling is critical as stated previously. Slippage in the planned schedules will impact negatively on the balance between financing and disbursements.

Bid Cost Comparisons

Several unit costs paid by DCWASA were compared to unit costs paid by neighboring utilities. To complete this cost comparison, basic unit costs from DCWASA and the City of Baltimore, Department of Public Works bid tabulations were studied. The findings are summarized below and in Figures 5-E and 5-F.

Our analysis indicated that a bid item's unit cost was directly proportional to a bid item's total cost within the project. As shown in the following bar charts, which compare Baltimore City and DCWASA unit costs, a lower unit cost was bid for the bid item on the project with the higher total units, i.e., a. classic economy of scale. This relationship was realized regardless of the contracting entity. However, an analysis of individual bid items, proposed by multiple contractors, showed a large variance between the proposed unit costs for the same bid item.

Figure 5-G: Bid Cost Comparison of New Construction of Sewers versus Sewer Rehabilitation

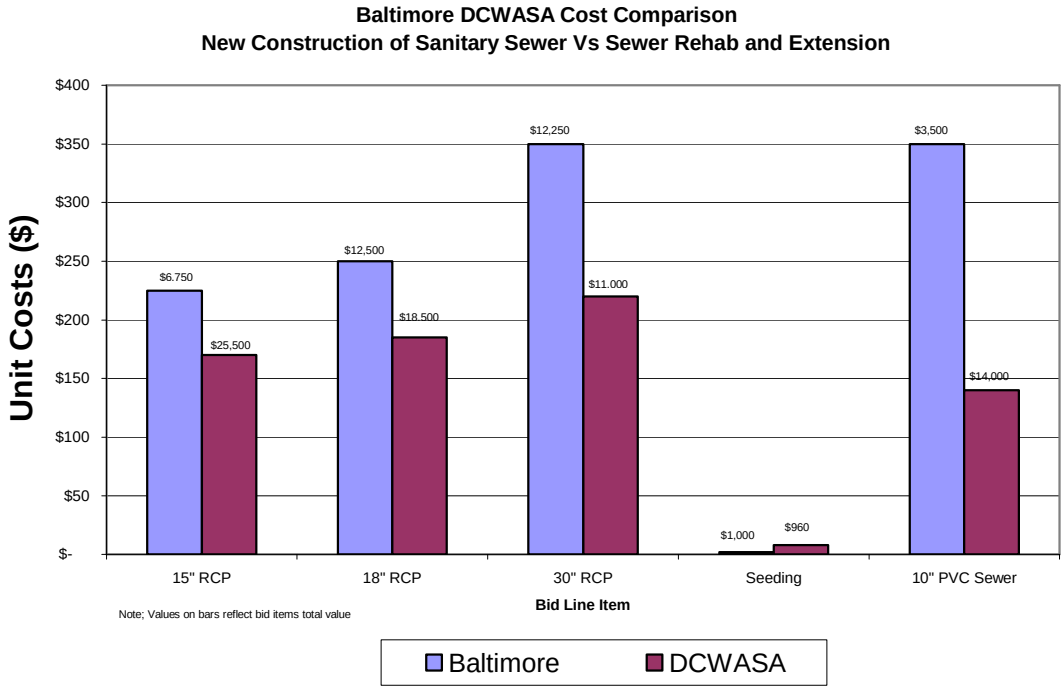
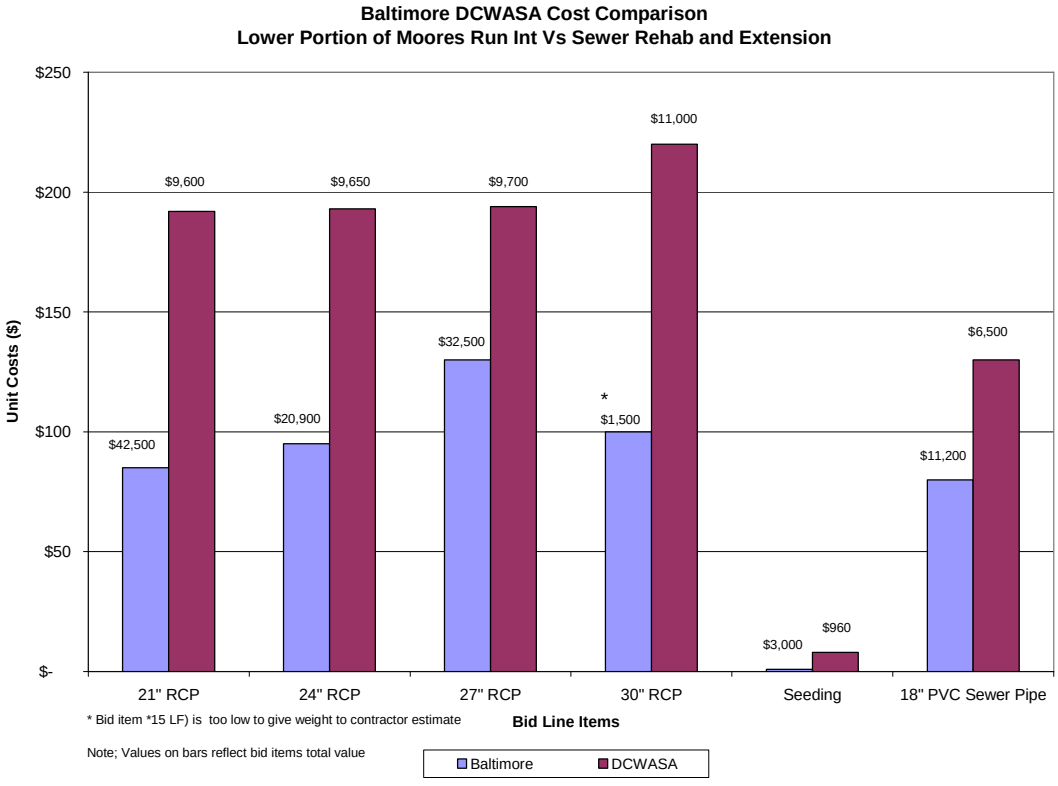


Figure 5-H: Bid Cost Comparison of Lower Portion of Moores Run Int versus Sewer Rehabilitation

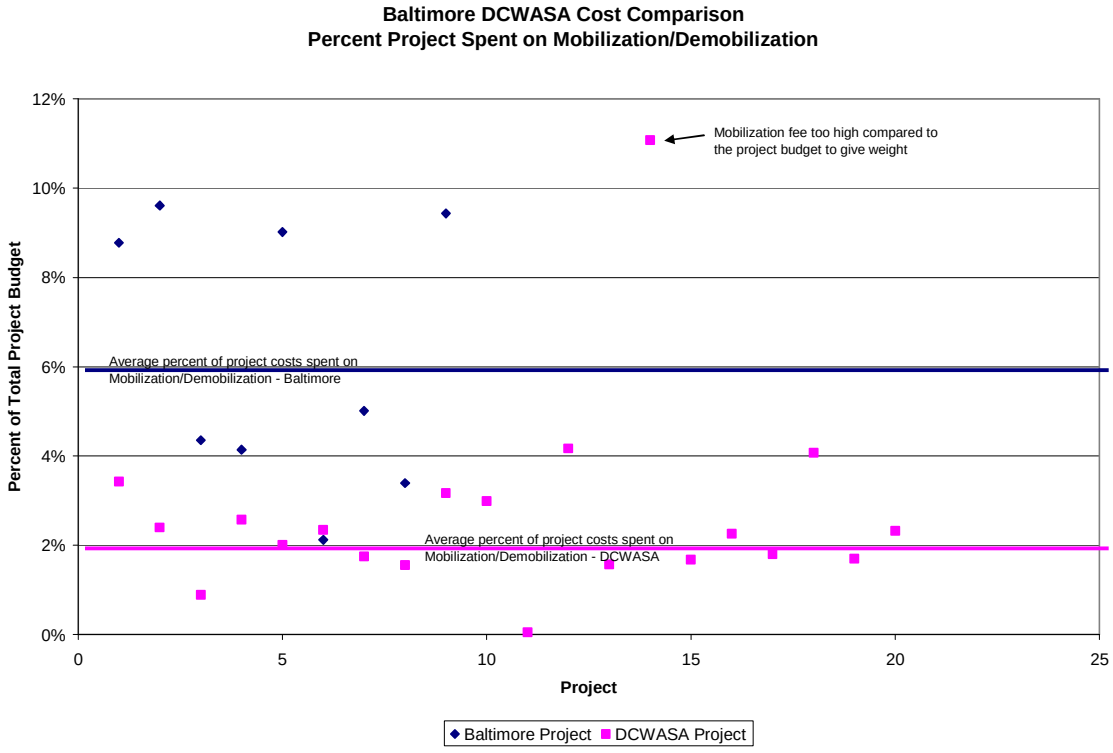


An analysis of the contractors bidding on Baltimore City and DCWASA projects indicate that four contractors bid on similar projects advertised by these agencies. Further analysis of these cross-over contractors indicates that the bid costs proposed by these contractors are similar, regardless of the contracting entity for the same bid items.

The range from the lowest bid to the highest bid for a project was more significant than the variance between bids let by Baltimore and DCWASA.

A specific bid item that was compared in each of the reviewed projects, regardless of scope and location, was a mobilization/demobilization fee. A plot of the Percent Project Budget Spent on Mobilization/Demobilization is shown below. A review of these fees, as a percent of total project budget basis, indicated that the average of Baltimore City mobilization/demobilization fees (approximately six percent of the total Baltimore City project cost) is four percent higher than the average DCWASA mobilization/ demobilization fee, which is approximately two percent of the total project budget. DCWASA predetermines the project's unit cost for the mobilization/demobilization fee. This practice prevents inflated front-end costs being paid out early in the project. The four percent average reduction in mobilization costs realized by DCWASA could not be tracked through individual bid item pricing as a means to recover the contractor's 'lost' four percent.

Figure 5-I: Percentage of Mobilization Spending between DCWASA and Baltimore City



Conclusions – Bid Tabulation Comparison
Although our sample selection was not statistically valid (since bid price comparisons are not the principal focus of this Study), we found that the variances between unit pricing were directly proportional to the number of units being bid. The economies of scale principle held for unit pricing regardless of the soliciting agency. The agency with the larger project received lower unit pricing for like items. Contractors bid DCWASA work as they bid Baltimore work. Our analyses indicate that the dynamics of low bid contract pricing holds for DCWASA projects. This conclusion was supported by the results of contractor interviews.

Contractor Interviews
Six contractors agreed to be interviewed, confidentially, as part of our effort to evaluate DCWASA's status as a customer. Although the responses were mixed, the overall impression by contractors with DCWASA experience was favorable.

- Value as a Customer – contractors familiar with the contracting process were candid concerning the importance of DCWASA as a customer. Contract dollar amounts were significantly large compared to smaller agencies. "Learning the paperwork ropes" was worth doing based on the large scale of the projects. A contractor which was particular towards what agencies with which to do business indicated that contractors held DCWASA in high regard "regardless of the difficulties encountered."
- Competition – Contractors believe that they will face 4-5 bidders on projects over $50 million and even more on work that is below $50 million in estimated cost.
- History with Blue Plains – contractors recognize the strides that have been achieved in project management since the inception of DCWASA. Quicker payments were the central theme. Very few 'war stories' were told that would reflect on mistakes or mismanagement. The general comment was "Huge, huge improvement in getting paid."
- Project Cost Premiums – Several contractors did not admit to any add-on percentages for Blue Plains' bids. Several equated bid pricing at Blue Plains to bidding WSSC work. "Best pricing" is employed for larger projects, following economies of scale. Several contractual stipulations were mentioned as being cost escalators. Several contractors claimed bids could be lowered if the administrative burdens placed on the contractor were reduced. Smaller agencies without the burden were mentioned as receiving lower bids.
- Payments – Progress payments throughout contract duration were considered to be timely. Payments for change orders were delayed, but within the typical public agency change order process, DCWASA wasn't judged to be appreciably slower than normal by several contractors. However, one war story was that a particular piece of equipment was now out of warranty, yet the change order to pay for the equipment is still awaiting approval.
- Specific Contract Stipulations – Every contractor mentioned the Training/Service Manual requirements as very expensive and cumbersome to deliver. A maintenance contractor, knowing of the existence of the service manuals,

requested a specific manual for the maintenance contract work and the manual was not provided.

DCWASA Staff Discussions
Similar topics were discussed with DCWASA staff, independent of the contractor interviews. Several parallel observations were discussed:

- Training/Service Manual specifications were being considered for modification by DCWASA/DETS.
- Staff took pride in the improved processing of payments and recognized the change order approval process as lengthy.
- Administrative burdens were identified also by staff. The risk aversion institutionalized by the public agency was recognized and discussed as a barrier to more competitive bidding.

Conclusions and Recommendations – Contractor/DCWASA Interviews
The candid discussions with the contractors paralleled the independent bid tabulations analyses. Although bureaucratic complaints were interspersed within the discussions, DCWASA was generally considered to be an important customer that paid reasonably well.

In order to be considered a customer of choice, we suggest that the administrative duties placed on the contractors should be reviewed with the intent to improve the construction manager/contractor dynamic. The use of industry contract language (EJCDC or AIA) documents to reflect professional/industry practices should be considered. A proactive outreach to the contracting community to address concerns and the ability to bid on appropriately sized contracts may provide long-term feedback and beneficial input to the Authority.

DCWASA's use of an Owner Controlled Insurance Program (OCIP) - An OCIP is a wrap-up under which a project owner provides various insurance coverage to contractors and subcontractors. OCIPs can potentially reduce an owner's project costs by approximately 1-2%, compared to traditional fragmented insurance programs.

An OCIP can be site-specific or it can be for multiple jobsites. Most OCIPs are multi-year programs with a fixed duration. For large construction projects, the most common duration is two to five years. The OCIP normally applies to all contractors and subcontractors performing work at the project jobsite. This jobsite is defined to include the construction site, all on-site fabrication shops, and associated material storage and yards.

DCWASA already uses an OCIP for its capital program to help optimize the cost of insurance for its capital projects. While our team has not surveyed the water and wastewater industry to assess the utilization of OCIPs, it is our belief that the use of OCIPs is limited at present. To help ensure that the Authority's program is providing the

optimum benefits, we suggest that a periodic review be conducted by a consulting firm that is experienced in creating/implementing OCIPs.

Capital program management – DCWASA uses a mix of in-house staff and consultants to manage individual projects within the CIP, a common practice in the industry. The overall CIP is managed by DCWASA professionals.

There are multiple information systems that support capital program management. Given the size and duration of the CIP, it is suggested that a single comprehensive information system be selected, installed and implemented to enhance the efficiency and effectiveness of program management. Among other things, such a system could support the preparation and maintenance of a master schedule for the CIP. It is not possible to estimate the cost savings or improvements in effectiveness that such a system will produce; however, such a system can provide better tools for DCWASA as it implements a multi-billion construction program.

Impact on Operating Expenditures – The following pie charts depict the trend in the impact of the CIP on operating expenditures. The percentage of debt service will continue to increase as part of the total budget. An increase in debt service is being experienced by utilities replacing aging infrastructure and complying with regulatory requirements.

Fig. 5-J: Operating Expenditure Trend

5.4 Financing of Capital Improvements

The Finance Department demonstrates a number of Best Practices. These include:

- Commercial paper program – this is a low interest cost, interim (270 days) financing method that allows for interest savings (by using short-term financing prior to long-term financing) and increased accuracy in determining required bond amounts.
- ROCIP – Rolling Owner Controlled Insurance Program (described earlier in this Section). This facilitates participation by smaller contractors (including MBE,

WBE and small businesses), brings more uniformity to the job site for such aspects as safety and drug testing and reduces capital costs. DCWASA estimates savings of 1%. This is within the range of claimed savings estimated by the insurance industry (1-2%).

- The Finance Department's cash management activities reflect a number of best practices – daily sweeps, the use of Zero Balance Accounts, etc.
- Oversight of rates demonstrates many best practices – review of alternatives, rate forecasts, and regular rate studies.
- A high level of long term financial planning, including rate forecasts, 10 year capital planning and other activities referred to in a previous chapter.

In evaluating financial performance, the Qualserve business operations metrics applicable to finance include the following parameters:

- Debt Ratio
- Return on assets
- System renewal/replacement rate

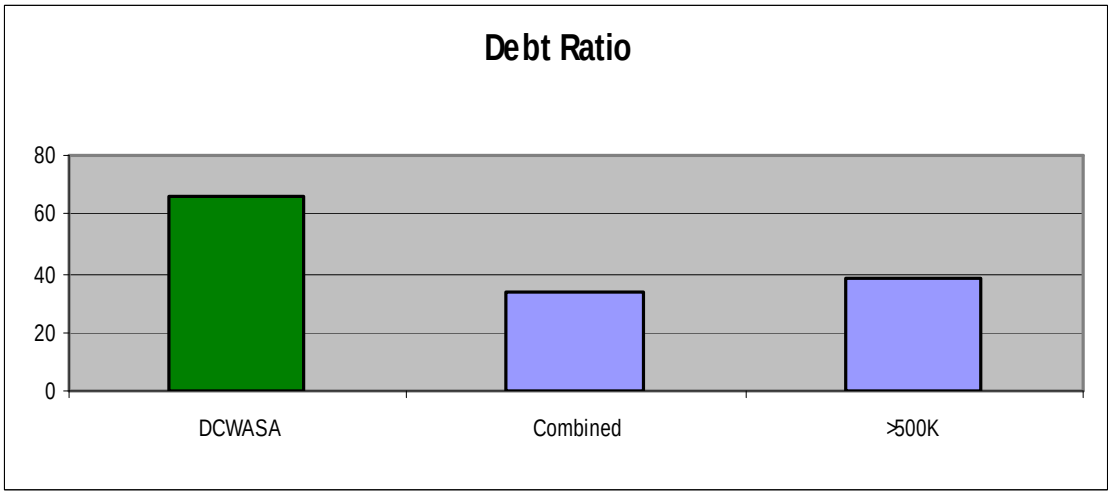
One additional metric identified by the AWWA Research Foundation study "Improving Water Utility Capital Efficiency" is Capital Intensity.

Debt Ratio
Debt ratio identifies the utility's level of indebtedness. The calculation is:

Debt Ratio= Total liabilities/Total assets

The following graph demonstrates DCWASA's position on this metric compared to combined (water and wastewater) utilities and large utilities serving more than 500,000:

Figure 5-K: Debt Ratio



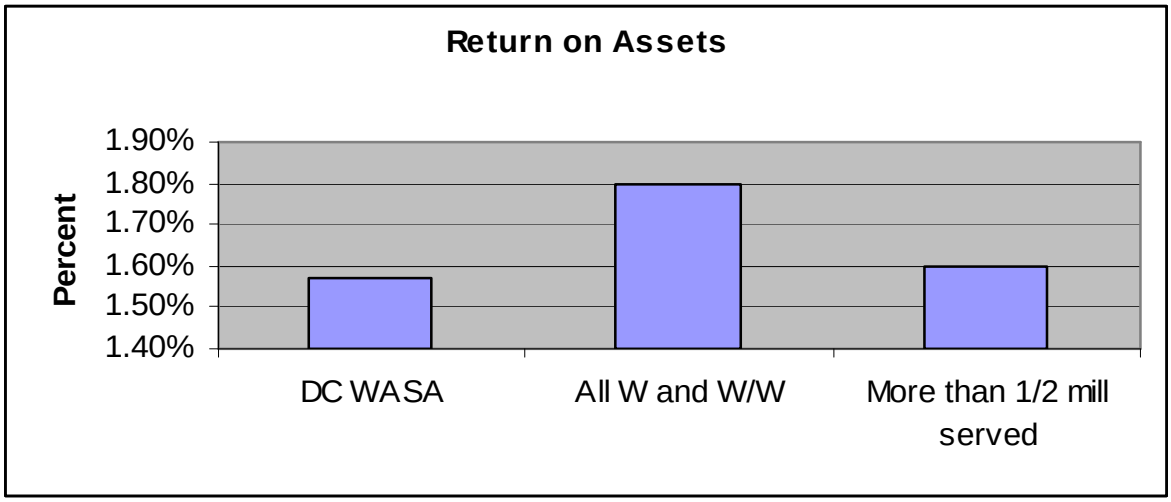
DCWASA is in the fourth (high) quartile on this measure. Debt ratio is a metric that, by itself, does not have a target value since it reflects the financing strategy of the utility. A companion measure is the percent of the revenue requirement that is attributable to annual debt service. This value is 23% which is below the NACWA average, so one can conclude that the level of debt is manageable. DCWASA's financing strategy going forward is to use a combination of debt and cash-financed construction or pay as you go capital (PAYGO) which should moderate this metric.

Return on Assets
Return on assets is described by Qualserve as a metric that measures the financial effectiveness of the utility. It is defined as:

Return on Assets (ROA) = Net Income/Total Assets

DCWASA's ROA is shown below compared to combined (water and wastewater) utilities and large utilities serving more than 500,000:

Figure 5-L: Return on Assets



Large utilities tend to have lower ROA's than smaller utilities. DCWASA's value is comparable to the large utility median (in 2006 DCWASA's ROA was about 2.1%).

System Renewal and Replacement Rate
This metric seeks to identify the effort expended into maintaining infrastructure. Renewal and replacement rate is defined as:

Renewal/Replacement Rate (%) =100*(actual expenditures and reserve/total present worth of renewal and replacement needs for each asset class)

The median values for combined utilities are:

Water pipeline	3.6%
Wastewater collection	4.0%

Wastewater treatment facility and pumping	5.2%

Large utilities have values in a similar range:

Water pipeline	2.2%
Wastewater collection	5.0%
Wastewater treatment facility and pumping	4.2%

DCWASA will not have the data to support this calculation until Maximo is fully populated. To determine whether DCWASA was in the right range we calculated an overall renewal/replacement rate for DCWASA: The following are renewal and replacement expenditures by year:

Figure 5-M: Capital Improvement Program

CAPITAL IMPROVEMENT PROGRAM Priority Codes for Renewal/Replacement $(000s)				
	2C	**3A**	**3B**	**FY Total**
FY 07	$ 72,786	$ 24,595	$ 3,778	$ 101,159
FY 08	$ 131,759	$ 36,877	$ 6,415	$ 175,051
FY 09	$ 111,733	$ 50,035	$ 19,478	$ 181,246
FY 10	$ 96,749	$ 44,812	$ 15,546	$ 157,107
FY 11	$ 55,683	$ 42,235	$ 11,247	$ 109,165
FY 12	$ 21,723	$ 65,650	$ 10,823	$ 98,196
			6-Year Total	**$ 821,924**
			Annualized R/R	**$ 136,987**

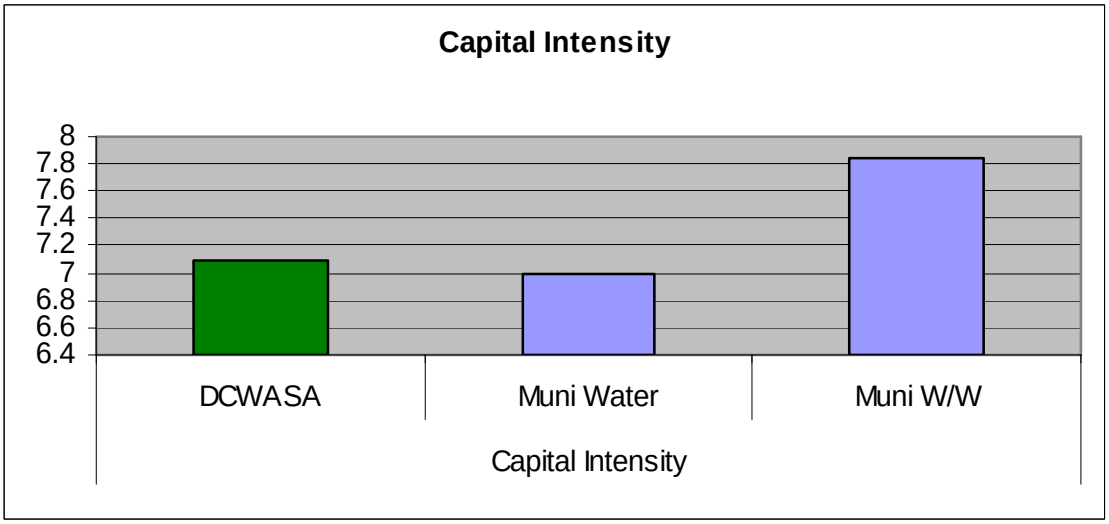
If we assume that the present worth of assets being renewed/replaced is double the net asset value, we arrive at an overall value of about 3.5%, which is a value that is within the median range for large utilities. Until Maximo is fully implemented, decisions based on this metric are not justified.

Capital Intensity
Capital intensity is used to describe the level of plant, property and equipment (PPE - also known as fixed assets) required to support a business operation. Capital intensity will vary significantly from industry to industry and from business to business. Key drivers of this metric are the nature of the industry (including how highly regulated), the effectiveness of the capital process and pricing discipline. The definition of capital intensity developed by the AWWARF study is:

Capital Intensity = Net asset value for PPE/annual operating revenues

A short hand version of this metric is – how many dollars in the ground are needed to generate a dollar of revenue? The following graph compares DCWASA to municipal water utilities (calculated from 180 water utilities) and to municipal wastewater utilities (the 140 utility NACWA sample):

Figure 5-N: Capital Intensity



As a combined operation, DCWASA is better than average. Two other metrics can provide insight into the future direction of this metric. Considering the CIP for the next five years:

- The ratio of 5 year CIP to net plant (i.e., how much will the CIP increase the net asset base) is about 50% - The ratio of 5 year CIP to net plant for 28 utilities surveyed by the AWWARF study is 61%
- The ratio of 5 year CIP to outstanding debt for DCWASA was about 1 - The AWWARF survey average was 98%

Based on the CIP, DCWASA should retain its better than average position on this metric.

Recommendations
DCWASA could develop an asset management plan to improve DCWASA's asset management capabilities. The plan could be based, in part, on the work performed by other utilities such as the Seattle Public Utilities Asset Management Triple Bottom Line Management Plan. Such a plan would be managed by an Asset Management Committee (AMC) that will oversee DCWASA strategic objectives, including financial, environmental, and social impacts as they relate to DCWASA's asset improvements. If properly implemented, an asset management plan can potentially save DCWASA many millions of dollars in capital expenditures.

The New York City Department of Environmental Protection developed a Capital Improvement Best Practices Audit Program to improve long-term strategic planning and

organization. DCWASA could implement a similar Program based on the ongoing success of the New York City plan or initiatives undertaken by other utilities. This plan should stress the importance of benchmarking and conducting site visits, strategic planning, organization design, and critical success factors and key performance indicators.

6. Operating Practices

DCWASA's Board of Directors asked for recommendations to contain rates while providing responsible water services and sewer services. The reference to responsible services recognizes that water and wastewater utilities are under tremendous pressure on several fronts. Drinking water quality regulations, receiving water quality standards and security measures are requiring major capital investments. At the same time, aging infrastructure requires operating and capital expenditures and advances in technology and thinking are revolutionizing operating techniques but also require investments. Water utilities are under pressure to reduce costs, maintain or enhance infrastructure and provide a great level of customer service, all at the same time.

In this chapter we will address several relevant operations and capital activities:

- Customer Service
- Health and Safety
- Human Resources
- Procurement

6.1 Customer Service

Customer Service Departments are pivtoal in shaping the relationship between water and wastewater utilities and their customers. They are the hub of incoming and outgoing communications in the typical utility. They receive and convey information to customers, process an enormous amount of information and are a key element in utility efforts to achieve high levels of customer satisfaction. Industry trends also indicate customer contact centers' ability to collect massive volumes of information about customers, seamlessly outsource many components of the service function, provide multiple service delivery channels for service, and provide customized service.

Some of the common customer service operations include:

- Meter reading
- Billing
- Call Center
- Emergency Dispatch

Customer service provided by DCWASA exhibits a number of best practices:

- Meter reading is almost fully automated (AMR) resulting in high billing accuracy;
- With AMR, the Authority is able to identify high usage and notifies customers by phone of a potential leak; and
- DCWASA is one of very few utilities that tracks first call resolution (FCR) at their call center. The Authority is achieving out-of-industry norms for this metric (90%).

The following figure summarizes DCWASA's call center metrics:

Figure 6-A: DCWASA Call Center Metrics

Metric	DCWASA Performance	Comment
Average speed of answer (ASA)	85% in 40 seconds	Better than industry average
Talk time	About 4 minutes	In middle of target range
Agent availability	75%	At target
First Call Resolution (FCR)	About 90%	Few utilities can even measure this crucial metric.

The evaluation of the above metrics is based on the AWWARF Study – "*Customer Satisfaction – Best Practices for a Continually Improving Customer Responsive Organization."*

6.2 Qualserve Customer Service Metrics

Qualserve compiles data for both water and wastewater utilities and administers a number of Customer Relations metrics (details on the Qualserve model are provided in Chapter 7). The metrics include:

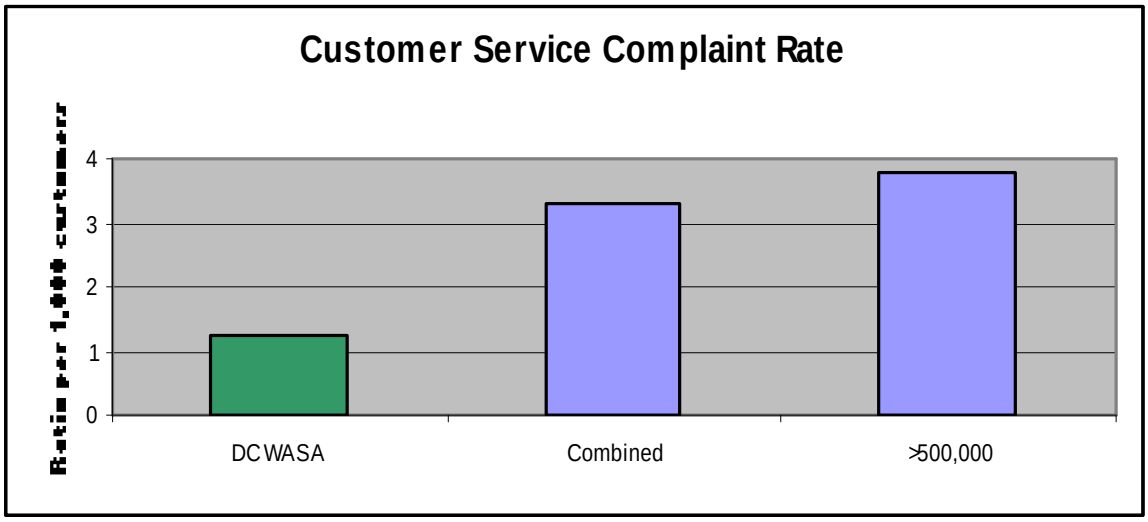
- Customer Service Complaints
- Technical Quality Complaints
- Others

Customer Service Complaints
A customer complaint is an expression of dissatisfaction conveyed orally or in writing to a utility employee and is a good indication of quality of customer service. A Customer Service Complaint Rate measures the complaint rate experienced by the utility excluding technical quality complaints which are measured separately (see below). It does include relationship factors such as appearance, courteousness and helpfulness. It also includes dissatisfaction with customer support services such as turn-ons, turn-offs, billing and communications. The mathematical calculation is:

Customer Service Complaint Rate = (1,000)*customer service associated complaints/Number of active customer accounts.

To calculate the Customer Service Complaint Rate for DCWASA, the Project Team worked with the Customer Call Center Director to identify customer service complaints calls from their log. In comparison to the industry and its peers, DCWASA is in the lowest (best) quartile for Customer Service Complaint Rate as illustrated below.

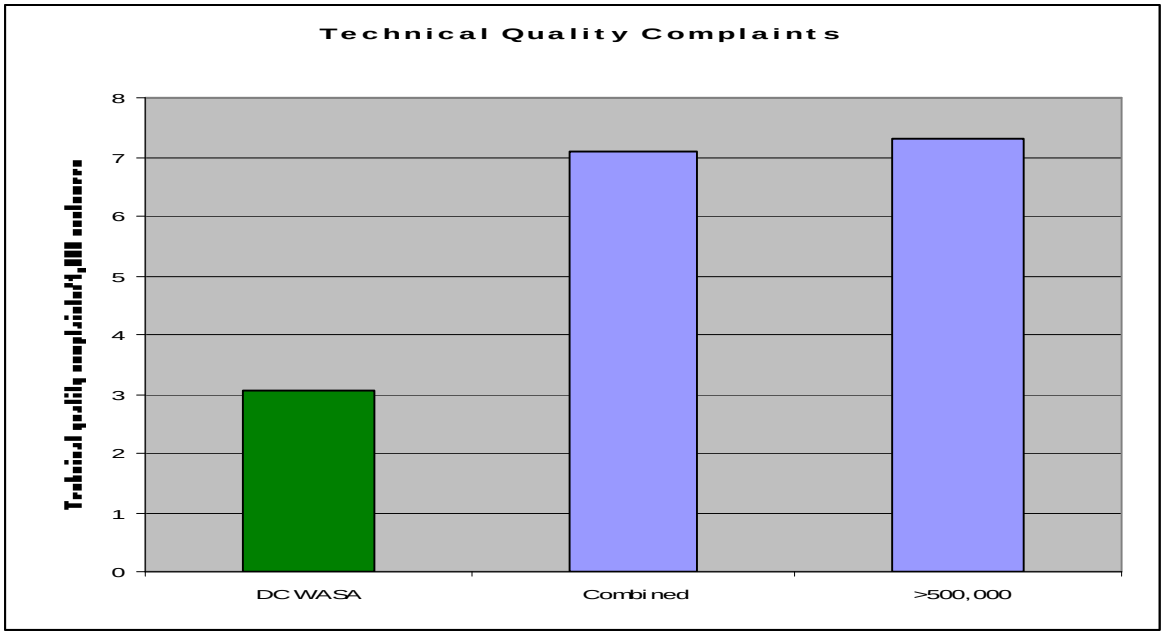
Figure 6-B: Customer Service Complaint Rate
(Ratio per 1,000 Customers)



This result presented above most likely underestimates DCWASA's experience since the complaints counted here were only based on calls to the call center. The metric is intended to include any expression of dissatisfaction to a utility employee even if by letter or other non-telephone communication. Notwithstanding this comment, we believe that DCWASA will still rank very high in relation to peer utilities in this measurement. When DCWASA implements its performance measurement system, it is suggested that the Authority should try to align data systems to identify complaints from all sources.

Technical Quality Complaints
The calculation of this metric is similar to the calculation shown above with an expansion in definition to include complaints about water quality, taste, odor, appearance, pressure, disruptions of service, etc. The URS team again worked with a Customer Service representative to identify technical complaints in the logs to calculate Technical Quality Complaint Rate. DCWASA is in the lowest (best) quartile on this measure comparing to the industry and its peers:

Figure 6-C: Technical Quality Complaints
(Technical quality complaints per 1,000 customers)



The calculations above again may underestimate the number of complaints received, both customer complaints and technical complaints, since only the calls to the call center were considered for this study. The Qualserve metrics are intended to include any oral or written expression of dissatisfaction to a utility employee including mail and emails. Once DCWASA implements its performance measurement system, the suggestion offered previously would apply to technical quality complaints as well.

Other Qualserve Measures
In addition to the two complaint ratios above, Qualserve has six indicators that identify the rate of disruption in service. DCWASA was not able to provide the data needed to calculate these indicators. Once DCWASA implements its Performance Measurement System, we suggest that the Authority should try to align its data systems to identify disruptions of service by duration and whether planned or unplanned.

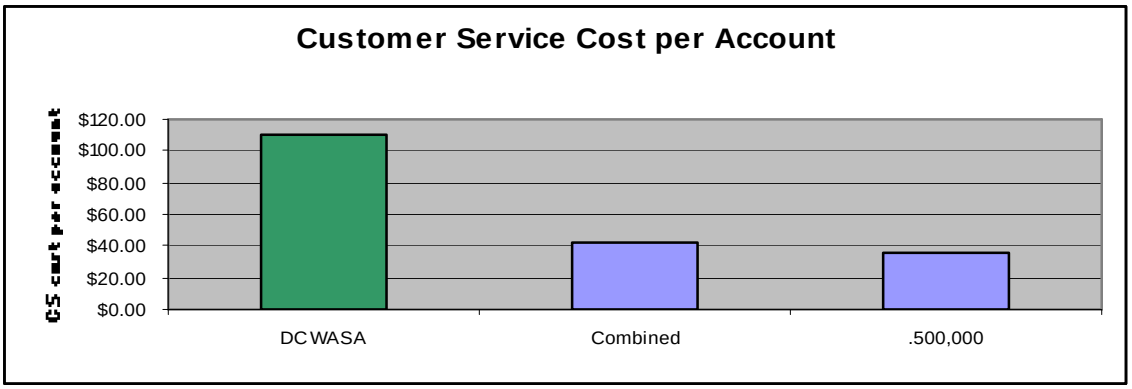
DCWASA reports its current billing accuracy rate as 99.6%. The Qualserve metric for billing accuracy is calculated as follows:

Billing Accuracy = (10,000)*(number of error driven billing adjustments in a year)/Number of bills generated in a year

Interpreting the 99.6% accuracy rate as 4 errors-driven billing adjustments out of 1000 bills rendered would place DCWASA above the median for all utilities. However, a clarification in the methodology of calculation is required before confirming that DCWASA is above average. Billing accuracy should improve even further once AMR is fully deployed at DCWASA.

Qualserve's uses customer service cost per account (total customer service costs/number of active accounts) as one measure of efficiency. DCWASA is currently in the fourth quartile (less efficient), likely due to a number of very large customers (Federal agencies, etc.).

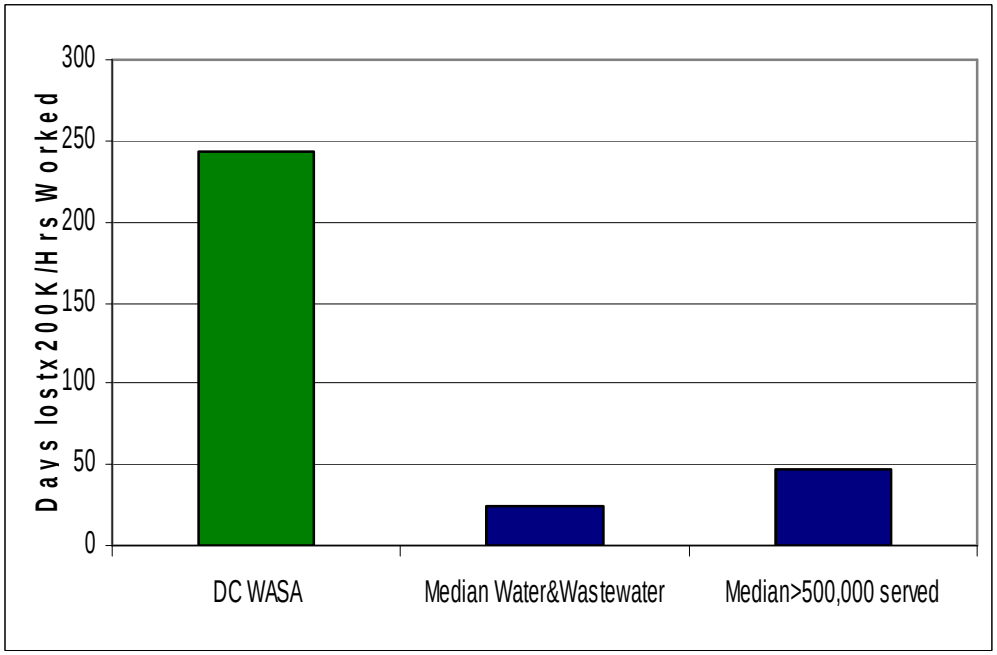
Figure 6-D: Customer Service Cost/Account



6.3 Health and Safety

Safety is a strategic focus for DCWASA with an allocated budget of approximately $2 million annually. The primary focus of the DCWASA safety initiative is on reducing incidence frequency which currently is within range of national trends. Qualserve, however, focuses on duration using the data in OSHA Form 300A *Summary of Work Related Injuries and Illnesses* which tracks total days away from work. The graph below shows DCWASA is higher than the industry and its peers on this measure. High values on this measure are found among utilities with a large amount of distribution and collection system work. High values may also be a sign of some issues associated with the worker's compensation system and may be mitigated by allowing for lower intensity work options.

Figure 6-E: Work Related Injuries and Illnesses (2006)



6.4 Human Resources

The Human Resource Department has implemented programs, including Knowledge Capture and Succession Planning, which are Best Practice characteristics of utilities. In addition, DCWASA is committed to employee training with $2 million set aside in FY 2008 for training. At more than 2% of payroll, DCWASA's training budget exceeds private sector targets. Qualserve uses training hours per full time employee (FTE) to objectively gauge training success. The median value for water and wastewater utilities is 21.8 hours annually per FTE. The estimated value for DCWASA is 19 hours. The success of the training program at DCWASA is partly evident by the increased number of certified operators and certified maintenance personnel. DCWASA will begin tracking training hours so it can benchmark again with peers in the industry.

6.5 Procurement

There are no readily available industry benchmarks for procurement (Qualserve does not have procurement metrics). However, management has recognized and is taking action to address previous issues which resulted in excess inventory. Current initiatives should assist DCWASA in achieving one or more best practices in procurement:

- Automating procurement management
- Revising regulations, open specs, etc.
- Automating the maintenance management and warehouse functions
- Policy and compliance
- Examining alternate methods of project delivery

7. Management

To evaluate DCWASA's organizational, managerial and operational practices, we conducted interviews of DCWASA representatives and performed a benchmarking analysis utilizing the Qualserve data maintained jointly by the American Water Works Association (AWWA) and the Water Environment Federation (WEF). Qualserve measures effectiveness and efficiency of water and wastewater utilities through five business areas, each of which comprises four to seven business process categories. Its performance indicators provide a simple and useful tool that DCWASA can use to assess its competitiveness against its peer group and best practices and to identify opportunities to enhance performance. The Qualserve Business Model is represented below.

Figure 7-A: The Qualserve Business Model for Water and Wastewater Utilities

Qualserve participating utilities include water and wastewater utilities located across North America with served populations ranging from less than 10,000 people to over 500,000. For this study, we have chosen to benchmark DCWASA against the Qualserve Organizational Best Practice Index that includes seven performance indicators. These seven indicators together measure different aspects of business processes that are needed to establish organizational best practices. These indicators are outlined below.

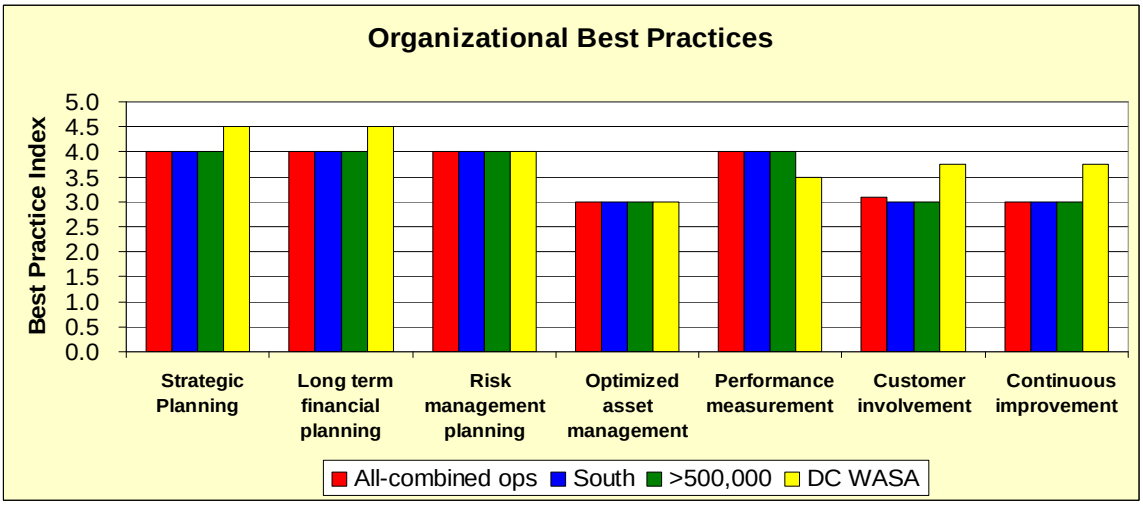
- Strategic Planning
- Long-Term Financial Planning
- Risk Management Planning
- Optimized Asset Management
- Performance Measurement
- Customer Involvement
- Continuous Improvement

While some Qualserve metrics are quantitative and can be easily compiled and compared, the seven indicators we use measure quality of performance. For the qualitative business processes that need to be evaluated, Qualserve uses performance indicators based on a 1 to 5 self-scoring system as follows:

- 5 points if this activity is fully implemented at the utility
- 4 points if this activity is largely implemented, but there is room for improvement
- 3 points if this activity is largely implemented, but there is substantial room for improvement
- 2 points if this activity is implemented, but only occasionally or without uniformity
- 1 point if this activity is not practiced in the utility

The following graph summarizes DCWASA scores in the seven indicators of the Organizational Best Practice Index benchmarked against the industry and its comparable utilities.

Figure 7-B: Management Best Practice Score



Overall, DCWASA currently scores higher than the industry median. In addition, as explained herein, the programs that DCWASA is currently implementing and pursuing will likely to allow it to enhance its score in the near future.

7.1 Strategic Planning

An adept strategy planning process is essential to any well-run organization. A strategy plan maps the short-term and long-term direction of the entity and identifies the needs and challenges to be met through that direction. It helps the utility to objectively acknowledge its strengths and potential opportunities for improvement as well as to identify its short-comings and impending threats. It also allows the utility to think of the operative environment it thrives in, both internally and externally.

An effective strategic plan will include at least some of the practices below:

- Formally documented vision and mission as well as organizational values statements;
- Consideration of internal and external factors that will or may impact the utility (internal benchmarking and environmental scan);
- An assessment of strengths and opportunities for improvement for the next 3 to 10 years;
- Analysis and selection of strategies in the areas of system management, customer service, finance, human resources management and business process improvements;
- Short-term and long-term action plans, including allocation of resources directed at achieving goals and strategies; and
- A process for strategic plan development and annual reviews and updates that facilitate input from customers, employees and other stakeholders.

The average score is 4.0 for strategic planning among all of the participating water and wastewater utilities in Qualserve based on their self-assessment. Water and wastewater utilities serving more than 500,000 people also reported an average of 4.0 for strategic planning. DCWASA representatives indicated a score of 4.5 on its strategic planning process, a score that we would concur with based on our review of documents and interviews of key personnel.

DCWASA scores higher than its peers. It has a mission, vision and values; it defines goals and tracks their progress; and it performs process updates on a regular basis. Based on the data gathered as the date of this report, some of the potential missing aspects of the strategic planning process include performance of an environmental scan and the creation of an employee involvement program.

7.2 Long Term Financial Planning

A comprehensive long-term financial plan helps to ascertain proper alignment of resources and priority ranking in order to meet the utility's strategic needs. This process typically projects 5 to as much as 25 years into the future. The financial plan is the implementation arm of the vision.

A scoring range of 1 to 5 is used based on a planning process that matches resources to the achievement of strategic goals such as:

- Funding of operations and maintenance costs;
- Funding of the Capital Improvement Plan (CIP), taking into account the effects of capital improvements on operations and maintenance costs;
- Funding of the optimized asset management plan for all asset classes; and
- Development of rate alternatives and recommended rate adjustments over the life of the plan.

The average score is 4.0 for long-term financial planning among all of the participating water and wastewater utilities in Qualserve based on their self-assessment. Water and wastewater utilities serving more than 500,000 people also reported an average of 4.0 for long-term financial planning. DCWASA representatives indicated a score of 4.5 on its long-term financial planning process.

DCWASA scored better than its peers in financial planning because it exhibits prudent long-term financial planning for O&M and the CIP, on a fully-costed basis. The impacts on O&M and rate alternatives are considered in capital program development. Some potential areas of improvement for DCWASA have been identified: the asset management plan is still under development and, when completed, will provide additional information for the planning process. In addition, it may be prudent to reconsider the current CIP inflator of 3% annually (at least for the near-term) given the recent rate of inflation in construction costs.

7.3 Risk Management Planning

A risk management planning process is utilized to identify the potential risk exposure to the utility in support of its strategic plan and to develop risk mitigation steps to minimize the exposure and potential loss.

Once again the scoring range is 1 to 5 based on a planning process that identifies the potential risks to the utility within the context of its strategic plan and for developing plans to mitigate physical and financial loss, such as:

- Disaster readiness planning;
- Security program for resources, facilities and service delivery systems;
- Health and safety programs for employees and the general public;
- Public liability exposure;
- Emergency operations planning;
- Hazardous material contingency planning; and
- Insurance program including property and casualty insurance, health and workman's compensation insurance, and liability insurance (or alternative self-insurance).

The average score is 4.0 for risk management planning among all of the participating water and wastewater utilities in Qualserve based on their self-assessment. Water and wastewater utilities serving more than 500,000 people also reported an average of 4.0 for

risk management planning. DCWASA representatives also indicated a score of 4.0 on its risk management planning process.

DCWASA is at par at risk management compared to its peers. As part of its risk management, DCWASA has performed disaster planning and security planning/implementation for its water system. The Authority maintains adequate insurance coverage. Its health and safety incidence ratio are at par compared to the industry (please see the discussion of health and safety provided in Section 6). In addition, the Authority's health and safety duration are better than the industry average. As the date of this report, we have not reviewed information on DCWASA's wastewater security program.

7.4 Optimized Asset Management

An optimized asset management program strives to ensure that the most appropriate decisions are made at all levels over the assets' life cycle. The financial impact of asset management affects all parts of the utility. A well-implemented asset management helps to optimize asset and therefore utility performance, reduce risk, and minimize expense.

An effective asset management program includes the following characteristics:

- An inventory of infrastructure assets;
- A condition assessment for all asset classes;
- Replacement cycles for each asset class;
- Assessment of the financial impact of both maintenance and replacement of assets;
- Life cycle costing in support of major asset decisions;
- Integrated use of data from multiple sources such as GIS and maintenance management systems to support decisions; and
- Communications with elected officials, customers and the general public.

The average score is 3.0 for asset management among all of the participating water and wastewater utilities in Qualserve based on their self-assessment. Water and wastewater utilities serving more than 500,000 people also reported an average of 3.0 for asset management. DCWASA representatives indicated a score of 3.0 on its asset management process.

Currently, DCWASA is at par in managing assets compared to its peers. However, DCWASA is in the process of implementing Maximo Asset Management and will likely to improve upon its current score in the near future.

7.5 Performance Management Systems

A formal and effective performance management practice is a result-oriented way to align organizational and personal activities and processes to the goals of the organization. It identifies organizational goals, results needed to achieve these goals, measures of

outcomes toward the goals, and means to achieve these goals. It produces a meaningful basis of measuring success, cultivates performance-based treatment, and creates accountability to accomplishing organizational and personal goals.

The scoring range is again 1 to 5 based on an effective performance measurement system incorporating such tools as Kaplan and Norton balanced scorecard or GASB performance measurement framework, with the following characteristics:

- Is multidimensional, utilizing appropriate measures for internal and external stakeholders, supporting both routine work and special projects, and offering integrated measurement systems responsive to the needs of line employees, management and executives
- Has a process for establishing targets, usually in conjunction with the budgeting process, that reflects broad internal, external, financial and improvement goals in strategic and operating plans
- Incorporates measures focused on quality, efficiency and effectiveness, and
- Includes a routine monitoring and reporting process

The average score is 4.0 for their performance management among all of the participating water and wastewater utilities in Qualserve based on their self-assessment. Water and wastewater utilities serving more than 500,000 people also reported an average of 4.0 for performance management. In contrast, DCWASA representatives indicated a score of 4.0 on its performance management process.

DCWASA scores at the industry median for large utilities. However, there are plans in place to develop a performance measurement system. Once implemented, DCWASA should score above average relative to its peers.

7.6 Customer Involvement

A customer involvement program describes a formal effort to assure active customer participation in the utility management process. The scoring range is 1 to 5 for the customer involvement program including practices such as:

- Offering educational programs and materials and assessing their effectiveness;
- Providing customers with a list of subject matter experts to answer their questions;
- Conducting customer satisfaction surveys and responding to what is learned;
- Soliciting input on projects and programs under consideration, in planning or under construction;
- Identifying and confirming customer priorities; and
- Resolving customer issues and complaints.

The average score is 3.25 for customer involvement among all of the participating water and wastewater utilities in Qualserve based on their self-assessment. Water and wastewater utilities serving more than 500,000 people also reported an average of 3.0 for

customer involvement. In contrast, DCWASA representatives indicated a score of 3.75 on its customer involvement program. Each of these scores (DCWASA and those of other utilities) is lower than for the previous measures highlighting the opportunities for the industry to improve the focus on customers.

DCWASA is better at getting customers involved in its management process compared to its peers. The Authority's complaint metrics are better than average (details provided in Section 6). Some outstanding practices in customer service (best in class) include tracking first call resolution (FCR), high-usage notification, and good call center metrics. According to the representatives of the Authority, customer satisfaction surveys have been performed in the past. As date of this report, the completed surveys were not returned to Consultant Team and therefore the extent to which customers are treated as stakeholders could not be verified.

7.7 Continuous Improvement

The scoring range is 1 to 5 based on the existence of an organizational continuous improvement program to help all utility employees at all levels to examine their practices with the goal of identifying and implementing improvement to service quality, effectiveness and efficiency. There are a large number of systems and programs available to water and wastewater utilities. Good practice would include examining each of the following and participating in the appropriate suite of systems that are aligned with utility goals:

- ISO 9000 Series;
- ISO 14001;
- Other Environmental Management Systems;
- Work process documentation programs;
- Self-Assessments, Peer Reviews, and Benchmarking such as those offered through QualServe;
- National Biosolids Partnership (NBP);
- The Partnership for Safe Water; and
- The Malcolm Baldrige National Quality Award Program or similar regional-run programs.

The average score is 3.0 for a continuous improvement program among all of the Qualserve participating water and wastewater utilities based on their self-assessment. Water and wastewater utilities serving more than 500,000 people also reported an average of 3.0 for continuous improvement. DCWASA representatives indicated a score of 3.75 on its continuous improvement program.

DCWASA does better in continuous improvement compared to its peers. It actively participates in NBP and is one of the few utilities to take part in Knowledge Capture, a risk-based work process documentation program. DCWASA's other continuous improvement programs are primarily strategic plan driven.