Puerto Rico Aqueduct and Sewer Authority

COMMONWEALTH OF PUERTO RICO

Puerto Rico Aqueduct and Sewer Authority

FINAL REPORT

Fiscal Year 2014 Consulting Engineer's Report

for the Puerto Rico Aqueduct and Sewer Authority

March 2015

MP ENGINEERS of PUERTO RICO affiliate of ARCADIS Infrastructure · Water · Environment · Buildings

Puerto Rico Aqueduct and Sewer Authority

#604 Barbosa Ave. • Hato Rey, Puerto Rico 00918

FINAL REPORT

Fiscal Year 2014 Consulting Engineer's Report for the Puerto Rico Aqueduct and Sewer Authority

with FY2015 Preliminary Results through December 31, 2014

To satisfy the requirements of Section 7.07 of the 2012 Master Agreement of Trust by and between PRASA and Banco Popular de Puerto Rico as Trustee; and Section 3.5 of the 2012 Fiscal Oversight and Support Agreement by and between PRASA, the Commonwealth of Puerto Rico and the Government Development Bank for Puerto Rico

Report Prepared By:

MP Engineers of Puerto Rico, PSC
Affiliate of ARCADIS U.S., Inc.

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Acronyms

Capitalized and abbreviated terms contained in this report are defined below. The terms listed below appear in multiple sections of this report, and are thus defined here for reference.

Acronym	Definition
ABT	Additional Bonds Test
ASD	Automatic Shutdown
AMR/AMI	Automatic Meter Reading and/or Advanced Metering Infrastructure
AOP	All Other Perils
AWWA	American Water Works Association
CAA	Coefficient of Annual Adjustment
CAB	Annual Base Coefficient
CAGR	Compound Annual Growth Rate
CBA	Collective Bargaining Agreement
CCL	Contaminant Candidate List
CD	Coefficient of Deficiency
CER	Consulting Engineer's Report
CFE	Combined Filter Effluent
CIP	Capital Improvements Program
CMOM	Capacity, Management, Operations, and Maintenance
CSO	Combined Sewer Overflow
CWA	Clean Water Act
DBP	Disinfection Byproduct
DBPR	Disinfection Byproducts Rule
DSC	Debt Service Coverage
ECRC	Environmental Compliance and Regulatory Charge
EPC	Energy Performance Contract
EPL	Excess Employment Practices
ESCO	Energy Service Companies
FEMA	Federal Emergency Management Agency
FOA	Fiscal Oversight and Support Agreement
FY	Fiscal Year
GDB	Government Development Bank for Puerto Rico
GIS	Geographic Information System
GWUDI	Groundwater Under the Direct Influence of Surface Water
HAA	Haloacetic Acid
HIEPAAA	Hermandad Independiente de Empleados Profesionales de la Autoridad de Acueductos y Alcantarillados

Acronym	Definition
ILI	Infrastructure Leakage Index
IMP	Integrated Maintenance Program
KPI	Key Performance Metrics
kWh	Kilowatt-Hour
LOC	Line of Credit
LTCP	Long-Term Control Plan
LT2 ESWTR	Long Term 2 – Enhanced Surface Water Treatment Rule
M	Million
MAT	Master Agreement of Trust
MARSH	Marsh Saldaña
MG	Million Gallons
MGD	Million Gallons per Day
MPPR	MP Engineers of Puerto Rico, PSC
NMC	Nine Minimum Controls
NPDES	National Pollutant Discharge Elimination System
NPDWR	National Primary Drinking Water Regulations
NRW	Non-Revenue Water
OCIP	Owner Controlled Insurance Program
O&M	Operation and Maintenance
OSHA	Occupation Safety and Health Administration
PAN	Programa de Asistencia Nutricional
PCC	Plant Control Center
PMC	Program Management Consultant
PML	Probable Maximum Loss
PMO	Program Management Office
PPA	Power Purchase Agreement
PRASA	Puerto Rico Aqueduct and Sewer Authority
PRDOH	Puerto Rico Department of Health
PREPA	Puerto Rico Electric Power Authority
PWS	Potable Water Systems
RFP	Request for Proposals
R&R	Renewal and Replacement
SAP	Systems, Applications, and Products in Data Processing
SIR	Self-Insured Retention
SDWA	Safe Drinking Water Act
SSOMP	Sewer System Operation & Maintenance Plan
STS	Sludge Treatment System

Acronym	Definition
TANF	Programa de Asistencia Temporal para Familias Necesitadas
TIV	Total Insurable Value
TOC	Total Organic Carbon
TTHM	Trihalomethane
UIA-AAA	Unión Independiente Auténtica de la Autoridad de Acueductos y Alcantarillados
U.S.	United States
USEPA	United States Environmental Protection Agency
UV	Ultraviolet
VAT	Value Added Tax
WPS	Water Pump Station
WTP	Water Treatment Plant
WWPS	Wastewater Pump Station
WWTP	Wastewater Treatment Plant
XCU	Explosion, Collapse or Underground

Executive Summary

E.1. Introduction

MP Engineers of Puerto Rico, PSC an affiliate of ARCADIS U.S., Inc. (MPPR/ARCADIS), has been retained by the Puerto Rico Aqueduct and Sewer Authority (PRASA) as its Consulting Engineer to assist in the preparation of a Consulting Engineer's Report (CER) to satisfy the reporting requirements specified in Section 7.07 of the 2012 amended and restated Master Agreement of Trust by and between PRASA and Banco Popular de Puerto Rico as Trustee (2012 MAT), and Section 3.5 of the 2012 amended and restated Fiscal Oversight and Support Agreement (2012 FOA) by and between PRASA, the Commonwealth of Puerto Rico and the Government Development Bank for Puerto Rico (GDB).

As required by Section 7.07 of the MAT, unless the Senior Bonds have been rated investment grade by at least two Rating Agencies for 24 consecutive months, the Consulting Engineer shall prepare a CER to document the current condition and changes, if any, in PRASA's operation and the performance of the water and wastewater systems (the System). Also, as required by Section 3.5 of the 2012 FOA, PRASA must maintain a continuous disclosure policy with GDB and satisfy certain reporting requirements throughout the fiscal year. To comply with this reporting requirements, MPPR/ARCADIS has prepared this CER for fiscal year 2014 (2014 CER). Given the elapsed time between the closing of FY2014 and the issuance of this report, the 2014 CER also includes commentaries, information, and preliminary results for the six months of FY2015 (July 1st through December 31st of 2014).

Unless otherwise indicated, MPPR/ARCADIS's opinion with respect to the technical, operational and financial condition and related matters of PRASA's System is presented for FY2014 and/or based on the information and preliminary results through December 31, 2014 where noted. Any statements contained in this report involving estimates or matters of opinion, whether or not so specifically designated, are intended as such, and not as representations of fact. MPPR/ARCADIS has not independently verified the accuracy of the reports and other information indicated as being provided by PRASA for the conduct of this assignment. To the extent that the information provided to MPPR/ARCADIS by PRASA is not accurate, the conclusions and recommendations contained in this report may vary and are subject to change. Changed conditions occurring or becoming known after the issuance of or beyond the period covered by the 2014 CER could affect the material presented to the extent of such changes. MPPR/ARCADIS has no responsibility for updating this report for changes that occur beyond the date of its issuance. For a complete understanding of MPPR/ARCADIS's opinions and the underlying assumptions upon which these are based, this report should be read in its entirety.

Recent federal legislation, including enactment of the Securities and Exchange Commission (SEC) Dodd-Frank Act Amendments (the Exchange Act) requires disclosures and documentation between MPPR/ARCADIS, PRASA and PRASA's registered municipal advisor. PRASA is aware of the

"Municipal Advisor Rule" of the SEC and the "independent municipal advisor" exemption from the definition of "advice." PRASA has acknowledged that it wishes MPPR/ARCADIS to continue to provide recommendations to PRASA as per the Consulting Engineer's requirements stipulated in the 2012 MAT. PRASA will rely on its registered municipal advisor for advice; as well as the GDB, as financial advisor of the Commonwealth of Puerto Rico, and/or the registered municipal advisors currently engaged by the GDB, as necessary. Refer to the Section 1.5 of this 2014 CER for MPPR/ARCADIS's *Statement of Disclosure*.

E.2. Organizational Updates and Changes

PRASA is organized into five operational Regions (North, South, East, West and Metro) and is managed by an Executive Management Team that provides the day to day management oversight and coordination for all institutional activities. It is supported by various departments in the organization including, but not limited to finance, human resources, customer services, purchasing and logistics, and information systems.

PRASA's Governing Board, as per Act No. 15 of May 6, 2013, is a nine-member Board comprised of the following: two ex officio members, Secretary of the Puerto Rico Department of Transportation and Public Works and the Puerto Rico Planning Board Director; one engineer licensed to practice the engineering profession in Puerto Rico; one lawyer with at least seven years of experience, authorized to practice law in Puerto Rico; one member with a wide knowledge and experience in corporate finances; the Executive Director of the Mayors Association; the Executive Director of the Mayors Federation; and two customer (consumer) representatives. The two customer representatives are elected through a public selection process under jurisdiction of and directed by the Department of Consumer Affairs of Puerto Rico (DACO, by its Spanish acronym).

Since Act No. 92 was enacted in 2004, PRASA has gone through several management changes at many levels of its organization including the executive level. It is MPPR/ARCADIS's opinion that these changes and their resulting successions and transitions have been adequately executed and have not affected the stability of the organization or the continuity of the operations. Key organizational changes as of December 31, 2014 include: 1) the appointment of a new Executive Director for the Metro Region, 2) the direct reporting of both the finance and legal departments to the Executive President, and 3) the creation (by way of approval by the Governing Board) of the Vice-President for Regional Operations and of the Vice President for Strategic and Corporate Planning position (previously, these were designated as Director positions).

Given the size and complexity of the System, PRASA's overall staff levels are higher than those of United States (U.S.) and Canada utility benchmarks[1]. During FY2013, there was an atypical personnel reduction as a result of the Government's retirement system's reform plan, which incentivized over 300 of PRASA's employees to retire. PRASA's staff totaled 5,090 at the end of

[1]Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, AWWA (2014)

FY2014, and 5,013 as of December 31, 2014. In FY2014 PRASA conducted an organizational study to provide the necessary information to the Executive Management Team regarding its human resources, in order to identify opportunities that will enable and contribute to its effective management and to optimize its deployment. The study, performed by Vision to Action, a strategic management consulting firm, identified that PRASA requires 4,693 employees (320 less than current staff levels) to operate the System at current levels of quality and efficiency. The study also provided several recommendations to PRASA's Executive Management Team which included, among others: relocation of certain personnel within regions and/or departments, and improvements to work scheduling practices. If implemented, these initiatives could yield material savings to PRASA through the reduction of overtime costs. PRASA is currently completing the analysis for the implementation of redistribution, reallocation, and/or reduction of personnel; it is expected to be completed by December 2015. Other recommendations from the study are also being considered for future implementation. Finally, PRASA is in the process of hiring employees to fill certain critical operational positions (i.e., plant operators) that were left vacant as a result of the numerous personnel retirements that took place in FY2013 due to legislated changes to the retirement conditions. These new hires are being done in accordance with the findings and recommendations contained in the organizational study previously mentioned.

In FY2012, PRASA and its larger union, the UIA-AAA, signed a new Collective Bargaining Agreement (CBA), effective from January 2012 through December 2015. It included certain retroactive and future economic agreements that have an impact on PRASA's payroll and benefits expense projections which started in FY2013. Also, PRASA and the HIEPAAA signed a new CBA effective from May 2012 through June 2016. It also contains certain economic agreements (i.e., salary increases) that also have an impact on PRASA's Payroll and Benefits expenses. However, the Commonwealth of Puerto Rico, through the enactment of Act 66 of June 17, 2014 – Fiscal and Operational Sustainability Act for the Commonwealth of Puerto Rico (Act 66-2014), declared a fiscal emergency situation and required that its instrumentalities (i.e., utilities, government agencies, and public corporations such as PRASA) implement certain measures to reduce its expenses.

Act 66-2014 has primacy over any other law and will remain in place for three years or until certain economic and financial conditions are met. Under Act 66-2014, PRASA negotiated some terms included under the CBAs with both UIA-AAA and HIEPAAA. Both UIA-AAA and HIEPAAA unionized personnel agreed with PRASA that the CBAs will continue as stipulated with the exception of some terms which include: the saving plans, salary increases, holiday and sick days benefits, among others. The total estimated annual savings expected for FY2015 that resulted from the negotiations with the UIA-AAA and HIEPAAA were $14,997,068 and $914,526, respectively. Additional savings from reduction to payroll and benefits (including health insurance benefits) for management employees, as well as reductions in contracted services, will yield a total savings of about $37M in FY2015. In future years, savings are estimated at about $43M.

Additionally, PRASA's unions and Executive Management Team agreed to certain non-economic agreements which include, among others: implementation of performance metrics to evaluate performance and productivity, the incorporation of computerized handheld meter readers and use of GPS data for disciplinary actions, and flexibilization of work shifts and functions in certain areas, as well as agreeing to certain modifications to disciplinary actions and the conversion of temporary employees (expected to be approximately 300) to regular positions, but with the benefits established by law rather than under the CBAs. These agreements shall remain in effect so long as Act 66-2014 is in effect. Despite certain union events that took place during the period of time when Act 66-2014 was proposed and approved, PRASA's management continues to maintain a positive working relationship and open communication channels with the unions.

Finally, PRASA continues to assess administrative and operational optimization as part of its ongoing operational, management and strategic activities. In general, PRASA's organizational and management changes have been smoothly implemented to ensure continuance of policy and programs implementation and an appropriate operation and maintenance (O&M) of the System.

E.3. Condition of System

PRASA owns a large variety of assets, including land, buildings, dams, wells, water and wastewater treatment facilities and pump stations, ocean outfalls, buried infrastructure, vehicles, equipment, and water meters. Between March and June of 2014, MPPR/ARCADIS assessed the condition of PRASA's System through an inspection program of a sample of facilities that included a selection of the major elements of the System. The purpose of these inspections was to identify the overall condition of the facilities in order to determine if they are being operated and maintained in a manner to achieve their operating goals, and to evaluate if PRASA's CIP is aligned with identified needs. MPPR/ARCADIS is conducting these facility inspections approximately every two years. As part of this assessment, MPPR/ARCADIS evaluated the compliance performance results for all PRASA water treatment plants (WTPs) and wastewater treatment plants (WWTPs) for the period from January 1st through December 31st of 2013. The next round of facility inspections will be completed in FY2016. Subsequently, as part of this report, MPPR/ARCADIS also evaluated the compliance performance results for PRASA's WTPs and WWTPs for the period from January 1st through December 31st of 2014.

Regarding the 2014 inspections, the condition of the facilities visited varied from new to those requiring capital upgrades and/or operational/process improvements. Compliance with discharge permit limits and drinking water standards varied depending on the plant age, condition and experience of operators. In general, the condition of the facilities averaged an adequate rating, and an overall improvement from previous results was observed as shown in Table ES-1.

Table ES-1:
FY2014 Asset Condition Ratings by Category

Asset Category	Overall Condition Ratings					2014 vs. 2012		2014 vs. 2008	
	2008 CER	2009 CER	2010 CER	2012 CER	2014 CER	Change in Overall Score	Percent Change	Change in Overall Score	Percent Change
Regulated Dams	Adequate	Adequate	Adequate	Adequate	Adequate	-0.2	-8.7%	-0.2	-8.7%
Water Treatment Plants	Adequate	Adequate	Adequate	Adequate	Adequate	-0.3	-11.5%	0.1	4.6%
Wastewater Treatment Plants	Adequate	Adequate	Adequate	Adequate	Adequate	-	-	0.1	5.3%
Wells	Adequate	Adequate	Adequate	Adequate	Adequate	-	-	0.2	10.0%
Water Pump Stations	Adequate	Adequate	Adequate	Adequate	Adequate	-0.2	-8.3%	-	-
Wastewater Pump Stations	Adequate	Adequate	Adequate	Adequate	Adequate	0.2	9.5%	0.6	32.3%
Water Storage Tanks	Adequate	Adequate	Adequate	Adequate	Adequate	0.5	26.3%	0.5	26.3%

Based on the regulatory compliance results evaluated for the 2014 CER, despite some operational (process control) and compliance issues, the treatment facilities are generally producing and delivering potable water and conveying and treating wastewater adequately. Only one Dam, Las Curías, was degraded to poor, in comparison to the previous inspection. Although Las Curías, is no longer utilized by PRASA as a raw water source, it still represents a high hazard in the event of an uncontrolled release of impounded water. Currently, PRASA indicates that through an existing agreement with the Municipality of San Juan, the Municipality is addressing the critical issues of the dam including slope stabilization, security improvements, among others.

Regarding the WTPs, a number of WTPs declined from good to adequate. This was mostly due to a decrease in the compliance criteria and, more specifically, as a result of the implementation of Stage 2 Disinfectants and Disinfection Byproducts Rule (D/DBPR). PRASA acknowledges that it has some challenges ahead to bring the systems served by these facilities into compliance with the new regulation; however, PRASA has begun conducting evaluations, water quality modeling, developing action plans and implementing remedial actions to minimize these non-compliance events.

Regarding the WWTPs, most of the facilities that obtained a low rating/score have at least one project identified in PRASA's CIP or PRASA is currently evaluating operational and process modifications. It should be noted that some of the facilities which have been rehabilitated in recent years, are still experiencing compliance exceedances of one or more discharge parameters mostly as a result of operational and/or process control issues. Finally, as shown in the table, based on the inspection results of the facilities visited for the 2014 CER, a condition improvement was observed for both Wastewater Pump Station and Water Storage Tanks.

MPPR/ARCADIS analyzed the PRASA-reported data on water leaks and sewer overflows. Reported active leaks and sewer overflows remain at high levels when compared to other utilities in the United States (U.S.) and Canada[2]; however, it must be noted that PRASA owns and operates a much more complex network of water and sewer infrastructure. In FY2014 PRASA improved its percent repaired and backlog days of pending repairs with duration greater than seven days metrics for leaks. In FY2014 PRASA reports that, on average, 98% of island-wide weekly reported leaks were repaired resulting in a decrease in PRASA's pending leaks general backlog. PRASA also decreased its backlog days of pending leaks with duration greater than seven days from 0.5 days (FY2013 result) down to 0.4 days. PRASA reports that during FY2014, leaks were repaired, on average, within 58.9 hours of identification (or receiving notice from client). The average for the first six months of FY2015 increase slightly up to 63.73 hours. Nevertheless, this demonstrates a great improvement in PRASA's response practices and time.

PRASA reports to have reduced the amount of water produced, the amount of Non-Revenue Water (NRW), and the amount of water losses. PRASA's average NRW percentage for the past 10 fiscal years has been about 61%, with a record high recorded in FY2011 of 64.5%. However, since FY2012, PRASA's NRW levels have been consistently declining. In FY2014, of the total 598 MGD produced, approximately 351 MGD was NRW (58.7%). Of this amount of NRW, 343 MGD (57.3%) was due to water losses (both apparent and real) and 8 MGD (1.4%) was due to unbilled authorized consumption. Of the total amount of water losses in FY2014, approximately 56 MGD (16.3%) was due to apparent (commercial) losses, while approximately 287 MGD (83.7%) was due to real (physical) losses. The percentage amount of water losses and NRW in FY2014 slightly reduced by about 0.1% and 0.2%, respectively, compared to FY2013 results; and by about 1.6% and 2.8%, respectively when compared to FY2012. Also, from FY2012 to FY2014, PRASA reports to have reduced the amount (volume) of water produced (31 MGD reduction), amount of water losses (27 MGD reduction), and NRW (36 MGD reduction).

Also, since FY2012, PRASA has been measuring the Infrastructure Leakage Index (ILI) which is an indicator that is used to measure the level of physical losses in the water distribution system. As a performance indicator, the ILI represents a measure of the combined performance of three infrastructure management methods for real losses: the speed and quality of repairs, active leakage control, and assets management. Factors that affect the ILI include the pipe age and material, customer density, and system pressure. The ILI has been adopted around the world, although it is mostly used in Europe. An ILI between 1 and 3 is considered excellent. U.S. utilities currently measuring the ILI for their systems reported values ranging from 0.7 to 11. Globally, systems in developed countries report lower values of 5; while in developing countries values range from 10 up to about 50. In FY2012, PRASA reported an ILI of about 18. However, since then, PRASA's ILI has reduced by about 40%: reported values for FY2013 and FY2014 are 13 and 11, respectively.

[2] Refer to Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, AWWA (2014)

PRASA has indicated that these reductions have been achieved through the implementation of the following measures:

- Improvements in data management and quality (better production measurement).
- Reduction in events and duration of water storage tank overflows.
- Reduction in the time to repair leaks.
- Leak detection with specialized equipment.
- Pressure management in the distribution system.

Finally, PRASA reports to have treated, on average, 244 MGD of wastewater during FY2014 which is in line (only about 2 MGD more) than treated in FY2013. With regards to overflows, PRASA also reported improvements in FY2014; on average, 100% of island-wide weekly reported overflows were repaired also resulting in a decrease in PRASA's backlog of pending overflows to be repaired. PRASA also decreased its backlog days of pending overflows with duration greater than seven days from 0.2 days (FY2013 result) down to 0.17 days.

E.4. O&M Practices and Strategic Plan

MPPR/ARCADIS assessed the adequacy of PRASA's O&M practices based on compliance with regulatory requirements, interviews with PRASA personnel, and facility observations by field inspectors obtained through the 2014 asset condition assessment effort previously described. Overall, MPPR/ARCADIS found PRASA's O&M practices to be adequate and also noted that during FY2014, through the roll-out, deployment and stewardship of PRASA's Strategic Plan, changes and improvements in PRASA's O&M practices made positive impacts on the System.

All the Dams facilities and the majority of WTPs and WWTPs were found to be adequately operated and maintained. However, there were a few WTP and WWTP facilities that lacked the appropriate operational tools (i.e., O&M manuals, process controls, and laboratory equipment) at the moment inspections were conducted. Also, even though PRASA has improved its processes for prioritizing, scheduling, and executing preventive, corrective and routine maintenance activities; there is still room for further improvement, particularly for buried infrastructure. Overall, MPPR/ARCADIS observed that, throughout time, PRASA's O&M efforts have improved. MPPR/ARCADIS also found that ancillary facilities, for the most part, are being adequately operated and maintained.

PRASA continues its mission of providing quality water and wastewater services at the lowest possible cost. As previously reported, PRASA's Executive Management Team developed and implemented a Strategic Plan that is comprised of five key strategic initiatives: 1) Fiscal Health, 2) Operational Excellence, 3) Infrastructure and Sustainability, 4) Organizational Transformation, and 5) Technological Innovation; it also includes programs involving projects to be executed between

FY2014 through FY2018. The Strategic Plan also includes key performance indicators and metrics established by PRASA's Executive Management Team to track and improve operational performance. PRASA's Executive Management Team is currently in the process of revising and refining certain aspects of its Strategic Plan considering the lessons learned during FY2014 and realignment of strategic initiatives such as Fiscal Health (to include a plan to self-finance PRASA's CIP in the future, and reduce the dependency on bonds within a 10-year period) and Organizational Transformation. KPI goals have been adjusted (made stricter) for FY2015; and the methodology for calculating certain KPIs has been revised in order to better align these with Management's goals.

MPPR/ARCADIS evaluated PRASA's annual System O&M costs. PRASA's FY2014 O&M expenses (based on preliminary results and adjusted for non-cash reserves) was approximately $670M, of which $580M were directly related to the O&M of the System. The other $90M were related to commercial activities and provision of customer services, including but not limited to: staffing and operation of customer service offices island-wide; meter reading; connection and disconnection services; invoice preparation, printing and distribution; customer service call centers; and water meter purchases, amongst others. PRASA estimates that approximately 75% of its System O&M budget ($435M) is allocated to the water system and the remaining 25% ($145M) to the wastewater system. PRASA continues its effort to become more efficient by exercising greater management controls in order to reduce its O&M costs and by implementing various operational programs and initiatives, now contained within its five year Strategic Plan. PRASA's O&M budgets are comparable to the most recently published median benchmark results published by the American Water Works Association in 2014[3].

Table ES-2 provides a comparison of PRASA's metrics to several key O&M benchmarks. Table ES-3 presents a summary of PRASA's KPIs goals and results. In FY2014, PRASA achieved a compliance score of 68% of its KPIs on an island-wide basis. Note though, that this was the first full fiscal year of KPI measurement and that, as indicated by PRASA's Management, the established goals were challenging.

Table ES-2:
PRASA Metrics vs. Water/Wastewater Utilities Benchmarks

Benchmark Category	2012 Benchmarks[1]			PRASA[2]
	Top Quartile	Median	Bottom Quartile	
Water O&M Cost per Account	$281	$408	$608	FY2010: $292 FY2011: $309 FY2012: $321 FY2013: $357 FY2014: $350

[3] Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, AWWA (2014)

Benchmark Category	2012 Benchmarks[1]			PRASA[2]
	Top Quartile	Median	Bottom Quartile	
Water O&M Cost per MG Processed	$1,873	$2,565	$3,406	FY2010: $1,555 FY2011: $1,702 FY2012: $1,777 FY2013: $1,991 FY2014: $1,993
Water O&M Cost per 100 miles of pipe[3]	$1,508,796	$2,233,874	$3,654,463	FY2014: $2,948,365
Wastewater O&M Cost per Account	$250	$373	$463	FY2010: $214 FY2011: $225 FY2012: $236 FY2013: $199 FY2014: $192
Wastewater O&M Cost per MG Processed	$2,056	$3,122	$4,259	FY2010: $1,949 FY2011: $2,067 FY2012: $2,151 FY2013: $1,692 FY2014: $1,628
Wastewater O&M Cost per 100 miles of pipe[3]	$1,573,765	$2,143,610	$3,109,259	FY2014: $2,418,931

[1] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, AWWA (2014)
[2] Includes total operation and maintenance costs, less depreciation and costs related to customer (commercial) services. PRASA reported values include payroll and related, power, chemicals, Superaqueduct O&M contract fee, insurance and other expenses, less capitalized operating expenses.
[3] New O&M Cost Benchmark included in the 2012 Benchmark Report published in 2014.

Table ES-3:
PRASA Operations Key Performance Indicators for FY2014 and for the first six months of FY2015

Key Performance Indicators	FY2014 Goals	Results as of June 2014	FY2015 Goals	Results of first six months of FY2015
Employees per Connection	3.25 or less Employees/ 1,000 connections	3.15	3.03 or less Employees/ 1,000 connections	2.92
Overtime	Reduce to 7%	10%	Reduce to 8%	10%
Budget Compliance (excludes electricity costs)	Increase to 100%	95%	Increase to 100%	94%
Collections vs. Billings	Increase to 92%	91%	Increase to 93.75%	92.89%
Compliance - Water System	Increase to 97%	98%	Increase to 98%	100%
Compliance - Wastewater System	Increase to 95%	97%	Increase to 97%	96%
Billing Adjustments	Increase to 97.5%	96.4%	Increase to 97.5%	96.9%
Complaints in Customer Service (per 1000 active accounts)	Reduce to 10.36	17.56	Reduce to 12.5	20.4
Monthly Average of Customers with Service Interruptions (as a Percentage of Total Customers)	Reduce to 9%	7%	Reduce to 6.5%	5.0%

Key Performance Indicators	FY2014 Goals	Results as of June 2014	FY2015 Goals	Results of first six months of FY2015
Customer Attention Time (Commercial Office)	Maintain below 25 min.	26.27 min	Maintain below 25 min.	30.05 min
Vehicle Availability	Increase to 90%	91%	Increase to 90%	88%
Average Processing Time of Purchase Orders	Less than 25 days	20 days	Less than 15 days	17 days
Preventive vs. Corrective Maintenance Ratio	Increase to 66% : 34%	71:29	Increase to 80% : 20%	79:21
Average Time for Equipment Repairs	Less than 20 days	24 days	Less than 20 days	31 days
Reported Overflows[1-]	-	-	Reduce to 2,512 monthly	2,428 per month
Reported Leaks[1]	-	-	Reduce to 5,455 monthly	5,092 per month
Repair time for leaks	Reduce to 60.0 hrs.	58.90 hrs.	Reduce to 60.0 hrs.	63.73 hrs.
Average Water Production (MGD)	Reduce to 608 MGD	598 MGD	Reduce to 546 MGD	580.81 MGD
Energy Consumption (Annual)	Reduce to 749.7MKwH	720 MKwH	Reduce to 710.28MKwH	349.26 MKwH
Project Progress (CIP)[2]	-	-	-	-
Cost Performance (CIP)	Greater or equal to 0.9	1.03	Greater or equal to 0.9	1.02
Training (cumulative hours per employee)	More than 24 hrs	32.42	More than 24 hrs per year	11.77 first 6 mths
Unplanned Work Effectiveness (Absenteeism)	Reduce to 4.58 days	19.69 days	Reduce to 1.5 days	2.82 days
Planned Work Effectiveness	Reduce to 5%	14%	Reduce to 10%	6%

[1] The Reported Overflows and Leaks KPIs were added as FY2015 goals.

[2] The Project Progress KPI was added as a FY2015 goal. According to PRASA, this KPI is being measured only by Region, as such, no overall goal and result is presented.

E.5. Capital Improvement Program and Regulatory Compliance

The CIP is a dynamic program that is constantly evolving and undergoing revision as needs and funding are identified, and as projects transition from planning through design, construction and startup. PRASA's CIP includes projects that cover major capital improvements identified throughout PRASA's five Operational Regions (North, South, East, West and Metro), as well as island-wide initiatives such as technological advancements, telemetry, preventive maintenance, meter replacement, and renewal and replacements (R&R) to the System. The purpose of the CIP is to modernize PRASA's infrastructure, protect public health, safeguard environmental quality, permit continued economic development and help bring the System into compliance with all regulatory requirements.

PRASA's projected FY2014 capital expenditures total $316M. As required by PRASA's Governing Board, PRASA's Infrastructure Department must annually submit for its approval an updated five-year CIP plan. PRASA's CIP plan includes $1,451.5M in capital expenditures from FY2015 through FY2019 as approved by PRASA's Governing Board under Board Resolution No.

2909; of which about 41% is for compliance-driven (mandatory and non-mandatory) projects. It includes a total of 620 projects that are scheduled for implementation during this period. Given the magnitude of the CIP, it is understandable that it will continue to evolve over time and the number and budgets of projects is expected to be updated regularly. PRASA continues to engage world renowned engineering and consulting companies, the Program Management Consultants (PMCs), in the development, implementation, and evolution of the CIP. The PMCs manage pre-construction, construction, and post-construction activities for PRASA's CIP projects in all five regions.

Over the past 10 years, PRASA has annually invested over 60% of its CIP in compliance-related projects, which include mandated requirements of existing consent decrees and agreements with Regulatory Agencies (U.S. Environmental Protection Agency, or USEPA; and the Puerto Rico Department of Health, or PRDOH). However, PRASA and the Regulatory Agencies are currently in discussions to modify certain requirements of the existing consent decrees and agreements to re-align compliance priorities and, in turn, help alleviate PRASA's financial burden. These modifications include postponement or advancement of the implementation of certain projects and/or the modification of their scope of work (note that the Board-approved CIP already considers these proposed modifications). Also, as part of the renegotiation process, PRASA and the Regulatory Agencies agreed to revise PRASA's prioritization system which establishes the relative priority of all planned upcoming projects with the objectives of allocating its limited financial resources according to such priority. With the exception of certain projects that have been included in what PRASA and the Regulatory Agencies have defined as the Base List (high priority mandatory compliance projects that have already started the process of planning, design or construction and will not be subjected to the prioritization process); all other projects to be included in PRASA's CIP will be prioritized accordingly. PRASA expects to close the negotiation process and file the amended consent decrees/agreements with the court during FY2015.

PRASA's CIP addresses requirements of the following existing consent decrees and agreements with Regulatory Agencies: the 2003 PRASA IV Consent Decree, the 2006 USEPA Wastewater Consent Decree, the 2006 PRDOH Drinking Water Settlement Agreement, and the 2010 USEPA Sludge Treatment System (STS) Consent Decree. Review of PRASA's CIP showed that all of the WTP and WWTP facilities that received a low rank in terms of compliance are either currently being addressed by PRASA's operational department and/or currently have CIP projects identified to either rehabilitate or close the facility, thus addressing existing compliance problems.

The planned CIP along with the O&M initiatives are generally in alignment with the System needs. However, there may be additional R&R and CIP needs to address: 1) buried infrastructure improvements including, but not limited to, additional wastewater collection system repair improvements that PRASA may be required to implement to bring these into compliance, and 2) future regulations that may impact PRASA's System. The existing CIP includes a limited contingency to address future regulations and any other regulatory requirements that PRASA may need to comply with. The impact of these future regulations may require significant operational

and capital investments, which may not be covered by these contingencies. As the impact of future regulations becomes more defined, CIP modifications will be required to adequately accommodate resulting needs. However, as discussed and negotiated with the Regulatory Agencies, any future CIP needs will be included in the project prioritization system that considers, among other criteria, PRASA's financial capacity. Also, as published in its November 24, 2014 *Financial Capability Assessment Framework for Municipal Clean Water Act Requirements* memorandum, the USEPA has pledged its commitment to work with state and local government partners to assist local municipalities and local authorities (such as PRASA) to meet CWA obligations considering the particular financial challenges that local jurisdictions face. PRASA continues to negotiate with USEPA in order to obtain as much flexibility as possible in the schedule development for its current and future obligations; and has provided ample support information for USEPA's consideration in accordance with the USEPA's financial capability assessment guidance and framework.

In FY2014, PRASA completed the first two tasks of the Master Plan Update, which included the service area re-assessment evaluation and demands update; and the water and wastewater infrastructure needs and project scopes update. As presented in the 2013 Puerto Rico Planning Board (PRPB) population projections and the 2010 U.S. Census, and in line with recent trends, the population of Puerto Rico is projected to decline by 2030, resulting in a decrease in the island's overall water demand. As a result, the Master Plan Update estimates a substantial decline in water demand from about 556 MGD in 2013 to 427 MGD in 2030.

E.6. Insurance Program

In order to meet the requirements of the MAT as it regards to PRASA's insurance program, MPPR/ARCADIS contracted MARSH Saldaña, Inc. (MARSH) to review PRASA's current insurance coverage and determine its adequacy considering the type and value of PRASA's fixed assets. MARSH also provided a professional opinion on the appropriateness of such coverage and recommendations related to PRASA's insurance coverage. In the opinion of MARSH, the insurance program covering PRASA's exposures to risks of accidental property and liability losses arising from on-going operations provides reasonable coverage and also provided several recommendations for PRASA's consideration.

E.7. System Assets and Financial Analysis

PRASA has an estimated total book value of fixed (capital) assets of approximately $6,748M (see Table ES-4). Additionally, PRASA has approximately $649M of assets that are currently under construction or as "Work in Process". Including land and other non-depreciable assets, as of June 30, 2014, the book value of PRASA's total fixed assets amounts to $7,470M (net of accumulated depreciation).

Table ES-4:
Estimated Fixed Assets Summary through June 30, 2014 ($, Millions)

	Original Cost	Accumulated Depreciation	Book Value
Fixed Assets	$10,303	($3,555)	$6,748
Work in Process	649	-	649
Land and other Non-Depreciable Assets	73		73
Total Fixed (Capital) Assets	$11,025	($3,555)	$7,470

PRASA's Total Assets are estimated at $8,268M. Total Assets include: current assets (approximately $368M), restricted assets (approximately $395M in restricted cash and cash equivalents), total capital assets ($7,470M as previously mentioned), and other assets ($35M in deferred loss resulting from debt refunding).

In the preparation of this 2014 CER, MPPR/ARCADIS reviewed PRASA's FY2014 preliminary results, PRASA's FY2015 results through December 31, 2014, and the PRASA-prepared FY2015 through FY2019 financial forecast (the Forecast) shown in Exhibit 1 (enclosed at the end of this section). The purpose of MPPR/ARCADIS's review was to assess the adequacy of the revenues and expense categories that make up PRASA's Forecast as well as the anticipated debt service coverage (DSC) for the five fiscal years from July 1, 2013 through June 30, 2019 (the forecast period). MPPR/ARCADIS opined on the reasonableness of this Forecast and provided recommendations to PRASA. As part of its review, MPPR/ARCADIS also completed a sensitivity analysis to demonstrate the impact that a change in certain Forecast assumptions will have on PRASA's projected financial results and DSC.

The Forecast presents PRASA's estimate of the expected results of operations and DSC for the forecast period. Thus, the Forecast reflects PRASA's judgment, based upon present circumstances, as to the most likely set of conditions and course of action. However, there will usually be differences between forecasted and actual results, because events and circumstances frequently do not occur as expected, and those differences may be material.

In connection with PRASA's 2012 bond issuance, on January 24, 2012 PRASA's Governing Board authorized the execution of an amended and restated Master Agreement of Trust (2012 MAT) by and between PRASA and Banco Popular de Puerto Rico as Trustee; and an amended and restated Fiscal Oversight and Support Agreement (2012 FOA) by and between PRASA, the Commonwealth of Puerto Rico and the GDB. PRASA's Forecast has been structured considering the requirements of both the 2012 MAT and the 2012 FOA.

On February 1, 2013, in compliance with the requirements of the 2012 FOA, PRASA submitted to GDB an updated *Fiscal Improvement Plan* which presented annual deficits starting in FY2014. The GDB, in turn, informed PRASA that it would not appropriate additional funds to supplement PRASA's revenues for FY2014. As a result, and in compliance with the 2012 MAT and the 2012

FOA, PRASA moved forward with its rate revision and increase process. The process was completed on July 3rd, 2013, when PRASA's Governing Board approved the final rate structure to be implemented and that would become effective on July 15, 2013. The Governing Board-approved rate structure includes increases of PRASA's base and volume charges and it incorporates a new monthly fixed charge, the Environmental Compliance and Regulatory Charge (ECRC), which varies by customer class and by either consumption or meter size. Subsequently, on December 18, 2013 the Governing Board amended the ECRC billing structure for non-residential customers.

PRASA also included an additional $2.00 monthly Special Charge for all customers to facilitate the development of projects that focus on the sustainable management of water resources in accordance with the existing Environmental Public Policy Law (Act 416 of September 2004, as amended) and the Puerto Rico Water Resources Comprehensive Plan (2008); and both water and wastewater improvement projects in Non-PRASA[4] systems. This Special Charge generated $19M in FY2014 (adjusted to account for the rate increase implementation lag) and is expected to generate $25M in each year thereafter. PRASA has included deposit transfers into the Capital Improvement Fund starting in FY2015 equivalent to these amounts for the use in the projects previously mentioned.

PRASA's Governing Board also included rate revisions to other services provided by PRASA including, but not limited to: service re-connections and sprinkler systems service. The revised rates for these services were designed to cover PRASA's cost of services. The new rates are being implemented on a phased approach between FY2014 and FY2016.

The Operating Revenues (presented on a cash basis as required by the 2012 MAT) include Service Revenues (net of subsidies), incremental revenues from the rate increase, adjustments for uncollectible accounts, revenues from certain operational initiatives, as well as other sources of revenues such as interest income, developer fee contributions, and new revenue from PRASA's holding company fiber optic installation initiative. Operating Revenues also include transfers to and from the Rate Stabilization Account, but exclude funds from the Budgetary Reserve Fund or special assignments from the Central Government. Finally, Operating Revenues consider reduced revenues from certain government accounts as a result of Act 66-2014. FY2014 preliminary results show that PRASA's Operating Revenues were approximately $953M. PRASA's FY2015 projection for Operating Revenues is about $963M, net of a transfer to the Rate Stabilization Account of about $143M. In future years, PRASA is forecasting Operating Revenues (also net of transfers to the Rate Stabilization Account) as follows: $1,130M in FY2016, $1,169M in FY2017, $1,216M in FY2018, and $1,244M in FY2019 (includes transfers from the Rate Stabilization Account in each year of the Forecast). The projected Operating Revenues for FY2018 and FY2019 include additional revenues to be generated from a 4.5% rate adjustment to be implemented in each

[4] A Non-PRASA system is a water community-operated or wastewater system that is not connected to PRASA's system.

year, in accordance with the Governing Board's Rate Revision Resolution No. 2794 of July 3rd, 2013.

As defined in the 2012 MAT and 2012 FOA, the Budgetary Reserve Fund and other sources of revenues such as special assignments from the Central Government, combined with the Operating Revenues, make up the Authority Revenues. In FY2014, no additional transfers from/to the Budgetary Reserve Fund were included; nor are they projected for future fiscal years.

The Operating (Current) Expenses projections (presented on an accrual basis as required by the 2012 MAT), include Payroll and Benefits costs, as well as Electric Power, Chemicals, Maintenance and Repair, among others. Expenses take into consideration the conditions of PRASA's negotiations of the CBAs with its unions and the projected savings to be achieved from the enactment of Act 66-2014 and reached agreements. Other expense projections such as Chemicals, Maintenance and Repair, and Other Expenses include provisions to account for inflation over the forecast period. Finally, PRASA's Operating Expenses Forecast considers a significant reduction in Electric Power costs resulting from the preferential electricity all-in-rate approved for PRASA under Act 50 of June 2013. This preferential all-in-rate sets the cost per kilowatt-hour (kWh) at $0.22 (for the first 750 million kWh) starting in FY2014. Preliminary results for FY2014 show that PRASA's Operating Expenses, prior to Adjustments for Non-Cash Reserves (as allowed by the 2012 MAT), were approximately $710M. After the adjustments, Operating Expenses total $670M. PRASA's FY2015 projection for Operating Expenses is about $660M. In future years, PRASA is forecasting Operating Expenses as follows: $668M in FY2016, $681M in FY2017, $692M in FY2018, and $706M in FY2019. Finally, in FY2015 PRASA is also including a deposit of $90M to the Current Expense Fund to repay funds used by PRASA to partially finance its CIP.

In accordance with PRASA's Fiscal Health strategic initiative, PRASA has included deposit transfers into the Capital Improvement Fund in each year of the Forecast as follows: $25M in FY2015, $50M in FY2016 and FY2017, and $75M in FY2018 and FY2019.

Debt service payments range from $366M in FY2015 (projected) to $463M in FY2019. These include payments due on outstanding bonds and projected future bond issuances forecasted for FY2015 ($750M), FY2017 ($210M), FY2018 ($115M) and FY2019 ($110M); assuming a 10% interest rate and a 30-year amortization period.

The 2015 Series A Senior Lien Revenue Bonds (the Senior Lien Bonds) will be issued as part of a comprehensive financial plan to continue to fund PRASA's CIP. The proceeds of PRASA's projected $750,000,000 Senior Lien Bonds will be issued to provide funds which may be used by PRASA to (i) repay or refinance certain outstanding lines of credit provided by a syndicate of local commercial banking institutions and by the GDB, respectively, (ii) finance a portion of PRASA's CIP for the five fiscal year period ending June 30, 2019, (iii) pay capitalized interest on the Senior 2015 Bonds, and (iv) pay certain costs of issuance of the Senior 2015 Bonds. In connection with the 2015 Series A Senior Lien Revenue Bonds, the 2012 MAT shall be further amended and

supplemented by the Fourth Supplemental Agreement of Trust by and between PRASA and the Trustee.

Table ES-5 below, summarizes PRASA's projected DSC over the forecast period (as shown in Exhibit 1). As presented, PRASA projects to meet all DSC requirements over the forecast period. The projected DSC results have been calculated using the Rate Covenant requirements as per the 2012 MAT.

Table ES-5:
FY2014 – FY2019 Debt Service Coverage

Debt Service Level	DSC Requirement	FY2014 Preliminary Results[3]	FY2015 Projection	FY2016 Projection	FY2017 Projection	FY2018 Projection	FY2019 Projection
Senior Debt[1]	2.50	4.92	3.46	3.64	3.52	3.53	3.49
Senior Subordinated Debt[1]	2.00	4.92	3.44	3.61	3.49	3.52	3.49
Subordinated Debt [1]	1.50	4.92	3.44	3.61	3.49	3.52	3.49
All Obligations[2]	1.00	1.01	1.00	1.00	1.00	1.00	1.00

[1]DSC calculated with respect to Operating Revenues.
[2]DSC calculated with respect to Authority Revenues.
[3]Senior DSC Preliminary Results consider available balance of $43.6M in the Senior Bond Fund.

For ABT purposes, Operating Revenues are divided by the maximum annual debt service for any fiscal year. Table ES-3 summarizes PRASA's projected ABT compliance over the forecast period. The projected ABT results for the forecast period have been calculated using the requirements of the 2012 MAT (as further amended and supplemented by the Fourth Supplemental Agreement of Trust by and between PRASA and the Trustee in connection with the 2015 Series A Senior Lien Revenue Bonds), and the PRASA-provided debt service re-payment schedule. Note that actual ABT calculations will depend on the actual amount borrowed by PRASA in each of its projected bond issuances during the forecast period, including the projected 2015 Senior Lien Revenues Bonds.

Table ES-6:
FY2015 – FY2019 Projected ABT Calculation

Debt Service Level	Requirement[1]	FY2015	FY2016	FY2017	FY2018	FY2019
Senior Debt	2.5/1.5	3.11	3.64	3.52	3.53	3.49
Senior Subordinate Debt	2.0/1.5	3.08	3.61	3.49	3.52	3.49
Subordinate Debt	1.5	3.08	3.61	3.49	3.52	3.49

[1] Two tests apply to future debt. The first test is Operating Revenues divided by existing and proposed debt service (at the existing lien level); the second test is Operating Revenues divided by existing and proposed debt service (regardless of lien level) plus specified Reserve Fund deposits

PRASA is forecasting to meet all DSC requirements for each fiscal year, while also including deposits to the Rate Stabilization Account (in FY2015 and FY2016) and deposits to the Capital Improvement Fund starting in FY2015. It is MPPR/ARCADIS's opinion that PRASA's Forecast is reasonable considering recent historical performance, with the exception of the projected Adjustments for Uncollectibles in FY2018 and FY2019, and Additional Savings from Operational Initiatives over the forecast period which MPPR/ARCADIS has deemed aggressive.

MPPR/ARCADIS conducted an analysis to stress PRASA's Forecast and determine how sensitive it is to changes in these two categories. In the case that one, or a combination of these sensitivity analysis scenarios occurs, PRASA's ability to meet its Forecasted transfers to/from the Rate Stabilization Account and/or projected deposits to the Capital Improvement Fund would be negatively affected. In order to meet its DSC requirements, and its Rate Stabilization Account and Capital Improvement Fund deposits as forecasted, PRASA would have to increase the transfers from the Rate Stabilization account and/or implement larger rate increases than currently projected for FY2018 and FY2019.

Finally, MPPR/ARCADIS cautions that the following events could have material negative effects on PRASA's Forecast:

- Elimination of the approved PREPA electric energy all-in-rate, which would result in higher Electric Power costs to PRASA. Although the currently favorable market costs of crude oil could work in PRASA's favor by offsetting part of the savings that would be lost as a result of the elimination of the preferential all-in-rate, the offset amount would not be sufficient to match the savings being achieved through the preferential all-in-rate.

- Lower savings achieved than those projected as a result of the enactment of Act 66-2014.

- Higher Operating Expenses and higher CIP costs as a result of the implementation of a Value Added Tax (VAT) by the Commonwealth of Puerto Rico. Currently, the Commonwealth of Puerto Rico is evaluating the implementation of a VAT (or IVA, by its Spanish acronym) and elimination of the existing Sales Tax system as part of a general tax system reform. The legislative project has recently been presented by the Governor of Puerto Rico and is still subject to review, modifications, and final approval by the Commonwealth's legislative branches. Although the proposed bill states that the sale of goods and services to agencies and instrumentalities of the U.S. Government, its States, the District of Columbia, and the Commonwealth of Puerto Rico shall be exempt of the VAT, PRASA's Forecast could be materially affected as a result of indirect (or direct) increases in costs of goods and services. However, at this time, there is insufficient information to estimate the potential impacts that the VAT could have on PRASA's Forecast.

- Higher interest rates on future bond issuances, as a result of PRASA's credit rating and overall market risk assessment.

E.8. Conclusions

In preparation of this report and the conclusions contained herein, MPPR/ARCADIS has relied on certain assumptions and information provided by PRASA with respect to the conditions which may exist or events which may occur in the future. MPPR/ARCADIS believes the information and assumptions are reasonable, but has not independently verified information provided by PRASA

and others. To the extent that actual future conditions differ from those assumed herein or provided by others, the actual results will vary from those forecast.

In the preparation of this report, MPPR/ARCADIS has made a number of considerations and assumptions (as provided throughout this report); some of the most notable are as follows:

1. MPPR/ARCADIS has made no determination as to the validity and enforceability of any contracts, agreements, existing laws, rules, or regulations applicable to PRASA and its operations. However, for purposes of this report, MPPR/ARCADIS has assumed that all such contracts, agreements, laws, rules and regulations will be fully enforceable in accordance with their terms.
2. PRASA will continue the current policies of employing qualified and competent personnel; properly operating and maintaining the System in accordance with generally accepted industry practices; and of operating the System in a prudent and sound businesslike manner.
3. The proposed CIP reflects the general needs of the System, the CIP will be largely implemented as planned and reflected in this report, and PRASA will make modifications to the CIP investment forecast if the overall System condition is negatively affected by the lower capital investment levels projected in future years.

Set forth below are the most relevant opinions which MPPR/ARCADIS has reached regarding the review of PRASA's System, CIP and financial projections.

1. PRASA's current organization is sufficient for the operation, management and maintenance of the System. PRASA continues to invest in the training of its staff, focusing on achieving greater job understanding, productivity, and ownership. Although PRASA continues to have some staffing needs at individual facilities or departments and despite notable improvements over recent fiscal years, PRASA's overall staff levels continue to be high when compared to industry benchmarks. PRASA is in the process of adopting recommendations made in the organizational assessment completed during FY2014.

2. PRASA's Executive Management Team continues to assess administrative and operational performance, and to implement organizational and policy changes, focusing on customer service, System performance, and budget controls as stipulated in the Strategic Plan 2014-2018 which is currently under revision. The revised Strategic Plan should continue to provide the necessary guidance for PRASA to meet its management, operational, organizational development, and financial goals. Key performance indicators and metrics being measured, along with stronger management oversight are contributing to improvements and optimization of operations and overall organization.

3. The enactment of Act 66-2014 should help PRASA modify some of its O&M processes and lower O&M costs; however, expected O&M savings will be offset by lower revenues to be generated from certain government accounts.

4. In general, the condition of the facilities visited for the 2014 condition assessment, varied from those recently upgraded/rehabilitated to those requiring capital upgrades. The data indicates that 97% of the facilities inspected are in the adequate to good range, and the condition of the System has generally improved when compared to the condition assessment conducted in FY2012. Comparing the 2014 assessment results by asset category with those of the 2012 assessment, significant changes were found for WTPs, WPS, Water Storage Tanks, and WWPSs. Only one dam, Las Curías, was degraded to poor, in comparison to the previous inspection. A number of WTPs declined from good to adequate. This was mostly driven by a decrease in the compliance criteria and, more specifically, as a result of the implementation of Stage 2 D/DBPR. Regarding the WWTPs, most of the facilities that obtained a low rating/score have at least one project identified in PRASA's CIP or will be addressed by the operational region. Finally, some of the facilities which have been rehabilitated, are still experiencing compliance exceedances of one or more discharge parameters, and process control continues to be a challenge in some of the facilities.

5. PRASA recognizes that the current amount of NRW is high and is implementing sound strategic programs and initiatives to measure, manage, and reduce water losses and NRW. PRASA continues to work on and improve its leak detection and monitoring practices, and continues to aggressively address leak occurrences among other initiatives currently being implemented. PRASA is now conducting periodic water audits which are used to implement the necessary controls and develop action items to address NRW. PRASA's FY2014 ending NRW level was 58.7%, or 0.2% less than estimated at the end of FY2013. The year over year reduction (volume) in NRW was 13 MGD. PRASA's FY2014 ILI was calculated at 11, which is a two point reduction from FY2013 results. The current decreasing trend reported by PRASA for FY2012 through FY2014 demonstrates a positive change in PRASA's efforts to reduce water losses and NRW.

6. Although the number of sanitary overflows is also high compared to the industry benchmarks, PRASA has continued to improve its response time and attention/repair effectiveness in order to minimize the duration of these overflow events and their environmental impact. PRASA is implementing sanitary sewer evaluations and repair plans to reduce levels of infiltration and inflow (I/I) that must be treated in their WWTPs. PRASA has also significantly improved (reduced) its attention time to address overflow occurrences.

7. PRASA's Operational Initiatives are well developed and address critical aspects of PRASA's operation such as NRW, energy management and efficiency, and revenue stream diversification. The Revenue Optimization Program, in particular, continues to provide significant benefits to PRASA in the form of increased revenues. During FY2014, the Electric Power preferential all-in-rate went into effect; however, it remains to be seen if it will remain in place beyond FY2015. PRASA continues to implement energy management and reduction measures, and diversify its energy sources as part of its Comprehensive Energy Management Program. Finally, PRASA is diversifying its service offerings, and is working on diversifying its revenue streams, through the development of its private subsidiary, PRASA Holdings, LLC.

8. With the possible exception of buried infrastructure improvements, the planned CIP along with the O&M initiatives are in alignment with the System needs. However, as PRASA is projecting lower CIP investment levels going forward, it is important that it maintain an adequate level of R&R spend in order to continuously renovate and maintain the System. A detailed analysis of PRASA's R&R needs, budget, and uses is recommended in order to optimize PRASA's R&R capital spending.

9. PRASA's proposed CIP adequately addresses all mandated requirements of existing consent decrees and agreements with Regulatory Agencies, and considers modifications currently under re-negotiation between PRASA and Regulatory Agencies. The full impact of future regulations and other regulatory requirements on PRASA's System are not known at this time. In some cases, future regulations and additional regulatory requirements are expected to require minor process changes and in other cases major capital improvements, such as construction of new treatment processes and intensive repair programs. PRASA's existing CIP includes a limited contingency to address future regulations and any other regulatory requirements. However, as the impact of future regulations becomes more defined, CIP modifications will be required to adequately accommodate resulting needs. It is expected then, that the identified needs will be prioritized following the process discussed with and approved by the Regulatory Agencies, considering PRASA's financial capacity.

10. PRASA's Master Plan Update, which included the service area re-assessment evaluation and demands update; and the water and wastewater infrastructure needs and project scopes update estimates a substantial decline in water demand from about 556 MGD in 2013 to 427 MGD in 2030 as a result of the projected continuing decline in population and demand. As a result, certain future infrastructure expansion and new infrastructure needs that had been previously planned for future years are no longer required. However, changes in Puerto Rico's long-term population projections may affect these results.

11. The insurance program covering PRASA's exposures to risks of accidental property and liability losses arising from on-going operations provides reasonable coverage. Also, the OCIP covering PRASA's exposures to risks of accidental property and liability losses arising from construction activities provides reasonable coverage. PRASA should address the following key recommendations:

    - Re-Conduct a PML Study considering new CAT Modellings and parameters.
    - Consider creating a Fund or Reserve in order to manage the considerable deductibles, in terms of severity and frequency, current and future, contained in Insurance Programs. (Property, General Liability, D&O, EPL, OCIP).
    - Revise the Coverage Termination Date under PRASA's OCIP General Liability Program for Completed Operations, from five years to 10 years after projects' completion.
    - Complete a thorough evaluation of PRASA's current Professional Liability Programs.

- Consider adding underground storage tank coverage to the pollution liability policy.
- Consideration of Terrorism Coverage, which is excluded under all current PRASA's Insurance Programs.

12. PRASA is forecasting to meet all DSC requirements for each fiscal year, while also including deposits to the Rate Stabilization Account (in FY2015 and FY2016) and deposits to the Capital Improvement Fund starting in FY2015. PRASA's Forecast is reasonable considering recent historical performance, with the exception of the projected Adjustments for Uncollectibles in FY2018 and FY2019, and Additional Savings from Operational Initiatives over the forecast period which MPPR/ARCADIS has deemed aggressive. The sensitivity analysis conducted by MPPR/ARCADIS on these two forecast categories shows in the case that one, or a combination of these sensitivity analysis scenarios occurs, PRASA's ability to meet its Forecasted transfers to/from the Rate Stabilization Account and/or projected deposits to the Capital Improvement Fund would be negatively affected. To meet its DSC requirements and forecasted deposits as included in Exhibit 1, PRASA would have to increase the transfers from the Rate Stabilization account and/or implement larger rate increases than currently projected for FY2018 and FY2019.

13. The probability of PRASA achieving its Forecast and meeting its DSC requirements throughout the forecast period is conditioned on the following key assumptions:

    - **PRASA's ability to maintain its Service Revenues, billings, and collections in a very challenging economic environment** – Continued uncertainty and strain on the economy, and population shifts, and consumption patterns could continue to cause further declines in PRASA's billings and collections.

    - **PRASA's ability to continue to successfully implement all of its Operational Initiatives** – PRASA's Forecast includes results from select Operational Initiatives that are described throughout this report. The Forecast also includes certain revenue enhancing and cost reduction initiatives that are currently underway. MPPR/ARCADIS's conclusions regarding the Forecast assume the framework and execution of the Operational Initiatives will not materially change; any changes could significantly alter the findings contained and presented in this report. Although PRASA has made a dedicated commitment to implement the initiatives described in this report, there is a possibility that the projected results and, more specifically, the timing of those results may not be achieved.

    - **PRASA's ability to maintain the PREPA preferential all-in-rate** – Changes to the PREPA preferential all-in-rate would materially affect PRASA's Forecast. MPPR/ARCADIS's conclusions regarding the Forecast assume that the preferential all-in-rate will be maintained as currently implemented (excludes any additional potential savings that could be achieved from the second phase reduction which is unlikely to be implemented). The currently favorable market costs of crude oil could work in PRASA's

favor by offsetting part of the savings that could be lost if the preferential all-in-rate is eliminated; however, there is a possibility that the offset amount may not be sufficient to reach the savings amount being achieved through the preferential all-in-rate.

- **PRASA's ability to secure future CIP financing sources at an affordable cost** – PRASA's Forecast assumes that PRASA will be able to secure future financing from either interim sources or through bond issuances to partially finance its CIP. However, given Puerto Rico's current economic and fiscal situation there is a possibility that the projected bond issuances and, more specifically the timing of these, and/or the assumed issuance terms will not be achieved. In this case PRASA would need to implement one, or a combination of the following measures: a) reduce its CIP spending, b) increase Operating and/or Authority Revenues, or c) further decrease its Operating Expenses; in order to increase the projected deposits to the Capital Improvement Fund.

14. Finally, PRASA should closely follow the developments regarding the potential implementation of a VAT by the Commonwealth of Puerto Rico. Although the proposed bill states that the sale of goods and services to agencies and instrumentalities of the U.S. Government, its States, the District of Columbia, and the Commonwealth of Puerto Rico shall be exempt of the VAT, PRASA's Forecast could be materially affected by it as a result of an indirect increase in the costs of goods and services. It is recommended that PRASA begin analyzing the effects that the proposed 16% VAT could have on its Forecast, and include the necessary allowances in future years.

EXHIBIT 1

	PRASA FINANCIAL FORECAST PRO FORMA[a] ($, Thousands)	FY2014 PRELIMINARY RESULTS	FY2015 PROJECTION	FY2016 PROJECTION	FY2017 PROJECTION	FY2018 PROJECTION	FY2019 PROJECTION
	OPERATING REVENUES						
1.	Service Revenues (Base Fee and Service Charges, Net of Subsidies)	$1,020,055	$1,071,346	$1,065,989	$1,060,659	$1,101,739	$1,142,613
2.	Transfer from/(to) Rate Stabilization Account	(93,000)	(142,266)	26,620	67,533	72,485	54,225
3.	Operational Initiatives - Additional Billings	97,567	91,609	92,525	93,451	94,385	95,329
4.	Operational Initiatives - Collections from Prior Years	5,546	6,300	5,400	4,500	4,500	3,600
5.	Adjustment for Uncollectibles	(86,443)	(72,705)	(69,511)	(66,361)	(65,787)	(64,992)
6.	Other Income (Miscelaneous/Special Assessments/ZumFiber-PRASA Holdings)	8,814	9,000	9,000	9,000	9,000	13,000
7.	**Total Operating Revenues [Sum Lines 1-6]**	**$952,539**	**$963,285**	**$1,130,024**	**$1,168,782**	**$1,216,322**	**$1,243,775**
	OTHER REVENUES						
8.	Other Sources of Revenue						
9.	Transfer from Budgetary Reserve Fund	-	-	-	-	-	-
10.	General Fund Contributions	-	-	-	-	-	-
11.	Additional External Support/Other Measures	-	-	-	-	-	-
12.	**Total Other Sources of Revenue [Sum Lines 9-11]**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
13.	**Total Authority Revenues [Line 7 + Line 12]**	**$952,539**	**$963,285**	**$1,130,024**	**$1,168,782**	**$1,216,322**	**$1,243,775**
	OPERATING EXPENSES						
14.	Payroll and Benefits	$324,988	$329,378	$338,268	$347,263	$356,258	$365,253
15.	Electric Power	166,720	154,844	154,303	153,195	151,606	151,371
16.	Maintenance and Repair	45,841	50,224	56,731	58,433	60,186	61,991
17.	Chemicals	28,659	29,475	30,359	31,270	32,208	33,174
18.	Superaqueduct O&M Contract Fee	3,908	3,838	3,953	4,072	4,194	4,320
19.	Insurance	9,492	9,523	9,809	10,103	10,406	10,718
20.	Other Expenses	162,577	156,062	160,780	165,604	170,572	175,689
21.	Additional Savings from Operational Initiatives	-	-	(7,473)	(9,711)	(13,675)	(15,293)
22.	Act 66-2014 Expense Reductions	-	(37,000)	(43,000)	(43,000)	(43,000)	(43,000)
23.	Capitalized Operating Expenses	(32,295)	(35,514)	(35,890)	(36,579)	(37,167)	(37,955)
24.	**Total Operating Expenses [Sum Lines 14-23]**	**$709,890**	**$660,830**	**$667,841**	**$680,650**	**$691,589**	**$706,268**
25.	Adjustment for Non-Cash Reserves	(39,927)	-	-	-	-	-
26.	**Total Operating Expenses, Adjusted [Line 24 - Line 25]**	**$669,963**	**$660,830**	**$667,841**	**$680,650**	**$691,589**	**$706,268**
	DEBT SERVICE						
27.	Senior Lien Debt Service (S, SSub,Sub)	$193,611	$280,420	$312,855	$335,107	$345,459	$356,191
28.	Subordinated Debt Service (CGI & CSO)	81,275	87,034	99,328	103,024	104,274	106,316
29.	**Total Debt Service [Line 27 + Line 28]**	**$274,886**	**$367,454**	**$412,183**	**$438,131**	**$449,733**	**$462,507**
	DEPOSITS						
30.	Deposit to the Senior Bond Fund	-	-	-	-	-	-
31.	Deposit to the Senior Subordinate Bond Fund	-	-	-	-	-	-
32.	Deposit to the Subordinate Bond Fund	-	-	-	-	-	-
33.	Deposit to the Current Expense Fund	-	-	-	-	-	-
34.	Deposit to the Operating Reserve Fund	-	-	-	-	-	-
35.	Deposit to the Capital Improvement Fund	-	25,000	50,000	50,000	75,000	75,000
36.	Deposit to the Commowealth Payments Fund	-	-	-	-	-	-
37.	Deposit to the Surplus Fund	7,690	-	-	-	-	-
38.	**Total Deposits [Sum Lines 30-37]**	**$7,690**	**$25,000**	**$50,000**	**$50,000**	**$75,000**	**$75,000**
39.	Repayment from CIP to the Current Expense Fund		**($90,000)**				
40.	**Net Authority Revenues After Obligations and Deposits [Line13-Line 26-Line 29-Line 38-Line 39]**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
	DEBT SERVICE PAYMENTS DUE						
41.	Senior (S), Net of Deposits in Senior Bond Fund	$193,611 [b]	$278,599	$310,123	$332,375	$344,548	$356,191
42.	Senior Subordinated (SSUB), Net of Deposits in Senior Subordinated Bond Fund	-	1,821	2,732	2,732	911	-
43.	Subordinated (SUB), Net of Deposits in Subordinated Bond Fund	-	-	-	-	-	-
44.	Commonwealth Guranteed Indebtednes (CGI), Net of Deposits in the Commonwealth Payments Fund	81,275	85,440	90,329	94,025	95,275	97,317
45.	Commonwealth Supported Obligations (CSO), Net of Deposits in the Commonwealth Payments Fund	-	1,594	8,999	8,999	8,999	8,999
46.	**Total Debt Service, Net of Existing Deposits [Sum Lines 40-44]**	**$274,886**	**$367,454**	**$412,183**	**$438,131**	**$449,733**	**$462,507**

[a] *Numbers may not add up due to rounding.*

[b] *Debt Service Amount reduced by available balance of $43.6M in the Senior Bond Fund.*

EXHIBIT 1

	PRASA FINANCIAL FORECAST PRO FORMA DEBT SERVICE COVERAGE[a] ($, Thousands)	FY2014 PRELIMINARY RESULTS	FY2015 PROJECTION	FY2016 PROJECTION	FY2017 PROJECTION	FY2018 PROJECTION	FY2019 PROJECTION
1.	Operating Revenues (Net of Transfers to Rate Stabilization Account)	$952,539	$963,285	$1,130,024	$1,168,782	$1,216,322	$1,243,775
2.	Other Sources of Revenue	-	-	-	-	-	-
3.	Authority Revenues [Line 1 + Line 2][b]	$952,539	$963,285	$1,130,024	$1,168,782	$1,216,322	$1,243,775
4.	Senior Debt						
5.	Annual Debt Service	$193,611 [b]	$278,599	$310,123	$332,375	$344,548	$356,191
6.	**DS Coverage Required = 2.50**	**4.92**	**3.46**	**3.64**	**3.52**	**3.53**	**3.49**
7.	Senior & Senior Subordinated Debt						
8.	Annual Debt Service	$193,611 [b]	$280,420	$312,855	$335,107	$345,459	$356,191
9.	**DS Coverage Required = 2.00**	**4.92**	**3.44**	**3.61**	**3.49**	**3.52**	**3.49**
10.	Senior, Subordinated Subordinated & Subordinated Debt						
11.	Annual Debt Service	$193,611 [b]	$280,420	$312,855	$335,107	$345,459	$356,191
12.	**DS Coverage Required = 1.50**	**4.92**	**3.44**	**3.61**	**3.49**	**3.52**	**3.49**
13.	Operating Expenses	$669,963	$660,830	$667,841	$680,650	$691,589	$706,268
14.	Total Subordinated Debt	81,275	87,034	99,328	103,024	104,274	106,316
15.	Repayment from CIP to the Current Expense Fund		(90,000)				
16.	Total Deposits to Capital Improvement Fund	-	25,000	50,000	50,000	75,000	75,000
17.	**Authority Revenues / All Obligations DS Coverage Required = 1.00**	**1.01**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**

[a] *Numbers may not add up due to rounding.*

[b] *Debt Service Amount reduced by available balance of $43.6M in the Senior Bond Fund.*

1. Introduction

1.1. Introduction

Since 2008, MP Engineers of Puerto Rico, PSC an affiliate of ARCADIS U.S., Inc. (MPPR/ARCADIS), has been retained by the Puerto Rico Aqueduct and Sewer Authority (PRASA) as its Consulting Engineer to assist in satisfying several requirements of its Master Agreement of Trust (MAT) with Banco Popular de Puerto Rico as Trustee. MPPR/ARCADIS understands that in March of 2008 PRASA entered into a trust agreement to enable it to issue revenue bonds and incur other indebtedness to partially finance its Capital Improvements Program (CIP) and to repay and refinance existing debt. The 2008 bond issuance totaled approximately $1,338 million (M). Also, on July of 2009 PRASA and the Government Development Bank for Puerto Rico (GDB) entered into a Fiscal Oversight and Support Agreement (FOA) that assigned responsibilities to the GDB as fiscal agent of PRASA.

In February of 2012, PRASA returned to the bond market and issued approximately $2,096M in new debt. The proceeds of this bond issuance were used to (i) fund a portion of the cost of its CIP, (ii) refinance certain lines of credits and bond anticipation notes, (iii) establish a debt service reserve fund, (iv) establish a deposit for capitalized interest, (v) fund payments for termination of a forward interest rate swap agreement, (vi) pay for expenses related to the issuance of the Senior Lien Revenue Bonds, (vii) refund the outstanding PRASA Series 1995 Bonds (Commonwealth Guaranteed), and (viii) pay for expenses related to the issuance of the Revenue Refunding Bonds.

In connection with the 2012 bond issue, on January 24, 2012 PRASA's Governing Board (the Board) authorized the execution of an amended and restated MAT (2012 MAT) by and between PRASA and Banco Popular de Puerto Rico as Trustee. The Board also authorized the execution of an amended and restated FOA (2012 FOA) by and between PRASA, the Commonwealth of Puerto Rico and the GDB. Under the 2012 FOA, GDB will continue to act as fiscal agent for PRASA. Also, PRASA must continue to comply with continuous disclosure and reporting requirements which include, but are not limited to, the development and implementation of a multi-year financial and operating plan (the *Financial Improvement Plan*) that establishes milestones for PRASA to achieve self-sufficiency through rate and cost adjustments. Furthermore, under the 2012 FOA a Budgetary Reserve Fund was created.

1.2. Consulting Engineer's Report Requirement

As required by Section 7.07 of the MAT, unless the Senior Bonds have been rated investment grade by at least two Rating Agencies for 24 consecutive months, the Consulting Engineer shall prepare a Consulting Engineer's Report (CER) to document the current condition and changes, if any, in PRASA's operation and the performance of the water and wastewater systems (the System). Also, as required in Section 3.5 of the 2012 FOA, PRASA must maintain a continuous disclosure policy

with GDB and satisfy certain reporting requirements throughout the fiscal year. Among these reporting requirements is the preparation and filing of a report prepared by the Consulting Engineer. As a result of the credit downgrades of PRASA's bonds to non-investment grade level in FY2013 and FY2014, and in compliance with the 2012 MAT and 2012 FOA, MPPR/ARCADIS has prepared this Consulting Engineer's Report for fiscal year (FY) 2014 (2014 CER). Given the elapsed time between the closing of FY2014 and the issuance of this report, the 2014 CER also includes commentaries, information, and preliminary results for the first six months of FY2015. Hence, unless otherwise indicated, MPPR/ARCADIS's opinion with respect to the technical, operational and financial condition and related matters of PRASA's System is presented for FY2014 and/or based on the information and results through December 31, 2014 where noted.

1.3. Conventions

PRASA's fiscal year begins on July 1st and ends June 30th. Throughout this 2014 CER, fiscal year is identified as "FY" followed by the calendar year in which the fiscal year ends, i.e., FY2014 is the fiscal year from July 1, 2013 through June 30, 2014.

1.4. Acronyms

A listing of acronyms or abbreviations of terms used in this report is included in the Table of Contents.

1.5. Statement of Disclosure

Recent federal legislation, including enactment of the Security and Exchange Commission (SEC) Dodd-Frank Act (Exchange Act) require disclosures and documentation between MPPR/ARCADIS, PRASA and PRASA's registered Municipal Advisor. Further, MPPR/ARCADIS is required to make disclosures stating the limitations of the work contained within the 2014 CER and its use. In accordance with the Exchange Act, the following disclosure statements are incorporated into the 2014 CER prepared by MPPR/ARCADIS.

This 2014 CER is prepared by MPPR/ARCADIS for PRASA; hereinafter referred to individually as the "Authorized Recipient."

In the performance of its services on behalf of the Authorized Recipient, MPPR/ARCADIS is (a) not recommending any action on the behalf of the Authorized Recipient to municipal financial products or the issuance of municipal securities; (b) is not acting as a municipal advisor to the Authorized Recipient and does not owe a fiduciary duty pursuant to Section 15B of the Securities Exchange Act of 1934, as amended by the Dodd-Frank Wall Street Reform and Consumer Protection Act, to Authorized Recipient with respect to the information and material prepared in connection with this scope of work; and (c) acting for its own interests. PRASA shall engage a registered municipal advisor and shall discuss any information and material prepared in connection with this scope of work with any and all internal or external registered municipal

advisors and experts that the Authorized Recipient deems appropriate before acting on this information and material.

Accordingly, MPPR/ARCADIS is not a municipal advisor registered with the SEC. PRASA acknowledges that: (a) it shall retain the services of an independent registered municipal advisor, which, during the past two years, was not associated with MPPR/ARCADIS, and that (b) MPPR/ARCADIS is required to comply with the requirements set forth in the federal Exchange Act, Municipal Advisor Rule (17 CFR 200, 240, 249), which requires that the engineering company (i) receive from the municipal entity a representation in writing that it is represented by, and will rely on the advice of, an independent registered municipal advisor; (ii) provide written disclosure to the municipal entity that MPPR/ARCADIS is not serving as a municipal advisor and, with respect to the municipal entity, is not subject to the statutory fiduciary duty applicable to municipal advisors under the federal Exchange Act, and (iii) provide a copy of such disclosure to the municipal entity's independent registered municipal advisor. MPPR/ARCADIS does not provide opinions on or advocates for using a financial product (issuing debt) or the choice of financial products employed. As such, MPPR/ARCADIS submitted its work products to PRASA and its registered municipal advisor for review and approval.

MPPR/ARCADIS devoted effort is consistent with (i) that degree of care and skill ordinarily exercised by members of the same profession currently practicing under same or similar circumstances and (ii) the time and budget available for its work in its efforts to endeavor to ensure that the data contained in the report is accurate as of the date of its preparation. This study was based on estimates, assumptions and other information developed by MPPR/ARCADIS from its independent research effort, general knowledge of the industry, and information provided by and consultations with the Authorized Recipient and the Authorized Recipient's representatives. No responsibility was assumed for inaccuracies in reporting by the Authorized Recipient, the Authorized Recipient's agents and representatives, or any third-party data source used in preparing or presenting this study. MPPR/ARCADIS assumes no duty to update the information contained in the report unless it is separately retained to do so pursuant to a written agreement signed by MPPR/ARCADIS and PRASA.

MPPR/ARCADIS's findings shall represent its professional judgment. Neither MPPR/ARCADIS nor its parent corporation, or their respective subsidiaries and affiliates, makes any warranty, expressed or implied, with respect to any information or methods disclosed in the document. Excluding PRASA, whose rights are governed by its contract with MPPR/ARCADIS, no recipient of the document shall have any claim against MPPR/ARCADIS, its parent corporation, and its and their subsidiaries and affiliates, for any liability for direct, indirect, consequential, or special loss or damage arising out of its receipt and use of this document whether arising in contract, warranty (express or implied), tort or otherwise, and irrespective of fault, negligence and strict liability.

No recipient of this document other than the Authorized Recipient may abstract, excerpt, or summarize this document without the prior written consent of MPPR/ARCADIS. Any changes made to this document, or any use of this document not specifically identified within MPPR/ARCADIS's contract with PRASA, or otherwise expressly approved in writing by MPPR/ARCADIS, shall be at the sole risk of the party making such changes or adopting such use. MPPR/ARCADIS hereby authorizes the inclusion of this document in the preliminary official statement and official statement of the Series 2015 Revenue Bonds.

MPPR/ARCADIS relied on assumptions, forecasts, data and statistics provided by PRASA, its other consultants, and published industry references. MPPR/ARCADIS reviewed the PRASA-prepared forecast over a future five-year period of time and "forward-looking statements." These statements relate to MPPR/ARCADIS's expectations, beliefs, intentions, or strategies regarding the future. These statements may be identified by the use of words like "anticipate," "believe," "estimate," "expect," "intend," "may," "plan," "project," "will," "should," "seek," and similar expressions. The forward-looking statements reflect MPPR/ARCADIS's views and assumptions with respect to future events as of the date of this study and are subject to future economic conditions and other risks and uncertainties. Actual and future results and trends could differ materially from those set forth in such statements due to various factors, including, without limitation, those that will be discussed in the CER. These factors are beyond MPPR/ARCADIS's ability to control or predict. Accordingly, MPPR/ARCADIS makes no warranty or representation that any of the projected values or results contained in this document will actually be achieved.

2. Organizational Updates and Changes

2.1. Introduction

This section describes the most recent changes within PRASA's organization and provides opinions regarding the adequacy of PRASA's organizational structure.

As shown in Figure 2-1, PRASA is organized into five operational Regions (North, South, East, West and Metro), as a result of the enactment of Act No. 92 on March 31, 2004 (Act 92-2004).

Figure 2-1: PRASA Regions

PRASA is managed by an Executive Management Team that provides the day to day management oversight and coordination for all institutional activities. It is supported by various departments in the organization including, but not limited to, finance, customer services, and information systems. Figure 2-2 provides a chart of PRASA's organization as of December 31, 2014. During FY2014, no major changes occurred in PRASA's Executive Management Team. However, PRASA reports the following major changes in its organizational structure, which became effective in the first six months of FY2015:

- Both the finance and the legal departments now report directly to the Executive President. Previously, these departments reported up to the Vice-President of Administration.
- On October 15, 2014, PRASA's Governing Board (the Board) approved the creation of the positions of Vice-President for Regional Coordination and Vice-President for Corporate and Strategic Planning (both positions were previously recognized as Directors positions), and confirmed the appointments of Francisco Martinez, P.E. and Mauricio Olaya, PhD, who were previously serving as Directors in these two positions, respectively.

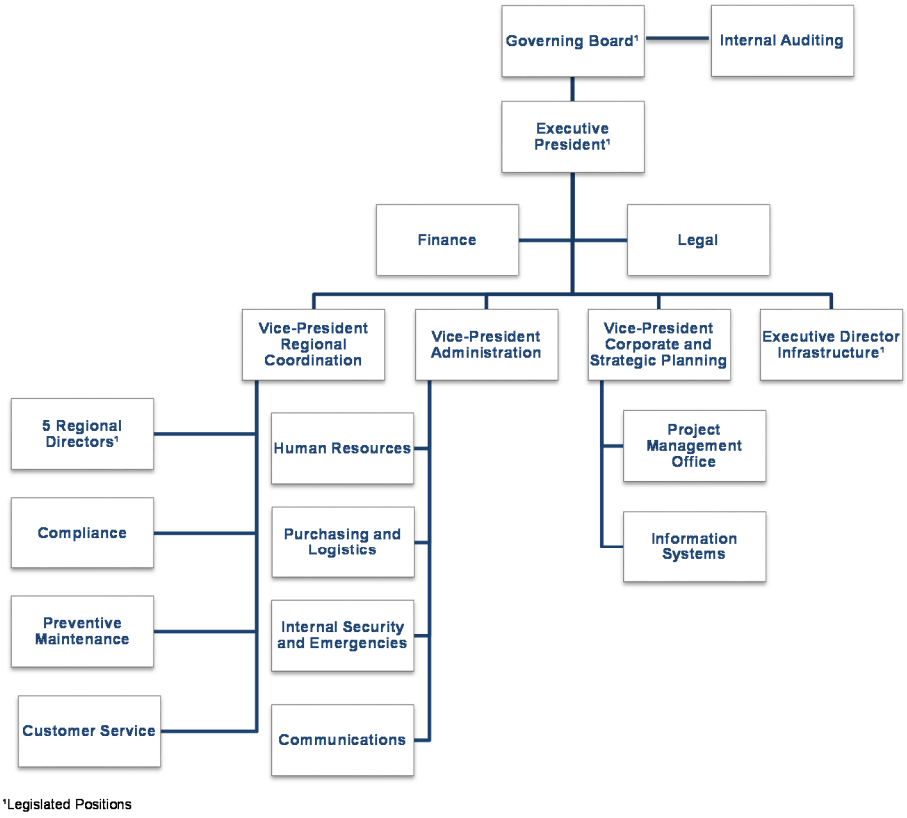

Figure 2-2: PRASA Legislated and Executive Management Structure as of December 31, 2014

PRASA continues to work to achieve the objectives set forth by its Executive Management Team. In FY2014, PRASA's Executive Management Team continued with the Strategic Plan developed in FY2013 with the defined mission of providing quality water and wastewater services at the lowest possible cost, consistent with industry standards. A detailed description of PRASA's Strategic Plan, including key performance indicators (KPIs), is included in Section 4.4.

2.2. Updates and Changes in PRASA's Organization and Management

2.2.1. Governing Board

On May 6, 2013, through the enactment of Act No. 15, PRASA's Board was re-structured as shown in Table 2-1. Although it continues to be a nine-member Board as previously enacted under the Commonwealth's Act 92-2004, the Board is now comprised of the following: two ex officio members, Secretary of the Puerto Rico Department of Transportation and Public Works and the Puerto Rico Planning Board Director; one engineer licensed to practice the engineering profession in Puerto Rico; one lawyer with at least seven years of experience authorized to practice law in Puerto Rico; one member with a wide knowledge and experience in corporate finances; the

Executive Director of the Mayors Association; the Executive Director of the Mayors Federation; and two customer (consumer) representatives.

Table 2-1:
PRASA Nine-Member Governing Board as of December 31, 2014

Name	Board Position	Position Description	Term Ends
1. Mr. Kenneth Rivera Robles, CPA	President	Independent Director/ Finance	July 3, 2017
2. Mrs. Maricarmen Ramos de Szendrey, Esq.	Vice President	Independent Director / Legal	July 3, 2017
3. Mr. Manuel Suárez Miranda, P.E.	Director	Independent Director / Engineering	July 3, 2017
4. Mr. Luis García Pelatti	Director	Governmental Director/ President of the PRPB	Ex Officio
5. Mr. Miguel Torres Díaz, P.E.	Director	Governmental Director/ Secretary of the PR-DTPW	Ex Officio
5. Mr. Pedro Crespo Claudio, Esq.	Director	Governmental Director/ Executive Director of the Association of Mayors	Ex Officio
7. Mr. Reinaldo Paniagua Látimer	Director	Governmental Director/ Executive Director of the Federation of Mayors	Ex Officio
8. Mr. Héctor Sánchez Cardona, P.E.	Director	Consumer Representative	June 19, 2020
9. Mr. Félix Aponte Ortíz, PhD	Director	Consumer Representative	June 19, 2020

With the exception of the two consumer representatives, and the Executive Directors of the Association of Mayors and the Federation of Mayors, all other members of the Board are named by the acting Governor of Puerto Rico, with the advice and consent of the Senate of the Commonwealth of Puerto Rico. The two customer representatives are elected through a public selection process under jurisdiction of and directed by the Department of Consumer Affairs of Puerto Rico (DACO, by its Spanish acronym). Finally, with the exception of the elected customer representatives who will hold their positions for six years, the designated or election terms of the other Board members will be four years or until their successors take office.

The Board is responsible for making or approving all major decisions taken PRASA, including overall institutional policies, PRASA's strategies and programs, executive and key management manpower recruitments and removals, approval of union contracts, professional services contracts beyond the limits accorded to the Executive President, and all contract changes that are beyond the limits accorded to the Executive President.

The Board is assisted by an Internal Audit Unit which is responsible for conducting internal audits for the Board, and by a Board Secretary, who maintains Board records, among other responsibilities.

2.2.2. Executive Management Team

Since the enactment of Act 92-2004, PRASA has gone through several management changes at many levels of its organization including the executive level. In general, these changes and their resulting successions and transitions have been adequately executed, and have not affected the stability of the organization or the continuity of the operations.

The only notable change in PRASA's organization as of December 31, 2014 was the designation of Eng. Roberto Martínez as the Executive Director for the Metro Region. Previously, Eng. Martínez was the Deputy Executive Director for the Metro Region. PRASA's Infrastructure Auxiliary Director for Planning was named Deputy Executive Director for the Metro Region, and a new Infrastructure Auxiliary Director for Planning was recruited from the private sector. A summary of PRASA's key Executive Management Team, including previous positions held and years of experience, is presented in Table 2-2.

Table 2-2:
PRASA's Executive Management Team as of December 31, 2014

Name	Current Role	Term Ends	Prior Role	Experience Total / PRASA
1. Eng. Alberto M. Lázaro Castro	Executive President[1]	January 2019	Executive Director for Infrastructure	18 years / 10 years
2. Eng. Francisco Martínez Castello	Executive Director of Regional Coordination	December 2017	Executive Director for East Region	25 years / 11 years
3. Ms. Ivonne Falcón Nieves	Vice-President of Administration	N/A	Treasurer	24 years / 20 years
4. Eng. Lynnette Ramírez Rivera	Executive Director for Infrastructure[1]	January 2019	Deputy Exec. Director for Infrastructure	13 years / 7 years
5. Mr. Efraín Acosta Reboyras	Executive Director of Finance	N/A	Deputy Exec. Director of Finance PRIDCO	37 years / 11 years
6. Eng. Roberto Martínez Toledo	Executive Director Metro Region[1]	December 2019	Deputy Exec. Director for Metro Region	28 years / 22 years
7. Eng. Doriel Pagán Crespo	Executive Director North Region[1]	December 2017	Deputy Exec. Director North Region	24 years / 22 years
8. Eng. Héctor Gierbolini Pérez	Executive Director South Region[1]	February 2019	Deputy Exec. Director South Region	20 years / 20 years
9. Eng. Roberto Guzmán Velázquez	Executive Director East Region[1]	December 2017	Deputy Exec. Director East Region	26 years / 26 years
10. Eng. Joel Lugo Rosa	Executive Director West Region[1]	February 2018	Deputy Exec. Director West Region	16 years / 16 years

[1]Legislated positions.

2.2.3. Staffing Profile

PRASA's existing staff is categorized into five primary categories described below:

- Appointed Employees: This category includes: the executive staff, deputy directors, area directors and administrative assistants that provide support to key management personnel of the utility.
- Management Employees: These employees manage the day-to-day operations of the utility. They hold management positions both in the central and regional offices.

- HIEPAAA Employees (Hermandad Independiente de Empleados Profesionales de la Autoridad de Acueductos y Alcantarillados): These employees are the unionized professional staff that includes accountants, engineers, insurance specialists, project inspections, and surveyors.
- UIA-AAA Employees (Unión Independiente Auténtica de la Autoridad de Acueductos y Alcantarillados): These employees are the unionized plant and system operators, maintenance and support staff, meter readers, customer service specialists, and administrative assistants.
- Temporary Employees: These employees are those that are hired and classified as temporary until formally assigned to a position. New hires are placed in a 90-day probationary period. They do not have full benefits during the probationary period. If still employed after probationary period, they either become full-time employees or remain temporary employees pending position confirmation, but mostly with the same benefits as full-time employees.

At the end of FY2014, PRASA had a total staff of 5,090, with 1,242,063 water customer accounts and 754,107 wastewater customer accounts, resulting in a ratio of about 392 customer accounts per employee (less than the 410 at end of FY2013). Current industry averages range from 407 to 907, with a median of approximately 568 customer accounts per employee[5]. Given the large number of PRASA facilities and wide geographic distribution of these across the island, PRASA's comparatively low ratio of customer accounts to employees is not surprising considering the System and the utility's size and complexity.

Towards the end FY2013 and throughout FY2014, PRASA hired an external consultant to conduct a study to identify opportunities to optimize the organization. The key goals of the study were to identify areas and departments where there are staffing needs and where there area staffing surpluses in order to balance the organization and, as such, determine PRASA's optimum staffing levels. As a result of this exercise, PRASA's Executive Management Team determined that to operate and maintain the System, and effectively manage the utility, a staff of about 4,800 employees is required. PRASA has indicated that this baseline staffing level will be achieved through a combination of the staffing control policies that have been employed, the regular annual employee attrition, and focused hiring practices. The analysis for the implementation or redistribution or reduction or personnel is currently is currently underway and is expected to be completed by December 2015.

Table 2-3 shows the staff levels by staff category over the last five fiscal years. Since FY2010, PRASA has implemented staff reduction initiatives, such as early retirement, re-training existing staff from overstaffed positions to reduce the need for new hires, and using staff attrition as a means to reduce staff levels. During FY2014, PRASA was in the process of hiring new employees to fill

[5] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, American Water Works Association (2014). Note that a customer with water and wastewater service is counted as two accounts for the purpose of this benchmark. Benchmarks reported for "all utilities" category.

certain critical operations positions that were left vacant as a result of the numerous personnel retirements that took place in FY2013 due to legislated changes to the retirement conditions. As a result, PRASA reported a 4.13% net increase of staff from FY2013 to FY2014. This net increase includes an increase of 375 temporary classified employees, three management employees, 11 appointed employees; and a reduction of 182 UIA-AAA employees and five HIEPAAA employees. As of December 2014, PRASA's staff totaled 5,013.

Table 2-3:
Staff Levels

End of FY	Appointed Employees	Management Employees	HIEPAAA Employees	UIA-AAA Employees	Temporary Employees	Total Employees
2010	161	960	171	3,391	318	5,001
2011	159	938	167	3,490	165	4,919
2012	164	917	172	2,933	890	5,076
2013	159	1,001	158	2,747	823	4,888
2014	170	1,004	153	2,565	1,198	5,090
5-year CAGR	**1.4%**	**1.1%**	**-2.7%**	**-6.7%**	**39.3%**	**0.4%**

Source: PRASA Human Resources Department

2.2.3.1. Labor Relations

In FY2012, PRASA and its larger union, the UIA-AAA, signed a new Collective Bargaining Agreement (CBA), effective from January 2012 through December 2015. It included certain retroactive and future economic agreements that have an impact on PRASA's payroll and benefits expense projections which started in FY2013. Also, PRASA and the HIEPAAA signed a new CBA effective from May 2012 through June 2016. It also contains certain economic agreements (i.e., salary increases) that have an impact on PRASA's Payroll and Benefits expenses. As a result of Act 66, described in the following section, PRASA's Executive Management and the unions negotiated some terms (i.e., salary increases and savings/retirement plan bonuses) of the CBA, due to the fiscal emergency situation declared by the Commonwealth of Puerto Rico. PRASA's management continues to maintain a positive working relationship and open communication channels with the unions.

2.2.3.2. Act 66 of 2014 – Negotiations and Final Results

The Commonwealth of Puerto Rico, through the enactment of Act 66 of June 17, 2014 – Fiscal and Operational Sustainability Act for the Commonwealth of Puerto Rico (Act 66-2014), declared a fiscal emergency situation and required that its instrumentalities (i.e., utilities, government agencies, and public corporations such as PRASA) implement certain measures to reduce its expenses. Act 66-2014 has primacy over any other law and will remain in place for three years or until certain economic and financial conditions are met. Act 66-2014 requires, among others, the following measures:

- 10% reduction in contracted services expense when compared to FY2014
- 20% reduction in appointed employees costs when compared to FY2012
- Freeze or reduction of some payroll benefits or compensation

As required under the Uniform Alternate Participative Process established in Act 66-2014, PRASA and its unions engaged in negotiations of the economic clauses of their respective CBAs which culminated with the execution of amendments which are expected to produce significant operating cost reductions. Both UIA-AAA and HIEPAAA unionized personnel agreed with PRASA that the CBAs will continue as stipulated with the exception of some terms which include: the saving plans, salary increases, holiday and sick days benefits, among others. The total annual savings that resulted from the negotiations with the UIA-AAA and HIEPAAA for FY2015 were $15M and $0.9M, respectively. A summary of the negotiated economic agreements between PRASA and its two main labor unions under Act 66-2014 are presented in Table 2-4. Additionally, the parties agreed to certain non-economic agreements which include, among others: implementation of performance metrics to evaluate performance and productivity, the incorporation of computerized handheld meter readers and use of GPS data for disciplinary actions, and flexibilization of work shifts and functions in certain areas, as well as agreeing to certain modifications to disciplinary actions and the conversion of temporary employees (expected to be approximately 300) to regular positions, but with the benefits established by law rather than under the CBAs. These agreements shall remain in effect so long as Act 66-2014 is in effect.

Table 2-4:
Negotiated Economic Agreements between PRASA and Labor Unions under Act 66

HIEPAAA	UIA-AAA
$1,000 reduction in the Christmas bonus and 50% reduction ($120) reduction in the Summer bonus.	The contribution to the savings plan was eliminated.
Elimination of four holidays, in accordance with Act 111 of July 2014.	All payments for service years (FY2013 payments) were reduced by 50%.
Salary increase agreed in the CBA was postponed to October 2014.	Reduction of five vacation days and three sick days benefits.
Liquidation of vacation days (in excess of 60 days) was eliminated.	The salary increase agreed in the CBA was modified; a salary increase of $50 per month will be awarded to all unionized personnel, on October 1, 2014.
Liquidation of sick days (in excess of 45 days) was eliminated.	Liquidation of vacation days (in excess of 30 days) as eliminated.
Meal allowance reimbursement conditions were modified.	Liquidation of sick days (in excess of 45 days) was eliminated.
Life insurance benefits were suspended	The use of subcontractors for repairs and meter replacements were eliminated; responsibilities assigned to unionized personnel. Subject to the compliance with the performance metrics.

Additional cost savings are projected to be achieved as follows: $9M from reductions to benefits of management employees, $4M in savings to be reduced from the costs of the health plan provided to employees, and $4M is to be achieved from reductions in contracted services and greater efficiencies to be achieved in operation and maintenance (O&M) practices through negotiated terms with unions previously discussed. In total, PRASA is projecting $37M in savings (during FY2015) as a result of Act 66-2014. Savings in future years will vary, depending on the projected increases that were to take place, but will not as a result of the freeze in payroll and benefits; and actual savings achieved in FY2015. These savings will help offset the revenue reduction from certain government accounts, since billings will be based on the rate structure that was in place prior to July 15, 2013 instead of the existing rate structure as a result of Act 66-2014.

2.2.3.3. Training

PRASA continues to offer varied training programs to its employees to improve work management and productivity. Training topics range from technical-oriented seminars to conflict resolution and team building sessions. In FY2014, PRASA offered over 164,280 training hours to its employees; this represents an average of approximately 32.3 hours per active employee. Overall, about 95% of the employees participated in training activities offered by PRASA. As part of PRASA's strategic initiatives, they continue to invest in personnel training to increase work ownership and productivity levels. They are in the process of implementing an Operator Training Center in the North Region, which will begin during FY2015 and is expected to be rolled out to other regions in the future. Additional information regarding PRASA's Strategic Plan is included in Section 4. Table 2-5 presents a summary of the number of operators by type of license they hold.

Table 2-5:
Operator Licensing

	In Training	Type I	Type II	Type III	Type IV	Total
Water	80	29	59	117	254	**539**
Wastewater	22	3	16	24	96	**161**
Total	**102**	**32**	**75**	**141**	**350**	**700**

2.3. Conclusions

The current organization is sufficient for the operation, management and maintenance of the System. PRASA has been able to continue with the policy and program implementation, and O&M. PRASA continues to invest in the training of its staff, focusing on achieving greater job understanding, productivity, and ownership. Although PRASA continues to have some staffing needs at individual facilities or departments and despite notable improvements over recent fiscal years, PRASA's overall staff levels continue to be high when compared to industry benchmarks. PRASA's Executive Management Team continues to assess administrative and operational performance, and to implement organizational and policy changes, focusing on customer service, System performance, and budget controls as stipulated in the Strategic Plan 2014-2018 which is

currently under revision. The enactment of Act 66-2014 will help PRASA modify some of its O&M processes through, for example, the implementation and use of metrics system to evaluate performance and productivity, and modifications to certain employee classifications; however, expected O&M savings will be offset by lower revenues to be generated from certain government accounts.

3. Condition of System

3.1. Introduction

PRASA is a public utility responsible for the production and distribution of potable water and collection, treatment, and disposal of a large portion of domestic and industrial pretreated wastewaters in Puerto Rico. PRASA serves a population of approximately 3.5 million residents[6] plus approximately 5 million visitors annually. PRASA can be considered a monopoly since it is the only water and wastewater utility in Puerto Rico, providing water and wastewater service to about 97% and 59% of Puerto Rico's population, respectively. While this is positive in terms of sales of services it also makes PRASA a critical entity for the wellbeing of Puerto Rico. The effective operation of this vital public service is essential to the health and economic prosperity of Puerto Rico and its citizens.

PRASA provides water and wastewater service throughout the island, which has an approximate area of 3,535 square miles. Due to the fact that Puerto Rico is an island with varied topography, isolated demographic distributions, and a diverse mix of users, PRASA has a somewhat fragmented and localized system of water sources, treatment systems and delivery systems. As a result, PRASA has many more treatment facilities than most utilities serving a similar number of customers. This results in a higher degree of diversity in PRASA's assets in terms of size, treatment technologies, and age when compared to systems in the United States (U.S.) and Canada, which tend to have more centralized systems with larger regional facilities. These facts add complexity to the management of the System and have historically contributed to higher O&M costs compared to other utilities serving similar populations.

Based on the data obtained from PRASA's FY2014 Accountability Report, as of June 30, 2014, PRASA owns and operates eight dams, 119 water treatment plants (WTPs), 52 wastewater treatment plant (WWTPs), 269 wells, 954 water pump stations (WPSs), 1,486 water storage tanks, 824 wastewater pump stations (WWPSs), and more than 20,000 miles of water and wastewater pipelines island-wide.

In FY2014, MPPR/ARCADIS assessed the condition of PRASA's System through an inspection program of a sample of facilities that included a selection of the major elements of the System. The purpose of these inspections, completed between March and June of 2014, was to identify the overall condition of the facilities in order to determine if they are being operated and maintained in a manner to achieve their operating goals, and to evaluate if PRASA's CIP is aligned with identified needs. MPPR/ARCADIS is conducting these facility inspections approximately every two years. As part of this effort, MPPR/ARCADIS evaluated the compliance results for all PRASA WTPs and WWTPs for the period of January 1, 2013 through December 31, 2013.

[6] Source: U.S. Census Bureau as of July 1, 2014

The next round of facility inspections will be completed in FY2016. Subsequently, as part of this report, MPPR/ARCADIS also evaluated the compliance results for PRASA's WTPs and WWTPs for the period from January 1st through December 31st of 2014.

This section presents a summary of MPPR/ARCADIS's inspection results, findings and recommendations regarding PRASA's System.

3.2. Facility Inspections

A summary of the facilities inspected during FY2014 is presented in Table 3-1. In total, 159 facility inspections were performed out of a total of 3,714. Inspected facilities include: dams, WTPs, WWTPs, WPSs, WWPSs, wells and water storage tanks. All regulated dams (100%) were inspected, due to the value of these individual assets; as well as approximately 39% and 54% of the WTP and WWTPs (percentages calculated based on the number of facilities as of June 30, 2014), respectively. The WTP and WWTP facilities inspected were selected based on three criteria: those that served a considerable amount of customers (higher risk impact/more critical), those with low compliance performance, and those that had a lower rating in previous inspections. Finally, a small portion (about 2% in total) of the wells, pump stations and storage tanks (minor facilities) were inspected considering the lower risk impact these assets have on the System. It should be noted that no inspections were performed on the following assets: small dams and weirs, buried infrastructure, meters, ocean outfalls, buildings, land, and other ancillary facilities. Nevertheless, based on data provided by PRASA, a discussion of the buried infrastructure has been included in a later section of this report.

3.2.1. Inspections Methodology

Inspections were performed throughout PRASA's five Operational Regions: East, Metro, North, South, and West. Table 3-1 shows the number of facilities inspected within each Region. It should be noted that the total number of inspections performed in the Metro Region is lower than those performed in the other Regions because it has fewer, but larger WTPs and WWTPs and no wells. Nevertheless, it was inspected in a manner consistent with the other Regions.

Table 3-1:
Summary of Inspections by Region

Asset Category	East	Metro	North	South	West	Total
Regulated Dams	3	2	1	1	1	8
Water Treatment Plants	14	5	8	8	12	47
Wastewater Treatment Plants	6	3	7	7	5	28
Wells	0	0	3	3	2	8
Water Pump Stations	5	5	4	3	4	21
Water Storage Tanks	6	6	6	6	6	30
Wastewater Pump Stations	3	4	4	3	3	17
Total	**37**	**25**	**33**	**31**	**33**	**159**

Each facility was inspected using an inspection form developed by MPPR/ARCADIS, that included scoring criteria and criteria weighting customized for each specific asset category. The evaluation criteria were chosen from the following list:

- Regulatory Compliance – degree to which the performance of the asset is in compliance with its permit limits and regulatory requirements.
- Operations / Process Control – degree to which asset condition and features allow it to be operated and controlled to meet its performance objectives.
- Equipment / Maintenance – assessment of the adequacy of the maintenance practices and the condition of the facility.
- Staffing / Training – assessment of the adequacy of facility staffing coverage and training.

Within each of the evaluation criteria, the asset inspected was assigned a numerical score between 0 and 3 in order to rate the facility as summarized below.

Rating	Range
Good (Most of the criteria are adequately addressed)	2.5 – 3.0
Adequate (Many of the criteria are adequately addressed)	1.5 – 2.4
Poor (Many of the criteria are not adequately addressed)	0.5 – 1.4
Unacceptable (Most of the criteria are not adequately addressed)	0.0 – 0.4

An overview of the results of the inspections for each asset category is discussed in the following section.

3.2.2. Inspection Results

Based on the most recent facility inspections performed between March and June of 2014, an overall condition rating for each asset category visited was determined. The condition of each of the facilities varied from new to those requiring certain capital upgrades and/or operational/process control improvements. The inspection rankings and results per facility type are summarized in this section.

3.2.2.1. Dams

All of PRASA's regulated dams, a total of eight, were inspected in FY2014. Regulated dam structures are under the jurisdiction of the Dam Safety Unit of the Puerto Rico Electric Power Authority (PREPA). PREPA administers the Dam Safety Program in association with the Department of Natural and Environmental Resources (DNER), Puerto Rico Planning Board, PRASA, and public sector appointees by the Governor. PREPA's Dam Safety Unit performed inspections from 2009-2013 of seven PRASA regulated dams creating summary reports addressing the dam structure, appurtenant works, operations and safety for each facility. MPPR/ARCADIS

utilized these reports as a baseline from which to perform independent visual inspections and evaluations of the dam structures.

Table 3-2 presents the comparison of the average rating of the facilities by each category evaluated. The overall average rating of each evaluation criteria for facilities inspected in each year are also presented. Particularly, there was a reduction on the equipment/maintenance category for this inspection. Overall, all eight dams received an adequate rating.

Table 3-2:
Dams – Comparison of Average Inspection Results for 2008-2014

Criteria	2008[1]	2009[2]	2010	2012	2014	Change 2014 vs. 2012	Change 2014 vs. 2008
Equipment/Maintenance	2.3	2.2	2.3	2.3	1.8	-0.5	-0.5
Regulatory Compliance	2.2	2.2	2.2	2.3	2.3	0.0	0.1
Operations/Process Control	2.2	2.1	2.1	2.2	2.1	-0.1	-0.1
Staffing/Training	2.1	2.1	2.3	2.3	2.4	0.1	0.3
Overall	**2.3**	**2.1**	**2.3**	**2.3**	**2.1**	**-0.2**	**-0.2**

[1] Based on seven facilities (excludes Río Blanco Dam).
[2] Río Blanco Dam, under construction at the time, was included in inspections.

One dam (Las Curías) received an unacceptable rating in the Equipment/Maintenance category and two dams received a poor rating in at least one of the four evaluation categories. These were: Cidra Dam (equipment/maintenance, regulatory compliance and operations/process controls) and Isabela Regulator Lake (equipment/maintenance). However, PRASA is currently carrying out two CIP projects, one for improvements at the Cidra Dam, and another for the partial replacement of the Isabela Regulator Lake liner. In general, one dam (Las Curías) received an overall rating of poor while the rest received an overall rating of either adequate or good. Las Curías Dam is currently not used by PRASA as a raw water supply and will not be considered for future use as its safe yield does not provide a significant contribution to the Metro Region's actual capacity and needs. Additionally, it should be noted that PRASA is in the process of including all dam gates in its Integrated Maintenance Program (IMP) in order to improve the operation and maintenance of these critical equipment.

3.2.2.2. Water Treatment Plants

Forty-seven (47) WTPs were inspected in FY2014. Each visit consisted of a site walkthrough and an interview with the operator, plant supervisor or designated personnel, and revision of available plant reports. Therefore, the information obtained was at least in part based on the understanding of the person that was being interviewed. Table 3-3 presents the comparison of the average rating results of the facilities inspected by each category evaluated. The overall average rating of each evaluation criteria for 2008 through 2014 inspections is also provided. On average, the WTPs were rated as good with a score of 2.3. This is indicative of the fact that approximately 77% of the WTPs are able to produce water that meets standards for disinfectant residual, turbidity, and disinfection byproducts (DBPs) at least most of the time. No WTP was rated as unacceptable or poor in overall.

Table 3-3:
WTPs – Comparison of Average Inspection Results for 2008-2014

Criteria	2008	2009	2010	2012	2014	Change 2014 vs. 2012	Change 2014 vs. 2008
Regulatory Compliance	2.2	2.3	2.1	2.5	2.3	-0.2	0.1
Operations/Process Control	2.2	2.5	2.6	2.7	2.2	-0.5	0.0
Equipment/Maintenance	2.1	2.3	2.3	2.3	2.4	0.1	0.3
Staffing/Training	2.2	2.6	2.4	2.9	2.7	-0.2	0.5
Overall	**2.2**	**2.4**	**2.3**	**2.6**	**2.3**	**-0.3**	**0.1**

In general, the WTPs are in good condition. However, four (9%) of the WTPs inspected were considered poor in terms of compliance, due to non-recurring exceedances of total coliforms, total trihalomethane (TTHM), and haloacetic acids (HAA). These exceedances were found to be mostly driven by the transition of facilities into Stage 2 D/DBPR. Also, almost all the facilities have recurring noncompliance events for parameters included in their National Pollutant Discharge Elimination System's (NPDES) permits. These facilities are currently being addressed either in measures identified in the 2006 Drinking Water Settlement Agreement (also referred to as the Puerto Rico Department of Health (PRDOH) Agreement), in PRASA's CIP, or by remedial actions taken by the Regions.

The facilities with the lowest overall score of the 47 WTPs inspected are summarized in Table 3-4. As shown, all five facilities received a score between 1.9 and 2.0 which puts them in the adequate range. One of these facilities, Ceiba Sur WTP, will be eliminated. The other facilities have remedial actions or projects in the CIP. Also, PRASA has reported that is conducting evaluations, water quality modeling, developing action plans, and implementing remedial actions in order to minimize non-compliance events and improve operational results at these facilities.

Table 3-4:
FY2014 WTP Lowest Rated Facilities and Observations

WTP	2014 Score	Observations	CIP Identified
Aguadilla (West Region)	1.9	The facility exceeded in the combined filter effluent (CFE) turbidity, total coliform, total organic carbon (TOC), TTHM, HAA. Also exceeded on NPDES's turbidity, copper, lead, and residual chlorine. The WTP has an adequate process control, but general safety needs to be improved. The equipment was rated as adequate; however, the plant is not well maintained. The equipment is corroded causing deterioration. Some equipment is out of service including the (Sludge Treatment System (STS).	Yes

WTP	2014 Score	Observations	CIP Identified
Ceiba Sur (East Region)	1.9	The facility exceeded several NPDES parameters including BOD, copper, lead, flow and turbidity. The facility lacks of proper support materials like the O&M manual. The process control is not adequate and the filters are not in good condition. Process control training is not provided. This facility will be eliminated with the construction of the new Valenciano WTP Phase 1	Yes
Canóvanas Nueva (Metro Region)	2.0	The facility exceeded in TOC, TTHM, HAA, and NPDES's copper, lead, zinc and BOD. Part of the wastewater from the backwash and sedimentation basins is recycled to the plant headwork. The WTP process control is performed adequately, however, the existing streaming current monitors are out of service. The superpulsator is operating as a sedimentation basin and some equipment, such as the Vac-Trac system and a filter, are out of service. Also, the filter media and underdrains need to be replaced.	Yes
Enrique Ortega-La Plata (Metro Region)	2.0	The facility exceed several parameters including TOC, THM, HAA, and for the NPDES permit exceedance were reported for flow, lead, and residual chlorine. Flocculation mixers were out of service and tube settlers were broken. Filtration media is lost when backwashing. Staff is adequate but training is required for the operators and the supervisor.	Yes
Juncos Urbano (East Region)	2.0	The facility did not comply with TTHM and TOC parameters during the evaluated period. The process control is not adequate and need instrumentation to be able to achieve a good process control. Operators require training for process control.	No / (Process Control Issue)

Finally, as stated above, the compliance period from January through December 2013 was used to score the facilities presented in Table 3-4; however, as previously stated for this CER MPPR/ARCADIS also reviewed the compliance data for the period from January through December 2014. Recent compliance results show that facilities are, in general, performing better with respect to compliance with limits of effluent discharge parameters. For example, Aguadilla WTP has improved its NPDES parameters, recording just one exceedance in THM and no exceedances in HAA during 2014. Ceiba Sur and Juncos Urbano WTPs have improved its compliance record for BOD and THM, with no exceedances reported during the period of July through December 2014; and with just one HAA exceedance reported. However, both Canóvanas Nueva WTP and Enrique Ortega WTP continue with certain challenges to meet THM, TOC, and HAA effluent parameters. Finally, it should be noted that in 2014 other facilities such as Barrio Nuevo and Miradero WTPs reported several exceedances, specifically in the Residual Chlorine parameter; and the Guayama WTP reported exceedances in THM, TOC, and HAA effluent parameters.

Future regulations may require additional capital improvements to achieve higher levels of treatment at certain facilities depending on the characteristics of the source water and the distribution system. The effects of these future regulations will not be known until PRASA performs data collection and studies to determine what, if any, additional capital improvements will

be needed to comply with these future regulations (see Sections 5.5 and 5.6 for additional discussion on renegotiations with Regulatory Agencies, future regulations and other regulatory requirements).

3.2.2.3. Wastewater Treatment Plants

Twenty-eight (28) WWTPs were inspected in FY2014. Each visit consisted of a site walkthrough and an interview with the operator, plant supervisor or designated personnel. Thus, as with the WTPs, information was at least in part based on the understanding of the individual whom was being interviewed. Table 3-5 presents the comparison of the average rating results of the facilities inspected by each category evaluated. The overall average rating of each evaluation criteria for 2008 through 2014 is also presented. Overall, WWTP facilities were rated as adequate with a score of 2.0.

Table 3-5:
WWTPs – Comparison of Average Inspection Results for 2008-2014

Criteria	2008	2009	2010	2012	2014	Change 2014 vs. 2012	Change 2014 vs. 2008
Regulatory Compliance	1.3[1]	1.5[1]	1.5[2]	1.4	1.5	0.1	0.2
Operations/Process Control	2.4	2.4	2.3	2.4	2.3	-0.1	-0.1
Equipment/Maintenance	2.2	2.2	2.4	2.2	2.3	0.1	0.1
Staffing/Training	1.8	2.0	1.8	2.3	3.0	0.7	1.2
Overall	**1.9**	**2.0**	**2.0**	**2.0**	**2.0**	**0.0**	**0.1**

[1] Two WWTPs (Playa Santa and La Parguera) that discharge to underground injection were not evaluated under this criterion because they do not have an approved NPDES Permit.
[2] One WWTP (Playa Santa) that discharges to underground injection was not evaluated under this criterion because it does not have an approved NPDES Permit.

The WWTPs generally range from poor to good condition with regulatory compliance as the category of primary concern. Compliance with NPDES effluent limits has been the greatest challenge for a number of WWTPs. Of the 28 facilities inspected, six (21%) received unacceptable rating and eight (29%) received poor rating in terms of compliance as a result of multiple reported exceedances of their interim and/or final NPDES limits. Most of the facilities rated poor or unacceptable from a compliance perspective are being addressed either in measures identified in the 2006 USEPA Consent Decree, in PRASA's CIP, or by remedial measures (including process control adjustments) being implemented by the Regions. However, most of the WWTPs which have been rehabilitated, expanded or retrofitted, are still incurring in compliance exceedances with NPDES discharge parameters. Process control continues to be a challenge in some of the facilities, even though the plant operators indicated that standard operating procedures and control strategies are followed.

In comparison with the 2012 and 2008 inspections results, the regulatory compliance, equipment/maintenance and staffing/training criteria scores increased, while the operations/process control criteria score decreased. The staffing/training criteria scores increased significantly in

comparison with 2008 and 2012 results. PRASA continues to invest in the training of its staff, focusing on achieving greater job understanding, productivity, and ownership. The overall condition of the facilities has slightly improved. The facilities with the lowest overall score of the 28 WWTPs inspected are summarized in Table 3-6. Some of these facilities have recently undergone improvements and/or rehabilitations, or may be scheduled under the 2006 USEPA Consent Decree to undergo improvements in the future.

Table 3-6:
FY2014 WWTP Lowest Rated Facilities and Observations

WWTP	2014 Score	Observations	CIP Identified
Caguas (East Region)	1.8	The facility compliance was rated as poor during the evaluated period, it incurred in several exceedances of fecal coliforms, phosphorous and residual chlorine. Process control and equipment condition resulted in a good rating. Grit removal system was under construction.	Yes
Camuy (North Region)	1.6	Compliance data reports multiple exceedances related to total nitrogen. As indicated by the supervisor, the plant never complied with the total nitrogen parameter since the last plant modification. Process modifications need to be accomplished to mitigate this problem.	No / (Process Controls Issues)
Guánica (South Region)	1.5	The facility compliance rating was unacceptable because several exceedances of total nitrogen parameter. Current treatment does not provide means to remove the nitrogen, however ongoing project to rehabilitate the BNR module, should mitigate this problem in the near future. Process control and equipment condition for the package plant was adequate.	Yes
Guayanilla (South Region)	1.9	The facility incurred in several exceedances of fecal coliforms, biochemical oxygen demand, phosphorus and residual chlorine during the evaluated period. Process control and equipment condition resulted in an adequate rating. Grit removal system is out of service.	Yes
Isabela (West Region)	1.6	The facility had exceedances in fecal coliforms, phosphorus, biochemical oxygen demand, residual chlorine, total coliforms, and ammonia. The WWTP requires a screening system to prevent the entering of plastic to the process which is causing damage on the disk filters. Some equipment is out of service, such as two communitors, one disk filter and one belt filter press.	Yes
Lajas (West Region)	1.5	The facility had exceedances in fecal coliforms, phosphorus, biochemical oxygen demand, residual chlorine, total coliforms, and ammonia. The compliance data indicates that process control needs improvements. The WWTP requires a screening system to prevent the entering of plastic to the process which is causing damage on the disk filters. Some equipment is out of service, such as two communitors, one disk filter and one belt filter press.	No / (Improvements to be addressed by Operational Region)
Ponce (South Region)	1.9	During the evaluation period the WWTP had significant problems with several parameters, specifically fecal coliforms and residual chlorine. Process control and equipment condition resulted in an adequate score; however two sludge digesters are out of service.	Yes

WWTP	2014 Score	Observations	CIP Identified
San Germán (West Region)	1.9	The facility had several exceedances of fecal coliforms and ammonia during the evaluated period. Process control and equipment condition resulted in an adequate rating; however the degritter units and a final clarifier are out of service.	No / (Improvements to be addressed by Operational Region)
Utuado (North Region)	1.9	The facility compliance rating was unacceptable because of multiple exceedances of fecal coliforms during the evaluated period because of problems with the ultraviolet (UV) system; however, this operational problem was resolved. Process control and equipment condition resulted in a good rating.	No / (Improvements to be addressed by Operational Region)
Vega Alta (North Region)	1.2	The facility incurred in flow, nitrates plus nitrites, total suspended solids and fecal coliforms exceedances. One of the package units is out of service, and the unit in service is operating overloaded. The process control manual was outdated. The existing emergency generator unit was out of service because of broken radiator. PRASA rented a portable unit temporarily. The facility currently has a capital improvement project. The existing contact stabilization package plant is under rehabilitation, which includes structural repairs and clarifier upgrade. The gravity sludge drying beds are not being used since they are using a rented centrifuge.	Yes
Vega Baja (North Region)	1.4	The facility had several exceedances of fecal and total coliforms, residual chlorine and phosphorous. There were isolated exceedances of biochemical oxygen demand, ammonia and total suspended solids which cause was uncertain. Most of the equipment is in good operating condition. The most critical aspect that requires attention is the disinfection. The tertiary filtration units and UV system have being bypassed for the last few months due to a problem in the UV system. The alternate disinfection, which is chlorine gas, is not in good condition. Minor operating aspects such as controlling the sludge return of the package plant, which is not measured, should be corrected as well.	No / (Process Controls Issues)
Yabucoa (East Region)	1.6	The facility incurred in several exceedances of flow, fecal coliforms and residual chlorine during the evaluated period. The conventional treatment plant modules are out of service causing all the hydraulic loads to be handled by the package plant, consequently operating above its design capacity.	Yes
Yauco (South Region)	1.8	The facility incurred in several exceedances of biochemical oxygen demand and total nitrogen during the evaluated period. Process control does not seem adequate since the WWTP is new and good sampling is performed. Compliance data indicates that process control needs improvement.	No / (Process Controls Issues)

Finally, as stated above, the compliance period from January 2013 through December 2013 was used to score the facilities presented in Table 3-6; however, as previously stated the compliance data results for January through December 2014 were also reviewed by MPPR/ARCADIS in the preparation of this CER. More recent compliance results show that facilities are performing better with respect to compliance with limits of effluent discharge parameters. For example, through December 2014 Vega Baja WWTP has no recorded phosphorus exceedances, a parameter that had

multiple exceedances in 2013. Similarly, the monthly BOD concentrations improved at the Yauco, Guayanilla, and Isabela WWTPs. Yabucoa, Utuado, Vega Alta, Ponce, and San Germán WWTPs also showed significant improvements in meeting compliance metrics.

3.2.2.4. Wells

PRASA has reported that it owns and operates 269 water wells, most of which deliver water directly into a distribution system with little or no treatment, except chlorination. PRASA's wells vary in size from 100 to 1,200 gallons per minute (gpm). A total of eight wells were inspected in FY2014. Each visit consisted of a site walkthrough and an interview with the designated personnel and the results of the assessment of those wells are described below. The inspection results for previous years were compared to the inspection results from the FY2014 inspection to analyze condition changes. Table 3-7 illustrates the comparison of the average rating for 2008 through 2014 of all facilities using the overall rating since the equipment evaluation was merged with the operations/process control criterion. This merged criterion was performed using the same deductions and weighted score than previous asset condition assessment reports thus the impact on the overall score was not altered. Of the eight wells inspected in 2014, adequate ratings were given to five facilities (63%); whereas the remaining three facilities received a rating of good. Overall, wells were rated as adequate with a score of 2.2.

Table 3-7:
Wells – Comparison of Average Inspection Results for 2008-2014

Criteria	2008	2009	2010	2012	2014	Change 2014 vs. 2012	Change 2014 vs. 2008
Overall	2.0	1.9	2.1	2.2	2.2	0.1	0.2

As shown in Table 3-7, all categories evaluated yielded results in the adequate range. The deficiencies noted were minimal and were due in part to deterioration in equipment conditions. Although all the wells were generally observed to be in adequate or good condition, there were a number of factors that resulted in some wells being rated lower. The wells rated adequate and near the poor category generally had several of the following conditions listed below:

- Lack of remote monitoring
- Inadequately labeled control panel
- No emergency generator unit
- Pressure regulator valve
- Overall appearance not satisfactory, such as overgrown vegetation, flooding, floating debris, and painting
- Inadequate security or fence

The sample of wells that were inspected is generally in adequate condition; these wells are expected to continue to serve their intended function of supplemental water supply. Most of the deficiencies

noted can be addressed through PRASA's Renewal & Replacement (R&R) program and may not require major capital improvements. However, future regulatory requirements may require either the implementation of significant capital improvements to include and achieve additional treatment capabilities at well facilities, or the closure of certain wells. Results of the Groundwater Under the Direct Influence of Surface Water (GWUDI) evaluations currently being conducted by PRASA should prove beneficial to identify additional needs in these facilities.

3.2.2.5. Water Pump Stations

PRASA has reported that it owns and operates 954 WPSs. WPSs consist of two major categories: 1) above ground pumps and 2) below ground pumps in vaults with heavy covers that cannot be readily removed by field inspectors (underground booster stations) – not inspected. PRASA's WPSs vary in pumping capability from less than 100 gpm to over 9,000 gpm. A total of 21 above ground WPSs (2% of total WPSs) were inspected on FY2014. Each visit consisted of a site walkthrough and an interview with the designated personnel. The results of the assessments of those stations are described below. For FY2014 inspections the facilities were evaluated using modified criteria: facility specific criteria and regional specific criteria. The reason for this change was to have a better understanding about the facility's conditions, and obtain an overview of the maintenance and staffing practices of the region/operational area. One criteria considers operations, process control and equipment aspects which are related (limited to) a specific facility. The other criteria considers maintenance aspects which are carried out either on a regional or operational area basis and, also, the staffing and training aspects. Staffing and training was included to evaluate the adequacy of PRASA's assigned monitoring and operations personnel.

The operations/process control/equipment criterion was assigned a weighting factor of 75%, while the maintenance/staffing criterion was assigned a weighting factor of 25%. Given the changes in the composition of each of these two evaluation categories and in order to normalize inspection results with those of previous inspections, individual deductions in the inspection form were also modified.

The inspection results for previous years were compared to the inspection results from FY2014 inspection to analyze performance changes since the previous inspections. Table 3-8 illustrates the comparison of the average rating of all facilities by each category evaluated. The overall average rating of each evaluation criteria for 2008 through 2014 is also presented. The average WPSs overall rating for 2014 resulted in the adequate range with an overall rating of 2.2.

Table 3-8:
WPSs – Comparison of Average Inspection Results for 2008-2014

Criteria	2008	2009	2010	2012	2014	Change 2014 vs. 2012	Change 2014 vs. 2008
Overall	2.2	2.2	2.3	2.4	2.2	-0.2	0.0

As shown in Table 3-8, the overall rating was lower compared to the 2012 results, but remained unchanged compared to the 2008 results. Although the majority of the WPSs were generally

observed to be in adequate or good condition, there were a number of factors that resulted in some WPSs being rated lower. The WPSs with lower ratings generally had several of the following conditions:

- Equipment not in full service
- Lack of pressure gages on pump suction and discharge
- Lack of pressure relief system
- Visible leaks
- Lack of posting emergency numbers in the facility
- Inadequate lighting
- Lack of flow meter
- Lack of remote monitoring
- Lack of lifting crane and/or hoist
- Lack of back-up power generator

The WPSs are generally in adequate to good condition and are expected to continue to serve their intended function of delivering drinking water throughout the distribution systems. The deficiencies noted are related to lack of features to optimize operation and maintenance practices, and condition of equipment of facilities. Other noted deficiencies, such as leaks and overgrown vegetation can be addressed through routine maintenance or PRASA's R&R program and do not require major capital improvements.

3.2.2.6. Wastewater Pump Stations

PRASA has reported that it owns and operates 824 WWPs, these vary in pumping capability from less than 100 gpm to over 10,000 gpm depending on the population density and its proximity to the WWTP. A total of 17 WWPSs (2% of total WWPSs) were inspected in FY2014. Each visit consisted of a site walkthrough and an interview with the designated personnel. In general, the inspected facilities predominantly use wet pit type submersible pumps, although several dry pit type stations were also inspected. The results of the assessments of those stations are described below. For FY2014 evaluations, the facilities were evaluated using modified criteria: facility specific criteria and regional specific criteria. The reason for this change was to have a better understanding about the facility's conditions, and obtain an overview of the maintenance and staffing practices of the region/operational area. One criteria considers operations, process control and equipment aspects which are related (limited to) a specific facility. The other criteria considers maintenance aspects which are carried out either on a regional or operational area basis and, also, the staffing and training aspects. Staffing and training was included to evaluate the adequacy of PRASA's assigned monitoring and operations personnel.

The operations/process control/equipment criterion was assigned a weighting factor of 75%, while the maintenance/staffing criterion was assigned a weighting factor of 25%. Given the changes in

the composition of each of these two evaluation categories and in order to normalize inspection results with those of previous inspections, individual deductions in the inspection form were also modified.

The inspection results for previous years were compared to the inspection results from FY2014 to analyze performance changes since the previous inspections. Table 3-9 presents the comparison of the average rating of all facilities by each category evaluated. The overall average rating of each evaluation criteria for 2008 through 2014 is also presented. The average WWPSs rating for 2014 resulted in the adequate range with an overall rating of 2.3.

Table 3-9:
WWPSs – Comparison of Average Inspection Results for 2008-2014

Criteria	2008	2009	2010	2012	2014	Change 2014 vs. 2012	Change 2014 vs. 2008
Overall	1.7	2.0	2.0	2.1	2.3	0.2	0.6

The overall condition of WWPSs slightly improved since the 2012 inspections but significantly improved when compared to the 2008 results.

The WWPSs with lower ratings generally had several of the conditions listed below:

- One or more major pieces of equipment are out of service
- Generator is not working/not present
- Lack of telemetry (level, power, etc.)
- No process pump protection (e.g., bar screen or communitor)
- Records of bypasses or overflows at the pump station
- Lack of exterior alarm
- Overall appearance is not satisfactory, such as overgrown vegetation
- Interior/exterior lighting is not adequate
- Bar screen requires cleaning
- Wet well fan is not working or not present
- Floating debris in the wet pit
- Staffing was not adequate

In general, the WWPSs are in adequate condition. The overall improvement observed in the WWPSs could be a result of PRASA's efforts under its Integrated Maintenance Program. Although facilities in overall were found to be adequate, issues such as equipment out of service, security concerns, and general maintenance were still observed. Also, some facilities still lack adequate

alarm systems and/or telemetry systems, and staffing. Having remote monitoring will help PRASA preventing overflows in the System.

3.2.2.7. Water Storage Tanks

PRASA has reported that it owns and operates 1,486 water storage tanks that vary in storage capacity (size) from 100 to 10,000,000 gallons. A total of 30 water storage tanks (2% of total tanks) were inspected in FY2014. Each visit consisted of a site walkthrough and an interview with the designated personnel. The results of the assessments of those stations are described below. For FY2014 evaluations, the facilities were evaluated using modified criteria: facility specific criteria and regional specific criteria. The reason for this change was to have a better understanding about the facility's conditions, and obtain an overview of the maintenance and staffing practices of the region/operational area. One criteria considers operations, process control and equipment aspects which are related (limited to) a specific facility. The other criteria considers maintenance aspects which are carried out either on a regional or operational area basis and, also, the staffing and training aspects. Staffing and training was included to evaluate the adequacy of PRASA's assigned monitoring and operations personnel.

The operations/process control/equipment criterion was assigned a weighting factor of 75%, while the maintenance/staffing criterion was assigned a weighting factor of 25%. Given the changes in the composition of each of these two evaluation categories and in order to normalize inspection results with those of previous inspections, individual deductions in the inspection form were also modified.

The inspection results for previous years were compared to the inspection results from FY2014 inspection to analyze performance changes since the previous inspections. Table 3-10 illustrates the comparison of the average rating of all facilities by each category evaluated. The overall average rating of each evaluation criteria for 2008 through 2014 is also presented.

Table 3-10:
Tanks – Comparison of Average Inspection Results for 2008-2014

Criteria	2008	2009	2010	2012	2014	Change 2014 vs. 2012	Change 2014 vs. 2008
Overall	1.9	1.6	1.6	1.9	2.4	0.5	0.5

On average, overall ratings significantly improved from the 2012 inspections and the 2008 inspections. Although the majority of the tanks were generally observed to be in adequate or good condition, there were a number of factors that resulted in some tanks being rated lower. The tanks rated poor generally had several of the following conditions:

- Lack of locks on tank access hatches
- Lack of routine internal inspections of tank
- Lack of adequate security lighting

- Lack of adequately screened vents
- Area around tank not readily accessible (typically due to overgrowth of vegetation)
- Unacceptable overall appearance, such as overgrown vegetation and debris

The water storage tanks are generally in adequate condition and are expected to continue to serve their intended function of providing potable water storage throughout the distribution systems. Some of the noted deficiencies are related to missing equipment and overall maintenance condition of the tanks, which are not critical to basic function of the tanks. However, there were a few deficiencies that should be addressed to ensure the tanks provide a safe, reliable source of stored potable water and to minimize treated water losses (i.e., local alarms and remote tank monitoring of tank levels). These deficiencies do not require significant capital upgrades, but rather a modification to operation and maintenance practices (e.g. removal of overgrown vegetation and periodic tank internal inspections) or can be addressed through PRASA's R&R program (e.g. repairs to tank hatches, vents, level alarms, and security fences). In addition, remote monitoring is recommended as an optimization measure and as a preventative measure against water losses in the distribution system; however, PRASA already begun with this initiative, providing remote monitoring to those tanks which are the most significant in the distribution system.

3.3. Buried Infrastructure

The following sections provide some discussion regarding indirect indicators of the condition of buried infrastructure and the steps PRASA is taking to improve them. Historically, PRASA had not kept a reliable database of its buried infrastructure. Nevertheless, since FY2005 PRASA has invested in and continues to develop and update its Geographical Information System (GIS) database to allow for a better control, record and management of its buried assets. Also, PRASA continues with its buried infrastructure R&R program, mainly managed and implemented by the Regions. Pipe R&R, which targets pipe break and leak-prone areas, are identified by PRASA's Operational Areas and prioritized according to severity of the problem. Meter replacements are programmed and managed through PRASA's Non-Revenue Water (NRW) Reduction Program.

3.3.1. Water Meters

PRASA owns over 1.4 million water meters ranging from 5/8 to 12 inches in diameter. PRASA has continued its meter replacement initiative under the Revenue Optimization Program. As reported by PRASA, about 634,000 small meters (1-inch in diameter or less) have been replaced between FY2010-FY2014. Also, during this period PRASA replaced approximately 3,900 large meters (greater than 1-inch in diameter). PRASA's meter replacement program has had significant positive results in PRASA's metering accuracy as well as in its billings. PRASA plans to continue renovating this infrastructure as meters continue to age and wear out.

3.3.2. Water Distribution System

Based on PRASA's Accountability Report of FY2014, PRASA owns over 14,753 miles of water pipelines, which include both transmission and distribution pipes with sizes ranging from two

inches to 72 inches in diameter. As in previous years MPPR/ARCADIS did not inspect the water transmission and distribution system. However, it is reasonable to assume that a portion of the water distribution system will require some structural repairs, as well as rehabilitation to reduce leakage.

3.3.2.1. Non-Revenue Water

NRW is water that has been produced but is not billed to customers. However, not all NRW is due to water losses. As shown in the water balance summary presented in Figure 3-1, NRW has three main components: unbilled authorized consumption, commercial (apparent) losses and physical (real) losses. Combined, commercial and physical losses make up the System's water losses. Unbilled authorized consumption is in turn composed of unbilled metered and unbilled unmetered consumption which includes water used by PRASA for operational and internal purposes and water used for firefighting. Examples include: potable water service provided to PRASA's facilities, water used for washing and cleaning PRASA's tanks and sanitary pipelines, tanker trucks for communities with deficient water service, firefighter's usage, etc.

<table>
<tr><td rowspan="10">System Input Volume (Dispatched Water)</td><td rowspan="5">Authorized Consumption</td><td rowspan="2">Billed Authorized Consumption</td><td>Billed Metered Consumption</td><td rowspan="2">Revenue Water</td></tr>
<tr><td>Billed Unmetered Consumption</td></tr>
<tr><td rowspan="3">Unbilled Authorized Consumption</td><td>Unbilled Metered Consumption</td><td rowspan="8">Non-Revenue Water</td></tr>
<tr><td>Unbilled Unmetered Consumption</td></tr>
<tr><td rowspan="5">Water Losses</td><td rowspan="3">Commercial Losses

(Apparent Losses)</td><td>Unauthorized Consumption (theft)</td></tr>
<tr><td>Customer Metering Inaccuracies</td></tr>
<tr><td>Data Handling (Billing) Errors</td></tr>
<tr><td rowspan="3">Physical Losses

(Real Losses)</td><td>Main Line Leakage</td></tr>
<tr><td>Storage Tank Overflows</td></tr>
<tr><td>Service Connection Leakage</td></tr>
</table>

Source: American Water Works Association and International Water Association

Figure 3-1: Water Balance Summary

Table 3-11 provides a summary of key water distribution system metrics for FY2014, including current levels of water production, water losses, and NRW, as reported by PRASA.

Table 3-11:
Water Losses and Non-Revenue Water

Fiscal Year	Total Water Production (MGD)[1]	Water Losses		Non-Revenue Water	
		(MGD)	(%)	(MGD)	(%)
FY2012	629	370	58.9%	387	61.5%
FY2013	617	354	57.4%	363	58.9%
FY2014	598	343	57.3%	351	58.7%
Difference FY2013-2014	-19	-11	-0.1%	-12	-0.2%
Cumulative Difference FY2012--2014	-31	-27	-1.6%	-36	-2.8%

[1]Includes a metering-error adjustment identified by PRASA in its water balance audits: about 14 MGD adjustment for FY2014 and 18 MGD adjustment for FY2013; FY2012 data was also adjusted by FY2013's amount.

PRASA's average NRW percentage for the past 10 fiscal years has been about 61%, with a record high recorded in FY2011 of 64.5%. However, since FY2012, PRASA's NRW levels have been consistently declining. In FY2014, of the total 598 MGD produced, approximately 351 MGD was NRW (58.7%). Of this amount of NRW, 343 MGD (57.3%) was due to water losses (both apparent and real) and 8 MGD (1.4%) was due to unbilled authorized consumption. Of the total amount of water losses in FY2014, approximately 56 MGD (16.3%) was due to apparent (commercial) losses, while approximately 287 MGD (83.7%) was due to real (physical) losses. As shown in Table 3-11, the percentage amount of water losses and NRW in FY2014 slightly reduced by about 0.1% and 0.2%, respectively, compared to FY2013 results; and by about 1.6% and 2.8%, respectively when compared to FY2012. However, as also shown in Table 3-11, from FY2012 to FY2014, PRASA reports to have reduced the amount (volume) of water produced (31 MGD reduction), amount of water losses (27 MGD reduction), and NRW (36 MGD reduction). PRASA attributes these reductions to the following main contributing factors: greater understanding and improvement of management practices regarding NRW and water losses, water system optimization measures, and corrections made in water production and data collection practices.

Based on the 2014 AWWA[7] benchmarking report, water losses (apparent plus physical losses) for utilities with combined (water and wastewater) operations range from 5.7% to 26.7% (median of 12.4%). Also in 2014, AWWA validated water audits for 26 utilities that use the same water audit methodology employed by PRASA[8]. Results show that NRW (expressed as a percentage of total water supplied) ranged from 5.8% up to 44%. Although methodologies for calculating NRW may differ between utilities, jurisdictions, and countries, which make it difficult to assess the reasonability of the comparisons; PRASA's level of NRW is still higher than the values previously presented.

[7] Sources: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, published by the AWWA (2014)
[8] http://www.awwa.org/resources-tools/water-knowledge/water-loss-control.aspx

Nonetheless, PRASA's NRW levels are comparable to those of developing and some emerging countries. For example, the Asian Development Bank mentions a study performed by the South East Asian Water Utilities Network analyzing NRW levels of 47 water utilities across Indonesia, Malaysia, Thailand, the Philippines, and Vietnam, which concluded that the levels of NRW average 30% of the water produced, with wide variations among individual utilities ranging from 4% to 65%[9]. For comparison purposes, the following are some additional NRW estimates published by The International Benchmarking Networks for Water and Sanitation Utilities (the number in parenthesis refers to the year results were reported in)[10]:

- Johannesburg, South Africa – 41% (2009)
- Guayaquil, Ecuador – 63% (2009)
- Quito, Ecuador – 31% (2010)
- Karachi, Pakistan – 30% (2010)
- Bogotá, Colombia – 51% (2010)
- Río de Janeiro, Brazil – 52% (2011)
- Sao Paulo, Brazil – 32% (2011)
- Montevideo, Uruguay – 49% (2011)
- Khulna, Bangladesh – 26% (2013)
- Lima, Peru – 37% (2008)

Also, since FY2012, PRASA began measuring the Infrastructure Leakage Index (ILI) which is an indicator that is used to measure the level of physical losses in the water distribution system. More specifically, the ILI is defined as the current annual real losses divided by the unavoidable annual real losses. The unavoidable annual real losses represents the lowest technically achievable annual real losses for a well-maintained, well-managed system and is the likely lower bound on water losses. As a performance indicator, the ILI represents a measure of the combined performance of three infrastructure management methods for real losses: the speed and quality of repairs, active leakage control, and assets management. Factors that affect the ILI include the pipe age and material, customer density, and system pressure. The ILI was introduced in 2000[11] and is also defined and calculated in AWWA's M36 Water Audits and Loss Controls manual. The ILI has been adopted around the world, although it is mostly used in Europe. An ILI between 1 and 3 is considered excellent. U.S. utilities currently measuring the ILI for their systems reported values ranging from 0.7 to 11.2. Globally, systems in developed countries report lower values of 5; while in developing countries values range from 10 up to about 50. In FY2012, PRASA reported an ILI of about 18. However, since then, PRASA's ILI has reduced by about 40%: reported values for FY2013 and FY2014 were about 13 and 11, respectively. PRASA has indicated that these reductions have been achieved through the implementation of the following measures:

- Improvements in data management and quality (better production measurement).
- Reduction in events and duration of water storage tank overflows.
- Reduction in the time to repair leaks.

[9] Source: Nonrevenue Water: A Governance Challenge, published by the ADB (2006)
[10] Source: https://www.ib-net.org/
[11] Source: Alegre, H. Hirner, W., Bapista, J., and Parena, R. (2000). "Performance indicators for water supply services" IWA Manual of Best Practices

- Leak detection with specialized equipment.
- Pressure management in the distribution system.

PRASA recognizes that reducing its NRW and water losses volume and, in turn, its water production, will have positive effects on not only its operations, but also on its financial results (lower O&M expenses and higher revenues, for example), and on its sustainability practices. Therefore, in addition to the measures previously mentioned, PRASA continues to implement a series of initiatives such as residential and commercial meters replacement, optimization and remote monitoring of the distribution systems, installation of flow meters integrated to PRASA's SCADA to adequately measure daily production, etc., in order to address the primary contributors of these water losses. These initiatives are discussed in detail in Section 4 of this report. Also, PRASA has established a fully dedicated NRW monitoring and management team.

3.3.2.2. Leak Monitoring and Control

As shown in Table 3-12, in FY2014 PRASA indicates that a total of 54,154 leaks were reported. Table 3-12 also shows the average annual leaks occurrence per 100 miles of water piping. The total annual reported leaks have increased approximately 6% over the past two fiscal years. This increase could be due to an increase in the actual number of leak occurrences, to an increase in the number of people reporting leaks (as a result of PRASA's communication initiatives and increased social media presence), or a combination of the two. Another factor that could be contributing to the higher number of reported leaks during FY2014 is the findings of the island-wide leak detection survey. However, MPPR/ARCADIS has not made an independent evaluation to identify the root causes of this increase. Nevertheless, PRASA's reported rate of leak occurrence continues to be very high compared to other utilities in the U.S. and Canada (average annual leak and breaks per 100 miles are between 12 and 86[12]). Although this high rate is not surprising, given the size, complexity, and significant changes in elevations of the System, this high rate of occurrence contributes to PRASA's NRW. Aging infrastructure is another contributing factor to the high rate of leaks.

Table 3-12:
Reported Leaks from FY2010 to FY2014

Fiscal Year	Total Annual Reported Leaks	Annual Leaks per 100 miles Using 14,031 miles of Water Pipeline
2010	55,897	398
2011	52,817	376
2012	42,868	306
2013	47,032	335
2014	54,154	386

Source: PRASA Systems, Applications, and Products in Data Processing (SAP) (Commercial) Database

[12] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, published by the AWWA (2014).

The average weekly reported and repaired leaks per fiscal year, as well as the percentage of repaired leaks with respect to the number of leaks reported in each fiscal year are shown in Figure 3-2. For FY2014, PRASA reports an average of approximately 1,022 leaks per week. Comparing the weekly reported leaks in each fiscal year, it can be observed that the reported leaks decreased from FY2010 to FY2012. However, the past two fiscal years, the weekly reported leaks have increased approximately 7%. PRASA also increased the percent of repaired leaks by about 7% in FY2014 compared to FY2013 results. As shown in Figure 3-2, PRASA has continued to improve its leak repair metrics, achieving an all-time high of about 1,004 leaks repaired per week, on average, during FY2014.

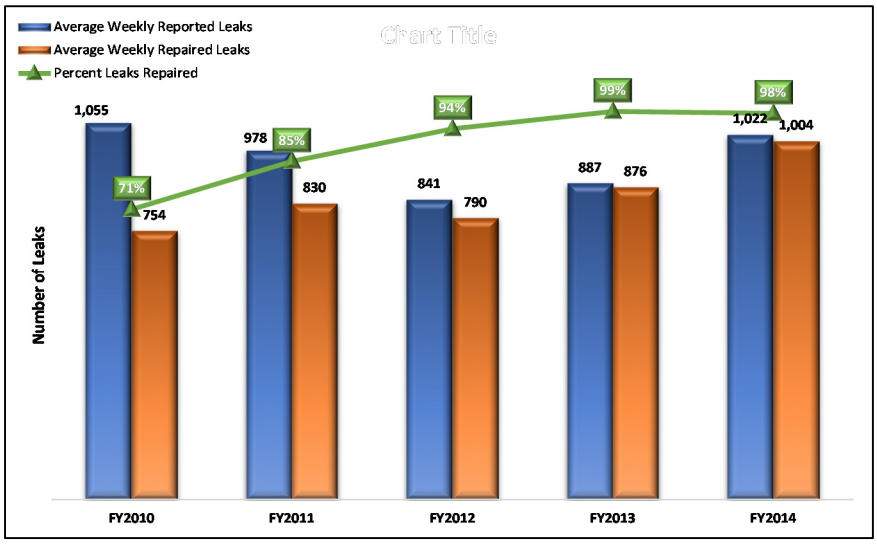

Figure 3-2: Island-Wide Weekly Average Leaks Reported and Repaired

Table 3-13 provides a summary of the average repaired leaks per working day and average backlog. Based on the weekly average pending leaks and weekly average pending leaks with duration greater than seven days, it can be observed that in FY2014 PRASA averaged a backlog of approximately 2.3 days of pending leaks and a backlog of approximately 0.4 days of pending leaks with duration greater than seven days. The average backlog days for pending leaks increased in FY2013 compared to FY2012 results, given the significant increase in the average weekly pending leaks from year to year. However, in FY2014 the average backlog days for pending leaks reduced by about 64% when compared to FY2013 results. This resulted in a significant improvement in the average backlog days for pending leaks greater than seven days, with a reduction of about 20% compared to FY2013 results. PRASA's effectiveness in repairing pending leaks in a timely manner has continued to improve year after year since FY2010.

Table 3-13:
Annual Average Backlog of Pending Leaks

Fiscal Year	Average Weekly Pending Leaks	Average Weekly Pending Leaks >7 Days	Average Repaired Leaks per Working Day[1]	Average Backlog Days for Pending Leaks	Average Backlog Days for Pending Leaks >7 Days
2010	1,750	891	151	11.6	5.9
2011	1,031	427	166	6.2	2.6
2012	611	226	158	3.9	1.4
2013	1,147	88	179	6.4	0.5
2014	460	72	205	2.3	0.4

[1] Assumes five working days per week. Source: PRASA SAP (Commercial) Database.

During the first six months of FY2015, PRASA indicates that a total of 30,560 leaks were reported. For this period, the weekly pending leaks and repaired leaks per working day averaged about 480 and 108, respectively. The average weekly pending leaks and the average repaired leaks per working day reports represents an increase of about 5% and 8%, respectively, both compared to the results obtained during the same period for FY2014. PRASA reported a backlog of 0.7 days of pending leaks with a duration greater than seven days during this period.

PRASA reports that it is in the process of implementing Mobile Data Terminals (MDT) in its repair crew vehicles. This technology will allow PRASA to assign paper-less work plans to its repair crews, and will facilitate the geo-referencing of leaks to allow PRASA to analyze leak frequency and identify root causes. Finally, it will provide better repair metrics measurement, as it will record hour by hour as opposed to day by day as currently tracked by PRASA. PRASA projects to complete the rollout process across its operational regions by end of FY2015. PRASA expects to achieve faster repair response times and improve the repair lead and backlog times tracking.

Regarding water storage tank overflows issues, PRASA has been implementing continuous monitoring of water storage tanks across its operational regions as a measure to help control and minimize overflow (water losses) occurrences. Finally, as a measure to help optimize the System's operation and reduce potential leaks through valves, PRASA has included its pressure regulator/sustaining valves in the IMP and has indicated that it is providing training to its employees to carry out the necessary maintenance activities.

Additional discussion regarding other PRASA NRW initiatives is included in Section 4 of this report.

3.3.3. Wastewater Collection System

Based on PRASA's Accountability Report of FY2014, PRASA owns approximately 5,994 miles of wastewater pipelines. Although the wastewater collection system was not inspected, it is reasonable to assume that a significant portion of the wastewater collection system will require some structural repairs, as well as rehabilitation (replacement) to reduce inflow and infiltration and overflow occurrences.

3.3.3.1. Overflow Monitoring and Control

As shown in Table 3-14, PRASA indicates that in FY2014, 26,937 overflows were reported. Data is not available regarding frequency of overflows in (a) combined sewer systems compared to separate systems or (b) dry weather overflows compared to wet weather overflows. Dry weather overflows are often caused by (a) insufficient cleaning and maintenance of the collection system, resulting in a buildup of roots or grease, restricting or blocking flow or (b) pump station failures due to old or insufficiently maintained equipment, poor design, or lack of reliable backup power supply. Wet weather overflows are an indicator of leaking sewers, storm water connections to sanitary sewer systems, or under-sized pipes or pump stations.

Table 3-14 also shows the average annual overflows occurrence per 100 miles of sewer. In FY2014, an average of 485 overflows per 100 miles of sewer was reported. There was an increase of total annual reported overflows of about 1.7% from FY2012 to FY2013 which could be due to an increase in the actual number of overflows occurrences, an increase in the number of people reporting overflows (as a result of PRASA's communication initiatives and increased social media presence), or a combination of the two. Again, MPPR/ARCADIS has not made an independent evaluation to identify the root causes of this increase. In FY2014 there was a reduction in the total annual reported overflows of about 6% compared to FY2013. Nevertheless, PRASA's reported rate of overflow occurrence continues to be very high compared to other utilities in the U.S. and Canada (average annual overflows per 100 miles are between 1 and 7 overflows[13]). However, this high rate is not surprising given the size and complexity of the System. Other contributing factors to this high rate of overflows include aging infrastructure and inadequate customer use (i.e., illegal connections and discharges).

Table 3-14:
Reported Overflows from FY2010 to FY2014

Fiscal Year	Reported Overflows	Annual Overflows per 100 miles Using 5,325 miles of Wastewater Pipeline
2010	25,735	483
2011	28,185	529
2012	26,903	505
2013	27,358	514
2014	26,937	506

Source: PRASA SAP (Commercial) Database

PRASA's average weekly reported and repaired overflows per fiscal year are shown in Figure 3-3. For FY2014, PRASA reports an average of approximately 508 overflows per week. Comparing the weekly reported overflows per each fiscal year, it can be observed that after experiencing an increase from FY2010 to FY2011, the reported overflows decreased in FY2012. However, in FY2013 there was a slight increase over the FY2012 results due to the increase in the number of

[13] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, published by the AWWA (2014).

reported overflows through the fiscal year. In FY2014, as previously mentioned, the average weekly reported overflows experienced a reduction of approximately 2% compared to FY2013 results. Also shown in Figure 3-3 is the percentage of repaired overflows with respect to the number of overflows reported in each fiscal year. PRASA's rate of repair of overflows has significantly improved since FY2010.

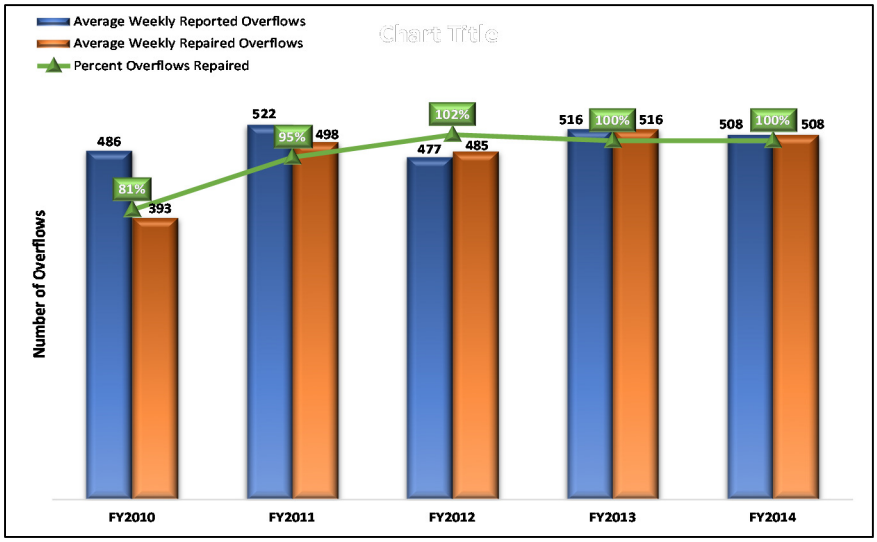

Figure 3-3: Island-Wide Weekly Average Overflows Reported and Repaired

Table 3-15 provides a summary of the average repaired overflows per working day and average backlog. As shown, the average weekly pending overflows decreased from FY2010 to FY2012. In FY2013 the average weekly pending overflows resulted a small increase compared to FY2012 results. However, in FY2014 PRASA reported only 169 average weekly pending overflows, which is a significant improvement compared to previous fiscal years. In FY2014, PRASA also improved its average backlog achieving approximately 1.6 days of pending overflows and a backlog of 0.17 days of pending overflows with duration greater than seven days. These results represent a reduction of about 43% and 15%, respectively, compared to FY2013 results. PRASA's effectiveness in repairing pending overflows in a timely manner has continued to improve year after year since FY2010, particularly those with duration greater than seven days.

Table 3-15:
Annual Average Backlog of Pending Overflows

Fiscal Year	Average Weekly Pending Overflows	Average Weekly Pending Overflows >7 Days	Average Repaired Overflows per Working Day[1]	Average Backlog Days for Pending Overflows	Average Backlog Days for Pending Overflows >7 Days
2010	467	193	79	5.9	2.4
2011	350	98	100	3.5	1.0
2012	224	52	97	2.3	0.5
2013	295	19	105	2.8	0.2
2014	169	18	104	1.6	0.17

[1] Assumes five working days per week. Source: PRASA SAP (Commercial) Database.

During the first six months of FY2015, PRASA indicates that a total of 14,597 overflows were reported. For this period, the weekly pending overflows and repaired overflows per working day averaged about 128 and 53, respectively. The average weekly pending overflows represent a reduction of about 35% and the average repaired overflows per working day represent an increase of about 4%, both compared to the results obtained during the same period for FY2014. PRASA reported a backlog of 0.17 days of pending overflows with a duration greater than seven days.

As with leaks, PRASA expects to improve its sewer overflows response time and metrics tracking using the MDT technology currently being implemented across its operational regions. As previously mentioned, this technology will allow PRASA to assign paper-less work plans to its repair crews, and will facilitate the geo-referencing of sewer overflows to allow PRASA to analyze overflow frequency and identify root causes.

3.4. Conclusions

In general, the condition of the facilities visited varied from those recently upgraded/rehabilitated to those requiring capital upgrades. Table 3-16 presents a summary of the FY2014 inspection results. The data indicates that 97% of the facilities are in the adequate to good range. When compared to FY2012 inspection results, this represents an increase of 2%.

Comparing the 2014 assessment results by asset category with those of the 2012 assessment, significant changes were found for WTPs, WPS, Water Storage Tanks, and WWPSs. As shown in Table 3-16, only one dam, Las Curías, was degraded to poor, in comparison to the previous inspection. However, the Municipality of San Juan is currently addressing critical issues as part of an agreement made with PRASA. Although Las Curías, is no longer utilized by PRASA as a raw water source, it still represents a high hazard in the event of an uncontrolled release of impounded water. Finally, addressing the priority items indicated in PREPA's inspection reports and the additional observations made by MPPR/ARCADIS included in the inspection forms, would give the dams a higher level of safety, and would help maintain the physical conditions of the structures so that they can continue serving the water supply system as expected.

Table 3-16:
FY2014 vs FY2012 Asset Condition Inspection Results Summary

Asset Category	Unacceptable		Poor		Adequate		Good		Total	
	2014	2012	2014	2012	2014	2012	2014	2012	2014	2012
Regulated Dams	0	0	1	0	5	5	2	3	8	8
Water Treatment Plants	0	0	0	0	35	15	12	32	47	47
Wastewater Treatment Plants	0	0	2	3	21	19	5	6	28	28
Wells	0	0	0	2	6	5	2	7	8	14
Water Pump Stations	0	0	1	0	16	13	4	13	21	26
Water Storage Tanks	0	0	1	4	15	16	14	4	30	24
Wastewater Pump Stations	0	0	0	0	10	19	7	4	17	23
Total	**0**	**0**	**5**	**9**	**108**	**92**	**46**	**69**	**159**	**170**
Percent of Total	**0%**	**0%**	**3%**	**6%**	**68%**	**54%**	**29%**	**41%**	**-**	

A significant number of WTPs declined from good to adequate. This was mostly driven by a decrease in the compliance criteria and, more specifically, as a result of the implementation of Stage 2 D/DBPR. PRASA acknowledges that it has some challenges ahead to bring these facilities (systems) into compliance with the new regulation; however, PRASA has begun conducting evaluations, water quality modeling, developing action plans and implementing remedial actions to minimize these non-compliance event. Another factor driving this decline is process controls which were still found to be a challenge in most of the WTPs visited, even though written procedures and control strategies are said to be followed. However, ongoing initiatives from PRASA, including the partial automation of the WTPs, should address these needs. Also, PRASA should continue to standardize processes and providing more tools and training to operators regarding process controls and actions, in order to facilitate and improve plant operations and performance.

Regarding the WWTPs, most of the facilities that obtained a low rating/score have at least one project identified in PRASA's CIP, or PRASA has indicated that is working on identifying operational measures to improve the facilities. Some of the facilities which have being rehabilitated, are still experiencing compliance exceedances of one or more discharge parameters. Also, process control continues to be a challenge in some of the facilities, even though standard operating procedures and control strategies are said to be followed. Bringing these facilities into consistent and sustained compliance with discharge parameters and additional operational improvements including new process equipment, process automation and process control optimization are some of the measures that PRASA must undertake in order to continue to improve and maintain the condition of these facilities.

Finally, the ancillary assets were rated better in overall compared to the 2012 results. As previously noted, most of the facilities continue to properly serve their intended function and most of the deficiencies (improvement areas) were categorized as minor improvements.

PRASA continues to work on and improve its leak detection and monitoring practices, and continues to aggressively address leak occurrences. Currently, PRASA is monitoring remotely most of the tank's levels in their distribution system to avoid tank overflows and improve the water distribution balance. Also, PRASA has established a fully dedicated NRW monitoring and management team and is now conducting periodic water audits which are used to implement the necessary controls and develop action items to address NRW. This has help drive the reduction in water production, water losses, and in NRW reported by PRASA from FY2012 to FY2014.

Although the number of sanitary overflows is also high compared to the U.S., for example; PRASA has continued to improve its response time and attention/repair effectiveness in order to minimize the duration of these overflow events and their environmental impact. PRASA is implementing sanitary sewer evaluations and repair plans to reduce levels of infiltration and inflow (I/I) that must be treated in their WWTPs.

MPPR/ARCADIS has provided recommendations for CIP projects and/or minor improvement needs (refer to facility inspection forms for facility-specific observations and recommendations). Considering the size and complexity of the System, it is reasonable to state that the System will continue to require significant capital investments and continuous maintenance and repairs. Also, it is likely that, as the System continues to age and as new compliance regulations are implemented, additional O&M budget may be necessary to address maintenance and repairs and compliance matters. However, this would put additional strain on PRASA's finances; hence, balancing potential increases in these expense categories with decreases in other expense categories such as payroll and benefits, electricity, and chemicals, is recommended.

4. O&M Practices and Strategic Plan

4.1. Introduction

MPPR/ARCADIS assessed the adequacy of PRASA's O&M practices based on compliance with regulatory requirements, interviews with PRASA personnel, and facility observations by field inspectors obtained through the 2014 asset condition assessment effort described in detail in Section 3. Overall, MPPR/ARCADIS found PRASA's O&M practices to be adequate and also noted that during FY2014, through the roll-out, deployment and stewardship of PRASA's Strategic Plan, changes and improvements in PRASA's O&M practices made positive impacts on the System.

All the Dam facilities and the majority of WTPs and WWTPs were found to be adequately operated and maintained. However, as presented in Section 3, there were a few WTP and WWTP facilities that reported exceedances in compliance treatment parameters during the evaluation period and/or lacked the appropriate operational tools (i.e., O&M manuals, process controls, and laboratory equipment) at the moment inspections were conducted; yet, these were the exception and not the norm. Also, despite needing some additional general upkeep and grounds maintenance ancillary facilities, for the most part, are also being adequately operated and maintained. Nevertheless, a number of these facilities were found to have at least one operational and/or maintenance shortcoming. MPPR/ARCADIS has observed that, throughout time, PRASA's O&M efforts and practices have improved. However there is still room for further improvement with respect to prioritization, scheduling, and execution of corrective and routine maintenance activities, particularly for ancillary facilities and buried infrastructure as noted during the 2014 asset condition inspections.

As previously mentioned, PRASA has adopted the mission of providing quality water and wastewater services at the lowest possible cost. In order to reach that goal, PRASA's Executive Management Team has developed and implemented a Strategic Plan with five key strategic initiatives: 1) Fiscal Health, 2) Operational Excellence, 3) Infrastructure and Sustainability, 4) Organizational Transformation, and 5) Technological Innovation. The Strategic Plan also includes KPIs established by PRASA's Executive Management Team, and metrics established and measured by the departments and Regions, to track and improve operational performance.

A summary of the O&M budgets, O&M highlights provided by PRASA's support departments and Regional personnel, and a detailed summary of PRASA's Strategic Plan, programs and Operational Initiatives are included in this section.

4.2. O&M Costs

Over the past five fiscal years, PRASA's O&M expenses have fluctuated from $616M in FY2010 to $670M (includes non-cash adjustments) in FY2014. PRASA continues its effort to become more efficient by exercising greater management controls in order to reduce its O&M costs and by

implementing various operational programs and initiatives, now contained within its five year Strategic Plan.

PRASA's FY2014 O&M expenses (based on preliminary results and adjusted for non-cash reserves) was approximately $670M, of which $580M were directly related to the O&M of the System. The other $90M were related to commercial activities and provision of customer services, including but not limited to: staffing and operation of customer service offices island-wide; meter reading; connection and disconnection services; invoice preparation, printing and distribution; customer service call centers; and water meter purchases, amongst others. PRASA estimates that approximately 75% of its System O&M budget ($435M) is allocated to the water system and the remaining 25% ($145M) to the wastewater system. Estimated costs per million gallons (MG) and per customer account are summarized in the Table 4-1 and Table 4-2 below.

Table 4-1:
PRASA FY2014 O&M Water System Budget Benchmarks

Performance Indicator	PRASA	2011 Survey Benchmark Median[1]	2012 Survey Benchmark Median[2]
Cost per Account[3]	$350.20	$362.00	$408.00
Cost per MG Processed[4]	$1,992.82	$2,164.00	$2,565.00
Cost per 100 miles of pipe	$2,948,364.74	N/A	$2,233,874.00

[1] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2011 Annual Survey Data and Analyses Report, AWWA (2013)
[2] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, AWWA (2014)
[3] Based on number of water accounts at the end of FY2014 of 1,242,063
[4] Based on FY2014 total production and distribution of approximately 598 MGD of potable water

Table 4-2:
PRASA FY2014 O&M Wastewater System Budget Benchmarks

Performance Indicator	PRASA	2011 Survey Benchmark[1]	2012 Survey Benchmark[2]
Cost per Account[3]	$192.27	$344.00	$373.00
Cost per MG Processed[4]	$1,628.01	$1,246.00	$3,122.00
Cost per 100 miles of pipe	$2,418,931.43	N/A	$2,143,610.00

[1] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2011 Annual Survey Data and Analyses Report, AWWA (2013)
[2] Source: Benchmarking Performance Indicators for Water and Wastewater Utilities: 2012 Annual Survey Data and Analyses Report, AWWA (2014)
[3] Based on number of wastewater accounts at the end of FY2014 of 754,107
[4] Based on FY2014 total treatment of approximately 244 MGD of wastewater

4.3. Support Departments and Regional O&M Highlights

MPPR/ARCADIS conducted meetings with key PRASA department directors and other personnel to obtain a current status of the different departments. A summary of the information provided by PRASA is detailed below.

4.3.1. Department Updates

- *Customer Service* – As of December 2014, PRASA's Customer Service Department continues having a total of 24 commercial offices plus three satellite offices. However, two of the commercial offices, Manatí and Utuado, now operate with minimum personnel. As part of PRASA's Strategic Plan, the Customer Service Department continues to focus on measuring and implementing aggressive metrics to further improve invoicing, collection and billing adjustment practices, customer service complaints, service interruptions, and customers with deficient services; and improving meter readings, collections, and customer time of attention in commercial offices. PRASA continues to monitor and improve its collections, particularly those of large clients, which include all government, commercial and industrial clients. As part of PRASA initiatives, a web service and a mobile application will be implemented by June 2015. Through these, PRASA's customers will be able to perform service related activities (inquiries, leak/overflow reports, service requests, etc.) online instead of having to do these in person in a commercial office. As part of PRASA's efforts to facilitate and improve customer service activities and customers' experience in PRASA's commercial offices, PRASA will be implementing an office optimization plan in two commercial offices per Region and including web service stations to provide guidance on the procedures related to services activities. Also, PRASA's Customer Service Department is currently working on an effort to reduce NRW and improve billings and collections in low income communities; currently, they are implementing a pilot program in collaboration with the community leaders and local residents that includes reading meters, addressing community concerns, and helping improve collections.

- *Purchasing and Logistics* – PRASA's Purchasing and Logistics Department continues to operate mainly from the central administration building, although certain purchasing and logistics personnel are permanently assigned to the Regions. Regarding purchasing practices, as part of the department initiatives, the SAP Portal program was implemented. Through this program, all purchasing requests are managed online, including the public bidding processes. As noted by PRASA's Purchasing and Logistics Department director, the SAP Portal has not only helped reduce the time it takes to address a purchase order request; it has also made the process more competitive allowing for a greater participation of new service/equipment providers. Regarding logistics practices, PRASA established their main distribution center in Mayaguez and PRASA's warehouses island-wide are now interconnected and communicate with each other; an initiative that has helped PRASA achieve greater inventory controls. As part of their effort of maintaining control of PRASA purchased materials, an inventory of all of PRASA's equipment in the distribution center was performed. Additionally, the department

implemented the Material Requirement Planning (MRP) program in January 2014. PRASA continues to evaluate further improvements to its purchasing and logistics processes in order to reduce costs and increase operational productivity. Also, they are focusing on improving its chemicals purchasing and management processes, and usage controls. This effort is being conducted in direct collaboration with the Operations and Compliance departments. The department also developed a storage yard and included in its inventory system large diameter pipe sections and parts, to facilitate and expedite repairs when they occur. Finally, as noted in the previous CER, the Purchasing and Logistics Department director continues executing the responsibilities involved with PRASA's fleet management. PRASA has ordered and will receive during FY2015 new fleet units which include: repair crew trucks, jeeps, and other critical vehicular equipment. Also, in FY2014, PRASA issued a Request for Expressions of Interest to determine market interest for the provision of fleet management services to PRASA. At the time of preparation of this report, PRASA's Executive Management Team and Governing Board were evaluating responses and alternatives.

- *Systems and Information Technology* – PRASA Systems and Information Technology (IT) Department continues developing the information technology management areas and the implementation of the Global Technological Innovation for PRASA's Renovation Program (INTEGRA, by its Spanish acronym). As of September 2014, some of the 25 original projects had been completed successfully; others have been postponed or eliminated. PRASA's Management indicates that project scopes, priorities, and returns on investment are the key factors being assessed in the evolution of the INTEGRA program. Also, During FY2014, the department made key technology infrastructure (hardware) upgrades that provide PRASA a more reliable IT infrastructure. The department is currently supporting the development of a technological platform to assist and digitalize human resources (HR) documentation and related transactions, among other projects. The HR portal will allow employees to complete administrative forms, request licenses (vacation, sick, and unpaid leaves), trainings, among others; as well, as improve PRASA's HR database and records. This will allow PRASA management to achieve faster results in managing HR matters of employees, and in measuring the HR Department's performance. The department continues supporting the development of technological advancements in PRASA and is now also working on a project that will connect and report (to key personnel) PRASA's island-wide SCADA facility data.

- *Communications* – PRASA's communication practices are now more transparent for its clients and other key stakeholders. The Communications Department, in coordination with the Systems and IT Department, continues updating and improving PRASA's web site, which now includes quarterly Accountability Reports, an Investor relations section (which includes applicable and relevant PRASA data), greater customer account capabilities, among other. PRASA's Communication Department has also increased PRASA's media presence (printed, online, and radio/televised). Finally, as a measure to retain institutional knowledge for future PRASA Executive Management Teams, the department is also maintaining clip logbooks of

key events (i.e., 2014 water drought, 2013 rate increase process); in addition to a year in review logbook.

- *Compliance* – PRASA's Compliance Department continues to effectively monitor regulatory compliance in PRASA facilities, and continues to maintain open channels of communication with Regulatory Agencies. PRASA continues to engage expert consultants to support in the compliance with regulatory mandates, and in the development and implementation of corrective measures. Currently, the department is focused on the implementation of remedial measures and commitments to improve the separate and combined sanitary sewer system operating efficiency in order to minimize sewer overflow impacts. As indicated by the Compliance Department, as part of their efforts to comply with the requirements stipulated by the Regulatory Agencies regarding the optimization of preventive maintenance protocols and corrosion prevention, new opportunities to improve the preventive and corrective maintenance program are required to ensure the proper O&M of all critical facilities. Additional information regarding PRASA's IMP is included in Section 4. At the time of the preparation of this report, the Compliance Department reported that they are in the process of implementing an oil and grease compliance program focused on educating, monitoring, and inspecting applicable commercial customers. Regarding the pre-treatment program (applicable for industrial clients) PRASA indicated that the projected regulatory changes in the discharge limits for phosphorus and nitrogen effluent parameters (discussed in more detail in Section 5) will also impact effluent limits for industrial discharges. The department is also now responsible for PRASA's health and safety program, one of the programs being implemented to improve O&M practices and employee safety. Finally, the Compliance Department, in collaboration with PRASA's Infrastructure Department, is still in an ongoing negotiation process with both USEPA and PRDOH regarding PRASA's consent decrees and agreements. Additional information on the renegotiation process is provided in Section 5.

- *Infrastructure* – PRASA's Infrastructure Department continues to manage and implement PRASA's CIP with the support of the Program Management Consultants (PMCs). PRASA's CIP currently includes over 719 projects that range from mandatory compliance-related projects, to general infrastructure (structure) improvements, renovation and replacement. The Infrastructure Department is also responsible for the management of PRASA's Comprehensive Energy Management and the Plant Automation programs (later discussed in more detail). A detailed description of PRASA's CIP is provided in Section 5, along with a description of the efforts being implemented by the Infrastructure Department, in coordination with the Compliance and Legal departments for the re-negotiation of existing consent decrees and agreements.

4.3.2. Regional Updates

MPPR/ARCADIS also conducted meetings with the five Operational Regional Directors and other personnel who provided current status of their operational activities. A summary of the information provided by PRASA is detailed below.

All Regions reported about their current focus on energy consumption reduction, optimization, plants automation, System simplification to reduce O&M costs, NRW identification and reduction (primarily through leak detection and attention), identification and reduction in sewer overflows, treatment facility compliance, among others. In addition, the Regions informed that they are performing quality checks to their metrics in order to support PRASA's KPIs. Also, investment in remote monitoring of facilities is being performed by all Regions to facilitate the future operation of the plants that are currently undergoing automation improvements.

Starting towards the end of spring 2014 and continuing throughout the summer of 2014, Puerto Rico experienced critical drought conditions which forced PRASA's Executive Management Team to activate its drought emergency contingency plans, which included a potential water rationing program. However, PRASA's Regions have been implementing operational adjustments (using modeling, and with operational improvements to add flexibility and redundancy in the System). These adjustments, combined with 1) the redundancy and flexibility added through key PRASA CIP projects and 2) its contingency protocols, helped delay the water rationing program. Shortly after announcing that a water rationing program may be necessary, Puerto Rico experienced a heavy rain period which helped to overturn the crisis. Nevertheless, the Regions reported that they have identified lessons learned from this water drought, and have implemented several improvements to the existing infrastructure to minimize, or avoid all together potential water interruptions in the future. Finally, the Regions reported that they continue to confront challenges regarding the fleet's mechanical conditions and availability. Although during FY2015 PRASA will be renovating part of its fleet (part of which has already been received during the first six months of the fiscal year), given the needs identified by the Regions additional acquisitions and renovations will be required over the next several fiscal years.

4.4. Strategic Plan FY2014-FY2018

As reported in the previous CER, PRASA has adopted the mission of providing quality water and wastewater services at the lowest possible cost. In order to reach that goal, PRASA's Executive Management Team developed and implemented a Strategic Plan in FY2013, which covers the five fiscal years from 2014 through 2018. The Strategic Plan includes five strategic initiatives and key programs, as shown in Figure 4-1. According to PRASA, these initiatives should address the different critical elements that affect its vision and mission.

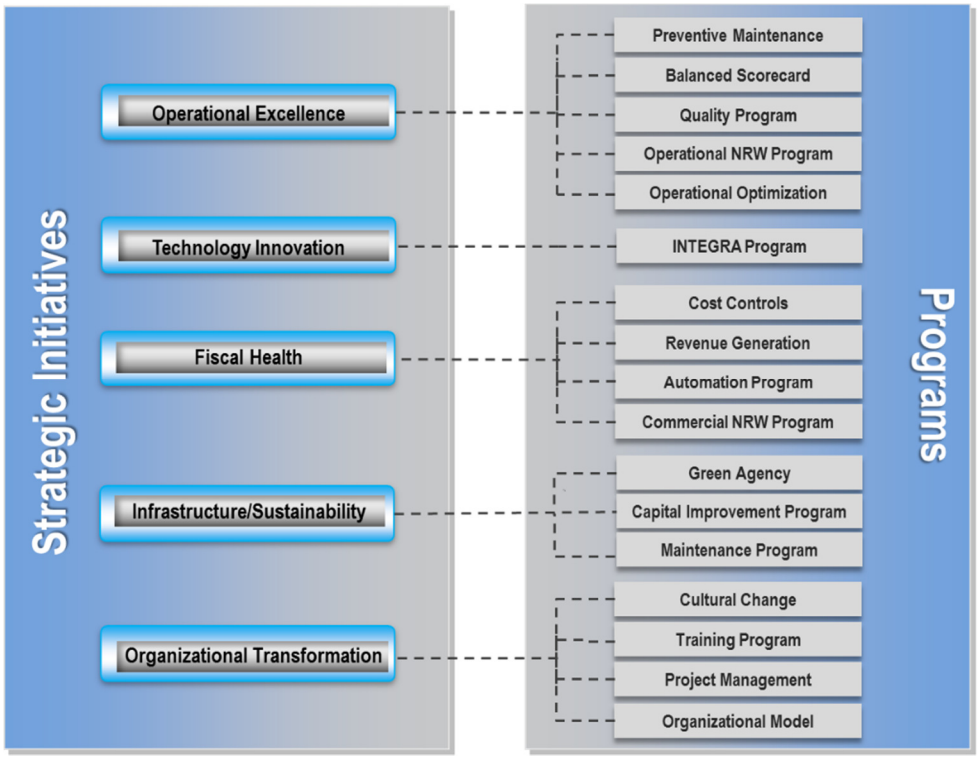

Figure 4-1: FY2014-FY2018 Strategic Plan Initiatives and Programs

PRASA's Executive Management Team is currently in the process of revising and refining certain aspects of its Strategic Plan considering the lessons learned during FY2014 and realignment of strategic initiatives such as Fiscal Health (to include a plan to self-finance PRASA's CIP in the future) and Organizational Transformation. KPI goals have been adjusted (made stricter) for FY2015; and the methodology for calculating certain KPIs has been revised in order to better align them with Management's goals. PRASA has stated that one of its key goals is to reduce its dependence on bond issuances for the financing of its CIP within the next 10 years.

A brief description of each strategic initiative and related programs is provided below.

- *Operational Excellence*: The principal objective of this initiative is to develop a model for providing reliable, sensible, and economic services while assuring the full compliance of customers' expectations. The associated objectives and goals of this initiative are summarized in Table 4-3.

Table 4-3:
Operational Excellence Strategic Objectives & Goals

Strategic Objectives	Program	Goals	Performance Indicator
Improve Regulatory Compliance	Quality Program	Increase the regulatory compliance	Non-compliance fines
			Potable water service compliance
			Wastewater service compliance
Operational Effectiveness	Operational Optimization/Balanced Scorecard	Improve bill precision	Billing adjustments
		Reduce quantity of customer service complaints	Customer service complaints
		Reduce quantity of clients with defective service	Service interruptions
			Deficient service clients
		Improve client satisfaction	Time of service in a commercial office
		Improve the fleet's mechanical conditions and repair rate	Available vehicles (%)
		Improve the service level of the supplier	Time of issuance service or purchase order
		Improve the average logistic time level	Time of delivery of the supplier
Improve the Integrated Maintenance Program (IMP)	IMP Program	Improve the time of repair in water production and distribution equipment	Average time of repair of equipment
		Increase the preventive maintenance level while the corrective maintenance is reduced	Preventive maintenance vs. corrective relationship
Non-revenue Water Reduction	NRW Operational Program	Improve service quality	Leak's repair time
		Non-revenue water reduction	Non-revenue water (MGD & percentage)
		Increase production efficiency	Water production (MGD)

- *Technology Innovation*: This initiative includes all projects related to software applications or infrastructure solutions aligned with the operational and functional support. The principal objective of this initiative is to centralize all technological projects in order to maximize the use of resources. The associated objectives and goals of this strategic initiative are summarized in Table 4-4.

Table 4-4:
Technology Innovation Strategic Objectives & Goals

Strategic Objectives	Program	Goals	Performance Indicator
Achieve Technology Optimization	INTEGRA Program	Complete projects as scheduled	Complete projects on schedule

- *Fiscal Health*: This initiative includes all projects aimed to increase revenues or reduce costs while maintaining a balance between long-term debt, asset values, O&M expenses, and operational revenues. The principal objective of this initiative includes the improvement of PRASA's financial capacity, capture revenue losses from existing customers, increase the budget's management effectiveness, reduce operational costs, and link service rates to factors such as economic tendencies of consumption, short-term financial management, and long-term financial health management. This initiative is PRASA's highest priority on its Strategic Plan. The associated objectives and goals of this initiative are summarized in Table 4-5.

Table 4-5:
Fiscal Health Strategic Objectives & Goals

Strategic Objectives	Program	Goals	Performance Indicator
Cost Controls	Automation Program/Control Costs	Improve the efficiency level of the employee	Employees by connection (1,000)
		Compliance with operational expenses	Overtime (over payroll)
Increase Revenues	NRW Commercial Program/Revenue Generation Program	Increase revenue	Budget usage
		Increase revenue level while debt level is reduced	Debt service coverage
		Increase collection level	Collections percentage

- *Infrastructure and Sustainability*: This initiative includes all projects aimed to generate an efficient use of hydrological and energy resources inside PRASA and the compliance with the CIP. The principal objective is to maximize infrastructure, investments and operational resources to protect, restore, and improve the natural environment. The associated objectives and goals for this strategic initiative are summarized in Table 4-6.

Table 4-6:
Infrastructure and Sustainability Strategic Objectives & Goals

Strategic Objectives	Program	Goals	Performance Indicator
Energy Consumption Reduction	Green Agency Program	Reduce the energy consumption	Electric Consumption
Comply with Capital Improvement Projections	CIP	Complete projects as scheduled	Performance Rate of Project Costs
			Performance Rate Progress of CIP Projects

- *Organizational Transformation*: This initiative includes all projects aimed to develop a proficient, adaptable, and motivated workforce under a collaborative environment. The principal objective of this initiative is the support to the improvement of PRASA's efficiency to be profitable, dependable and sustainable on all facets of the operations and support processes. The associated objectives and goals of this initiative are summarized in the following Table 4-7.

Table 4-7:
Organizational Transformation Strategic Objectives & Goals

Strategic Objectives	Program	Goals	Performance Indicator
Achieve an organization committed with the established objectives	Cultural Change Program/Training Program/ Project Management/Organizational Model	Increase the Employees' Satisfaction	Employee Training
			Work Effectiveness
			Non-working days

PRASA's Executive Management Team also adopted an operation optimization balanced scorecard with the purpose of improving PRASA's operational effectiveness. The indicators (previously discussed) measured in this balanced scorecard are: billing adjustments, customer service complaints, service interruptions, clients with deficient services, time of service in a commercial office, fleet availability, time of issuance/completion of service/purchase order, and effectiveness and timeliness of suppliers.

PRASA began tracking these performance indicators towards the end of FY2013 and set aggressive metrics to be met in each year included in the Strategic Plan. As previously mentioned,

Finally, PRASA has begun the development of a Program Management Office (PMO) to centralize all management, planning, and execution of its Strategic Plan and related initiatives and programs, data control, and KPI monitoring.

4.4.1. Key Performance Indicators

Tables 4-8 and 4-9 present a summary of PRASA's KPI goals and results. The results are stated as of June 2013 (Table 4-8), as of June 2014, and for the first quarter of FY2015 (Table 4-9). In FY2014, the first full fiscal year of KPI measurements, PRASA achieved a compliance score of 68% of its KPIs on an island-wide basis. Based on the FY2014 results, the following are the KPIs for which PRASA did not meet its defined goals: billings vs. collections, planned work effectiveness, unplanned work effectiveness, billing adjustments, and average time for equipment repairs, among others. These are key areas that PRASA should continue to work on in FY2015. PRASA continues to challenge itself in enhancing its operational optimization efforts in order to achieve its strategic goals. Also, PRASA continues to add new performance indicators and establishing aggressive metrics in some of the KPIs, as shown in the tables below.

Table 4-8:
FY2013 PRASA Operations Key Performance Indicators

Key Performance Indicators	Goal (FY2013)	Results as of June 2013
Compliance - Water System	Increase to 97%	93%
Compliance - Wastewater System	Increase to 95%	92%
Service Interruptions	Reduce to 9%	10%
Customers with Deficient Services	Reduce to 3,892	4,325

Key Performance Indicators	Goal (FY2013)	Results as of June 2013
Average Processing Time of Purchase Orders	Less than 25 days	33 days
Vehicle Availability	Increase to 90%	66%
Average Time for Equipment Repairs	Less than 20 days	22 days
Preventive vs. Corrective Maintenance Ratio	Increase to 80% : 20%	60% : 40%
Planned Work Effectiveness	Reduce to 13%	18%
Percent Readings	Increase to 85%	83%
Customer Attention Time (Commercial Office)	Maintain below 25 min.	21.6 min.
Average Customers with Service Interruptions (as a Percentage of Total Customers)	Reduce to 9%	9%
Complaints in Customer Service	Reduce to 10/1000 clients	10.6
Repair time for leaks	Reduce to 60.0 hrs.	87.4 hrs.

Table 4-9:
FY2014 & First Six Months of FY2015
PRASA Operations Key Performance Indicators

Key Performance Indicators	FY2014 Goals	Results as of June 2014	FY2015 Goals	Results of first six months of FY2015
Employees per Connection	3.25 or less Employees/ 1,000 connections	3.15	3.03 or less Employees/ 1,000 connections	2.92
Overtime	Reduce to 7%	10%	Reduce to 8%	10%
Budget Compliance (excludes electricity costs)	Increase to 100%	95%	Increase to 100%	94%
Collections vs. Billings	Increase to 92%	91%	Increase to 93.75%	92.89%
Compliance - Water System	Increase to 97%	98%	Increase to 98%	100%
Compliance - Wastewater System	Increase to 95%	97%	Increase to 97%	96%
Billing Adjustments	Increase to 97.5%	96.4%	Increase to 97.5%	96.9%
Complaints in Customer Service (per 1000 active accounts)	Reduce to 10.36	17.56	Reduce to 12.5	20.4
Monthly Average of Customers with Service Interruptions (as a Percentage of Total Customers)	Reduce to 9%	7%	Reduce to 6.5%	5.0%
Customer Attention Time (Commercial Office)	Maintain below 25 min.	26.27 min	Maintain below 25 min.	30.05 min
Vehicle Availability	Increase to 90%	91%	Increase to 90%	88%
Average Processing Time of Purchase Orders	Less than 25 days	20 days	Less than 15 days	17 days
Preventive vs. Corrective Maintenance Ratio	Increase to 66% : 34%	71:29	Increase to 80% : 20%	79:21
Average Time for Equipment Repairs	Less than 20 days	24 days	Less than 20 days	31 days

Key Performance Indicators	FY2014 Goals	Results as of June 2014	FY2015 Goals	Results of first six months of FY2015
Reported Overflows[1-]	-	-	Reduce to 2,512 monthly	2,428 per month
Reported Leaks[1]	-	-	Reduce to 5,455 monthly	5,092 per month
Repair time for leaks	Reduce to 60.0 hrs.	58.90 hrs.	Reduce to 60.0 hrs.	63.73 hrs.
Average Water Production (MGD)	Reduce to 608 MGD	598 MGD	Reduce to 546 MGD	580.81 MGD
Energy Consumption (Annual)	Reduce to 749.7MKwH	720 MKwH	Reduce to 710.28MKwH	349.26 MKwH
Project Progress (CIP)[2]	-	-	-	-
Cost Performance (CIP)	Greater or equal to 0.9	1.03	Greater or equal to 0.9	1.02
Training (cumulative hours per employee)	More than 24 hrs	32.42	More than 24 hrs per year	11.77 first 6 mths
Unplanned Work Effectiveness (Absenteeism)	Reduce to 4.58 days	19.69 days	Reduce to 1.5 days	2.82 days
Planned Work Effectiveness	Reduce to 5%	14%	Reduce to 10%	6%

[1] The Reported Overflows and Leaks KPIs were added as FY2015 goals.
[2] The Project Progress KPI was added as a FY2015 goal. According to PRASA, this KPI is being measured only by Region, as such, no overall goal and result is presented.

4.5. On-Going Programs and Initiatives

The following programs and initiatives, some of which began development and implementation prior to FY2014, have been included under PRASA's Strategic Plan. A brief description and current status of each of these initiatives is provided below.

4.5.1. Integrated Maintenance Program (IMP)

The 2006 and 2010 Consent Decrees with USEPA and the 2006 PRDOH Agreement require that PRASA implement and continue to develop a comprehensive Integrated Preventive Maintenance Program, which evolved to the Integrated Maintenance Program (IMP) during FY2013 to include both corrective and planned (i.e. preventive, predictive and proactive) maintenance activities, to ensure the proper O&M of its plants and other critical facilities, including WWPSs. Through this program, PRASA established a plan to enable programmed and continuous maintenance to plants, pump stations, vehicles, and equipment to provide for more reliable service, improve client satisfaction, and achieve long-term operational cost savings through preservation of assets. PRASA still finances part of the program through its CIP (costs associated with the necessary R&R prior to the integration of the facilities into the preventive maintenance program) and the rest (the actual maintenance costs) through its O&M budget.

The benefits highlighted by PRASA regarding the preventive maintenance program include the following:

- 100% compliance with the requirements of the Regulatory Agencies.
- The elimination of hiring external O&M service crews.
- Increase the efficiency of the planning group.
- Increase operational reliability of equipment in order to reduce service interruptions and address repairs effectively and in a timely manner.
- Improve the use of information technology and quality of its database.

Key achievements include:

- Integration to the IMP of 100% of water and wastewater facilities (including plants, pump stations, wells, dams, intakes, and tanks).
- Integration to the IMP of 90% of control valves in the distribution system.
- 97% of generators were operable (this metric was about 94% in FY2013).
- The average pumps redundancy was at about 95% for all water and wastewater pumps and treatment plants.
- Perform paperless certification (digital copies) of equipment calibrations.
- Began process to standardize control panels in the North and West operational regions.
- Reduced average time to repair equipment from 30 to approximately 24 days (FY2014 results); current KPI is to maintain average time to repair equipment at or below 20 days.

PRASA had implemented a short-term and a long-term plan for the IMP. The short-term plan, to be completed during this FY2015 is shown in Figure 4-2. Key short-term projects to be completed by FY2015 include the following:

- Rehabilitation of water treatment plants (currently 90% completed)
- 100% integration of the facilities into the programs
- Mobile devices implementation for calibrations, warehouses, and facility inspections (pending)
- Plants maintenance costs optimization (on-going)
- Implementation of SAP PM in WTPs (currently 65% completed)
- Predictive techniques implementation with the interim service crews (on-going)
- Live tracking IMP metrics (on-going)
- Integrate the wastewater collection system and water distribution systems into the IMP (currently 90% completed).

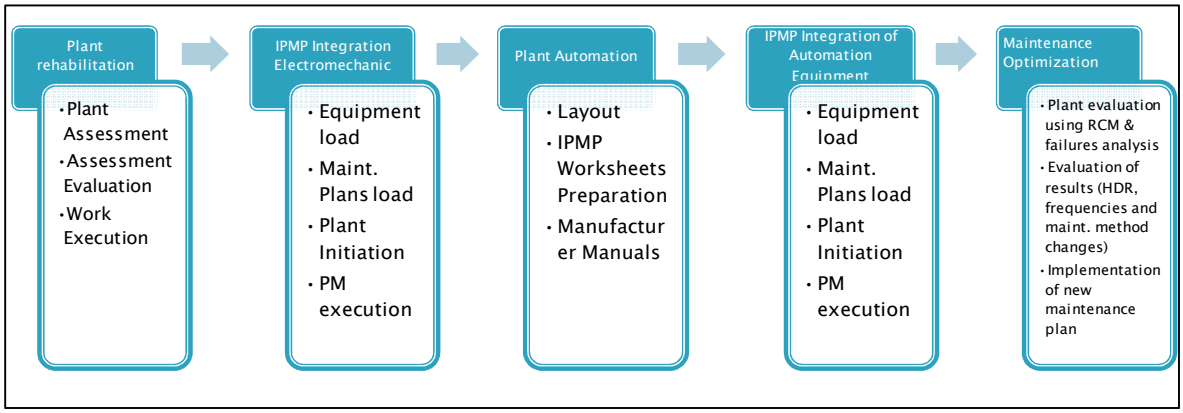

Figure 4-2: IMP Short-Term Plan

As previously reported, the long-term plan to be completed beyond FY2015, includes the following projects:

- New metrics and more aggressive goals for existing metrics including average time of equipment repair and tracking of corrective versus preventive maintenance
- SAP PM and SCADA Programs Integration – maintenance orders being automatically created in SAP PM by SCADA
- Asset management implementation and nomenclature standardizations
- Special equipment establishment in reliability maintenance managed by the IMP in PRASA's central administration building
- Continuous improvement projects including equipment standardization and critical materials incoming/receiving inspections.

4.5.2. Non-Revenue Water Reduction Program

In May of 2008, PRASA began to implement its comprehensive NRW Reduction Program to reduce water losses (apparent and real), increase revenue, reduce operational costs, and minimize water infrastructure capital investments. Reducing NRW continues to be a high priority goal for PRASA. PRASA embarked on the development of a strategic NRW management and reduction plan. For this, in late 2011, PRASA retained the services of a NRW consultant. The objective of this strategic NRW management and reduction plan is to provide PRASA with the necessary information to develop a comprehensive and cost-effective, long-term NRW management program. The report was completed in May of 2012; it identifies a series of short, mid, and long-term activities that would provide PRASA opportunities to not only reduce its current NRW volume, but also to improve its revenues and reduce expenses. The specific initiatives being implemented under this program are described below. PRASA has established a fully dedicated NRW monitoring and management team and is now conducting periodic water audits which are used to implement the necessary controls and develop action items to address NRW.

4.5.2.1. Revenue Optimization Program

As part of the NRW Reduction Program, PRASA's strategy has focused mostly on revenue optimization (enhancing) initiatives, which target apparent losses related to its commercial operation. These initiatives, which together make up the Revenue Optimization Program, have resulted in significant additional revenue for PRASA over the past five fiscal years.

Figure 4-3 depicts this increasing tendency in revenue generated from PRASA's Revenue Optimization Program from FY2010 to FY2014. PRASA has consistently exceeded its budgeted amount for operational initiatives. In FY2014, PRASA collected approximately $103.1M through its Revenue Optimization Program, which is 18% higher than the FY2014 approved budget amount of $87.6M. It should be noted that the significant increase from FY2013 results to FY2014 preliminary results (an increase of approximately 32%) considers the rate increase implemented by PRASA on July of 2013.

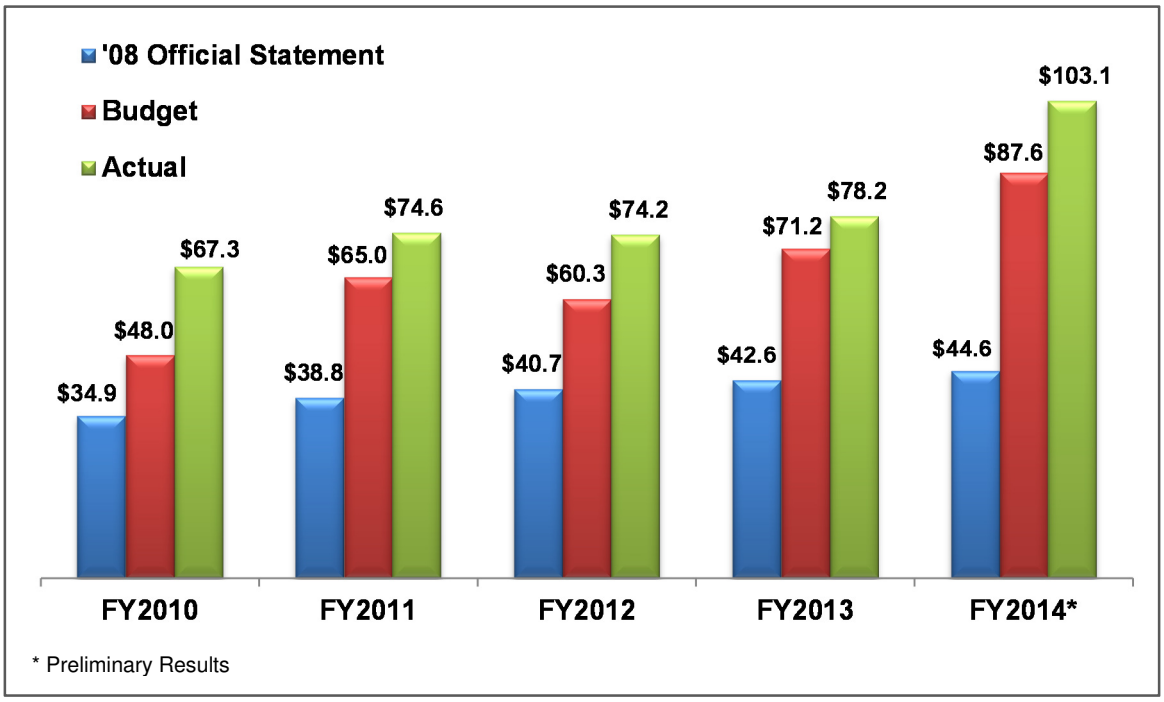

Figure 4-3: Revenue Optimization Program Results FY2010-FY2014 ($, Millions)

Table 4-9 below, presents a breakdown of the Revenue Optimization Program initiatives, the projected revenues achieved in FY2014, and the FY2015 through FY2019 projected opportunities. The expected cost of all the above mentioned initiatives is projected at $10M per year plus the cost of financing the required capital investments, which has been included in PRASA's financial projections.

Table 4-10:
Revenue Optimization Program Initiatives FY2014 – FY2019 ($, Thousands)

Initiative	FY2014 Preliminary Results	FY2015 Projection	FY2016 Projection	FY2017 Projection	FY2018 Projection	FY2019 Projection
Small Meters (net of degradation)	$37,009	$42,505	$54,710	$61,518	$63,165	$59,612
Large Meters	14,183	14,884	17,827	19,637	21,473	23,430
Theft and Inactive (Tx) Accounts	26,735	35,010	38,485	41,436	43,144	44,522
Sprinklers	1,695	571	773	943	1,114	1,284
Disconnections	13,051	6,300	5,400	4,500	4,500	3,600
Class Correction	6,424	1,129	1,461	1,929	2,397	2,865
Condominiums	874	1386	986	986	986	986
Miscellaneous	3,143	1,521	1,281	1,281	1,281	1,281
Total Additional Revenues	**$103,114**	**$103,306**	**$120,923**	**$132,230**	**$138,060**	**$137,580**

Numbers may not add up due to rounding.

A description of each of the NRW operational initiatives, and underlying assumptions regarding their projected revenue impact, is discussed below.

1) **Small Meters**: This operational initiative consists of replacing meters of 1-inch or less in diameter that are more than 10 years old, as these meters lose precision and account for less water than is delivered. By replacing them, PRASA increases billed consumption and improves revenues. Every year there is a cumulative revenue effect from meters previously changed as well as a revenue loss due to the slow degradation of an aging meter's accuracy. This degradation is accounted for in the calculation of the operational initiatives revenues.

   PRASA reports to have replaced around 634,000 small meters from FY2010 to FY2014. In FY2014, projected revenues from this initiative total $37.1M (net of degradation adjustment). PRASA estimates that 107,155 small meters will be replaced in FY2015. The average additional monthly revenue per meter assumed, based on the results of prior replacements, was $8.10 per month for the first year, $7.50 for the second year, $6.86 for the third year and $6.24 for the fourth year. In the fifth year, PRASA has slightly increased the monthly revenue to $7.02 (based on historical performance of the initiative). From then onwards, a yearly reduction is assumed until the eleventh year, when there is no additional monthly revenue expected to be gained. Finally, the average monthly consumption per meter assumed, based on the results of prior replacements during the last six fiscal years, was an additional 1.27 cubic meters per month. PRASA projects that over 440,000 additional meters will be replaced between FY2016 and FY2019 at a total capital cost of $239M (net of degradation adjustments).

2) **Large Meters**: This operational initiative consists of replacing meters with a diameter equal to or greater than 1-inch. This initiative generates revenues from the additional billed consumption due to better accuracy of the meters and retroactive fines assessed to customers

that present abnormally higher consumption than the average previous to the replacement of the meter.

PRASA replaced over 3,900 large meters from FY2010 through FY2014. In FY2014, projected revenues from this initiative were about $14.1. PRASA estimates that 450 large meters will be replaced in FY2015. The average additional monthly revenue per meter assumed, based on the results of prior replacements, was $301 per month for the first year, $275 for the second year, and $250 for the third and fourth year. For the fifth year onwards, PRASA estimates that the average additional monthly revenue per meter will be about $312. This increase in the average additional monthly revenue per meter is based on the historical average results of monthly incremental billings achieved. Finally, the average monthly consumption per meter assumed, based on the results of prior replacements during the last six fiscal years, was an additional 10.26 cubic meters per month. PRASA projects that about 2,275 large meters will be replaced from FY2016 through FY2019.

3) **Theft and Inactive Accounts**: The intervention of theft accounts initiative focuses on converting connected and non-paying customers into paying customers. This includes: 1) Tx accounts (inactive accounts with consumption), which specifically targets customer accounts currently included in PRASA's database categorized as inactive with recorded consumption (also referred to as water theft in inactive accounts); and 2) active accounts with irregularities (i.e., direct connections and meter tampering). This initiative leverages a database desktop exercise to target the potential customers that are currently benefiting from PRASA's services, but are not paying for them.

   Over the last five fiscal years PRASA has normalized a total of 50,328 customers. However, it is expected that as accounts are handled and normalized, the number of inactive accounts with consumption will reduce over time. In FY2014, projected revenues from this initiative were about $26.7M. PRASA plans to normalize approximately 4,500 additional accounts in FY2015 and an additional 39,000 customers from FY2016 through FY2019.

4) **Fire Protection and Sprinkler Initiative**: PRASA has targeted commercial customers required by coding specification to have a sprinkler system that are not paying for the service. PRASA currently provides fire protection sprinkler service to 1,277 accounts. In FY2009 and FY2010, PRASA visited 3,429 targeted customers, of which 604 accounts were found to be out of compliance. Of these accounts, PRASA fined 389 customers $10,000 per account, collecting revenues of $3.7M. From FY2011 through FY2013, PRASA normalized about 365 customers, which represented additional revenues in the amount of $2.5M. In FY2013, PRASA reduced its efforts in this initiative in order to focus on higher investment-return initiatives. As such, only 99 additional accounts were added during the fiscal year, which represented approximately $0.9M in additional revenues to PRASA. In FY2014, PRASA addressed 173 sprinkler accounts, normalizing 14 of these. PRASA collected approximately $1.7M in

additional revenue for this initiative. PRASA is planning to normalize 100 sprinklers customers in FY2015 and collect a conservative amount of approximately $0.6M. Also, PRASA plans to normalize 100 sprinkler customers each year from FY2016 through FY2019.

5) **Disconnections**: These initiatives focus on reducing uncollected accounts and ensuring customers pay on time. In a proactive approach, collection management consists of contacting residential, commercial, industrial and government customers with past due bills; disconnection consists of shutting-off service once a customer's bill is 60 days past due.

   Disconnections continue to be a major factor contributing to revenues collected under these initiatives. Over the last four fiscal years, PRASA has performed over 934,000 disconnections. Between FY2010 and FY2013, PRASA collected about $71.6M in additional revenues from this initiative. In FY2014, PRASA performed a total of 280,000 disconnections and collected additional revenues in the order of $13.1M. For FY2015, PRASA estimates to collect a conservative amount of $6.3M through this initiative. PRASA is projecting a tapering down of the revenues to be collected through this initiative from $5.4M in FY2016 to $3.6M in FY2019.

6) **Class Correction**: This initiative includes revenues from rate classification/categorization (class and meter size) corrections. Over the last four fiscal years PRASA has normalized a total of 2,205 customers, and has collected over $11.9M from this initiative. PRASA reported additional revenues from this initiative in its FY2014 preliminary results of $6.4M. PRASA is projecting to correct about 500 customer accounts in FY2015, (based on the potential identified through PRASA's Geodatabase project – presented in detail in this Section), and projects to normalize approximately 1,000 customers each year from FY2016 through FY2019.

7) **Miscellaneous**: These initiatives include, among others:

   - Reductions of discounts to billed amounts due to deficiencies in service. The number of clients receiving deficient service credits was reduced from 27,000 in August of 2009 (up to $20,000 in credits per month in total) to about 2,500 currently.
   - Sewer accounts not billed for the service. PRASA normalized 11,288 sewer accounts in FY2014.
   - Inactive Accounts Debt Transfer. This initiative searches for inactive accounts with pending balance that also has an active account with same social security number. Then the pending balance from the inactive account is transferred to the active account in order to initiate the collection process.

8) **Condominiums:** This initiative consists in billing the master meter of the condominiums which were not being billed as a result of meter reading and billing problems. These meters were normalized and are being billed on a monthly basis without exceptions. FY2014 preliminary results show that PRASA collected $0.9M from this initiative.

4.5.2.2. Development of a Customer Geodatabase

This project consists in the development of an island-wide customer geodatabase to identify and map (geospatially) PRASA's existing and potential customers including, but not limited to, developed and pre-developed parcels not included in PRASA's SAP customer database. This geodatabase shall then be linked with PRASA's SAP customer database. PRASA seeks to develop a tool for the proactive management of its customer database, that will help in the detection of theft and, ultimately, in the reduction of apparent (commercial) losses. As such, the project's objectives focus on:

- the reduction of NRW losses
- the identification of PRASA's customers and non-registered users geospatially
- the improvement of water system planning (uses and needs) and water conservation

Project development and implementation commenced in July of 2012. The first phase of the project, which included the location of customers through a desktop analysis of various databases, was completed in July 2014. Approximately 89% of PRASA's customers were identified and georeferenced as a result of this effort, which included the completion of the following tasks:

- Integration of PRASA's current customer database with the existing databases of other Puerto Rico agencies to identify common customers and use as the starting point for the Geodatabase to be created as part of this project.
- Development of the Geodatabase using GIS software. Approximately 860,000 locations were geo-referenced by the contractor.
- Standardization of physical addresses in both the Geodatabase and PRASA's SAP customer database of about 30% of accounts.
- Linking the Geodatabase with PRASA's SAP customer database.

PRASA continued the development of the geodatabase with internal resources and support from its GIS subcontractors as follows:

- The second phase of the project, which commenced in July 2014, included field visits to identify the remaining PRASA customers in the Metro Region not previously located (approximately 129,000 customers), as well as the identification of any customer receiving PRASA services without an active or with an inactive account. Field visits have been completed and approximately 15,000 additional customers have been geo-referenced as a result. The field data is currently under evaluation to determine if new or potential clients have been located.
- Standardization of the remaining physical addresses, including the creation of area, sectors, and urbanization maps. Approximately 1,000 urbanizations, condominiums, and sectors have been identified and delimited.

Although some locations still have not been geo-referenced, field investigations will no longer be performed. PRASA's GIS subcontractor conducted a pilot field study to evaluate the cost-

effectiveness of geo-referencing the remaining locations by conducting field visits; results showed that the costs outweighed the benefits to be achieved given that the percent amount of locations geo-referenced was significantly lower than the sites visited (approximately 16% were georeferenced). In other words, most of the meter visits resulted in not being able to be paired up with a PRASA account. As such, going forward PRASA will geo-reference accounts not yet found, leveraging opportunities under its capital and R&R projects (i.e., piping replacement projects and new system construction).

Because the Geodatabase is a tool to be used by PRASA in the identification of its existing and potential customers, at this moment PRASA is not estimating incremental revenues from this initiative. However, with this tool, PRASA will be able to implement additional initiatives and address customer database and connection anomalies that do represent significant revenue opportunities for PRASA, specifically regarding commercial losses.

4.5.2.3. Development and installation of an AMR/AMI System for Large Meter Customers in the Metro Region

The purpose of the development and installation of this initiative is primarily to:

- Increase efficiency and precision in the process of meter reading and billing consumption
- Reduce NRW
- Improve the service provided to large customers within the Metro Region

For purposes of this project, large meter customers are defined as those customers with water meters 1-1/2 inches or larger.

As previously reported, this project was originally envisioned to consist of the installation and operation of an Automatic Meter Reading and/or Advanced Metering Infrastructure (AMR/AMI) system for approximately 3,305 large meter customers in the Metro Region. However, the scope of work was later on expanded by PRASA. Through this project, PRASA has partnered with a performance contractor (Johnson Controls, Inc.) to enter into a performance contract for the implementation of revenue enhancement measures, which includes water meter accuracy improvements and the installation of a hybrid AMR/AMI system for large meter customers in the Metro Region. Additionally, PRASA believes that there is an opportunity to identify and impact additional customers in the Metro Region that are currently inadequately identified in PRASA's Customer Database or that have inadequately sized meters installed, particularly non-residential customers with smaller diameter meters. Therefore, the scope also includes water meter improvements to selected 1-inch and smaller meter customers in the Metro Region.

Infrastructure improvements, such as improvements to meter boxes and meter box lids, retrofit of existing meters, installation of new meters, and replacements or modifications to the meter size or type, and the integration of the customers' accounts with PRASA's SAP customer database system, as needed, also form part of the measures identified in the scope of work to be included in the performance contract. Under the performance contract, the selected contractor will be required to provide a performance guaranty for the incremental accuracy to be achieved through the project,

which translates into additional revenues to PRASA (when compared against the baseline consumption profile and meter accuracy prior to modifications).

The project is being implemented in two phases: Phase 1 – Development Phase and Phase 2 – Implementation Phase. During Phase 1 the contractor conducted a thorough audit of all large meter customers in the Metro Region, as well as identified opportunities for non-residential customers with small diameter meters. The audit (Phase 1) was completed in August of 2014. Audit results presented by Johnson Controls, Inc. show that once the project is completed (i.e., all measures identified in the audit are implemented), the projected additional annual revenues are in the order of $2.2M; although PRASA may receive additional economic benefits as a result of: 1) a decrease in operation and maintenance costs, and 2) future capital cost avoidance. Investment costs were also revised and refined in the audit: total investment costs estimated at about $18.7M. The main difference in the project costs (compared to the original estimate prior to completion of the audit) is due to the actual findings of meter infrastructure conditions and the additional infrastructure improvements that are required to be able to install the AMR/AMI system (i.e., meter box improvements and lids replacements). Additional measurement and verification and on-going maintenance costs are estimated at about $1.1M per year.

Based on the audit results, and considering the additional non-measurable benefits that the project will provide PRASA, PRASA's Executive Management Team (as approved by PRASA's Governing Board) will proceed with Phase 2 of the project, the Implementation Phase. PRASA is currently in the negotiation process of the Phase 2 contract agreement. The implementation time (installation period) for this initiative is estimated at 18-24 months.

4.5.2.4. Water Leak Detection

To better understand the magnitude of hidden water leaks (physical losses) in PRASA's water system, in FY2013 PRASA carried out a project to detect leaks in the Arecibo and Caguas water distribution systems. In total, between the two systems a total of 600 miles of pipeline was surveyed. About 288 leaks were detected with an estimated flow of about 4.7 MGD. Through this project, PRASA confirmed that there are a significant number of undetected water leaks in PRASA's water system. Based on these results, PRASA projects that there could be as much as 100 MGD being lost through undetected water leaks throughout the island. Hence, PRASA's Executive Management Team believes that detection and repair of these leaks could significantly reduce the volume of PRASA's NRW.

In January 2014, PRASA expanded the leak detection project throughout the island. PRASA established a goal of surveying about 7,000 miles of water pipelines, island-wide, over an 18-month period as part of the project. As of October 2014, a total of 4,666 miles of water pipelines have been surveyed. PRASA's Regions are prioritizing leak repairs in accordance to their severity, giving a higher priority of repair to major leaks which represent a higher reduction in NRW. The project is expected to be completed in FY2015.

4.5.3. Comprehensive Energy Management Program

PRASA's energy cost is the second largest cost behind Payroll and Benefits; in FY2014 it accounted for approximately 24% of its total Operating Expenses, 6% less than previously reported for FY2013. PRASA's electric power costs have historically increased at a compound annual growth rate (CAGR) of about 8%, despite a modest annual consumption increase of about 2% per year. In FY2014, PRASA's electric power costs were significantly reduced as a result of the preferential electricity all-in-rate approved for PRASA under Act 50 of June 2013 (Act 50), of $0.22 per kilowatt-hour (kWh) for the first 750 million kWh of consumption (any excess to be paid at PREPA's average cost per kWh for the most recent audited fiscal year). This rate is effective from FY2014 through FY2016. Starting on FY2017 and going forward, and unless PREPA is able to provide electricity at a lower cost or that PREPA's debt service coverages are negatively affected, the all-in-rate will decrease to $0.16 per kWh, again for the first 750 million kWh of consumption[14]. A key benefit of the all-in-rate is that, in addition to stabilizing PRASA's electric energy costs, it has also helped PRASA to better forecast its Operational Expenses (in recent years, electric energy costs were very volatile and difficult to forecast and budget for). Refer to Section 7 for further discussion regarding PRASA's forecasted assumptions and projected savings.

PRASA has implemented a Comprehensive Energy Management Program to manage and reduce its energy consumption and costs. As previously reported, PRASA undertook two separate procurement processes to engage the private sector in investing in energy related projects. These are: 1) Demand Side Projects through Energy Performance Contracts (EPCs); and 2) Supply Side Projects through Power Purchase Agreements (PPAs). Additionally, PRASA has developed internal initiatives and activities being implemented by the operational Regions and PRASA's Infrastructure Department. A description of the different initiatives is provided below.

4.5.3.1. Demand Side Projects through Energy Performance Contracts

During FY2014, PRASA completed the implementation phase of the first of six EPCs. The objective of this initiative is to have Energy Service Companies (also referred to as ESCOs) perform assessments and guarantee savings obtained by installing equipment and implementing activities designed to reduce energy consumption. The most important benefit for PRASA in employing this type of performance contract is the operations benefit from improvements guaranteed by the ESCOs and as such, if the energy savings are not achieved, the ESCO will pay PRASA for the non-achieved savings. The positive financial impact of this initiative for PRASA is limited by the fact that savings are guaranteed by the ESCOs until the investment is recovered and earned their agreed payments.

[14] PREPA is currently under a forbearance agreement with its creditors. In September of 2014, a chief restructuring officer was appointed to evaluate PREPA's fiscal situation and develop a comprehensive fiscal turnaround plan. It is expected that under this plan, to be completed and presented sometime in FY2015, the second stage of the preferential all-in-rate (and potentially the all-in-rate as a whole) will be eliminated.

PRASA has proceeded to perform a total of six EPCs with Honeywell International as the Energy Savings Company (ESCO) for water and wastewater treatment facilities. Table 4-11 provides a status summary of this initiative as of December 31, 2014. Investment Grade Energy Audits (IGEA) were performed at other PRASA facilities by Honeywell International (Fajardo WWTP) and Omega-Wendel (Rio Blanco WTP, Fajardo WTP, Aguadilla WTP, Mayaguez WWTP and eight PRASA buildings); however, based on the IGEA results (returns on investments did not meet PRASA's goals), EPCs were not pursued at these facilities. Upon completing the implementation phase of all six EPCs, PRASA expects to save approximately 21.7 million kWh per year. In terms of capital costs, unlike the demand side PPAs, the capital investments is financed by PRASA with bond proceeds (due to restrictions of the Governmental Accounting Standards Board standards). As previously mentioned, approximately $50M of the PRASA's February 2012 bond issue was designated to finance facility improvements related to the EPCs initiative; thus, the debt service cost associated to this project is included in the financial projections discussed in Section 7.

Table 4-11:
PRASA EPCs

Facilities	Status
Caguas WWTP	Implementation completed. Started Measurement and Verification phase.
Barceloneta WWTP & Bayamón WWTP	Construction/Implementation in progress
Sergio Cuevas WTP (Carraízo RWPS)	Design completed
Superaqueduct RWPS & Puerto Nuevo WWTP	Design in progress

4.5.3.2. Supply Side Projects through Power Purchase Agreements

In 2009, PRASA also undertook a parallel process in which it is procuring companies who are interested in providing independent energy supply services through PPAs. The objective is to secure one or more PPAs for lower energy unit costs per kWh than what PRASA currently pays to PREPA. From this process, PRASA selected seven companies to pursue further negotiations with and to possibly enter into PPAs. However, only three of the seven negotiations carried out by PRASA resulted in a successful agreement between the parties. Additionally, after the completion of the Request for Proposal (RFP) process, various unsolicited proposals were received. Of these, PRASA has elected to pursue two additional PPA projects. Table 4-12 below provides a status summary of the PPAs as of December 31, 2014.

Table 4-12:
PRASA PPAs

Proponent	Technology	Status
Aspenall Energies	Wind	Contract was cancelled - contractor faced challenges in obtaining PREPA's connection approval
Renewable Power Development[1]	Gasification	Contract Signed; Undergoing planning and permitting process for one 10MW facility (5MW committed to PRASA). Contractor is facing challenges in obtaining permits and waste supply contracts
Windmar Renewable Energy (PV Properties)	Solar	Contract Signed; 6.1 MW in operation, 0.5 MW construction completed and pending approval by PREPA
Element Power Solar	Solar	3 MW; in contract development
Organics Management	Gasification	Contract signed; project in design phase

During the second half of FY2014, PRASA issued a second RFP for additional PPAs. From this process, PRASA received five proposals which included solar, liquefied natural gas and biomass technologies. PRASA is completing the evaluation of the proposals and is expecting to begin negotiating with the selected company for a minimum of 5 MW during the second half of FY2015. During FY2014, PRASA saved approximately $350,000 from the solar PPAs currently in operation. Additional savings are expected once the other signed PPAs and those selected to be pursued from the 2014 RFP are in operation.

4.5.3.3. Regional Operational Initiatives

PRASA's Executive Management Team has set a goal to achieve additional energy consumption reductions of at least 5% between FY2014 and FY2017. During FY2014, PRASA's Operational Regions started to evaluate opportunities to implement energy conservation measures in its WTPs and WWTPs, and they are also leveraging hydraulic modeling analyses and optimization efforts to reduce energy consumption in the water distribution and wastewater collection systems (i.e., pump stations facilities). So far, PRASA's Operational Regions have identified energy conservation measures that reduce equipment operation time at the WWTPs with process control and at the WPSs by identifying and controlling system pressures and distribution tank overflows. Methods to track savings and establishing metrics are under development and are expected to be in place during FY2015.

4.5.3.4. Other Projects

In addition to the demand and supply side projects, PRASA continues working on the rehabilitation of the Lago Loíza (Carraízo) hydroelectric facility. The facility has been out of service since Hurricane Hugo impacted the island in 1989. PRASA will replace one of the three hydropower units, which has an estimated capacity of 1.1 MW. Energy generated from the rehabilitated facility will be used to supply power to PRASA's facility on-site. The design for this project has been completed and the bid process was completed in the first half of FY2015. PRASA is currently evaluating next steps for this project, as bids received were much higher than estimated.

4.6. Treatment Plant Automation Program

PRASA has continued the development and implementation of the Treatment Plant Automation Program, which consists in the installation of the necessary equipment and the development of the system protocols to automatically operate and remotely monitor its WTPs. The project scope includes the procurement and installation of automation control equipment (capital investment is estimated at approximately $400,000 per facility). As previously reported, the automation program underwent significant changes during the second term of FY2013. The program continued to be managed by PRASA's Infrastructure Department during FY2014. The Automation Program delivery strategy was revised as follows:

- Cluster operational model in place – PRASA to implement the organizational change component internally.
- Implement full automation of WTPs processes in the North Region clusters (No. 5, 6, 8, 9, and 10) and in the Metro Region (Cluster No. 22).
- Automatic Shutdown (ASD) at all plants in the West, South, and East Regions.

PRASA expects to complete the full automation of WTPs in Cluster No. #5 (a total of six plants), and Cluster No. 8 (a total of eight plants), and Cluster #9 by FY2015. Delays during construction and modification to some plants have extended the construction period to complete full automation of these clusters. PRASA also projects to transition the Metro Region facilities into full automation sometime during FY2015. The other regions will be partially automated following the 8-4-8-4 Automation plan[15]. PRASA intends to complete the remote monitoring of the remaining plants during FY2016. At the same time, PRASA will negotiate with PRDOH which of these plants will be transitioned to remote operation[16] in the future.

Facilities modifications to accommodate the Plant Control Center (PCC) rooms for each cluster and the automation-capable Remote Operation Centers (ROCs) will be completed by FY2016. Repair and replacement of certain plant equipment extended the previously reported completion date of FY2015. The East Region ROC was completed in FY2012. The North Region ROC and three of the five PCCs are completely functional as of FY2013. The remaining two PCCs will come online in FY2015. The South and West Region ROCs were completed in FY2014 and the Metro Region ROC will be completed by FY2016.

PRDOH and PRASA agreed on an endorsement procedure prior to the implementation of 8-4-8-4 and remote operation. This means that while plants can have ASD (needed for 8-4-8-4 operations) or full automation capabilities, the WTPs will have to follow the endorsement procedure prior to

[15] The term 8-4-8-4 operations refers to having an operator at the facility for a period of eight hours followed by a remote monitoring and un-manned operation for the next four-hour period. This 12-hr cycle is repeated, reducing the number of operators needed and minimizing overtime significantly.
[16] The term remote operation refers to a WTP that automatically adjusts parameters to meet regulatory compliance without the need of on-site operators. The WTP's performance is remotely monitored 24 hours a day, 7 days a week. Routine visits are required for maintenance and other specific tasks.

implementation of reduced shifts or staff. This causes a gap in the number of plants delivered and the number of plants endorsed. To date, a total of six endorsements have been received, and an additional nineteen, mostly due to new findings by the PRDOH during inspections, are expected by end of FY2015. After a maturity period and full automation is tested, PRASA can request endorsement for remote operation. Table 4-13 summarizes the projected program development schedule over the life of the project. As shown, under the revised strategy, PRASA has determined that only 113 WTPs (out of 119) will be impacted through this initiative. During FY2014, PRASA added five more plants to the initiative, including three large Metro Region plants (Sergio Cuevas, Enrique Ortega, and Guaynabo). Though PRASA is not intending to remote operate these three plants, they were added to the initiative to provide for remote monitoring.

Table 4-13:
Plant Automation Implementation Schedule

Fiscal Year	Cumulative No. of Plants with Remote Monitoring	Cumulative No. of Plants in Program with ASD Capability	Cumulative No. of Plants in Program with ASD Endorsement	Cumulative No. of Plants in Program with Full Automation Capabilities	Cumulative No. of Plants in Program with Remote Operation Endorsement
<2014	30	15	2	6	0
2014	52	34	5	9	0
2015	85	68	24	25	0
2016	107	87	66	29	5
2017	113	91	85	30	17
2018	113	91	85	30	24
2019	113	91	85	30	24

4.7. Creation of PRASA Holdings, LLC

As part of PRASA's plan to collect additional revenues to supplement its revenues and diversify its revenues sources, pursuant to Act No. 228, enacted on November 1, 2011, PRASA has created a new corporate entity, as a holding company for future investments. PRASA Holdings, LLC was registered in the State of Delaware; it is authorized to do business in Puerto Rico. One of the first opportunities pursued is the exportation of consulting services focused on infrastructure management and revenue optimization for utilities in Latin America (i.e. Honduras and Colombia).

Another opportunity being pursued is the development and operation of open access fiber optic infrastructure mainly through PRASA's water and wastewater System pipes in the San Juan Metropolitan area neighborhoods of Old San Juan, Condado and Isla Verde. Based on PRASA's feasibility analysis, the initial capital investment needed to launch the open access optic fiber network is estimated to be approximately $7.9M. Total capital expenditures are approximately $19M (over a 10-year period) and annual operating expenses are estimated at about $1.6M. The feasibility analysis also shows that starting in year 3, the projected revenues ($7M each year, on

average) would be sufficient to cover annual capital and operational costs. The project is expected to commence in FY2015.

The optic fiber network will be comprised of a mix of infrastructure elements and will be capable of delivering ultra-high-speed data, video, and voice services providing each customer with access to a bandwidth of 100 megabits to one Gigabyte per second. The fiber optic infrastructure will be built using, to the extent possible, PRASA's existing assets. It will incorporate planned aesthetic and undisruptive enhancements to complement such assets and to preserve their current operations without interfering with the capacity of the pipelines and sewer services. Based on PRASA's feasibility analysis, the estimated annual revenues range from around $1.8M during the first year of the project, up to $7M once connections reach the projected level (more than 10,000 connections).

4.8. Conclusions

Despite certain O&M related observations made during facility inspections in 2014, PRASA's O&M practices are adequate. The planned O&M expenses are generally in alignment with the System needs. PRASA continues to develop and implement operational initiatives with the goal of improving and optimizing its operations. The implementation of a Strategic Plan and the measurement and tracking of key metrics and KPIs has helped PRASA in the execution of its programs and projects, and in improving both operational and management results. Finally, the creation of a new corporate entity, as a holding company for future investments, allows PRASA to pursue diversified opportunities including the exportation of their knowledge and services; opportunities that could help them both diversify and supplement its revenue sources.

5. Capital Improvement Program and Regulatory Compliance Status

5.1. Introduction

PRASA continues to implement a comprehensive CIP to improve its water and wastewater infrastructure. The purpose of the CIP is to modernize PRASA's infrastructure, protect public health, safeguard environmental quality, permit continued economic development and help bring the System into compliance with all regulatory requirements.

The CIP is a dynamic program that is constantly evolving and undergoing revision as needs and funding are identified, and as projects transition from planning through design, construction and startup. In FY2014, PRASA's projected CIP expenditures amounted to $316M. As required by PRASA's Governing Board, PRASA's Infrastructure Department must annually submit for its approval an updated five-year CIP plan. PRASA's CIP plan includes $1,451.5M in capital expenditures from FY2015 through FY2019 as approved by PRASA's Governing Board under Board Resolution No. 2909. It includes a total of 620 projects that are scheduled for implementation during this period. Given the magnitude of the CIP, it is understandable that it will continue to evolve over time and the number and budgets of projects is expected to be updated regularly.

The CIP projects are divided into categories, groups and types. Additionally, PRASA has implemented a prioritization system in order to better manage the CIP, given its size and complexity. The individual project cost estimates within the CIP, including the R&R program, have not been independently verified by the Consulting Engineer, as these have been prepared by PRASA in direct collaboration with the PMCs.

This section of the report provides:

- an overview of PRASA's CIP, including summary of the program by project category;
- an assessment of the adequacy of the CIP to address identified system deficiencies and current requirements stipulated in open consent decrees with Regulatory Agencies; and
- an overview of the potential effects of future regulations on PRASA's System and CIP.

5.2. CIP Development and Management

Prior to 2004, many of the projects required to improve the System were not being delivered due to insufficient funding and internal execution resources. Recognizing the need to successfully implement an extremely aggressive and robust infrastructure program, PRASA obtained the services of five major firms or program management consultants (the PMCs) to plan, design, and manage the CIP projects in each of the five Regions. On July 1, 2009, PRASA reduce the number of PMCs from five to two in order to reduce associated program overhead costs (estimated savings

of about $7M). However, PRASA's Infrastructure Department identified the need to re-engage a third PMC and re-distribute responsibilities, as performance metrics started to decline. Therefore, since February 1, 2013 there are three PMCs that provide support to PRASA in the project development process and actively participate in the planning, conceptualization, design and construction phases island-wide. The PMCs are organized into three main teams: pre-construction, construction, and post-construction. As part of the pre-construction activities, the PMCs manage key tasks that drive CIP project budgets, such as defining project scopes, negotiating consultant contracts for studies and design services, reviewing project constructability, preparing project construction cost estimates, preparing bid packages, and managing bid processes (in close coordination with PRASA's Bids Board). As part of the construction management services, the PMCs serve as PRASA's representative in the CIP projects, managing project schedules, negotiating project change orders and administration of construction contracts, among other activities. Finally, as part of the post-construction services, the PMCs provide support for project start-up, training, and all project close-out activities.

At the request of PRASA's Infrastructure Director and based on the performance results measured by PRASA's Infrastructure Department, on December 2014, PRASA's Governing Board approved the following modification in the PMC structure: re-assignment of the PMC responsibilities for the South Region from CDM-Smith (current PMC) to Black and Veatch (existing PMC of the East Region); to become effective during the second half of FY2015, after a transition period. The new PMC structure is presented in Figure 5-1.

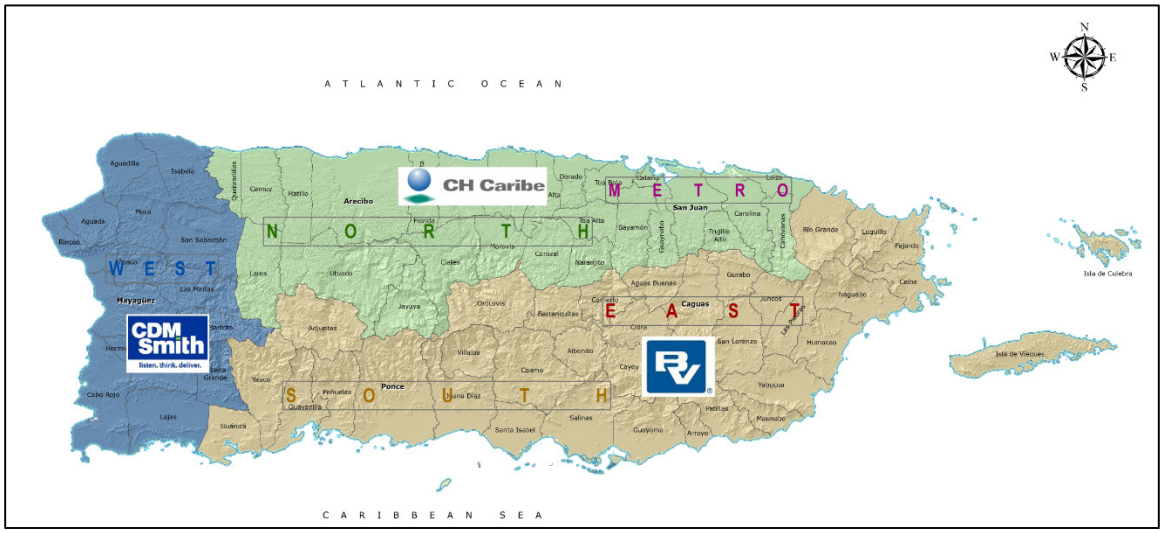

Figure 5-1: Program Management Consultants
(as approved by PRASA's Governing Board on December 2014)

Finally, PRASA continues to engage other engineering and consulting companies in areas such as planning, design, land acquisition and for other special assignments and initiatives.

5.3. CIP: Project Distribution and Costs

Projects included in the CIP cover major capital improvements identified throughout all five Regions, as well as island-wide initiatives such as technological advancements, telemetry implementations, meter replacement, and R&R to the System. The CIP is developed by PRASA taking into consideration a) current and future infrastructure and operational needs identified from system planning studies, and b) regulatory commitments as stipulated in consent decrees, administrative orders, and other agreements with Regulatory Agencies. Once the need for a capital improvement project is identified, a project creation form is prepared. The form summarizes the project scope, preliminary schedule, and cost estimates, amongst other information. The project is then assigned a CIP project number and added to the CIP inventory, where it is categorized according to PRASA's classification and prioritization system. Periodically (at least once a year), the changes to the CIP are presented to PRASA's Governing Board for revision and approval.

Total CIP investments per project are calculated taking into consideration the following estimated costs:

- Planning, studies, and land acquisition costs
- Design costs
- Construction costs
- Project management and inspection costs
- Contingencies
- Miscellaneous cost (includes financing costs, insurance, O&M documents and administrative costs)

Design costs are estimated based on the College of Engineers and Land Surveyors of Puerto Rico professional services compensation guidelines (vary by project type and complexity). The project management and inspection costs were revised to 7.5% of the construction costs; general, administrative and insurance costs are estimated at 14% of construction costs; while contingencies are estimated to be about 10% of the construction cost. PRASA is no longer including an annual inflation rate on construction costs over the project development period. PRASA eliminated the annual inflation rate of 3.8% previously used, considering the downturn in construction activity and lower project cost estimate results received during project bids. Throughout the development of the planning and design phases of the project, the contingencies are modified as the construction cost estimates are updated. Once the project goes out to bid and the bid is awarded, the amount calculated for contingencies is no longer updated and it remains as part of the assigned funds of the project until it is completed and closed-out. During the construction phase of the projects, contingencies are used to cover change order costs and other costs that may occur, such as additional land acquisition, permitting, or design activities. PRASA reports that existing contract change order percent in construction projects is about 3%, which is much lower than typical industry values of about 15-20%. Finally, as previously mentioned in Section 4, PRASA is tracking

KPIs for CIP project costs and schedules; results for FY2014 and for the first six months of FY2015 show that PRASA is managing the project budgets and schedules effectively.

5.3.1. Project Classification and Prioritization

CIP projects are classified into mandatory and non-mandatory categories. Also, PRASA has added a new category called "Structure". As such, there are now six CIP categories as listed below:

- Mandatory (USEPA, PRDOH, Civil Action, Administrative Orders)
- Non-Mandatory Compliance
- Non-Mandatory Quality, Efficiency, Reliability and Redundancy
- Non-Mandatory Growth
- Non-Mandatory Other
- Structure

Mandatory projects are those that are required by law, as stipulated in consent decrees, administrative orders, and agreements with Regulatory Agencies including the USEPA and PRDOH. Non-mandatory projects are those that, although not mandated by Regulatory Agencies, are necessary to maintain, upgrade, and grow the System. Structure category projects includes R&R projects, as well as technology improvements, meter replacement, and fleet improvement projects.

Projects are further classified as either water or wastewater system projects. Water system projects include projects for improvements or construction of new facilities regarding: water supply, water distribution, WTPs, WPSs, amongst others. Wastewater system projects include projects for improvements or construction of new facilities regarding: wastewater collection, WWTP, WWPSs, amongst others.

In addition to project classification, CIP projects are ranked according to a prioritization score. This score is the result of the weighted sum of the evaluation criteria adopted in PRASA's Master Plan and negotiated with Regulatory Agencies. Four main criteria were selected to prioritize CIP projects: Regulatory Compliance, Quality of Service and Reliability, Operational Efficiency and Improvements, and Population Impacted by Project. PRASA is in the process of finalizing its project prioritization system as part of the renegotiation process with USEPA and PRDOH. The implementation schedule of future projects, currently not included in PRASA's CIP, will be subject to the prioritization system and PRASA's financial capacity.

5.3.2. Capital Improvement Program FY2015-FY2019

PRASA's programmed CIP for FY2015 through FY2019 amounts to $1,451.5M and includes $320.3M for mandatory projects, as shown in Table 5-1. Figure 5-2 shows the total projected capital expenditures by category for FY2015 through FY2019. As shown in Table 5-1, the investment amounts for Mandatory projects reduces significantly from FY2017 to FY2019. This reduction is

mostly due to the terms being renegotiated with Regulatory Agencies. PRASA projects that in the future (from FY2020 through FY2025) Mandatory-driven investments will be in the range of $7M (4%) to $19M (12%) of the total projected annual capital investment for each fiscal year.

Table 5-1:
Capital Improvement Program FY2015-2019 by Category ($, Millions)

Project Category	Fiscal Year Ending June 30,					Total
	2015	2016	2017	2018	2019	2015-2019
Mandatory (Consent Decrees, Agreements etc.)[2]	$89.4	$105.1	$82.8	$34.4	$8.6	$320.3
Non-Mandatory Compliance	54.8	71.1	65.8	42.8	44.1	278.6
Non-Mandatory Quality, Efficiency, Reliability & Redundancy	38.3	45.5	37.9	35.3	49.8	206.8
Non-Mandatory Growth	5.3	8.4	13.4	11.2	5.0	43.2
Non-Mandatory Other	23.9	36.0	32.9	30.1	23.3	146.1
Structure	79.1	99.4	77.0	91.2	109.7	456.4
TOTAL[1]	**$290.8**	**$365.5**	**$309.8**	**$244.9**	**$240.5**	**$1,451.5**

[1] Numbers may not add due to rounding.
[2] Includes Caño Martin Peña/ENLACE projects.

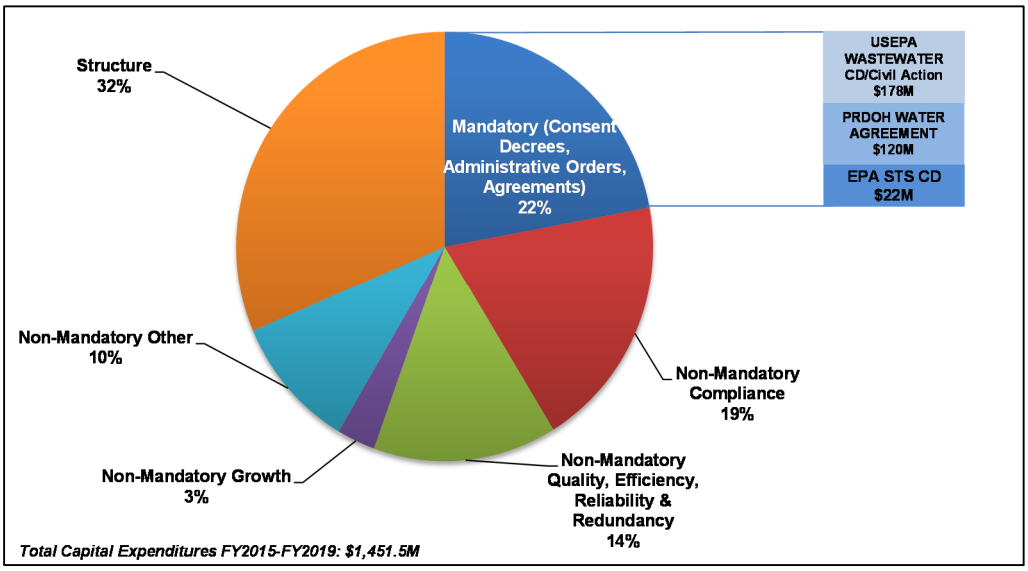

Figure 5-2: FY2015-FY2019 Capital Expenditures by Project Category

Water System Projects

The water system projects include projects to improve compliance (mandated and not mandated), new WTPs, new reservoirs and upgrades to water distribution systems. Total capital expenditures in water system projects for FY2015–FY2019 are estimated at approximately $413.0M, of which approximately $143.1M is allocated for projects classified as mandatory.

Wastewater System Projects

The wastewater system projects include projects to improve compliance, new WWTPs, and upgrades to wastewater collection systems. Total capital expenditures in wastewater system projects for FY2014–FY2018 are estimated at $425.2M, of which approximately $156.3M is allocated for projects classified as mandatory.

Other Projects: Structure, Operational, Planning, R&R and Technology

Total capital expenditures for all other capital projects are estimated at approximately $613.4M for FY2015–FY2019. These projects address R&R, preventive maintenance, meter replacements, office and building improvements, fleet upgrades, minor repairs, and technology improvements. R&R component of the IMP and certain minor repair projects are categorized as mandatory-driven, with an estimated FY2015–FY2019 capital expenditure of $20.8M.

Table 5-2 shows the project distribution and capital expenditure by group and type classification for FY2015 through FY2019.

Table 5-2:
Capital Improvement Program 2015-2019 by Project Type ($, Millions)[1]

Category Type	Sub-Category	Fiscal Year Ending on June 30,					Total
		2015	2016	2017	2018	2019	2015-2019
Water System	Water Supply	$8.1	$23.7	$23.7	$17.4	$23.5	$96.4
	Water Pump Stations	0.2	0.0	0.0	0.0	0.5	0.6
	WTP Capacity Increase	2.7	0.8	0.0	0.0	0.0	3.6
	WTP Improvements	37.5	39.7	24.7	11.4	7.0	120.2
	WTP New	17.0	19.1	17.2	3.1	0.0	56.4
	Water Distribution	19.7	19.2	17.4	30.9	47.3	134.5
	STS	1.2	0.1	0.0	0.0	0.0	1.3
	SUBTOTAL	**$86.4**	**$102.6**	**$82.9**	**$62.8**	**$78.2**	**$413.0**
Wastewater System	Wastewater Pump Stations	$4.3	$6.8	$7.8	$2.1	$0.0	$20.9
	WWTP Capacity Increase	0.3	0.4	0.02	0.0	0.8	1.6
	WWTP Improvements	17.8	38.3	45.7	27.0	14.3	143.0
	WWTP New	0.01	0.0	0.0	0.0	0.0	0.01
	Wastewater Collection	52.5	76.9	72.7	40.7	16.9	259.7
	SUBTOTAL	**$74.9**	**$122.4**	**$126.1**	**$69.8**	**$32.0**	**$425.2**
Meters	Water Meters	$16.0	$20.2	$20.7	$23.4	$22.1	$102.4
Buildings	Buildings	4.7	10.3	5.8	1.2	0.1	22.1
Fleet	Fleet	5.1	2.9	5.7	8.0	8.8	30.5
IMP (R&R component only)[2]	Water & Wastewater	12.2	4.8	1.2	0.0	0.0	18.1
Minor Repairs	Water & Wastewater	32.5	34.6	12.3	18.5	29.7	127.7
Renovation & Replacement	Water & Wastewater	29.9	53.5	47.5	51.2	60.2	242.3
Technology	Water & Wastewater	29.2	14.2	7.6	10.1	9.3	70.4
	SUBTOTAL	**$129.5**	**$140.5**	**$100.8**	**$112.4**	**$130.3**	**$613.4**
TOTAL		**$290.8**	**$365.5**	**$309.8**	**$244.9**	**$240.5**	**$1,451.5**

[1] Numbers may not add due to rounding.
[2] Does not include actual maintenance costs related to the IMP; these are included in PRASA's O&M budget.

5.4. CIP and Current Regulatory Compliance

The primary focus of the CIP is to maintain, modernize and help bring the System into compliance with applicable environmental laws; it adequately addresses the requirements of existing consent decrees and agreements and considers proposed modifications to said consent decrees and agreements, as currently being negotiated by PRASA with Regulatory Agencies. Nonetheless, it shall be noted that the actual cost of compliance with the consent decrees and agreements and PRASA's total capital expenditures may vary substantially depending on, among other things:

- Inflationary environment with respect to the costs of labor and supplies needed to implement the compliance program.
- Weather conditions that could adversely affect construction schedules and consumption patterns.
- Population trends and political and economic developments in Puerto Rico that could adversely impact the collection of operating revenues.
- Willingness of the U.S. Justice Department, USEPA, PRDOH and others, to cooperate with respect to the re-negotiations of existing consent decrees and agreements; and the timing of implementation and any additional requirements that may arise as PRASA implements its mandated studies and remedial plans.
- Possibility of new environmental legislation or regulations affecting the Systems.
- Unanticipated costs or potential modifications to projects resulting from requirements and limitations imposed by environmental laws and regulations.
- Inherent uncertainty involved in CIP projects of the magnitude undertaken by PRASA.

PRASA is currently bound by the terms of several comprehensive consent decrees and settlement agreements to eliminate treatment plant non-compliance and unpermitted discharges of untreated sewage, and to improve the quality of potable water and STSs. These agreements include the following:

1. PRASA IV: 2003 Consent Decree, U.S. v. PRASA, Commonwealth of Puerto Rico, and Compañía de Aguas de Puerto Rico, Inc., Civil Action No. 01-1709 (JAF) – Addresses violations to the Section 301 and 402 of the Clean Water Act (CWA) and regulations and PRASA's NPDES permits with regard to certain of PRASA's WWPSs.

2. 2006 Wastewater Consent Decree, U.S. v. PRASA and Commonwealth of Puerto Rico, Civil Action No. 06-1624 (SEC) – Addresses violations to the Section 301 and 402 of the CWA and regulations promulgated there under, and PRASA's NPDES permits with regard to PRASA's WWTPs.

3. 2006 PRDOH Drinking Water Settlement Agreement Civil Action KPE 2006-085817, as amended – Addresses non-compliance and alleged violations with the Puerto Rico Potable Water Purity Protection Law, as amended ("Ley para Proteger la Pureza de las Aguas Potables de Puerto Rico, Ley Num 5 de 21 de Julio de 1977, según enmendada"), the Safe Drinking Water Act (SDWA) and applicable regulations, and the General Environmental Health Regulation ("Reglamento General de Salud Ambiental, Reglamento Núm. 6090 de 4 de febrero de 2000").

4. 2010 USEPA STS Consent Decree, U.S. v. PRASA and Commonwealth of Puerto Rico – Addresses alleged violations to the SDWA and the CWA specifically to the National Primary Drinking Water Regulations (NPDWRs).

The consent decrees with USEPA and the agreement with PRDOH require PRASA to implement remedial plans, develop and implement CIP projects to bring the System into compliance with regulatory requirements, and conduct evaluation concerning specific System infrastructure and operational issues. PRASA currently estimates that the total cost (incurred and projected) of compliance with the existing consent decrees and agreements will be over $2,700M through fiscal year 2025. In the preparation of this CER, MPPR/ARCADIS reviewed the following reports, submitted to Regulatory Agencies in compliance with consent decree and agreement requirements:

- PRASA IV Triannual Progress Report No. 33, No. 34, and No. 35, covering the period from January 1 to April 30, 2014; May 1 to August 31, 2014; and September 1 to December 31, 2014, respectively.
- 2006 USEPA Consent Decree Triannual Progress Report No. 23, No. 24, and No. 25 covering the period from October 1, 2013 to January 31, 2014; February 1 to May 31, 2014; and June 1 to September 30, 2014.
- 2006 PRDOH Agreement Quarterly Progress Reports No. 24, No. 25 and No. 26, covering the period from January 1 to March 31, 2014; April 1 to June 30, 2014; and July 1 to September 30, 2014, respectively.
- 2010 USEPA STS Consent Decree Triannual Progress Report No. 12 and No. 13, covering the period from January 1 to April 30, 2014; and May 1 to August 31, 2014, respectively.

5.4.1. PRASA IV: 2003 Consent Decree, Civil Action No. 01-1709 (JAF)

PRASA submitted to the USEPA the Triannual Progress Reports No. 33, No. 34, and No.35 that cover the periods from January 1 to April 30, 2014; May 1 to August 31, 2014; and September 1 to December 31, 2014, respectively. As of August 2014, all measures were implemented including the Supplemental Environmental Project (SEP) and the stipulated penalties for the bypass events

[17] In 2008 CER and PRASA's Official Statement, it was referred to as 2006 Drinking Water Settlement Agreement. Year has been updated to reflect date Settlement Agreement was signed: March 15, 2007. Subsequently, the Settlement Agreement was amended on June 16, 2008.

associated to the WWPSs are still being assessed. The proposed plan regarding this consent decree is to integrate it into the 2006 USEPA Consent Decree; this is still pending further negotiations between PRASA and USEPA. A summary of the status of remedial actions is listed below.

- Remedial actions to be performed at the agreed upon pump stations – Pursuant to Section VI, paragraph 11, of the consent decree, PRASA was required to submit a detailed list of remedial actions to be performed at each agreed upon pump station and a proposed schedule for completion. As informed in the Triannual Report No. 12, all required projects have been completed.

- Operation and Maintenance Plan – The agreed phased approach for integrating the wastewater pump stations to the IMP was completed. The major tasks performed during the period ending August 2014 were organizational structure and SAP PM Implementation. PRASA continues to conduct compliance inspections of all facilities to endure on going and sustainable compliance with the basic elements of the implemented program.

- Spill Response and Cleanup Plan – Pursuant to Section VIII, paragraph 17 of the consent decree, PRASA was required to submit to USEPA for approval a spill response and cleanup plan that specifies actions to be taken by PRASA for unanticipated bypasses for any pump station facility. PRASA offered several spill response and cleanup plan refresher sessions to 150 employees during the months of July through October 2007 and summer of 2008 that were involved with the operation of wastewater lift stations, including those responsible for the notification of events. The PRASA spill response and cleanup plan is being reviewed to integrate pump stations unanticipated bypass and combined sewer overflow (CSO) events.

- Supplemental Environmental Project – PRASA selected the El Chichón, Villa Blanca and Lajitas communities for implementation of the supplemental environmental project. All construction and related works were completed and the project was accepted by PRASA's Operational Area.

5.4.2. 2006 Consent Decree, Civil Action No. 06-1624 (SEC) (or Mega Consent Decree)

PRASA submitted the Triannual Compliance Reports No. 23, No. 24, and No. 25 that cover the periods from October 1, 2013 to January 31, 2014; February 1 to May 31, 2014; and June 1 to September 30, 2014, respectively. PRASA has indicated that it requested a time extension for the issuance of the triannual report No. 26; the progress report is expected to be issued on February of 2015. The 2006 USEPA Consent Decree specifies that PRASA shall implement system-wide remedial measures at all WWTPs owned/operated by PRASA. These remedial actions are to be completed in three phases, consisting of short and mid-term remedial actions, and long-term CIP projects to be implemented over the course of 15 years. PRASA completed all short and mid-term remedial actions (CIP Term 1). All the CIP Term 2 and CIP Term 3 ending June 1, 2016 and June

1, 2021, respectively, will be in compliance with terms and conditions of the NPDES permits for each facility. The CIP Term 2 has a total of 33 projects, in which six projects were completed within CIP Term 1 deadline and/or by the year 2013. These projects were: El Torito WWTP flow diversion, the Morovis WWTP new package plant, the Boquerón WWTP elimination, the Mayaguez WWTP seepage from the raw influent channel, the Maunabo WWTP expansion, the Playa Santa WWTP elimination, and the Ponce WWTP ROV study of the sewer line from Mercedita PS to the Ponce WWTP. The CIP Term 3 has total of 19 projects in which six projects are not included in the prioritization list and are being eliminated through the renegotiation. These projects are: the Comerío WWTP flow diversion, the Dorado and Vega Baja WWTPs' retrofit and flow diversion, the Unibón flow diversion, and the Las Marías and Maricao WWTPs' retrofit and capacity increase. Finally, it should be noted there are still a number of these Term 2 and Term 3 projects that are currently being negotiated between PRASA and USEPA.

The following presents a status summary of the applicable standard and special conditions of probation:

- In accordance with special condition No. 3 of the consent decree, PRASA shall construct and complete capital improvements to replace, repair and upgrade the collection and wastewater treatment system in the Ponce de Leon Avenue area of San Juan of not less than $10M to remedy and prevent direct discharges to the Martin Peña Channel. The Ponce de Leon Ave. sewer separation project is a combined storm water and wastewater system that discharge combined wet weather flows into the Martin Peña Channel. The existing combined flow channel is approximately 10,700 feet, located in the center of Ponce de León Ave., which runs through a mainly business and commercial area within a heavily congested arterial. As agreed by all concerning entities, the project completion schedule will be in line with the requirements of the consent decree and this should not have a negative impact on PRASA's current compliance record.

- In accordance with special condition No. 9 of the consent decree, all PRASA plants shall have a licensed operator available at all times, 24 hours a day to ensure proper operation of the treatment facilities. PRASA maintains USEPA informed of the Agency's efforts to increase the percentage of licensed operators including in each triannual report a progress report on the status of the licensing process of the water and wastewater operators. PRASA continues the training and hiring process of water and wastewater operators. In order to increase the percentage of licensed operators, PRASA's training department has an on-going training program for the WWTPs and WTPs operators and other operational and compliance personnel.

- In accordance with special condition No. 19 of the consent decree, PRASA shall undertake all necessary measures to reduce the amount of sanitary sewage systems overflows. On May 21, 2012, PRASA submitted to USEPA a revised version of a spill response and cleanup plan, which specifies actions to be taken by PRASA for sanitary sewage systems overflows from all

facilities owned and/or operated by PRASA. This response and cleanup plan is still under revision to incorporate the pump stations and combined sewer systems spill response control activities.

- Section IX of the consent decree specifies that PRASA shall develop and implement a sanitary sewer system evaluation plan and a sanitary sewer system repair plan for the Aguadilla, Bayamón, Isabela, Juncos, La Parguera, San Sebastián New and Unibón Morovis WWTPs service areas. Furthermore, PRASA shall develop and implement a preliminary sanitary sewer system evaluation plan for all facilities in Puerto Rico owned and/or operated by PRASA, with the exception of the seven facilities covered by the sanitary sewer system evaluation plan and repair plan, as specified above. This process of evaluation and repairs project is a strategy focused to control the I/I issues in PRASA's wastewater collection system. PRASA completed the required evaluations and the next steps are included as part of the renegotiation of the consent decree.

- Section XXIII of the consent decree specifies that, as a SEP, PRASA shall commit at least $3M to provide sewer service (which shall include the connections to private residences in the community) to at least one community that historically has not been connected to PRASA's wastewater collection system. Essentially, the watersheds that shall be considered for this project are La Plata and Río Grande de Loíza watersheds. La Plata Community, located in Naranjito, Puerto Rico, was approved by USEPA on December 15, 2006. After the design was placed on hold in 2009 while USEPA and PRASA discussed the possibility of replacing the SEP, the project was issued for bid on November 2011 and the notice to proceed was issued in May 2012. Currently, the construction of the project is 100% completed and all punch list items were finalized by September 19, 2014. The facilities are ready to be operated, and the project was turned over to PRASA Operations.

5.4.3. 2006 PRDOH Drinking Water Settlement Agreement

PRASA submitted the Quarterly Settlement Agreement Reports No. 24, No. 25, and No. 26 that cover the periods from January 1 to March 31, 2014; April 1 to June 30, 2014; and July 1 to September 30, 2014, respectively. PRASA has indicated that it requested a time extension for the issuance of the triannual report No. 27; the progress report is expected to be issued on February of 2015. Article VII of the 2006 PRDOH Agreement states that PRASA will implement remedial actions in multiple systems or components. These remedial measures are classified as short, mid, and long term remedial measures. A summary of the status of the remedial actions as of September 2014 is described below.

- Short-term measures – A list of 540 remedial actions was identified to be completed within 12 months of PRASA and PRDOH entering into the 2006 PRDOH Agreement. All short-term measures were completed.

- Mid-term measures – A total of 115 remedial actions were identified to be completed by March 14, 2010. All mid-term remedial measures were completed.

- Long-term measures – The long-term measures are divided into three terms to be respectively completed in the scheduled time frames. Term 1 (five years or no later than December 15, 2011) includes 38 total projects; these were completed with the exception of the Guayama WTP, which the revised date extension was due December 31, 2013. PRASA solicited an additional time extension until October 31, 2014. The periods to implement the remedial measures for Term 2 and Term 3 have due dates from December 31, 2016 through December 31, 2021. The Term 2 measures have a total of 19 projects in which eight were already completed. Finally, the Term 3 measures have a total of 13 projects in which three were already completed. These three projects were Enrique Ortega WTP Phase-A improvements, the Tetúan system, and the Guajataca WTP improvement.

- Article VII of the Transactional Agreement stated that PRASA will develop a program aimed to optimize treatment processes to be implemented in larger systems. According to PRASA, on May 24, 2013, PRASA submitted to PRDOH a report that summarizes their efforts in the optimization program and their proposed strategy to provide monitoring and continuity of the program. PRDOH submitted comments to PRASA. Subsequently, PRASA will have a meeting with PRDOH to discuss the comments. On June 6, 2014, a meeting was performed between PRASA and PRDOH to discuss the status of the optimization program.

- The SEP project presented to PRDOH, was divided in three projects and impacts the Non-PRASA Water Systems due to technical limitations, management or financials in which it difficult to operate and maintain a public water system in compliance with state and federal laws and regulations. The project is divided as follows: 1) Sampling and analysis of regulated chemical contaminants in potable water (was completed but PRASA agreed with PRDOH to extend the project for an additional year); 2) Disinfection equipment installation, which was completed; and 3) PRASA service connections to schools served by Non-PRASA systems. For this last project, on August 29, 2014, PRASA and PRDOH filed a motion requesting an amendment to select the Non-PRASA system known as "Asociación Pro-Desarrollo Comunal Bo. Florida de Naguabo, Puerto Rico". The project consist of the installation of meter boxes with their respective supply connection on the property limit of each structure to allow the connection to PRASA's potable water system. PRASA submitted its work plan for PRDOH approval. PRASA, at the time of the preparation of this report is awaiting for the approval of the amendment.

5.4.4. 2010 USEPA STS Consent Decree

PRASA submitted the Triannual Progress Report No. 12, and No. 13, covering the periods from January 1 through April 30, 2014; May 1 to August 31, 2014, respectively. PRASA has indicated that it requested a time extension for the issuance of the triannual report No. 14; the progress report

is expected to be issued on February of 2015. The report summarizes all PRASA's activities, any applicable stipulated penalties, along with all pertinent deliverables required to be submitted. In general, PRASA has mostly complied with the requirements of the consent decree. PRASA reports to have made several requests for deadline extensions for certain projects. These extensions have been approved, as applicable, by USEPA and U.S. Court. PRASA reports to have assessed, in various occasions, penalties as a result of violations to interim and final effluent compliance parameters. A summary of the compliance status as of August 2014 is described below.

- The remedial measures are divided in three phases, consisting of short and mid-term remedial actions, and long-term capital improvements. PRASA agreed to undertake and substantially complete short-term remedial actions by December 31, 2010 and mid-term remedial actions by June 30, 2012. Long term CIP projects were further divided in three additional subdivisions referred as CIP-Term 1, CIP-Term 2 and CIP-Term 3, with variable termination dates ranging from June 30, 2012 up to June 30, 2024.

  - The short-term remedial actions were completed as required by the consent decree.

  - A motion was presented to and subsequently approved by the U.S. Court for the District of Puerto Rico on August 29, 2012 which modified certain requirements, including deadlines, for the 417 mid-term remedial measures included in the 2010 USEPA STS Consent Decree. The mid-terms remedial measures, which were scheduled for March 2013, were completed during the months of April 2013 to October 2013, with the exception of Guayama WTP, for which, PRASA requested an additional time until July 2014. The remedial measures for Guayama WTP already were completed.

  - The compliance with the Long-Term CIP-Term 1 showed that 13 of the 14 projects of the Remedial Measures have been completed. PRASA requested an approval extension of time for Sergio Cuevas WTP project to USEPA until June 2014. The Sergio Cuevas WTP project is already completed. The certification of completeness will be included in the next Triannual Progress Report. The compliance with the Long-Term CIP-Term 1 represents a 98% of agreed projects measures. The CIP-Term 2 and CIP-Term 3 are underway.

- PRASA is complying with the interim limits set forth for each of the WTPs until the established deadlines for each one are met. As part of the renegotiation of this agreement (currently in process), PRASA and USEPA have discussed the possible amendments of the interim limits. PRASA will submit a proposal to the USEPA to complete all interim limits. Monitoring is being conducted as specified for each parameter in their respective NPDES permit, and the results are submitted in the monthly DMRs.

- PRASA operates and maintain all WTP's STSs in accordance with the USEPA-approved IMP. This program is meeting the requirements and schedules and, as previously presented, PRASA is well underway to complete the implementation no later than March 31, 2021. PRASA

implemented an interim IMP in all STSs. This program includes at a minimum, regular inspections and procedures to support prompt repair of all equipment and routine preventive maintenance for all equipment. PRASA continues conducting compliance inspections of all facilities to ensure on going and sustainable compliance with the basic elements of the implemented program. PRASA also continues implementing a Process Control System (PCS) that includes at least the Standard Operating Procedures (SOPs) for the treatment of washwater discharges at the STSs, accurate flow measurements, logs and records for all activities, processes and tests performed at the STSs, the troubleshooting guides for proper process control, and the organizational structure for implementation of PCS.

- PRASA completed the construction of the SEP of the Aeration of the Toa Vaca Lake. A first completion report was submitted on December 13, 2012 for USEPA's evaluation and approval. A second and final completion report that details the operation and maintenance of the project for the past five years will be submitted on December 31, 2017, for USEPA's evaluation and approval.

5.5. Consent Decree Renegotiation between PRASA and Regulatory Agencies

PRASA and the Regulatory Agencies are currently in discussions to modify certain requirements of the existing consent decrees and agreements to re-align compliance priorities and, in turn, help alleviate PRASA's financial burden. These modifications are expected to result in the postponement or advancement of the implementation of certain projects currently included in the CIP, and/or the modification of their scopes of work. The discussions significantly advanced in FY2013 and continued in FY2014. Final filing of the amended consent decrees and agreements with the court is expected to be completed in FY2015.

This renegotiation process is expected to result in the following modifications:

- The postponement or advancement in completion dates of certain projects currently included in the CIP.

- A revision to the negotiated projects' scopes of work to better address the facilities' current needs.

- The elimination of projects from the consent decrees and agreements given that the facility is in compliance and the project no longer needs to be performed or because the project has already been completed and certified.

- The addition of new compliance projects – Several projects that were not originally included in the consent decrees or the agreement were negotiated to be included. Additional projects proposed for the 2006 PRDOH Agreement involve compliance projects required by the Long

Term 2 (LT2) Enhanced Surface Water Treatment Rule. This rule requires further treatment of cryptosporidium and other pathogenic microorganisms with the purpose of reducing the illness associated with them (detailed information on Section 5.6). Additional projects added to the 2006 USEPA Consent Decrees include: I/I studies, CSO projects, and Caño Martin Peña/ENLACE projects.

- Development of a prioritization system – Specific criteria were defined for each project category (water, wastewater or STS) and a scoring methodology was developed in order to objectively prioritize, as much as possible, the list of projects. The criteria considers regulatory and environmental compliance, operational requirements and needs, as well as population served, among other characteristics. The prioritization system establishes the relative priority of all planned upcoming projects with the objectives of allocating PRASA's limited financial resources according to such priority. Hence, for example, any projects to address future regulations would only be funded if it was within PRASA's approved annual spending level and based on its priority score.

- Development of a Base List of projects – Includes high priority mandatory compliance projects that have already started the process of planning, design or construction and will not be subjected to the prioritization process. Specific deadlines for these high priority projects were individually discussed and negotiated between PRASA, USEPA and PRDOH.

5.6. Future Regulations and Other Regulatory Requirements

The CIP was also reviewed for adequacy to comply with future regulations and other regulatory requirements that could impact compliance limits for PRASA's water and wastewater facilities.

Regarding the wastewater system, plant-specific changes to effluent permit limits for phosphorus and nitrogen are expected within the next few years. It is anticipated that in order to comply with the lower discharge limits to be imposed by USEPA for this parameters in NPDES permits, operational modifications and even additional capital improvements to the WWTPs may be required. However, as part of the re-negotiation process with USEPA, PRASA is requesting the flexibility to address these issues, and any future, plant-specific changes to effluent permit limits, first through the implementation of interim limits, and second with the development of the necessary improvements which, should they be of capital investment in nature, would be subject to the CIP prioritization system. Also, as addressed in the consent decrees and as part of the ongoing negotiations with USEPA, PRASA may be required to implement a repair plan of its wastewater collection system (including any existing combined sewer systems) to reduce sewer overflows.

PRASA is already under regulatory mandate to implement remedial measures and commitments to improve the separate and combined sanitary sewer system operating efficiency to minimize sewer overflow impacts for the Puerto Nuevo WWTP service area. The most recent NPDES permit for the Puerto Nuevo WWTP requires that PRASA implement the Nine Minimum Control (NMC)

measures and a Long-Term Control Plan (LTCP) for the Puerto Nuevo WWTP service area to address wastewater collection system and combined sewer system overflow occurrences. As such, PRASA is currently undertaking the development and design of a Sewer System Operation & Maintenance Plan (SSOMP or S2OMP) for the Puerto Nuevo WWTP service area. The SSOMP will manage both the combined sewer systems and the sanitary sewer system requirements as stipulated in the NPDES permit (NMC and LTCP) in addition to a comprehensive capacity, management, operations, and maintenance (CMOM) program for all the Puerto Nuevo sanitary sewer system. The following tasks will be performed by either PRASA personnel or a private contractor as part of the SSOMP: inspection and cleaning of the combined sewer system and identified areas of concern, modelling, cleaning and mapping/drawing validation (reconnaissance). Through these efforts, PRASA expects to identify System needs related to overflows (including CSOs) and to be able to better estimate the effort and expected costs of a future repair plan. PRASA has indicated that once it completes these efforts in the Puerto Nuevo WWTP service area, it will expand the program to the rest of the Metro Region and, eventually, to the rest of the island (where applicable). At this time, PRASA does not have a specific time frame for when this will occur. However, it is likely that USEPA will include conditions and requirements such as those included in the Puerto Nuevo WWTP NPDES, in NPDES permits for other facilities.

As part of PRASA and USEPA's ongoing renegotiation process, the economic impact of developing and implementing repair plans in these systems, specifically in the Puerto Nuevo WWTP service area, is currently being defined. At this time, PRASA preliminarily estimates that the remedial measures and commitments to address the separate and combined sanitary sewer system of the Puerto Nuevo WWTP service area could be in the range of approximately $7M to $10M per year for the next 14 years. However, as published in its November 24, 2014 *Financial Capability Assessment Framework for Municipal Clean Water Act Requirements* memorandum, the USEPA has pledged its commitment to work with state and local government partners to assist local municipalities and local authorities (such as PRASA) to meet CWA obligations considering the particular financial challenges that local jurisdictions face. PRASA continues to negotiate with USEPA in order to obtain as much flexibility as possible in the schedule development for its current and future obligations; and has provided ample support information for USEPA's consideration in accordance with the USEPA's financial capability assessment guidance and framework.

Regarding the water system, anticipated future regulations for potable water systems (PWSs) at the time of this report writing include:

- *Unregulated Contaminant Monitoring Program* – The USEPA uses the Unregulated Contaminant Monitoring Program to collect data for contaminants suspected to be present in drinking water, but do not have health based standards set under the SDWA. Every five years, the USEPA reviews the list of contaminants, largely based on the Contaminant Candidate List (CCL). To date, two rounds of unregulated contaminant monitoring have occurred; the results will help USEPA shape the future regulatory environment.

- *Candidate Contaminant List* – The CCL is a list of contaminants that are currently not subject to any proposed or promulgated national primary drinking water regulations, but are known or anticipated to occur in public water systems, and that may require regulation under the SDWA. The list includes, among others, pesticides, DBPs, chemicals used in commerce, waterborne pathogens, pharmaceuticals and biological toxins.

Also, as previously noted, PRASA will be likely required to implement remediation measures in well facilities that, under the GWUDI regulation, are found to be influenced by superficial water sources. Currently, the evaluation program is still underway. PRASA continues the evaluation process at these facilities to determine the improvement needs and to develop the well remediation program and action plan. Finally, PRASA may identify additional CIP needs to bring the water system into compliance with the Stage 2 D/DBPR. As noted in Section 3, since the implementation of the Stage 2 D/DBPR, several PWSs that were previously in compliance are now exhibiting compliance problems as a result of the stricter monitoring and sampling requirements imposed by this regulation. For now, PRASA is currently implementing changes in its O&M practices to bring the PWSs into compliance. However, any additional needs identified and included in PRASA's CIP will be entered into the CIP prioritization system.

5.7. Master Plan Updating

As reported in previous CERs, in 2011 PRASA updated its water and wastewater infrastructure Master Plan (FY2011 Master Plan). However, recognizing the need to keep this document up to date, in FY2013 PRASA began revising it to reflect infrastructure needs based on the analysis of the most recent population projections using the data provided in the U.S. Census 2010, the Puerto Rico Planning Board (PRPB) 2013 population projections, and PRASA's updated compliance and capacity data. The updated Master Plan provides PRASA with a revised roadmap for the implementation of its future investments in water and wastewater infrastructure through the year 2030. In addition, the updated Master Plan also takes into consideration recent renegotiation agreements with Regulatory Agencies and the projects' prioritization system.

In FY2014, PRASA completed the first two tasks of the Master Plan Update; Task 1: Water and Wastewater Service Area Re-Assessment Evaluation and Demands Update, and Task 2: Water and Wastewater Infrastructure Needs and Project Scopes Update. As presented in the 2013 PRPB population projections and the 2010 US Census, and in line with recent trends, the population of Puerto Rico is projected to decline by 2030, resulting in a decrease in the island's overall water demand. The Master Plan Update estimates a substantial decline in water demand from about 556 MGD in 2013 to 427 MGD in 2030. In contrast, the water demand trend estimated in the FY2011 Master Plan, presented an increase in water demand from 650 MGD in 2010 to 667 MGD by 2030.

Consequently, results presented in the Master Plan Update show that fewer projects than those recommended in the FY2011 Master Plan will be required over the planning period. Instead of moving towards the construction of more WTPs, intakes and reservoirs; more transfers, WTPs

elimination and wells inactivation are recommended. As such, the Master Plan Update focuses more in the maintenance and optimization of the System. In terms of compliance, although a different approach was used – FY2011 Master Plan evaluated the facilities individually, whereas the Master Plan Update evaluated PRASA's water distribution systems or PWSs (eg. subsurface and surface systems) – improvements in both compliance with water quality parameters and discharge requirements were observed.

The plan is to continuously revise PRASA's Master Plan to maintain its CIP updated with the System necessities. Additional modifications to PRASA's Master Plan may be warranted as conversations with Regulatory Agencies continue and additional regulatory requirements and needs arise.

5.8. Conclusions

PRASA's CIP generally addresses the needs of the System and complies with PRASA's existing commitments with Regulatory Agencies (as proposed to be amended). The CIP includes projects that cover a broad array of current and future needs, as identified by PRASA and as required by consent decrees. The CIP also includes funding for minor repair projects and PRASA's R&R program. Although projected annual investments from FY2016 through FY2019 for projects classified as R&R are lower than PRASA's historical R&R annual investments, PRASA has indicated that minor repair projects also target System renovation and rehabilitation. Also, as noted in previous reports, given PRASA's high rate of leaks and overflows and continuing aging infrastructure, additional funds and an acceleration of the R&R program may be required to reduce/minimize these incidences. Hence, PRASA may need to realign its projected CIP breakdown of funding sources if results show that the lower annual R&R investment is not adequate to maintain the System. Finally, PRASA's CIP includes funding for maintenance improvements, as well as for other necessary infrastructure projects (i.e., fleet and building renovation, and technological improvements) essential to maintaining and preserving the utility assets.

PRASA will need to perform additional assessments and implement operational changes or additional capital improvements to bring non-compliant facilities into compliance. However, PRASA's most recent facility compliance results, and record of compliance with the milestones of the consent decrees with USEPA and the agreement with PRDOH supports PRASA's ongoing commitment to continue to maintain its System in compliance with applicable regulations and environmental matters.

While PRASA has begun to identify the potential impact of new regulations, the full impact of future regulations and other regulatory requirements on PRASA's System are not known at this time. In some cases, future regulations and additional regulatory requirements are expected to require minor process changes and in other cases major capital improvements, such as construction of new treatment processes and intensive repair programs. In general, although the CIP includes some contingencies to address future regulatory needs, the existing CIP does not include projects

intended solely to address future regulations or additional regulatory requirements that may be imposed on PRASA. As the impact of future regulations becomes more defined, CIP modifications will be required to adequately accommodate resulting needs. These CIP needs, as currently being negotiated with Regulatory Agencies, will be prioritized and implementation schedules will depend on PRASA's financial capacity.

6. Insurance Program

6.1. Introduction

Section 7.08 of the MAT establishes that "[PRASA] shall employ an Insurance Consultant to review the insurance program of the Authority from time to time (but not less frequently than biennially). If the insurance Consultant makes recommendations for the increase of any coverage PRASA shall increase or cause to be increased such coverage in accordance with such recommendations, subject to a good faith determination of PRASA that such recommendations in whole or in part are in its best interest."

MPPR/ARCADIS contracted MARSH Saldaña, Inc. (MARSH) to review PRASA's current insurance coverage and determine its adequacy considering the type and value of PRASA's fixed assets. MARSH also provided a professional opinion on the appropriateness of such coverage and recommendations related to PRASA's insurance coverage, as detailed in the following sections. The data, opinions, and comments included in this section have been based on PRASA's copies of policies and other documents provided by PRASA for this purpose.

6.2. Risk Management

Risk is exposure to loss. It is the chance of something happening that will lead to a loss or an undesirable outcome and it is measured in terms of consequences and likelihood. Risk management is an effective process that is directed towards management of risks and hazards in order to produce a desired set of results.

The treatment of risk takes the following forms:

- Loss Control:
  - Elimination or reduction of risk by physical, technical or mechanical means, loss prevention techniques, loss prevention engineering.
- Contractual transfer:
  - Hold harmless agreements, indemnity agreements in contracts with suppliers, contractors, service providers, customer agreements.
- Transfer of risk through insurance:
  - Self-insurance.
  - Insurance policies and coverage available from insurance companies.

- Insurance products/programs available from government's Federal Emergency Management Agency (FEMA) and state (Commonwealth of Puerto Rico) including workers' compensation, and health/medical, among others.

6.2.1. PRASA Insurance Department

The risk management function is an integral part of the management function. Within PRASA, risk identification and treatment is performed by all departments at all levels in conformity with local and federal regulations, including the Occupational Safety and Health Administration (OSHA) regulations. Risk management is applied through the employment of independent engineering and consulting firms in planning, design and construction and in the implementation of excellence in practices and processes. Furthermore, new construction is carried out in accordance with applicable building codes and regulations.

6.2.2. Identification of Risk

The risks affecting PRASA can be broadly categorized as follows:

1. Risks to property, facilities, and physical assets from natural and human element causes.
2. Financial risks arising from damage to, or loss of, physical assets, such as loss of income, interruption of operations and an increase in operating expenses to continue operations.
3. Financial risks resulting in management liability related to economic downturns.
4. Regulatory issues that might result in liability or service interruption.
5. Theft of owned and non-owned property.
6. Theft of water production.
7. Liability risks, including suits from third parties for injury or loss of property, fines/penalties, injuries caused by vehicles or properties, advertising injury, products, libel, slander, false arrest/detainment and injuries occurring on or off premises.
8. Pollution liability claims and fines.
9. Public authority/errors and omissions liability, which is liability arising from financial loss incurred by other that does not result in physical injury to persons or property.
10. Reputation risk which includes incidents, events or human actions which seriously damage the image and reputation of the organization.
11. Epidemic or pandemic that causes wide-spread injury or sickness to PRASA employees.
12. Kidnap, ransom, extortion risks.
13. Privacy & Cyber Liability arising from alleged failure to adequately secure customer data.
14. Acts of Terrorism affecting PRASA's facilities or customers.

15. Strikes and Labor unrest causing loss of income, interruption of operations and an increase in operating expenses to continue operations.

6.3. Assessment of Insurance Program

This section of the report provides MARSH's summary and recommendations with respect to PRASA's insurance policies currently in force.

6.3.1. Property Insurance

The following are the findings and recommendations under the Commercial Property Program currently placed through AIG Insurance Company and London Markets:

PRASA's property is insured by a policy issued by AIG Insurance Company – Puerto Rico (AIG-PR). Four other insurance companies and the "London Market" are shown on the AIG-PR policy as "subscribers." This means they have each agreed to bear a portion of each loss.

Coverage is written on an "all risks" basis. The policy insures real and business personal property, impounded water, dams, underground piping and covers business interruption resulting from covered physical damage/loss to property for up to 18 months.

Major policy limits and deductibles are shown in Table 6-1.

Table 6-1:
2014-2015 Property Coverage, Limits and Deductibles

Coverage	Limit	Deductible
Total Insurable Value (TIV's)	**Unknown** (Should be stated in Policy Contract)	As stated below
Property – All Other Perils (AOP) (including Data Processing, In Transit and equipment breakdown)	$150 million per occurrence, Combined Single Limit for Property Damage and Business Interruption, excess of applicable deductibles.	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Windstorm	Included in $150 million limit	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Earthquake	$300 million Combined Single Limit for Property Damage and Business Interruption, excess of applicable deductibles.	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Flood	$300 million Combined Single Limit for Property Damage and Business Interruption, excess of applicable deductibles.	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.

Coverage	Limit	Deductible
Business Interruption	Included in $150 million property for AOP, including WIND, and $300 million EQ and Flood Coverages	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Extra Expense	Included in $150 million property for AOP, including WIND, and $300 million EQ and Flood Coverages	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Contingent Business Interruption	Included in $150 million property for AOP, including WIND, and $300 million EQ and Flood Coverages, subject to a $35 million Sublimit	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Newly Acquired Locations	Included in $150 million property for AOP, including WIND, and $300 million EQ and Flood Coverages	$25 million Combined for Property Damage and Business Interruption, except for the perils of Boiler Explosion and Machinery Breakdown, where a $25,000 applies.
Boiler and Machinery	Included in $150 million property coverage	$25,000 each and every accident

6.3.1.1. Recommendations

The following recommendations were made by MARSH regarding PRASA's property insurance policy:

1. As required by the Bureau of Public Insurance, entity in charge of administering the Insurance Programs for the State Government Instrumentalities, the Named Insured under the program should read **Puerto Rico Aqueduct and Sewer Authority and/or Commonwealth of Puerto Rico and/or Treasury Department c/o Bureau of Public Insurance**.

2. MARSH recommends the Business Description on the Policy Contract to read **Water Filtration and Distribution, and Wastewater Treatment and Conveyance.**

3. Policy Contract should state the TIV's Limit, especially since the applicability of several Coverages and Conditions specified in the Policy Contract are subjected to this amount.

4. Section 3, Notification of Loss, omits the Condition previously contained under the Policy Contract of Partial Payment of Loss, which stated that "in the event of loss covered by this Policy, it is understood and agreed that the Underwriters will issue partial payment(s) of claim subject to the Policy Provisions, and shall not be less than the undisputed estimate of loss or damage between the Insured and the Underwriters." This Condition provided PRASA with the opportunity of being partially indemnified for losses over the established deductible, in order to expedite the repair and/or reconstruction process.

5. On Page 4, Section 4. Waiver of Subrogation, it states that "the Insurers agree to hold harmless and waive any rights and remedies or relief to which they may become entitled by subrogation against: C. the Commonwealth of Puerto Rico, its instrumentalities, public corporations or any political sub-division". Given the magnitude of the deductible on this program, and the fact that PRASA would be reimbursed said deductible, partially or totally, from FEMA only in the event of a catastrophe if certified by the President of the U.S., MARSH believes the waiver of subrogation should not be automatic, since it deprives PRASA the opportunity of collecting from damages negligently caused by any other Governmental Instrumentality.

6. On Page 6, Item 9 Cancellation, the time frame being provided does not match the requirements presented by the Bureau of Public Insurance of the Department of Treasury. As per said Government Requirements, written cancellation notice should be given with, at least, 90 days prior notice, instead of the 45 days stated. For non-payment of premium, a 45 day prior written notice is required in order to cancel. Currently, under contract, a 10 day grace period is provided.

   With respect to any "unearned premium", the computation should always be on a "pro-rata basis", irrespective of whom elects to cancel the insurance program.

   On the sixth paragraph, which relates to the period of limitation for cancellation notices being void by "any law controlling the construction thereof", MARSH recommends to include after "law", "or any requisite of the Bureau of Public Insurance of the Treasury Department."

7. On Page 7, Item 14. Audit, it is stated that the Insurers "may examine and audit the Assured's books and records at any time during the Policy Period and extensions", up to three (3) years after the termination of the Policy. Government Entities and Public Corporations, as PRASA, work on Fiscal Year Budgets. An audit might affect said budgets, especially if conducted years after the termination of the Policy Contract.

8. Also on Page 7, Item 15. Misrepresentation and Fraud, the word "Assured" is too broad and should be limited to Executive Officers and Directors.

9. On Page 8, Section 17. Dispute Provisions, Item A. and B., limits the ability of PRASA to present a suit in the event of a dispute against the Carrier, and it further states that "in the event of the failure of the Insurers hereon to pay any amount claimed to be due hereunder, the Insurers hereon, at the request of the Assured, will submit to the jurisdiction of a Court of competent jurisdiction within the United States." Should clearly state that Puerto Rico is considered as a competent jurisdiction within the U.S.

10. On Page 10, Section 24, Off Premises Services Clause, includes an exclusion for Overhead Transmission Lines. MARSH recommends this exclusion to be deleted.

11. Page 11, Section 26, Joint Loss Clause, it is stated that this condition applies if "in the event of loss of or damage to property and a disagreement between the Insurers of this Policy and the Insurers of the Boiler and Machinery Policy ….". There is only one Policy issued covering both risks; therefore, this Condition should be eliminated.

12. On Page 12, Section 1, Insuring Agreement, it states that "the Policy insures against All Risk of direct physical loss or damage occurring during the Policy period to Property Insured from any external cause except as hereafter excluded …." MARSH recommends the term "external cause" to be defined.

13. On Page 14, Section 4. Property Excluded, Item C. states that the Policy does not cover loss or damage to Excavations, Grading, and Filling". In the 2006 valorization made by Malcolm Pirnie of PRASA's Property Assets, this item was included in determining the replacement cost values for all buried infrastructure; therefore, this exclusion should be deleted from the Policy Contract.

14. The deductible for Data Processing Equipment, which previously stood at $25,000, appears to now stand at the full $25M deductible. MARSH recommends that a $25,000 deductible be negotiated.

6.3.1.2. Recommendations Unrelated to Policy Contract

1. The $25M deductible applies whether the loss sustained by PRASA is due to a catastrophic peril as well as by any other insurable peril. FEMA would only reimburse PRASA if:

    a. The direct damage has been caused by a Catastrophic Peril (Windstorm, Flood or Earthquake)
    b. The affected area has been declared a Disaster Zone by the President of the U.S.
    c. Subject to Availability of Funds.

    PRASA should be considering establishing a FUND to cover possible financial losses from any future catastrophic, but especially, from any non-catastrophic, peril that might affect infrastructure and operations and, therefore, impose an unexpected financial burden.

2. The current Probable Maximum Loss (PML) Estimates for PRASA for quantifying Catastrophic Risk Exposures were performed in 2010 by MARSH Risk Consulting, through AIR Worldwide Corporation, based on a valorization study from 2006. Since then, modules, maps and projections have changed, and new modules might prove economically beneficial to PRASA; therefore, MARSH strongly recommends that PRASA undertake a new PML Study.

6.3.2. Crime

PRASA maintains a crime policy issued by AIG Insurance Co. providing the coverage and limits shown in Table 6-2 for loss discovered during the policy period.

Table 6-2:
2014-2015 Crime Coverage, Limits and Deductibles

Coverage	Limit	Deductible
Employee Dishonesty	$1 million	$10,000
Claim Preparation Expense (employee dishonesty)	$100,000	$0
Loss Inside Premises	$500,000	$10,000
Loss Outside Premises	$500,000	$10,000
Counterfeit currency and Money Orders	$500,000	$10,000
Depositors Forgery	$500,000	$10,000
Computer Fraud and Funds Transfer Fraud	$500,000	$10,000
Incoming Check Forgery	$500,000	$10,000
ERISA Extension	$500,000	$0
Extortion Threats to Persons	$100,000	$10,000
Extortion Threats to Property	$100,000	$10,000
Audit Expense – For Audit required by State of Federal bodies as result of employee dishonesty	$100,000	$0
Policy Aggregate	$1 million	Not Applicable

6.3.2.1. Recommendations

The following recommendations were made by MARSH regarding PRASA's Crime Policy:

1. There is an opportunity to negotiate policy enhancements to broaden some of the aforementioned coverages.

2. The Crime Policy includes a $500,000 ERISA Extension. ERISA Act requires that the fidelity bond should be placed with sureties that are Treasury listed. MARSH recommends that an ERISA bond be purchased.

3. The Crime policy is written to cover losses that are sustained during the policy period and discovered either during such policy period or up to one year after the policy expires. The Negotiated Discovery Period endorsement that forms part of the PRASA policy has a detrimental effect of reducing the Discovery Period to 90 days. Moreover, in a policy cancellation or non-renewal scenario, the endorsement requires PRASA to pay 75% annual premium for an Optional Extended Reporting Period of a year that would be provided in the policy contract with no additional cost.

4. A 45 day notice to the Insured is required by the Public Insurance Department for cancellation due to non-payment and 90 days for cancellation or non-renewal. The current policy says that it will be immediately terminated in its entity upon the receipt by PRASA of a written notice from the Underwriter of its desire to cancel the policy; therefore, an amendment is necessary.

5. Knowledge or Discovery of Loss clauses should be re-negotiated to specifically identify positions triggering knowledge of incidents in order to minimize the risk of carrier declines for late reporting.

6.3.3. General Liability

PRASA's current commercial general liability program is issued by MAPFRE PRAICO Insurance Company (MAPFRE) with the limits detailed in Table 6-3, below. Aggregate limits apply per location and per project as per ISO forms CG-2504 (03-97) and CG-2503 (03-97), attached to the MAPFRE policy. A $100,000 Self Insured Retention, which contemplates both Indemnity and claims adjustment expenses, applies to each occurrence. This Self Insured Retention has a $750,000 Aggregate or Cap as respects claims adjustment expenses, so once this amount is paid by PRASA, the Insurance Company will pay these amounts from the first dollar and the Self Insured Retention would apply to Indemnity payments only.

Table 6-3:
General Liability Coverages and Limits

Coverage	Limit
General Liability – Each Occurrence	$1 million
General Liability – General Aggregate	$2 million
Personal and Advertising Injury	$1 million
Products - Completed Operations Aggregate	$2 million
Employer's Liability Stop-Gap	$1 million
Employee Benefits Liability	$1 million
Fire Damage	$1 million
Medical Expense	$10,000

6.3.3.1. Recommendations

The following recommendations were made by MARSH regarding PRASA's general liability program:

1. Under the "Special Conditions" endorsement attached to the MAPFRE policy, MARSH recommends the following amendments be performed.

    a. Severity of Interest (item 8) should be revised to read Severability of Interest.

b. The language utilized under Item 12, Erroneous Notice of Occurrence, is quite confusing and MARSH recommends it be substituted by the following:

> It is agreed that only an executive officer, risk manager or person designated by the insured, shall be responsible to give notice to the insurer after having knowledge of an accident, occurrence, claim or suit. Failure to give an immediate notice of any loss or damage, or of any suit, or to forward to the insurer any demand, notice, summons or other process received, shall not invalidate any claims made by the insured or free the company form any responsibility under this policy.

2. ISO Form CG 0300 (01-96) "Deductible Liability Insurance" should specify that the Deductible included in MAPFRE's policy applies for Bodily Injury and/or Property Damage Liability Combined, since the Declarations Page is not clear as to the applicability of said deductible.

3. ISO Form CG-2230 (07-98) "Corporal Punishment Exclusion" should be eliminated since it is not applicable to any of PRASA's operations, unless PRASA owns or operates any educational facility or day care operations.

4. Although Item 14 of the Special Conditions deletes any "Explosion, Collapse or Underground Property Damage Hazard" (XCU) exclusion. ISO Form CG-2142 (01-96) which excludes XCU hazards should be eliminated from the Forms and Endorsements scheduled under the policy.

5. Commercial General Liability program excludes coverage for any Terrorism event. Considering the Insured operations and act of Terrorism is an important and potentially severe exposure with considerable implications. MARSH recommends that Terrorism coverage should be considered under PRASA's Commercial General Liability program.

6. The applicability of the Medical Expenses coverage should be addressed within the policy. PRASA's commercial general liability program provides a $10,000 per person limit for Medical Expenses, but the policy has a $100,000 self-insured retention. MARSH recommends that an endorsement in the policy be included that states that the Self Insured Retention will not apply to Medical Expenses hence coverage would be first dollar.

6.3.4. Automobile Liability

PRASA maintains automobile liability coverage through MAPFRE for:

- Bodily Injury and /or Property Damage caused by **any** automobile, including hired and Non-Owned, with a $1M Combined Single Limit per accident and includes a $5,000 per person Medical Expense limit for owned autos only.

- Physical Damage to owned autos of the Insured is not included in the policy except for Specific Catastrophic events which includes Lightning, Fire, Explosion, Windstorm, Hail, Flood and Earthquake, with a limit of $2M per event and subject to a $50,000 per event deductible.
- Drive other car Coverage is included for Liability coverage on a blanket basis for up to 50 individuals.
- Policy provides automatic Physical damage coverage for Hired autos with a value up to $40,000 with a $100 Deductible. Any vehicle with a value greater than $40,000 must be submitted to the company. This coverage is subject to a deposit premium and an annual revision at a rate of 7.5%.
- Garage liability coverage is for any automobile with a $1M per accident limit and a $3M aggregate limit for garage operations and is written on a Direct Primary basis.
- Garage Keeper coverage is included on a Direct Primary basis for Comprehensive and Collision with a limit of $1M per event for each covered location for "Autos left with you for service, repair, storage or safekeeping". Comprehensive coverage is subject to a $250 per event deductible subject to a maximum of $1,000 per event and collision coverage is subject to a $500 deductible.
- Comprehensive and collision Trailer interchange coverage is provided for non-owned trailers, with a physical damage limit of $35,000 each trailer and subject to a $100 deductible.

6.3.4.1. Recommendations

The following recommendations were made by MARSH regarding PRASA's Commercial Auto, Garage Liability and Garage Keeper's programs:

1. Coverage such as Rental Reimbursement, Damage to Temporary or Substitute vehicles, Auto Loan/Lease Gap and Confiscation typically compliment Physical Damage coverage. Since PRASA's Commercial Auto policy does not contemplate Physical Damage coverage except for specified catastrophic events, MARSH recommends that Physical Damage coverage be included in order to ensure the most comprehensive coverage.

2. As respects to the $50,000 per event deductible included for Physical Damage for specified Catastrophic events, MARSH recommends that it be revised to a per vehicle amount with a maximum of $50,000 per event.

3. Hired and non – owned Physical Damage coverage for vehicles less than $40,000 should be included within the premium being charged and not subject to an annual adjustment of 7.5%. In fact, this amount should be increased to at least $60,000. Vehicles that exceed this amount should be included for a flat charge and not subject to an annual adjustment of 7.5%.

4. MARSH recommends that form U-6 (11-93) "Liability Coverage Exclusion Endorsement" be eliminated since the language utilized is too broad and may present coverage interpretations unfavorable to PRASA.

5. For Trailer Interchange coverage valuation should be revised to a Replacement Cost basis in lieu of "Actual Cash Value".

6. Limits for Garage Liability and Garage Keeper apply per covered location and the only location scheduled in the policy is "Anywhere in the Commonwealth of Puerto Rico". This needs to be clarified in order to have coverage on a per location basis.

7. Drive other Car coverage is included only for Liability. MARSH recommends that it be broadened to include both Physical Damage and Medical Payments coverage.

6.3.5. Umbrella and Excess Liability

PRASA maintains a primary umbrella policy which provides a $20M limit excess of the primary general, automobile and employer's liability policies. The umbrella is otherwise subject to a $1M self-insured retention (SIR) for bodily injury, property damage and personal and advertising injury losses not covered by the primary insurance. Coverage is provided through Triple S.

PRASA also maintains an excess liability policy providing a $40M limit in excess of the $20M umbrella limit described in the preceding paragraph. Coverage is also provided through Triple S.

6.3.5.1. Recommendations

The following recommendations were made by MARSH regarding PRASA's Excess Liability program:

1. Include the Garage Liability policy issued by MAPFRE under the Commercial Umbrella's "Schedule of Underlying Insurance", in order to achieve the higher limits provided by the Excess Liability program for any Garage Liability claim that could exceed policy limits or could be excluded from coverage under said program.

2. Commercial Umbrella program does not include an Insuring Agreement which would state what terms and conditions apply to the Commercial Umbrella and whether the Excess Liability programs is following form or not. This needs to be included in order to avoid any misinterpretations at the time of a large loss which could trigger coverage under the Excess Liability program. The latter should be fully follow form.

3. MARSH has completed a benchmarking analysis, shown in Figure 6-1 using proprietary information to determine in absolute terms if the limit purchased by PRASA is aligned with limits carried by 49 industry peers. The report showed that on average, limits of $53M were carried.

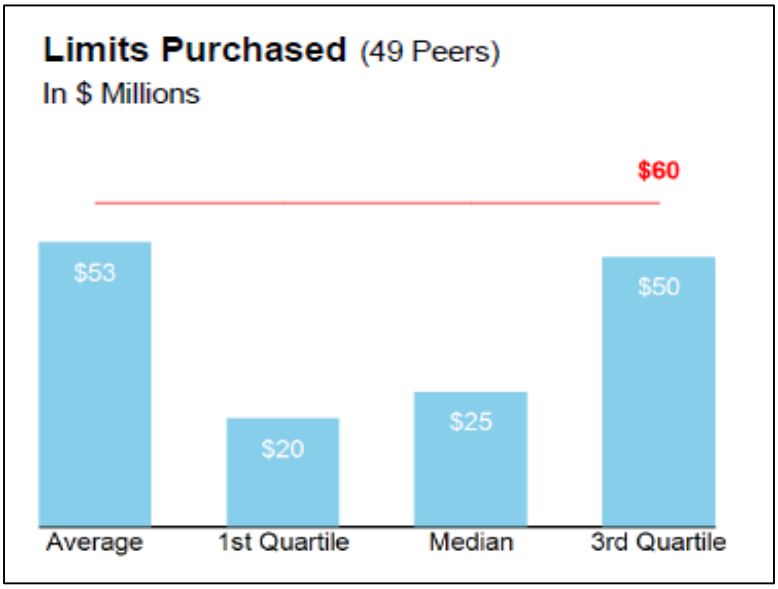

Figure 6-1: Umbrella and Excess Liability Benchmarking Analysis

4. Notwithstanding the above, a risk exists for a catastrophic failure of a PRASA dam that could potentially cause a very large liability loss, especially if there are residential communities located below a dam. The question of PRASA's exposure to liability from destruction of a dam was raised previously and MARSH understands that there is a potential for a substantial loss of life were a PRASA dam to collapse. In such an event, according to MARSH, $60M total liability limit may not be enough to settle claims if PRASA was found to be negligent.

6.3.6. Directors and Officers Liability

PRASA maintains one primary and two excess layers of directors & officers (D&O) liability insurance. Coverage is written on a claims-made basis and is subject to a prior litigation date of July 1, 2013 (meaning the policy will not cover claims arising from or related to litigation started prior to July 1, 2013) on the primary policy, July 1, 2010 on the first excess issued by Liberty & July 1, 2014 for the second and last excess issued by Berkley Insurance Co.. The D&O carriers and limits are shown in Table 6-4.

Table 6-4:
Directors and Officers Liability

Insurer	Limit
ACE Insurance Company (Primary)	$20 million
Liberty International Underwriters (First Excess Layer)	$10 million excess of $20 million
Berkley Insurance Company (Second Excess Layer)	$5 million excess of $30 million
Total D&O Limit	$35 million

The primary layer of D&O insurance is subject to a $200,000 SIR for claims against indemnified persons or a claim against PRASA alleging a breach of duties.

MARSH has completed a benchmarking analysis, shown in Figure 6-2 using proprietary information to determine in absolute terms if the limit purchased by PRASA is aligned with limits carried by peers.

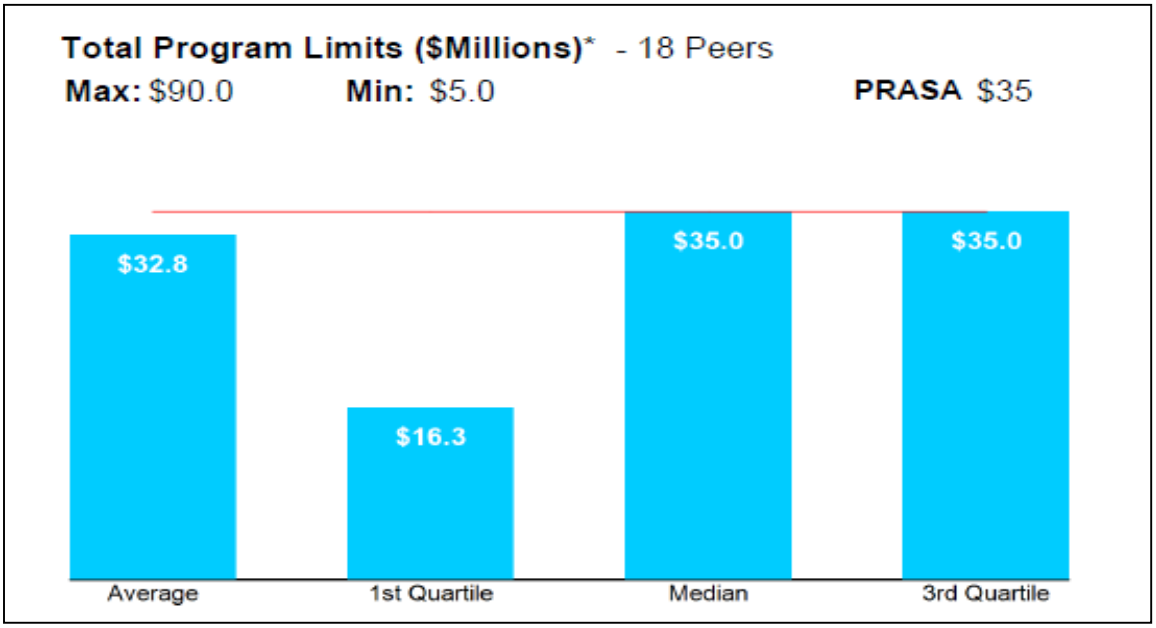

Figure 6-2: Directors and Officers Liability Benchmarking Analysis

With regard to the terms and conditions of the policy, the policy form is a fairly basic Directors & Officers Liability coverage that provides coverage for allegations of wrongful acts made against an Insured. The definition of Insured includes the corporate entity, PRASA, and its employees.

The following recommendations were made by MARSH regarding PRASA's Directors and Officers insurance:

- **Consider Correcting the Prior & Pending Litigation Dates for consistency**. The Private Company Endorsement lists the Prior & Pending Litigation date as July 1, 2004 while on the Declarations Page, the Prior & Pending Litigation date is stated to be July 1, 2013.

- **Consider Re-negotiating Definition of Application Endorsement so that it is pertinent**. The Amend Definition of Application Endorsement makes reference to documents filed with the Securities & Exchange Commission. The intent of this endorsement should be to limit information used in underwriting to information received within the last year. This clarification is important because when faced with large claims insurance carriers frequently evaluate the

opportunity to rescind the policy. When documentation is limited to that submitted within the past year, it is more difficult for them to rescind the policy.

- **Consider Eliminating the Private Company Endorsement**. There appears to be a conflict in wording with regard to the Securities Coverage. The policy has a Private Company Endorsement that adds coverage for the corporate entity by changing Insuring Clause C. from Company Securities Liability to Company Liability eliminating the securities coverage. The Private Company endorsement has a specific Public Offering of Securities exclusion. MARSH recommends eliminating the Private Company endorsement. ACE can include the employees as Insured's by an additional endorsement.

- **Consider Amending Securities Claim Definition** to include administrative or regulatory proceeding against PRASA when such proceeding is also commenced and continuously maintained against an Insured Person. Currently, such proceedings are specifically excluded.

- **Consider Including a Priority of Payments clause** be added to the policy specifying that the Insurer is first liable to pay on behalf of the Insured Persons under Insuring Agreement A (Non – indemnifiable D&O claims); second, the Insurer should pay that Loss for which they may be liable to pay on behalf of the Company under Insuring Agreement B (Corporate Reimbursement); lastly, any payments under Insuring Agreement C (Company Securities Liability) would be made.

- **Consider Increasing Coverage Threshold for Securities Claims**. The policy has a Securities Exclusion with a carve – out for Claims arising from the offering, sale or purchase of securities, whether debt or equity in a transaction exempt from registration with the SEC in which the total consideration for the offering does not exceed $50M. Given that the majority of the offerings exceed this amount MARSH recommends establishing a strategy to progressively increase this threshold.

- **Consider Incorporating Amendments to Claim Reporting Threshold Endorsement**. The policy has a Claims Reporting Threshold that allows for periodic bordereaux. Instead of amending Section IV Defense, Settlement and Allocation, the endorsement should amend Section 6 Notice. MARSH recommends that a 45 day grace period be granted after the quarter end for the reports to be submitted. The endorsement should also include a ninety day window after policy expiration for reporting claims.

- **Consider Eliminating The Specific Matter Exclusion – Regulatory & Water Price**. It is understood that the D&O policy does not respond to disgorgement remedies; however, this endorsement goes far beyond excluding all claims brought by clients, customers or any entity on behalf of such clients or customers as it related to the Insured's regulator capacity in establishing tariffs for water consumption to clients, customers and cogeneration companies. (This last reference is also unclear).

- **Consider Requesting Clarification to Discovery Period endorsement**. Lastly, it appears that the intent of the Discovery Period (90 Days) endorsement is to allow 90 days for PRASA to pay the premium for the extended reporting period. To achieve this, the only amendment necessary is to change the thirty day term to 90 days in Section 4. Paragraph one. The current wording references a bond policy, which is not the case and creates the impression that the premium for a 90 day extension is 75% of the annual premium when generally ACE Insurance Company (ACE) charges 75% for a one year extension term.

- **Consider Requesting Amendments so that the Second layer is follow form and "drops down".** The second excess layer issued by Berkley should be follow form and as such should be amended to eliminate the Bankruptcy exclusion and a drop down exclusion allowing the underlying limit to be eroded by either payment under the policy or payment of the underlying limit by another source should be added.

6.3.7. Employment Practices Liability

PRASA maintains primary and excess employment practices liability (EPL) policies providing total limits of $10M in the aggregate annually for employee claims alleging wrongful termination, employment related misrepresentation, sexual harassment, retaliation or other violation of an employee's civil rights. A $100,000 SIR applies to each claim. Primary coverage is provided through ACE. Excess EPL coverage is through Berkley Insurance Company.

6.3.7.1. Recommendations

A benchmarking study, shown in Figure 6-3 based on limits carried by other public corporations in the industry class with similar level of corporate and economical characteristics showed that on average, limits of $6.8M were carried.

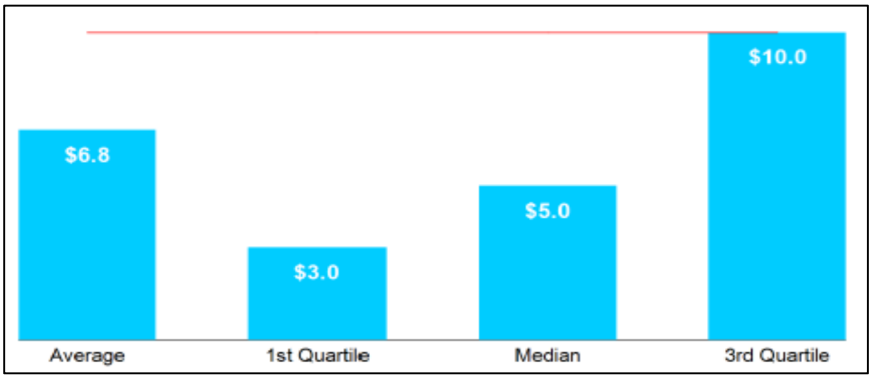

Figure 6-3: Employment Practices Liability Benchmarking Analysis

The following recommendations were made by MARSH regarding PRASA's Employment Practices policies:

1. There is an opportunity to negotiate broader Definitions of some of the most coverage-determinative provisions in the EPL insurance policy.

2. At a minimum, coverage for defense costs for "Mesada" Claims should be included. Options Law 80 Statutory Severance remedy should also be explored.

3. The EPL Excess does not include a Drop Down Endorsement to govern when and how such excess policy will respond on behalf of the Insured in the event of the primary policy's exhaustion.

6.3.8. Premises Pollution Liability

ACE Insurance Company provides pollution liability coverage on a claims-made basis at $5M per occurrence, $10M annual aggregate limits. Coverage is subject to a $250,000 per accident SIR. A retroactive date of July 1, 2002 applies.

6.3.8.1. Recommendations

The following recommendation was made by MARSH regarding the 2013-2014 policy and the 2014-2015 renewal binder for the pollution liability:

1. **Consider increasing limits.** The limit of "per pollution condition" may be increased to $10M due to all the exposure PRASA has on the covered locations mentioned on the policy, "All those locations which PRASA operates, maintains, and manages throughout Puerto Rico, Vieques and Culebra". The aggregate limit may be increased to $20M as well.

6.3.9. Professional Liability

PRASA maintains a miscellaneous errors & omissions liability policy through ACE, providing a $25M per claim limit and a $50M annual aggregate limit, subject to a $250,000 per claim deductible. The policy is written on a claims-made basis and claims and defense costs are included within the limit. The policy has a September 21, 2004 retroactive date. Coverage applies to contract administration, design, engineering, consulting, inspection, and construction management, including planning, permitting, regulatory compliance services, land acquisition, assisting in construction, procurement assistance, start-up services, testing and extended commissioning under the PRASA multi-year CIP as modified by the PRASA Board of Directors from time to time.

6.3.9.1. Recommendations

The following recommendations were made by MARSH regarding PRASA's Errors & Omissions policy:

1. **Consider amending the Defense and Claims Expenses (Section I, B).** The second paragraph of the Defense and Claims Expenses agreement says the insurer is not obligated to investigate or defend a claim after the limit of liability has been exhausted, "*or after the Company (the insurer) has deposited the remaining available limit of liability into a court of competent jurisdiction.*" Defense costs can be high and can surpass the cost of damage or injury in the event of serious loss. A provision which allows the insurer to walk away from defending the insured by depositing the balance of the liability limit with a court means the insured can be left with the cost of defending itself from that point forward, and forced to finance defense costs it had expected the insurer to pay. MARSH recommends that the broker attempt to delete the phrase shown in italics above which allows the insurer to deposit the remaining liability limit with the court and avoid defense costs.

2. **Consider amending the Section IV. Conditions, Item G. Settlement.** Item G says the insurer cannot settle any claim without the insured's permission. However, in the event the insurer recommends settlement and the insured is unwilling to settle, the insurer then has the right to cease its defense efforts. In that event the limit of liability is then limited to the amount the claim could have been settled for at the time the insurer recommended settlement. This "hammer clause" is harsh compared to similar clauses in many policy settlement provisions.

   Most errors & omissions policy settlement provisions allow the insured to not settle upon the insurer's recommendation, and the insurer is then obligated to provide a defense and ultimately pay damages and defense costs. Some policies have a "soft hammer" clause where the Insured assumes part of the damages and defense costs in excess of the floor established when the carrier recommended the settlement recommendation. The percentage of damages and defense costs assumed by the Insured might vary from 50% to 25% of the damages and defense costs incurred above the settlement amount for which the claim could have been settled. MARSH recommends that an attempt be made to renegotiate this clause at the June 2015 renewal.

3. **Consider amending Section III. Definition, Item G. Client**, to mean any Third Party with whom the Insured has a formal written contract in place eliminating "for the supply of the Insured's Professional Services in return for a fee". Most claims under this policy are centered around contract disputes with contractors. The current policy definition does not accurately reflect the intent of an Owner Controlled Insurance Program of this type.

4. **Consider amending the Section III. Definition, Item CC. Professional Services** to mean only those services specified in Item 5. Of the Declaration and performed by an Insured or by any person or entity for whom the Insured is liable. The current definition requires that the services be performed for others for a fee. The services provided by the contractors & sub – contractors are for another Insured, PRASA.

5. **Consider amending Section IV. Conditions, Item J. Other Insurance Clause and Endorsement 15,** to allow contractors and sub – contractors to use their E&O policies as a primary policy to meet the $250K deductible requirement. Currently, Endorsement 15 stipulates that PRASA's policy shall be primary to any other policy.

6. **Consider amending Section IV. Condition, Item L. Territory** to eliminate the requirement that all Claims be brought in the Commonwealth of Puerto Rico, thus covering claims filed against PRASA worldwide.

7. **Consider amending Section V., Item M.,** Contractual Liability exclusion to add a clarification at the end of the exclusion as follows: "however, this exclusion will not apply to Professional Services as defined in Item 5." Many of the claims filed under the policy have to do with contract administration. This exclusion might preclude coverage for these claims.

8. **Consider amending Endorsement #2 to change the reference to the description of professional services from Endorsement #5 to Item 5 of the Declarations Page.** This appears to be an oversight in the policy revision process.

9. **Consider amending Endorsement #3** to include the schedule of projects referenced in the endorsement for clarity purposes.

10. **Consider eliminating Endorsement #12, Bankruptcy Exclusion** that excludes coverage under the policy for any claim arising out of or resulting from the alleged bankruptcy of the Insured; except when arising from a Wrongful Act in the rendering of Professional Services by the Insured.

11. **Consider eliminating the Libel and Slander exclusion from Endorsement #13.** For most construction managers, engineers and architects, their professional liability policy is the only source of coverage for this risk as the General Liability policy will most likely have an exclusion.

12. **Clarify in Extended Reporting Period Amendment Endorsement (Endorsement 1) the intent to provide an Extended Reporting Period for all projects.** Endorsement 1 includes an extended reporting period for all projects initiated or declared as commencing during the "Policy Period". However, as worded, it appears to restrict coverage for projects begun prior to the policy inception date. MARSH recommends that the endorsement language be amended to clarify that all projects commenced prior to the policy inception date as part of the Capital Improvement Plan are covered or a schedule of projects specifically to be covered be included. MARSH recommends, that the policy's September 21, 2004 retroactive date be used as a starting point for any ongoing projects, that the endorsement be amended to apply to all projects initiated during the "Policy Period" or subsequent to any applicable retroactive date. A specific list of projects would eliminate potential future controversies.

MARSH recommends, to take advantage of the policy's September 21, 2004 retroactive date for any ongoing projects, amend the Extended Reporting Period Amendment Endorsement to apply to all projects initiated during the "Policy Period" or subsequent to any applicable retroactive date.

6.3.10. Cyber Liability

PRASA does not currently purchase cyber liability insurance. PRASA retains client information as part of the operations that might include data that is considered Personal Identification Information (PII) in Puerto Rico. This information includes social security numbers, driver's license numbers, bank account numbers (with or without access codes), among other things. There have been many well publicized breaches and cybersecurity awareness continues to grow. This new cyber consciousness has had an impact on litigation, cyber claims, and how companies respond to data breach attacks. A privacy breach or cyber-attack can affect any company.

6.3.10.1. Recommendations

The following recommendation was made by MARSH regarding PRASA's cyber liability policy:

1. **Consider cyber liability coverage.** MARSH recommends that PRASA complete a self-assessment to determine potential areas of weakness as compared to international standards and also to determine the potential frequency & severity of a breach. These two studies will help to gauge limits. With this information in hand, MARSH recommends that PRASA purchase a Privacy & Cyber Liability policy to insure against liability arising from potential allegations such as PRASA failed to adequately secure customer data and the associated identification theft costs needed to repair customer credit.

6.3.11. Heliport Liability

PRASA owns and maintains a helipad on the roof of its main building. PRASA has indicated that the helipad is rarely or never used. If there is a potential for emergency use of the helipad, or possible future use, MARSH recommends that PRASA obtain liability coverage for this exposure. Coverage is now excluded from other liability policies.

6.4. Owner Controlled Insurance Program

PRASA maintains an Owner Controlled Insurance Program (OCIP) for its multi-year Capital Improvements Program - CIP. In addition to covering PRASA, the OCIP is designed to insure enrolled contractors, subcontractors (and design professionals for General Liability only) of all tiers working on the CIP. The OCIP does not cover vendors, installers, truckers, delivery persons, concrete/asphalt haulers, and/or contractors who do not have on-site dedicated payroll, except as otherwise endorsed into the policy. The OCIP program provides builder's risk, general liability, umbrella, pollution liability insurance and miscellaneous errors & omissions professional liability insurance. Each of these coverages is discussed below.

6.4.1. Contractors All Risk –Completed Value Builder's Risk -

PRASA maintains a builder's risk policy as part of its OCIP program. AIG - PR and ACE Insurance Company (50% - 50% each) are the insurers. Coverage applies to all risks of direct physical loss, except as excluded by the policy. The maximum contract value per contract is $50M. The Limit of Liability in any one occurrence and in the annual aggregate for the policy term is $100M. Certain sub limits apply to additional exposures, such as off-site storage, inland transit and debris removal, but these sub limits are part of and not in addition to the Limit of Liability and are subject to the per project reported value as maximum limit of liability.

The AOP deductible is $20,000 any one occurrence. Other deductibles are 2% for flood and 2% named windstorm, and 5% for earthquake of the total insured values at risk at the time and place of loss any one occurrence, with a minimum of $100,000 any one occurrence for projects with a contract value of more than $10M. In addition, a $100,000 deductible in any one occurrence applies for damage to Principal's existing property, property insured while undergoing testing and commissioning; and in respect to damage to existing property.

6.4.1.1. Recommendations

The following recommendations were made by MARSH regarding PRASA's OCIP builder's risk policy:

1. Request an endorsement to include a "Partial Occupancy Provision" to grant permission for partial occupancy of project areas. Therefore, coverage will not cease or expire due to the partial occupation of any project area or due to the project's substantial completion.

2. Request an endorsement to delete Exclusion I. Underground works other than laying pipelines and construction of underground sewer collectors systems.

3. Request an endorsement to delete Exclusion J. Horizontal directional drilling, pipe jacking, and micro tunneling.

4. MARSH recommends negotiating coverage for: Wet works and any type of roads, ways, expressway works, overpasses and bridges, viaducts and tunneling works. These, are usually impacted during water mains and sewer pipes construction and should be covered with at least a reasonable sub limit.

5. **Consider amending General Condition 3 – Misrepresentation & Fraud.** Section C-General Conditions, General Condition 3 voids the policy if the Named Insured has concealed or misrepresented any material fact or circumstance concerning this insurance. The definition of Named Insured in the second paragraph of Section A – Declarations, Item 1, A, includes joint venture companies and/or all contractors and/or subcontractors of any tier. Thus, if a sub-subcontractor failed to disclose their involvement in a loss, the policy would technically be void. MARSH recommends to amend the General Condition 3 to void the policy only with

respect to the Named Insured which concealed or misrepresented any material fact or circumstance concerning this insurance.

6. Request deleting endorsement MR106 - Warranty concerning sections limiting the length of certain ground works, to a maximum length of section of 1,000 feet.

7. Consider including a "Claims Preparation Expense" additional coverage sublimit to provide for the necessary and reasonable fees or expenses incurred by the insured's customary auditors, accountants, architects or engineers that may assist the insured proving a claim.

6.4.2. Commercial General Liability

The OCIP general liability policy is as "per occurrence" policy provided by ACE and includes the limits shown in Table 6-5.

Table 6-5:
2014-2015 OCIP General Liability Coverages and Limits

Coverage	Limit
Each Occurrence	$2 million
General liability – General Aggregate	$4 million
Personal and Advertising Injury	$2 million
Products/ Completed Operations - Aggregate	$4 million
Employer's Liability Stop Gap	$2 million
Fire Damage (Any One Fire)	$250,000
Medical Expense (Any One Person)	$5,000

A $5,000 per claim deductible applies for bodily injury and a $5,000 per claim deductible applies to property damage for each and every loss. Policy is silent as to who is responsible for deductibles. The OCIP Manual states the Contractor should assume this deductible.

This policy covers PRASA and contractors and all tiers of subcontractors and consultants performing operations at or from the project site in connection with the work for PRASA under the contract documents.

The Completed Operations coverage extension is for five years from the termination date of the policy or its renewal(s). MARSH recommends changing it to 10years to cover the full statutory limit (Statute of Limitations Law).

6.4.3. Commercial Umbrella Liability

The OCIP commercial umbrella liability policy is provided by ACE. The limits of insurance are $50M each incident and $100M Policy aggregate, in excess of the primary OCIP commercial general liability limits of insurance. Each incident retained limit is the underlying insurance or $10,000 SIR.

The Completed Operations coverage extension is for five years from the termination date of the policy or its renewal(s). MARSH recommends changing it to 10 years to cover the full statutory limit (Statute of Limitations Law).

MARSH recommends negotiating a limit for Care, Custody and Control exposures.

6.4.4. Contractor's Pollution Liability

The OCIP contractor's pollution liability insurance is provided by ACE. Coverage applies on an occurrence basis and covers pollution arising from construction activities involving PRASA's wrap-up program. The policy provides a $25M limit each loss and annual aggregate subject to a $25,000 SIR, and covers PRASA and OCIP contractor participants. Defense costs and other claim expense erode the aggregate limit.

6.4.5. Conclusions

In the opinion of MARSH, the insurance program covering PRASA's exposures to risks of accidental property and liability losses arising from on-going operations provides reasonable coverage. MARSH has provided several recommendations to PRASA's insurance program.

Particularly, PRASA should address the following key recommendations:

1. Re-Conduct a PML Study considering new CAT Modellings and parameters.
2. Consider creating a Fund or Reserve in order to manage the considerable deductibles, in terms of severity and frequency, current and future, contained in Insurance Programs. (Property, General Liability, Directors & Officers, EPL, OCIP)
3. Complete a thorough evaluation of PRASA's current Professional Liability Programs as per recommendations included in Section 6.3.6 and 6.6.9.
4. Revise the Coverage Termination Date under PRASA's OCIP General Liability Program for Completed Operations, from five years to 10 years after projects' completion.
5. Consider adding underground storage tank coverage to the pollution liability policy.
6. Consideration to Terrorism Coverage, which is excluded under all current PRASA's Insurance Programs.

7. System Assets and Financial Analysis

7.1. Introduction

In accordance with the 2012 MAT and 2012 FOA, MPPR/ARCADIS hereby provides a statement of the estimated cost of all additions made to the System and of all the retirements of property made in FY2014. Also, MPPR/ARCADIS evaluated PRASA's financial forecast and assessed the appropriateness of rates and charges. A summary of the findings is provided in this section.

7.2. System Assets

7.2.1. Fixed Assets Changes

Table 7-1 shows that, as of June 30, 2014, PRASA had an estimated total book value of fixed (capital) assets of approximately $6,748M. Additionally, PRASA has approximately $649M of assets that are currently under construction or as "Work in Progress". Including land and other non-depreciable assets, as of June 30, 2014, the book value of PRASA's total fixed assets amounts to $7,470M (net of accumulated depreciation).

Table 7-2 provides a summary of the fixed assets changes from FY2012 to FY2013, and from FY2013 to FY2014. Please note that FY2013 values have been revised, as per PRASA's Restated Audited Financial Statements for years ended June 30, 2013 and 2012.

Table 7-1:
Estimated Fixed Assets Summary through June 30, 2014 ($, Millions)

	Original Cost	Accumulated Depreciation	Book Value
Fixed Assets	$10,303	($3,555)	$6,748
Work in Process	649	-	649
Land and other Non-Depreciable Assets	73		73
Total Fixed (Capital) Assets	$11,025	($3,555)	$7,470

Table 7-2:
Fixed Assets Changes ($, Thousands)

	FY2012-FY2013[1]	FY2013[1]-FY2014
Fixed Assets (Net of Accumulated Depreciation)	$707,964	$276,757
Work in Process	(660,098)	(173,160)
Land and other Non-Depreciable Assets	1,257	1,808
Total Fixed Asset Changes	$49,123	$105,405

[1]As restated.

PRASA's Total Assets are estimated at $8,268M. Total Assets include: current assets (approximately $368M), restricted assets (approximately $395M in restricted cash and cash equivalents), total capital assets ($7,470M as previously mentioned), and other assets ($35M in deferred loss resulting from debt refunding). For additional discussion regarding PRASA's assets, please refer to PRASA's Audited Financial Statements available on PRASA's website, under Investor Relations.

7.3. PRASA's Rate Structure

On February 1, 2013, in compliance with the requirements of the 2012 FOA, PRASA submitted to GDB an updated *Fiscal Improvement Plan* which presented annual deficits starting in FY2014. The GDB, in turn, informed PRASA that it would not appropriate additional funds to supplement PRASA's revenues for FY2014. As a result, and in compliance with the 2012 MAT and the 2012 FOA, PRASA moved forward with its rate revision and increase process. The process was completed on July 3rd, 2013, when PRASA's Governing Board approved the final rate structure to be implemented and that would become effective on July 15, 2013. The Governing Board-approved rate structure includes increases of PRASA's base and volume charges and it incorporates a new monthly fix charge, the Environmental Compliance and Regulatory Charge (ECRC), which varies by customer class and by either consumption or meter size. Subsequently, on December 18, 2013 the Governing Board amended the ECRC billing structure for non-residential customers.

PRASA also included an additional $2.00 monthly special charge for all customers, to facilitate the development of projects that focus on the sustainable management of water resources in accordance with the existing Environmental Public Policy Law (Act No. 416 of September 2004, as amended) and the Puerto Rico Water Resources Comprehensive Plan (2008); and both water and wastewater improvement projects for Non-PRASA[18] systems.

PRASA's Governing Board also included rate revisions to other services provided by PRASA including, but not limited to: new service connections, service re-connections, and sprinkler systems service. The revised rates for these services were designed to cover PRASA's cost of services. The new rates for these services will be implemented on a phased approach over the next three fiscal years (FY2014-FY2016).

Tables 7-3 through 7-5 summarize the existing rates for residential customers as implemented on July 15, 2013.

[18] A Non-PRASA system is a water community-operated or wastewater system that is not connected to PRASA's system.

Table 7-3:
Residential Monthly Base Charge per Account
(includes first 10 cubic meters of monthly consumption)

Water Service Line	Water	Wastewater	Water & Wastewater
1/2" & 5/8"	$10.60	$9.11	$19.71
3/4"	18.40	15.86	34.26
1"	30.23	20.36	50.59
1-1/2"	57.12	31.32	88.44
2"	97.24	53.56	150.80
3"	149.15	89.23	238.38
4"	335.50	156.69	492.19
6"	894.72	731.19	1,625.91
8"	1,431.55	835.64	2,267.19
10"	2,290.50	1,337.02	3,627.52
12"	3,664.80	2,139.25	5,804.05

Table 7-4:
Residential Volumetric Rate per Cubic Meter[1]

Use Block (m^3)	Water	Wastewater	Water & Wastewater
>10 – 15	$1.25	$1.02	$2.27
>15 – 25	1.99	1.59	3.58
> 25-35	2.69	2.14	4.83
>35	2.84	2.27	5.11

[1]Under the Board-approved rate structure, the number of residential volumetric blocks was increased from three to four and the use block thresholds were modified.

Table 7-5:
Residential Environmental Compliance and Regulatory Charge (ECRC)

Use Block (m3)	Water	Wastewater	Water & Wastewater
Base Charge (0 – 10)	$1.00	$1.00	$2.00
>10 - 15	6.50	6.50	13.00
>15 - 25	10.50	10.50	21.00
>25 - 35	17.50	17.50	35.00
> 35	31.50	31.50	63.00

Tables 7-6 through 7-9 summarize the existing rates for non-residential customers (includes commercial, industrial and certain government customer classes) as implemented on July 15, 2013. However, as previously noted, certain government customers continue to be billed using PRASA's previous non-residential rate structure as a result of Act 66-2014.

Table 7-6:
Non-Residential Monthly Base Charge per Account[1]

Water Service Line	Water	Wastewater	Water & Wastewater
1/2" & 5/8"	$24.37	$20.10	$44.47
3/4"	36.09	31.85	67.94
1"	61.10	44.85	105.95
1-1/2"	122.43	75.23	197.66
2"	194.62	117.32	311.94
3"	436.87	243.86	680.73
4"	725.75	459.81	1,185.56
6"	1,858.58	1,474.93	3,303.51
8"	2,939.80	2,288.04	5,227.84
10"	4,703.70	3,660.87	8,364.57
12"	7,525.91	5,857.39	13,383.30

[1]Under the Board-approved rate structure, the allotment of the first 10 cubic meters of consumption previously included in the base charge was eliminated.

Table 7-7:
Commercial and Government Volumetric Rate per Cubic Meter

Use Block (m^3)	Water	Wastewater	Water & Wastewater
>0 – 100	$1.74	$1.44	$3.18
>100 – 200	2.16	1.73	3.89
> 200	2.84	2.27	5.11

Table 7-8:
Industrial Volumetric Rate per Cubic Meter

Use Block (m^3)	Water	Wastewater	Water & Wastewater
>0	$2.27	$1.82	$4.09

Table 7-9:
ECRC for Non-Residential Customers

Commercial and Government ECRC Meter Size Equal to or Less than 2-inches[1]			
Use Block (m^3)	**Water**	**Wastewater**	**Water & Wastewater**
>0-100	$1.18	$0.98	$2.16
>100-200	1.22	1.01	2.23
>200	1.26	1.04	2.30
Industrial ECRC Meter Size Equal to or Less than 2-inches			
>0	$1.54	$1.22	$2.76
Non-Residential ECRC Meter Size Greater than 2-inches			
Meter Size	**Water**	**Wastewater**	**Water & Wastewater**
3"	$482.00	$482.00	$964.00
4"	839.50	839.50	1,679.00
6"	2,340.00	2,340.00	4,680.00
8"	3,703.00	3,703.00	7,406.00
10"	5,924.50	5,924.50	11,849.00
12"	9,479.50	9,479.50	18,959.00

[1]Values have been corrected to reflect the charges as approved by PRASA's Governing Board; FY2013 CER listed slightly higher, but incorrect values.

7.3.1. Future Rate Increases

As approved by PRASA's Governing Board, future rate increases, which shall not be implemented before FY2018, shall follow the provisions, as amended, that had been previously approved under Resolution No. 2167 (dated October 6, 2005) as follows:

a) Adjustments and increases after July 1, 2017 will be calculated according to a specified formula (Coefficient of Annual Adjustment [CAA] described below);

b) Beginning July 1, 2017, there is a cap or limit on future annual increases of 4.5% and a limit on the cumulative increases of 25%;

c) If PRASA requires an increase in excess of 4.5% in any single year, or once the 25% cumulative limit is reached, PRASA must follow the formal approval process for requesting a rate increase.

Adjustments and increases implemented after July 1, 2017 are limited by the calculation of the CAA described in the Resolution and as presented herein. There are three steps to determining the CAA as follows:

- STEP 1 – Calculate the Coefficient of Deficiency (CD) for the applicable year:

  CD = Operating Expenses and Debt Service / Operating Revenues

- STEP 2 – Calculate the Annual Base Coefficient (CAB) for the Base Year:

  CAB = Operating Expenses and Debt Service (FY2007) / Operating Revenues (FY2007)

- STEP 3 – Calculate the CAA:

  CAA = CD/CAB

If the CD for any year is greater than the CAB from FY2007, i.e., CD for FY2017 greater than CAB, then the rates can be increased by the lesser of the CAA minus one (CAA-1) or 4.5% until the 25% cumulative maximum is reached. If the cumulative maximum is reached, or should PRASA in any given year require a higher rate increase than maximum annual adjustment amount of 4.5%, PRASA shall then follow the rate increase process required by Act 21 of 1985, as amended, of the Commonwealth of Puerto Rico. The first step requires review and ratification by PRASA's Governing Board of the proposed rate structure and approval to initiate the rate modification/increase process. The second step is the appointment of an independent Official Examiner that will conduct an independent review of the proposed changes and increases, and will lead public hearings. The third step is the development of a report by the Official Examiner that includes his findings and recommendations, to be considered by PRASA's management and Governing Board prior to final approval of the rate structure modifications and increases to be implemented. This report is published for public commentary. The fourth step and final step is the review and final approval by PRASA's Governing Board, considering the Official Examiner's recommendations.

7.4. FY2014 Results and FY2015 – FY2019 Forecast

MPPR/ARCADIS reviewed the PRASA-prepared financial forecast (the Forecast) shown in Exhibit 1 (included at the end of this section). This section summarizes the findings of MPPR/ARCADIS's review and provides an assessment of the reasonableness of PRASA's assumptions in the preparation of the Forecast. The purpose of this review was to assess the sufficiency of the proposed financial plan to provide the revenues necessary to support the projected costs shown in Exhibit 1, including O&M expenses, debt service payments, and required deposits, in compliance with the 2012 MAT and the 2012 FOA. Additionally, the Forecast illustrates the FY2014 debt service coverage (DSC), and the anticipated DSC for the five fiscal years from July 1, 2015 through June 30, 2019 (the forecast period).

The Forecast represents PRASA's estimate of the most probable results of operations and debt service requirements for the forecast period. Thus, it reflects PRASA's judgment, based upon present circumstances, as to the most likely set of conditions and course of action.

MPPR/ARCADIS worked closely with PRASA to obtain the information necessary to support its conclusions regarding the Forecast. The following information, provided by PRASA, was used in this review:

- Amended and restated 2012 MAT
- Amended and restated 2012 FOA
- Audited financial statements for FY2010 to FY2013
- FY2014 Preliminary Audited financial statements
- PRASA's FY2015 Annual Budget
- PRASA's FY2015 Projections (through December 31, 2014)
- PRASA's FY2016-FY2019 revenue and expense projections
- Debt service schedules for all currently outstanding debt service and preliminary projected debt obligations

7.4.1. Operating Revenues

As defined in the 2012 MAT, **Operating Revenues** *"shall mean all moneys received by or on behalf of the Authority, including (i) the moneys derived by or on behalf of the Authority from the sale of water produced, treated or distributed by, or the collection, transmission, treatment or disposal of sewage by the Systems, (ii) any proceeds of use and occupancy insurance on the Systems or any part thereof, (iii) except as provided in the following sentence, any income from the investments made under this Agreement, (iv) any special assessments, including assessments in the nature of impact fees, (v) amounts, if any, paid from the Rate Stabilization Account into the Operating Revenue Fund in any Fiscal Year minus the amounts, if any, paid from the Operating Revenue Fund into the Rate Stabilization Account during the same Fiscal Year; and (vi) regularly scheduled payments received under any Qualified Swap or Hedge Agreement during such period. In no event shall Operating Revenues include (i) income from the investment of moneys on deposit to the credit of the Construction Fund, proceeds of insurance (except use and occupancy insurance) or condemnation awards (which are required to be deposited directly to the credit of the Capital Improvement Fund), (ii) proceeds of sales of property constituting a part of the Systems (which are required to be deposited directly to the credit of the Capital Improvement Fund), (iii) the proceeds of Bonds or other Indebtedness, (iv) any governmental grants or appropriations available to pay Current Expenses of the Authority, including grants or appropriations received by the Authority and specifically made for the payments of principal of and interest on obligations of the Authority or for reimbursing the Authority for such payments, (v) any amounts received from the Commonwealth of Puerto Rico on account of Commonwealth Guaranteed Indebtedness (which is required to be deposited directly in the Commonwealth Payments Fund) or Commonwealth Supported Obligations (which is required to be deposited in the Commonwealth Payments Fund), (vi) any amounts transferred from the Budgetary Rese;3rve Fund to the Trustee and (vii) any*

termination or similar payment under any interest rate swap or similar hedge agreement received by the Authority (which are required to be deposited directly to the credit of the Capital Improvement Fund)."

PRASA's projections for Operating Revenues, on a cash basis, are presented in Table 7-10; a description of PRASA's assumptions is discussed below.

Table 7-10:
PRASA Operating Revenues ($, Thousands)

FY2014 Preliminary	FY2015 Projected[1]	FY2016 Projected	FY2017 Projected	FY2018 Projected	FY2019 Projected
$952,539	$963,285	$1,130,024	$1,168,782	$1,216,322	$1,243,775

[1]Based on year-to-date results through December 31, 2014.

1. Base Fee and Service Charges, Net of Subsidies (Exhibit 1, line 1) – PRASA's single largest source of revenue is from the monthly base charge and volume rate for services, the ECRC, and the Special Charge of $2.00 (refer to Section 7.3 for additional information). PRASA's preliminary FY2014 revenues from base fee and service charges (Service Revenues) net of subsidies amounted to $1,020M. For FY2015 PRASA has budgeted $1,089M in Service Revenues; however, PRASA's projection based on year-to-date results through December 31, 2014 amounts to $1,071M (approximately $18M less than budgeted). PRASA's FY2015 projection considers: 1) 12 full months of billings under PRASA's current rate structure (in other words it does not include the Service Revenues' implementation lag adjustment of FY2014); 2) additional customer accounts and consumption reductions; and 3) reduced government charges as a result of Act 66-2014 (estimated at approximately $37M for FY2015). PRASA's Forecast projections for FY2016 through FY2019 include Service Revenues, also net of subsidies, in the amounts of $1,066M in FY2016, $1,061M in FY2017, $1,102M in FY2018, and $1,143M in FY2019. For FY2018 and FY2019 PRASA has included in its Service Revenue projections, additional revenues to be generated from rate adjustments in the order of $46M each year, which represents an annual adjustment of about 4.5% of projected Service Revenues. Table 7-11 provides a breakdown of PRASA's Service Revenues for the forecast period.

Table 7-11:
PRASA Service Revenues ($, Thousands)

Service Revenue Category	FY2014 Preliminary	FY2015 Projected	FY2016 Projected	FY2017 Projected	FY2018 Projected	FY2019 Projected
Base Fee, Volume Charges, and ECRC[1]	$995,853	$1,046,346	$1,041,114	$1,035,909	$1,030,729	$1,071,959
Special Charges ($2.00)	24,202	25,000	24,875	24,750	24,627	24,503
Rate Adjustments[2]	-	-	-	-	46,383	46,151
Total	**$1,020,055**	**$1,071,346**	**$1,065,989**	**$1,060,659**	**$1,101,739**	**$1,142,613**

[1] Based on existing rates, includes rate adjustments, and projected reductions due to consumption reduction.
[2] Revenues generated from rate adjustments implemented in each year.

PRASA's Service Revenues are presented net of subsidies. While all customers pay for service, PRASA provides a 35% subsidy to the base charge for residents over the age of 65 who are eligible under the PAN Program or residents under the TANF Program; both government assistance programs. Also, since FY2010, and in compliance with Act 69 approved by the Puerto Rico Legislative Assembly in August of 2009, PRASA provides a subsidy to all public housing residential customers limiting the monthly payments of these customers to only the water and wastewater base fee charge. Table 7-12 summarizes the number of residential customers that are provided a subsidy for water and wastewater bills as of June 30, 2014. No material changes were observed in the number of customers under a subsidy program; although a slight reduction was recorded when compared to subsidized customers as of June 30, 2013.

Table 7-12:
Water and Wastewater Subsidized Customer Accounts

Subsidy	Number of Customers	Percent of Total Residential Customers[1]
PAN Subsidy	41,304	3.5%
TANF Subsidy	13,143	1.1%
Fixed Tariff (Public Housing)	52,508	4.5%
Total	**106,955**	**9.1%**

[1]Based on a total number of residential customers of 1,177,347 as of June 30, 2014.

PRASA's Service Revenue projections are based on certain assumptions regarding customer growth projections and average billed consumption. From FY2004 through FY2014, PRASA experienced a CAGR in number of accounts of approximately 0.13% per year. However, in recent years, PRASA's customer accounts have decreased. From FY2012 to FY2013, the number of customer accounts decreased by 0.07% and, as shown in Table 7-13, from FY2013 to FY2014 the number of customer accounts further decreased by 1.1%. The largest reductions (on a percentage basis) were observed in the number of industrial and commercial accounts.

Table 7-13:
Customer Accounts

Fiscal Year	Customer Class				Total
	Residential	Commercial	Industrial	Government	
FY 2013[1]	1,185,538	58,125	1,006	11,003	1,255,672
FY 2014[2]	1,177,347	53,702	916	10,500	1,242,465
% Difference	**-0.8%**	**-6.4%**	**-8.9%**	**-4.6%**	**-1.1%**

[1] Number of accounts by customer class through June 30, 2013.
[2] Number of accounts by customer class through June 30, 2014.

From FY2004 through FY2014, PRASA experienced a CAGR of -1.12% in average monthly billed consumption and of -1.38% in average monthly consumption per account. As shown in Table 7-14, total consumption in FY2014 decreased by approximately 5.2% compared to FY2013 results. This amount is in line with the assumed reduction in billed consumption due to price elasticity as a result of the July 15, 2013 rate increase; as previously reported, PRASA projected a 5% consumption reduction (equivalent to approximately 15M cubic meters) as a result of the rate increase. Also, the reduction may reflect the industry trend of declining consumption per customer account due to more efficient fixtures and appliances.

Table 7-14:
Average Monthly Billed Consumption by Class FY2013 – FY2014
(1,000 Cubic Meters)

Fiscal Year	Customer Class				Total
	Residential	Commercial	Industrial	Government	
FY 2013[1]	19,398	3,228	1,250	3,111	26,986
FY 2014[2]	18,601	3,007	1,220	2,747	25,575
% Difference	**-4.1%**	**-6.8%**	**-2.4%**	**-11.7%**	**-5.2%**

[1] Based on results through June 30, 2013.
[2] Based on results through June 30, 2014.

In turn, this reduction in consumption represents a decrease in the average billed consumption per account of approximately 4.2%, as shown in Table 7-15.

Table 7-15:
Average Monthly Consumption per Account FY2013 – FY2014
(Cubic Meters)

Fiscal Year	Customer Class				Total
	Residential	Commercial	Industrial	Government	
FY 2013[1]	16.4	56.3	1,242.5	282.7	21.5
FY 2014[2]	15.8	56.0	1,331.3	261.6	20.6
% Difference	**-3.4%**	**0.8%**	**7.2%**	**-7.5%**	**-4.2%**

[1] Based on results through June 30, 2013.
[2] Based on results through June 30, 2014.

The average monthly consumption for the July through December 2014 period was about 24.7M cubic meters. This represents an average monthly consumption of about 19.9 cubic meters per account. When compared to the FY2014 results, both the average monthly consumption and the consumption per customer have further decreased by an additional 3% each. Further analysis shows that when comparing the results for the period from July through December 2014 with those of the same period for FY2013, overall consumption has decreased by about 7%. Finally, currently, billings for the July through December 2014 period are about 4.2% behind budget, and about 3% less when compared to the same period for FY2013.

According to the U.S. Census Bureau, there was a 6.8% decline in Puerto Rico's population between 2000 and 2014.[19] Additionally, both the U.S. Census Bureau and the PRPB are projecting that Puerto Rico's population will continue to decline over the next 10 years at an estimated annual rate of 1.3%. Considering the historically low annual growth rate, the reduction in Puerto Rico's population (and PRPB projections), and the reduction in number of accounts that occurred from FY2012 to FY2014, PRASA has incorporated additional customer accounts and consumption reductions in its Forecast which result in a 0.5% decrease in Service Revenues in FY2016 (from the FY2015 projected amount), and an additional reduction from previous year results of about 0.5% in each year thereafter. As of December 31, 2014, PRASA had a total of 1,240,452 customer accounts. This represents a further reduction of about 0.2% from FY2014 results.

MPPR/ARCADIS believes that PRASA's assumptions for Service Revenues are reasonable considering that: 1) PRASA is projecting lower Service Revenues for FY2015 based on year-to-date results through December 31, 2014, and 2) is including further reduction in future fiscal years. Nevertheless the following should be noted:

- FY2014 results as well as year-to-date results through December 31, 2014 show that average billed consumption, average monthly consumption per account, and residential billings have reduced significantly since FY2013. These reductions have been at a higher rate than those assumed by PRASA in its FY2015 Annual Budget, and are impacting PRASA's FY2015 projection.

- Continued strain on the economy and the high unemployment rate in Puerto Rico[20] could continue to materially affect consumption profiles, resulting in 1) further declines in the consumption patterns and/or number of PRASA customers, and 2) further reductions of projected Service Revenues.

[19] The U.S. Census Bureau shows Puerto Rico population in 2000 was 3,808,610 and 3,548,397 in 2014.
[20] Based on the U.S. Bureau of Labor Statistics, as of June of 2014 the unemployment rate in Puerto Rico was 13.1%, which is 5.1% lower than reported in June of 2013; Source: www.bls.gov/lau/

- PRASA's projected Service Revenues for FY2018 and FY2019 depend on the timeliness of implementation of the projected rate adjustments. These rate adjustments are subject to approval by PRASA's Governing Board as part of the Annual Budget review and approval process. Prior to 2013, previous attempts by PRASA to implement the 4.5% rate adjustments proved unsuccessful, forcing PRASA to seek alternate funding sources and special assignments from the Central Government. Also, these projected rate adjustments could negatively affect Service Revenues as customers could adopt additional water conservation measures resulting in additional consumption and, in turn, Service Revenue reductions.

2. Transfers to/from the Rate Stabilization Account (Exhibit 1, lines 2) – In accordance with the 2012 MAT Rate Stabilization Account, the balance of which is determined in the annual budget, shall be established. This account is established within the Surplus Fund, which contains any remaining moneys after all required deposits are made. Equivalent monthly deposits during the fiscal year must be made into the account to equal to the balance set forth in the annual budget.

   As previously reported, PRASA's July 15, 2013 increase is projected to generate excess Service Revenues during FY2014 and FY2015 that PRASA plans to use in future years to meet its operational and debt service obligations. PRASA's preliminary results show a transfer of $93M to the Rate Stabilization Account in FY2014. Part of this transfer is due to an Adjustment for Non-Cash Reserves made in accordance with the 2012 MAT, and included in PRASA's FY2014 preliminary results of about $40M (see Exhibit 1, line 25). These Adjustments for Non-Cash Reserves include: $7.6M from labor complaints and $32.4M in contingencies, fines, etc. The rest of the funds deposited in the Rate Stabilization Account in FY2014 are from revenues available given the lower debt service payments (a delay in PRASA's next bond issuance reduced the debt service payments due in FY2014), and lower electricity and maintenance and repair costs.

   In FY2015, PRASA projects to transfer (deposit) to the Rate Stabilization Account approximately $142M, which is approximately $90M higher than the amount included in PRASA's Board-approved FY2015 Annual Budget. This difference is a result of: additional savings of about $3M to be achieved from certain initiatives further discussed in Section 7.4.3 of this report, reductions of about $22M in the projected debt service amount due in FY2015 (as a result in the delay of issuance of bonds), and a projected net transfer of $65M from the CIP account to the Operational account. This net transfer considers a repayment amount of $90M for CIP project payments made by PRASA (to be funded with bond proceeds) and a projected deposit of $25M to the CIP fund for projects to be funded with the Special Charges paid by PRASA's customers.

In future years, PRASA projects the following withdrawals from the Rate Stabilization Account: $26.6M in FY2016, $67.5M in FY2017, $72.5M in FY2018, and $54.3M in FY2019.

MPPR/ARCADIS believes that PRASA's assumptions are reasonable. However, as noted regarding PRASA's Service Revenues, continued strain on the economy and the high unemployment rate in Puerto Rico could cause a continued decline in the consumption patterns of PRASA customers, resulting in reductions of projected Service Revenues which could negatively impact PRASA's ability to make these transfers. Also, these transfers depend on the reasonability of PRASA's Operating (Current) Expenses, later discussed in this 2014 CER.

3. Operational Initiatives (Exhibit 1, lines 3 & 4) – As previously mentioned, PRASA's operational initiatives include: 1) Revenue Optimization Program which is a set of programs implemented by PRASA to increase revenues and collections, and 2) Additional NRW Reduction Initiatives. Table 7-16 presents a summary of the projected revenues PRASA has included in its Forecast. Based on FY2014 preliminary results, PRASA has conservatively elected to include it its Forecast a lower revenue projection for FY2015 through FY2019 to be generated from Operational Initiatives (about 25% less) than those estimated and presented in Section 4.

Table 7-16:
Revenue Optimization Program Initiatives FY2014 – FY2019
($, Thousands)

	FY2014 Preliminary Results	FY2015 Projection	FY2016 Projection	FY2017 Projection	FY2018 Projection	FY2019 Projection
Additional Billings	$97,567	$91,609	$92,525	$93,451	$94,385	$95,329
Collections from Prior Years	$5,546	$6,300	$5,400	$4,500	$4,500	$3,600

MPPR/ARCADIS believes that PRASA has a strong commitment to its Operational Initiatives (as evidenced by historical results), and to achieving the goals outlined for each initiative. FY2014 results show that PRASA collected $103M in additional revenue from these initiatives. This amount is more than originally budgeted and those results are mostly due to an increased efforts regarding small and large meter replacements, addressing theft and inactive accounts, and service disconnections. PRASA's FY2015 year-to-date results through December 31, 2014 show that PRASA is surpassing its budgeted amount by about 15%, or $7M. In future years, the projected revenue amount to be generated from Operational Initiatives are, on average, about $98M in each year of the Forecast.

Considering the historical performance of Operational Initiatives, and the projected benefits that could be achieved (as discussed in Section 4), MPPR/ARCADIS finds the projections reasonable. Nonetheless, PRASA's assumptions for the incremental revenues from Operational

Initiatives rely on the effective and timely implementation of these initiatives. Any changes to the implementation schedule could materially affect PRASA's projections. As such, PRASA should continuously monitor its results and make adjustments as necessary.

4. Adjustment for Uncollectibles (Exhibit 1, line 5) – Prior to the rate increases implemented in 2005 and 2006, PRASA's historical percentage of Adjustment for Uncollectibles was approximately 4% of its Service Revenues. Although PRASA's rate of uncollectibles increased significantly in the years following the 2005/2006 rate increases, in FY2012 and FY2013, PRASA's rate of uncollectible accounts (including collections from prior years) stabilized below 5%.

   PRASA's preliminary results for FY2014 (first year after the rate increase implemented on July 15, 2013) include about $86M in adjustments for uncollectible accounts. This represents a rate of uncollectibles of about 7.7% of Service Revenues and additional billings from Operational Initiatives. In FY2014, PRASA reports to have collected about $5.5M from previous years. PRASA's FY2015 projections includes an Adjustments for Uncollectibles amount of about $72.7M (or 6.25% of Service Revenues and additional billings from Operational Initiatives). This is approximately $13.7M less than FY2014 preliminary results and is in line with the FY2015 Annual Budget. In future years, PRASA has assumed an annual rate of uncollectibles of Service Revenues and additional billings from Operational Initiatives of 6% in FY2016, 5.75% in FY2017, 5.5% in FY2018 and 5.0% FY2019. To achieve the reduction in its rate of uncollectibles PRASA has indicated that it will continue to address complaints and service disconnections. Year-to-date results through December 31, 2014 show that the rate of uncollectibles for regular (non-government) accounts is about 2.2%; while for government accounts is about 13.25 (note that only about 14% of PRASA's Service Revenues are generated from government accounts); hence, year-to-date Adjustment for Uncollectibles results are about 3.3% of Service Revenues and Operational Initiatives which is much lower than currently projected and included in PRASA's Forecast.

   MPPR/ARCADIS cautions that the uncollectibles rate could increase beyond the levels currently assumed by PRASA, considering the uncertain economic and fiscal situation for Puerto Rico as a whole. Nevertheless, considering year-to-date results through December 31, 2014, MPPR/ARCADIS PRASA's Adjustments for Uncollectibles Forecast for FY2015 through FY2017 reasonable. However, considering that rate adjustments are projected for FY2018 and FY2019, MPPR/ARCADIS recommends no further reduction in the uncollectibles rate for those two fiscal years. Refer to the sensitivity analysis discussed in Section 7.8 of this report for recommended assumptions and updated Forecast results.

5. Other Income (Exhibit 1, line 6) – PRASA's Other Income includes: Miscellaneous Income, Special Assessments (fees paid by developers), and income from other sources. Miscellaneous Income mainly includes fines, reconnection charges, bulk water sales, other miscellaneous

revenues, and interest income. Special Assessments are fees paid by developers for construction projects or new development connections. These fees apply to new water and sewer connections to the System. The FY2014 fees were about $500 each for water and sewer connections ($1,000 total per unit). Special Assessments depend on the fees paid by developers of new projects and it is expected that the current economic situation will continue to impact the local new housing market during the next few years.

Finally, PRASA is including income from other sources starting in FY2019. Through its subsidiary, PRASA Holdings, PRASA is projecting to generate additional revenues in the amount of $4M each year, starting in FY2019 from its private subsidiary fiber optic installation and services. MPPR/ARCADIS has not reviewed this revenue projection in detail and, as such, is not providing an opinion on its reasonability.

Based on preliminary results, PRASA's Other Income revenues for FY2014 totaled $8.8M. Miscellaneous Income for FY2014 amounts to $4.3M, while Special Assessments amounts to an additional $4.5M. For FY2015 through FY2018, PRASA is projecting $9M from Other Income. Finally, in FY2019, the amount projected from Other Income increases to $13M considering the additional $4M to be generated through PRASA Holdings, LLC. Assuming that PRASA is able to generate the projected revenues from the fiber optic installation and services, MPPR/ARCADIS finds PRASA's Other Income Forecast reasonable.

7.4.2. Authority Revenues (Other Sources of Revenues)

As per the 2012 MAT, the Authority Revenues (Exhibit 1, line 13) include all the Operating Revenues (previously discussed) plus other sources of revenues which are not from the System. Other sources of revenue include: transfers from the Budgetary Reserve Fund, Central Government Appropriations, among others.

In past fiscal years, PRASA has required other sources of revenues to be able to meet its obligations. Because PRASA delayed implementing a rate increase until FY2014, PRASA required support from the Central Government. In FY2011, PRASA received a contribution of $105M from the Central Government General Fund to fund an otherwise anticipated operational deficit. In FY2012, a similar contribution was approved by the Puerto Rico Legislature in the Central Government's Annual Budget. PRASA received $70.3M of the $183.9M approved from this assignment in FY2012. The difference was covered with a $95M draw from the Budgetary Reserve Fund which was initially funded in FY2012 with bond proceeds from PRASA's 2012 bond issuance. In order to meet its FY2013 obligations and to comply with the requirements of Section 7.01 of the 2012 MAT, PRASA used $145M (remaining balance) from the Budgetary Reserve Fund.

PRASA is not projecting additional revenue from other sources in the forecast period. The revenues to be generated under the existing rate structure should be sufficient for PRASA to meet its obligations through FY2017, as presented in Exhibit 1. As previously mentioned, for FY2018 and

FY2019 PRASA is projecting additional revenues from rate adjustments in the order of $46M, or about 4.5% of projected Service Revenues, each year. Should these rate adjustments not materialize, external support/other measures shall be pursued by PRASA. These may include, but are not limited to one, or a combination of special assignments from the Central Government, additional revenues from Operational Initiatives, and reductions in Operating Expenses.

7.4.3. Operating (Current) Expenses

As defined in the 2012 MAT, **Current Expenses** "*shall mean the reasonable and necessary current expenses, incurred by the Authority in the ordinary course of business, calculated on an accrual basis, of maintaining, repairing and operating the properties constituting the Systems or causing said maintenance, repair and operation, which expenses shall exclude depreciation, reserves for allowances for doubtful accounts and other non-cash reserves or expenses. For purposes of the Rate Covenant and the Annual Budget required by Section 7.02 of the 2012 MAT, Current Expenses will be calculated on an accrual basis. For all other purposes of the 2012 MAT, Current Expenses will be calculated on a cash basis. Notwithstanding any accounting treatment to the contrary, the amount of any termination or similar payment under any interest rate swap or similar hedge agreement shall, if payable by the Authority, not be taken into account in computing Current Expenses to the extent the same is paid by or on behalf of the Authority from the proceeds of any Indebtedness."*

PRASA's projections for Operating (Current) Expenses, on an accrual basis, and associated assumptions are discussed below.

1. Payroll and Benefits (Exhibit 1, line 14) – Payroll and Benefits continues to be PRASA's largest expense category. Over the past five fiscal years, PRASA has averaged approximately $303M annually for this expense category. Since FY2009, PRASA has implemented cost control methods to reduce its staff levels and, in turn, Payroll and Benefits costs. Over the past five fiscal years PRASA has reduced its staff levels by about 0.4% each year. As previously reported, PRASA ended FY2013 with 4,888 employees; however, this low staff level was mainly due to the one-time increase in personnel retirements, many of which occupied positions that PRASA would replace. During FY2014, PRASA was in the process of hiring new employees to fill certain critical operations positions that were left vacant as a result of the numerous personnel retirements that took place in FY2013 due to legislated changes to the retirement conditions. As a result, PRASA reported a 4.13% net increase of staff from FY2013 to FY2014. Although PRASA projected that staff levels would increase to about 5,373 during FY2014, actual staff levels on June 30, 2014 were 5,090. PRASA indicates that during FY2015 it plans to hire about 283 new employees in order to reduce overtime hours (and costs) and contract positions, and fill certain open positions, which includes positions left vacant by employees who retired during FY2013 and FY2014. PRASA projects to maintain this headcount level over the rest of the forecast period.

It should be noted that PRASA is not considering in this expense category the Payroll and Benefits savings to be achieved as a result of the enactment of Act 66-2014; these savings are considered in a separate expense category, shown in Exhibit 1 as Act 66-2014 Expense Reductions (Exhibit 1, line 22). PRASA's FY2014 preliminary results for Payroll and Benefits amount to $325M, which is $8M higher than the budgeted amount. This negative deviation was due mostly to additional overtime expenses. PRASA's FY2015 projection for Payroll and Benefits, based on year-to-date results through December 31, 2014, totals $329M, which is $3M less than budgeted. PRASA is projecting an annual increase in the base Payroll and Benefits costs of about 2.5% per year (on average) in each year of the Forecast thereafter. These amounts consider the increase in staff levels, the impact of the CBAs that were signed during FY2012 with the UIA-AAA and HIEPAAA, and the increase in the employer's contributions to the Retirement System; and, as previously mentioned, excludes the projected savings to be achieved from the enactment of Act 66-2014. Based on the historical results and the assumptions made by PRASA in its projections, MPPR/ARCADIS believes these projections are reasonable. However, PRASA must continue to closely monitor the overtime costs to assure that the expected reductions to be achieved through the new personnel to be hired are realized.

2. Electric Power (Exhibit 1, line 15) – Electric Power is PRASA's second largest expense category. Up until FY2014 the electric power costs were in an upward trend. PRASA's electric power costs have historically increased at a CAGR of about 8%. However, as a result of the preferential all-in-rate approved by PREPA (previously discussed) that went into effect in FY2014, for the first time in over ten years PRASA's Electric Power costs decreased year over year. PRASA's FY2014 preliminary results for Electric Power amount to $166.7M, which is $7.3M less than the budgeted amount. PRASA's FY2015 projection for Electric Power, based on year-to-date results through December 31, 2014, totals $155M, which is about $4M less than budgeted. The Electric Power expense projection for FY2015 considers PRASA's projected cost of energy using the PREPA preferential all-in-rate for Electric Power, and the projected reductions in consumption and reductions from renewable power purchases to be achieved through PRASA's Comprehensive Energy Management Program. In future years, PRASA is projecting Electric Power expenses of $154M in FY2016, $153M in FY2017, and about $151M in both FY2018 and FY2019.

   PRASA is projecting that the Electric Power purchased from PREPA will decrease over the forecast period at a rate of about 1.5% per year; to be achieved through the initiatives currently underway under PRASA's Comprehensive Energy Management Program. PRASA is also projecting that the cost per kWh for the first 750 million kWh will remain at $0.22 per kWh throughout the Forecast, and any excess amount consumed over the allotted 750 million kWh under the preferential all-in-rate will be paid at a rate of $0.27 per kWh. Considering PREPA's current fiscal situation and the high probability that the second phase of the preferential all-in-rate will not materialize come FY2017, PRASA has excluded the second phase reduction to

$0.16 per kWh of the preferential all-in-rate. As a result, the estimated additional savings which were to be deposited in the Capital Improvement Fund (approximately $45M) previously reported in the 2013 CER, have been eliminated from PRASA's projections.

Considering PRASA's relatively low historical annual consumption growth rate and expected results of its Comprehensive Energy Management Program, and assuming that the preferential all-in-rate will remain in force throughout the forecast period, MPPR/ARCADIS finds the Forecast reasonable. However, it must be highlighted that currently PREPA is experiencing a critical fiscal situation and has been appointed an external Syndicate who will develop and present fiscal recovery recommendations which may include the reduction or removal, all together, of existing subsidy programs and other economic/rate agreements which may affect PRASA's preferential all-in-rate. MPPR/ARCADIS recommends that PRASA closely and actively monitor PREPA's situation in order to adopt contingency measures, as necessary.

3. Maintenance and Repair (Exhibit 1, line 16) – PRASA's FY2014 preliminary results for Maintenance and Repair expenses amount to $45.8M. PRASA's FY2015 projection for Maintenance and Repair expenses, based on year-to-date results through December 31, 2014, totals $50.2M, which is about $4M less than budgeted. The increase over FY2014 preliminary results is based on additional costs for the cleaning of the Superaqueduct Water Treatment Plant sludge lagoons (about $6.3M) which was originally budgeted for FY2014 and it was not performed; additional costs of approximately $2M for the activities related to the CSO systems in the Puerto Nuevo service area; and the estimates provided by the Regional Operational Directors as to the amounts required to maintain and repair the system. PRASA has included a 3% increase starting in FY2016 and in each year thereafter to account for inflation. MPPR/ARCADIS believes these projections are reasonable.

4. Chemicals (Exhibit 1, line 17) – PRASA's FY2014 results for Chemical expenses amount to $28.7M. PRASA FY2015 projection for Chemical expenses, based on year-to-date results through December 31, 2014, totals $29.5M which is about $3M less than budgeted. This amount includes the Chemical costs for the Superaqueduct System facilities, which were previously included in the Superaqueduct O&M Contract Fee expense category. Chemical costs are usually affected by inflation and worldwide demand as they are mostly commodities. The CAGR for the past five fiscal years for chemical costs has been about 2% per year. PRASA has included a 3% annual increase starting on FY2016 and in each year thereafter to account for inflation. Based on results in previous years and considering that PRASA does not expect significant changes in its chemical usage pattern over the forecast period, MPPR/ARCADIS believes these projections are reasonable.

5. Superaqueduct O&M Contract Fee (Exhibit 1, line 18) – Over the past 10 years, and up until FY2011, the Superaqueduct had been managed and operated by Thames-Dick Superaqueduct Partners, PSC (Thames-Dick) under a contract agreement with PRASA (the Master

Agreement). Thames-Dick's compensation included two main components: a fixed fee for operation and management activities, which included Thames-Dick's gross margin (approximately $2M); and the pass-through of operation and maintenance expenses. These pass-through expenses included: power and fuel, chemical, insurance, contingencies, and lagoon cleaning costs. The Master Agreement between Thames-Dick and PRASA was dissolved by the parties pursuant to a Resolution Agreement dated May 18, 2011. The decision was made based on business and policy reasons, mutually agreed by the parties, and not based on their respective performance or existing claims.

PRASA continued to contract the O&M services to a private operator (Caribbean Water Specialists, Corp., or CWS). All costs that were previously considered pass-through costs (i.e., electricity, chemicals, spare parts, equipment, and insurance costs, among others) were assumed by PRASA. As a result, PRASA has modified the Superaqueduct cost center and only the costs associated with the O&M contract are included in this expense category. Hence, all costs that were previously considered as pass-through costs have been appropriately accounted for in the respective operational expense categories.

In FY2013, looking to reduce O&M costs, PRASA performed a competitive RFP process to identify a new contract operator for O&M services. As a result, in October of 2013, PRASA contracted CH2M Hill Puerto Rico, Inc. (CH2M Hill) for an annual fixed fee of $3.8M (a savings of about $1.5M compared to the previous contract with CWS) for the O&M of the Superaqueduct. PRASA renewed CH2M Hill's contract for FY2015. PRASA's FY2015 Annual Budget and projection for the Superaqueduct O&M amounts to $3.8M. Even though the contract does not include an annual compensation escalator, in future years PRASA is projecting that the contract amount will increase at a rate of 3% per year as a result of adjustments in materials and equipment costs. MPPR/ARCADIS believes these projections to be reasonable considering PRASA's contract costs control efforts.

6. Insurance (Exhibit 1, line 19) – Results for Insurance expenses in FY2014 totaled $9.5M. PRASA is projecting $9.5M for insurance expenses in FY2015 and has included a costs increase of 3% per year starting in FY2016 and in each year of the Forecast thereafter. PRASA does not project major policy and coverage changes over the Forecast. MPPR/ARCADIS believes the projections for this expense category are reasonable; however, to the extent that PRASA elects to adopt some or all of the recommendations provided by MARSH (see Section 6), Insurance costs may vary in future years and projections may need to be adjusted.

7. Other Expenses (Exhibit 1, line 20) – Other Expenses include, for example: materials and supplies, security, treatment of residuals, rentals, and water transport. FY2014 preliminary results for this expense category are approximately $163M, which is about $15M above the FY2014 Annual Budget, and about $36M higher than preliminarily reported in MPPR/ARCADIS' *FY2015 Annual Budget Review Report*. This deviation is due to: higher

expenses of materials and supplies (net effect of higher expenses and lower than expected capitalized costs), and an increase in contingency reserves. PRASA has included $156.1M for Other Expenses in its FY2015 Annual Budget and is currently projecting to meet this budget amount. For FY2016 through FY2019, PRASA has assumed that this expense category will increase at a rate of 3% per year (this increase is based on PRASA's assumed inflation rate). MPPR/ARCADIS believes these projections to be reasonable considering PRASA's historical results; however, a detailed evaluation of the atypical increase in materials and supplies expenses experienced in FY2014 is recommended.

8. Additional Savings from Initiatives (Exhibit 1, line 21) – PRASA has included a new expense category to account for additional projected savings to be generated from certain initiatives not already considered in PRASA's Forecast. Projected savings are approximately $7.5M in FY2016, $9.7M in FY2017, $13.7M in FY2018, and $15.3M in FY2019. PRASA has indicated that these savings are to be achieved from: net savings due to the reduction of physical water losses (ranges from $3.2M in FY2015 up to $11.8M in FY2019), additional reduction in contract amounts (of about $1.5M per year starting in FY2016), and further reductions in Other Expenses (of about $2M per year starting in FY2018).

   MPPR/ARCADIS has not independently validated PRASA's estimated net savings to be achieved from reducing physical losses. As previously reported, PRASA engaged an external NRW consultant (Miya Puerto Rico LLC, a local subsidiary of Miya Luxemburg Holdings S.a.r.l.) that provided an opinion on the potential opportunities to be achieved by addressing the reducing PRASA's physical losses. While in the initial years investments were higher than the achieved benefits; in the long-term the projected benefits of reducing physical losses were greater than the investment costs, producing net benefits in the range of $1M all the way up to $100M (cumulative) per year. Using the data collected through its water pipeline survey and water audits, PRASA has adjusted these projections and believes there is a net benefit opportunity that could be captured in the range of about $6M to $24M (cumulative). However, in its Forecast, PRASA has only included 50% of these potential benefits.

   Regarding the other initiatives, PRASA indicates that additional savings will be achieved from further consolidation of facilities (i.e., commercial offices), optimization of operations, and further reductions in contracted services (i.e., cost savings from re-procurements). MPPR/ARCADIS finds PRASA's projections for this expense category aggressive. PRASA's assumptions rely on the effective and timely implementation of these initiatives; on its ability to reduce water production (and in turn associated production costs) and future repair costs as a result of the reduction in physical losses, a task that could prove difficult to accomplish if financing sources are limited, and if there is further pressure on CIP and expense reductions; and, on its capacity to consolidate facilities such as commercial offices, an initiative that has been previously pursued but that PRASA has not been able to implement at the desired level. MPPR/ARCADIS recommends a more conservative Forecast assumption that excludes the

projected Additional Savings from Initiatives, until such time PRASA demonstrates that the estimated results are achievable. Refer to the sensitivity analysis discussed in Section 7.8 of this report for recommended assumptions and updated Forecast results.

9. Act 66-2014 Expense Reductions (Exhibit 1, line 22) – As previously mentioned, a fiscal emergency situation for the Commonwealth of Puerto Rico has been declared through the enactment of Act 66-2014, which requires that its instrumentalities (i.e., utilities, government agencies, and public corporations such as PRASA) implement certain measures to reduce its expenses. As a result of Act 66-2014, PRASA has projected a reduction of $37M in expenses for FY2015. The savings includes a reduction of about $29M in Payroll and Benefits of which $15.9M is from negotiated terms with the unions, $9M from reductions to management employees, and $4M in savings to be reduced from the costs of the health plan provided to employees. The remaining $4M is to be achieved from a reduction in contracted services and greater efficiencies to be achieved in O&M practices through negotiated terms with unions previously discussed in Section 2. For FY2016 through FY2019, PRASA is projecting a reduction of $43M each year, of which the additional $6M in savings is to be achieved through additional cost reductions from one or a combination of the measures already agreed between PRASA and the unions and its management personnel.

   PRASA's projected expense reductions for compliance with Act 66-2014 are reasonable, but highly depend on PRASA's ability to achieve said reductions through the implementation of the measures discussed in this report.

10. Capitalized Expenses (Exhibit 1, line 24) – PRASA's external consultant, PJ Sun LLC, completed the review of PRASA's capitalization rate and issued an update to the 2007 Asset Capitalization Report. Based on the recommendations included in the report, PRASA should use a capitalization rate of 5.1%. FY2014 preliminary results for Capitalized Expenses amounts to $32.3M, or 4.4%. As discussed under Other Expenses, during FY2014 PRASA experienced higher materials and supplies expenses with a lower capitalization rate which is not typical. For FY2015 and in each year of the Forecast thereafter, PRASA has projected 5.1% of Operational Expenses will be capitalized. MPPR/ARCADIS assumes that the estimation for expense capitalization used by PRASA is reasonable given that, in previous years, it has been accepted by PRASA's outside, independent auditors in the preparation of its financial statements. MPPR/ARCADIS has not reviewed this estimation in detail and, as such, is not providing an opinion on the reasonability of the recommended capitalization percentage. Nevertheless, PRASA should investigate the reasons behind the lower capitalization results for FY2014 in order to avoid a similar result in the future.

7.4.4. Other Expense Considerations

As previously mentioned, in FY2015 PRASA is including a deposit of $90M to the Current Expense Fund (Exhibit 1, Line 39) to repay funds used to partially finance (on an interim basis) its

CIP. This amount will be repaid with bond proceeds from PRASA's 2015 Series Revenue Bonds, further discussed in Section 7.6.

Finally, it must be noted that the Commonwealth of Puerto Rico is currently evaluating the implementation of a Value Added Tax (VAT or IVA by its Spanish acronym) and elimination of the existing Sales Tax system as part of a general tax system reform. The legislative project has recently been presented by the Governor of Puerto Rico and is still subject to review, modifications, and approval by the Commonwealth's legislative branches. Although the proposed bill states that the sale of goods and services to agencies and instrumentalities of the U.S. Government, its States, the District of Columbia, and the Commonwealth of Puerto Rico shall be exempt of the VAT, PRASA's Forecast could be materially affected as a result of an indirect increase in costs of goods and services. However, at this time, there is insufficient information to estimate the effect that a VAT could have on PRASA's Forecast. As such, the opinions provided by MPPR/ARCADIS regarding PRASA's Operating Expenses Forecast exclude the potential impacts of a VAT.

7.5. Funding of PRASA CIP

PRASA is projecting capital investment expenditures of $1,379.5M from FY2015-FY2019, as previously presented in Section 5 of this report. Projected sources of funds for the same period total $1,410.7M. Table 7-17 provides a summary of the CIP uses of funds along with the anticipated sources of funding (as approved by PRASA's Governing Board). As with PRASA's Operating Expenses, PRASA's CIP Forecast could be materially affected by the implementation of a VAT as a result of indirect increases in the cost of goods and services. However, at this time, there is insufficient information to estimate the potential impacts that the VAT could have on PRASA's CIP costs.

As shown in Table 7-17 below, the distribution of CIP sources of funds projected in the forecast period are as follows: 54% from bond proceeds (down from the historical 60%) and/or interim financing; 24% from Federal Funds (State Revolving Fund, Rural Development bonds, and other matching sources); and 22% from PRASA's projected deposits to the Capital Improvement fund and others. It should be noted that this is the first time that PRASA is including deposits into the Capital Improvement Fund to partially fund its CIP project. In FY2014, PRASA funded its Capital Improvement Fund requirement with federal funds, with funds in the 2012 Bonds $50M Construction Fund, and a facility with a private bank. This facility will expire on May 29, 2015. It is expected that PRASA will issue bonds to settle the facility during FY2015. If the future bond issuances do not occur as projected, PRASA would likely have to work with the GDB or with private banks to secure the necessary interim financing to continue its CIP implementation.

Table 7-17:
CIP Projected Uses and Sources of Funds ($, Thousands)

	FY2015 Projection	FY2016 Projection	FY2017 Projection	FY2018 Projection	FY2019 Projection	TOTAL
USES OF FUNDS[1]						
Repair & Replacement of Fixed Assets	$97,911	$47,831	$51,870	$78,523	$83,356	$359,491
CIP Infrastructure Projects	192,890	317,677	257,912	166,398	157,177	1,092,054
Total Projected Capital Expenses (Uses)	**$290,801**	**$365,508**	**$309,782**	**$244,921**	**$240,533**	**$1,451,545**
SOURCES OF FUNDS						
Surplus Cash Available from CIP[2]	$1,873	$1,572	$3,564	$3,782	$3,861	$14,652
Federal Funds – Rural Development Funds	15,000	22,500	15,000	15,000	15,000	82,500
Federal Funds – State Revolving Funds	88,000	45,000	45,000	45,000	45,000	268,000
Deposits to CIP Fund and Restricted Funds for Contrstruction[3]	25,000	50,000	50,000	75,000	75,000	275,000
2012 Bonds $50M Construction Fund	30,000	-	-	-	-	30,000
Fleet Financing	7,500	-	-	-	-	7,500
Bonds Proceeds / Interim Financing	125,000	250,000	200,000	110,000	105,000	790,000
Total Sources of Funds	**$292,373**	**$369,072**	**$313,564**	**$248,782**	**$243,861**	**$1,467,652**
Funding Surplus / (Shortfall)	**$1,572**	**$3,564**	**$3,782**	**$3,861**	**$3,328**	**$16,107**

[1] Includes the Expenses Capitalized to CIP costs; numbers may not add due to rounding.
[2] Surplus from bonds proceeds/interim financing not used in previous fiscal year.
[3] Sources: Special Charges ($2.00) and forecasted deposits to the Capital Improvement Fund from Net Authority Revenues.

7.6. Debt Service

7.6.1. Master Agreement of Trust

The 2012 MAT contains specific DSC requirements that must be met by PRASA including, but not limited to, a Rate Covenant. As stated in the Rate Covenant defined in the 2012 MAT, PRASA has covenanted to establish and collect rates, fees and charges so that it meets the following four independent requirements[21] (which will be calculated annually no later than six months after the end of each fiscal year based on Operating Revenues and Authority Revenues set forth in PRASA's most recent audited financial statements):

- Operating Revenues shall be at least equal to 250% of annual debt service with respect to Senior Indebtedness for the current fiscal year;
- Operating Revenues shall be at least equal to 200% of annual debt service with respect to Senior Indebtedness and Senior Subordinate Indebtedness for the current fiscal year;

[21] Capitalized terms as defined in the 2012 MAT.

- Operating Revenues shall be at least equal to 150% of annual debt service with respect to all Bonds and Other System Indebtedness for the current fiscal year; and
- Authority Revenues, shall be sufficient in each fiscal year to be at least equal to the sum of:
  - Annual debt service on Indebtedness;
  - Current expenses;
  - the amounts, if any, necessary to be deposited in any Senior Debt Service Reserve Account, Senior Subordinate Debt Service Reserve Account or Subordinate Debt Service Reserve Account to restore the amount on deposit therein to the amount of the applicable Debt Service Reserve Requirement (provided that each such Accounts will be deemed to be funded at the applicable Debt Service Reserve Requirement for so long as the deposits required by the 2012 MAT are being made);
  - the amount, if any, necessary to be deposited in the Operating Reserve Fund to maintain the balance therein at the Operating Reserve Fund Requirement; and
  - the amount, if any, necessary to be deposited in the Capital Improvement Fund and the Rate Stabilization Account of the Surplus Fund in accordance with the Annual Budget for the current fiscal year.

Should PRASA decide to issue additional debt while any of the debt issued under the 2012 MAT is outstanding, the additional bonds test (ABT) requirements of the 2012 MAT would also have to be met. The ABT is a measure of whether or not DSC will still be met after the proposed, additional bonds are issued. The modified ABT requirements which PRASA must meet (under the 2012 MAT) include the following:

- Senior Bonds ABT
  - Operating Revenues are at least equal to 2.5x Senior Bonds maximum annual debt service; and
  - Operating Revenues are at least equal to 1.5x maximum annual debt service on all System Indebtedness.
- Senior Subordinated Bonds ABT
  - Operating Revenues are at least equal to 2.0x combined Senior Bonds and Senior Subordinate Bonds maximum annual debt service; and
  - Operating Revenues are at least equal to 1.5x maximum annual debt service on all System Indebtedness.
- Subordinated Bonds ABT
  - Operating Revenues are at least equal to 1.5x maximum annual debt service on all System Indebtedness.

A summary of PRASA's 2012 MAT DSC and ABT requirements is presented in Table 7-18 below.

Table 7-18:
Summary of 2012 MAT DSC Requirements

Lien Level	Debt Secured	DSC for Additional Bonds Test (MADS)	DSC for Covenant Test	In Default if DSC not Achieved?
Senior	2008, 2012 & 2015 Senior Bonds	2.5/1.5	2.5	Yes
Senior Subordinate	Bond Anticipation Note & Senior Subordinate Bonds	2.0/1.5	2.0	Yes
Subordinate	Not currently applicable	1.5	1.5	Yes
Below Subordinate	Commonwealth Guaranteed Indebtedness	N/A	1.0	No
Below Subordinate	Commonwealth Supported Obligations	N/A	1.0	No

[1] Two tests apply to future debt. The first test is Operating Revenues divided by existing and proposed debt service (at the existing lien level); the second test is Operating Revenues divided by existing and proposed debt service (regardless of lien level) plus specified Reserve Fund deposits.

In accordance with the 2012 MAT, the flow of funds shall be as follows:

- Senior, Senior Subordinate and Subordinate debt (and any debt that is secured on a parity therewith) takes priority over current Operating Expenses.
- Commonwealth Guaranteed and Commonwealth Supported debt would continue to be funded/paid only after funding of current operating expenses.
- All revenues shall be deposited by PRASA in the first instance to the Operating Revenue Fund to make the required deposits set forth below. The Trustee transfers the moneys on deposit in the Operating Revenue Fund to the following funds in the following order or priority:
  - Senior Bond Fund – to fund principal and interest payments on Senior Indebtedness;
  - Senior Debt Service Reserve Fund – to fund deficiencies in the reserve fund upon the issuance of additional Senior Bonds or withdrawals or valuation losses;
  - Senior Subordinate Bond Fund – to fund principal and interest payments on Senior Subordinate Indebtedness;
  - Senior Subordinate Debt Service Reserve Fund – to fund deficiencies in the reserve fund upon the issuance of additional Senior Subordinate Bonds or withdrawals or valuation losses;
  - Subordinate Bond Fund – to fund principal and interest payments on Subordinate Indebtedness;
  - Subordinate Debt Service Reserve Fund – to fund deficiencies in the reserve fund upon the issuance of additional Subordinate Bonds or withdrawals or valuation losses;
  - Current Expense Fund (a new fund under the 2012 MAT) – to fund current operating expenses of PRASA;

- Operating Reserve Fund – to fund Operating Reserve Requirement and to pay reimbursement obligations on Operating Reserve Facilities;
- Capital Improvement Fund – to fund the Capital Improvement Fund Requirement;
- Commonwealth Payments Fund – to fund principal and interest payments on CGI and CSO; and
- Surplus Fund – to fund the Rate Stabilization Fund and, thereafter, for any lawful purpose.

7.6.2. Existing Debt Service

The 2008 Series A and B Senior Lien Revenue Bonds (the "Senior Lien Bonds") and Revenue Refunding Bonds 2008 Series A and B (collectively, the "2008 Guaranteed Bonds") were issued as part of a comprehensive financial plan to fund PRASA's CIP and restructure PRASA's outstanding indebtedness to accommodate its current and future CIP needs. The proceeds of PRASA's $1,338,649,456 Senior Lien Bonds were used by PRASA to (i) fund a portion of the cost of its CIP, (ii) refinance certain lines of credits and bond anticipation notes, (iii) establish a debt service reserve fund, (iv) establish a deposit for capitalized interest, (v) fund payments for termination of a forward interest rate swap agreement, and (vi) pay for expenses related to the issuance of the Senior Lien Revenue Bonds. The proceeds of PRASA's $284,755,000 Revenue Refunding Bonds (Commonwealth Guaranteed) 2008 Series A and B were used by PRASA to (i) refund the outstanding PRASA Series 1995 Bonds (Commonwealth Guaranteed), and (ii) pay for expenses related to the issuance of the Revenue Refunding Bonds.

The 2012 Series A and B Senior Lien Revenue Bonds (the Senior Lien Bonds) were issued as part of a comprehensive financial plan to continue to fund PRASA's CIP. The proceeds of PRASA's $1,800,450,000 tax exempt Senior Lien Bonds were used by PRASA to (i) refinance certain LOCs and BANs, (ii) fund a portion of the cost of its CIP, (iii) provide initial funding for the Budgetary Reserve Fund, (iv) establish a deposit for capitalized interests, and (v) pay for expenses related to the issuance of the Senior Lien Revenue Bonds. Additionally, the proceeds of PRASA's $295,245,000 taxable Senior Lien Bonds were used to refinance an existing $241M BAN and provide additional financial liquidity to PRASA.

For more information, refer to the Plan of Finance in the respective Official Statements.

7.6.3. Proposed Debt Service

The 2015 Series A Senior Lien Revenue Bonds (the Senior Lien Bonds) will be issued as part of a comprehensive financial plan to continue to fund PRASA's CIP. The proceeds of PRASA's projected $750,000,000 Senior Lien Bonds will be issued to provide funds which may be used by PRASA to (i) repay or refinance certain outstanding lines of credit provided by a syndicate of local commercial banking institutions and by the GDB, respectively, (ii) finance a portion of PRASA's CIP for the five fiscal year period ending June 30, 2019, (iii) pay capitalized interest on the Senior 2015 Bonds, and (iv) pay certain costs of issuance of the Senior 2015 Bonds. In connection with

the 2015 Series A Senior Lien Revenue Bonds, the 2012 MAT shall be further amended and supplemented by the Fourth Supplemental Agreement of Trust by and between PRASA and the Trustee.

7.6.4. Debt Service Coverage

Exhibit 1 summarizes the existing and proposed debt service for the forecast period. Estimated debt service amounts include projected payments on the 2008 and 2012 Bonds, future bond offerings (including the 2015 Series A Senior Lien Revenue Bonds), LOC payments, and payments for maintaining required debt service reserves, as applicable. The Senior bonds include existing Senior obligations, Senior obligations from the proposed issuance, and future bond offerings. The Senior Subordinated bonds include a Term Loan used for fleet renewal. There are no projected Subordinated bonds included in the Forecast. Commonwealth Guaranteed Indebtedness (CGI) includes existing obligations of PRASA that are guaranteed by the Commonwealth of Puerto Rico including the 2008 Commonwealth Guaranteed Bonds, USDA Rural Development Bonds, and SRF Loans. Commonwealth Supported Obligations (CSO) include the obligations of PRASA related to the Superaqueduct financing costs. PRASA's Forecast includes its payment of the CGI and CSO.

Debt service requirements in PRASA's Forecast include current debt, projected interim financing and future bond issuances that are expected to be necessary to partially finance the CIP. PRASA has assumed a 10% interest rate (plus issuance and underwriters' costs) and a 30-year amortization period on projected (future) bond issuances. PRASA has included the following bond issuances during the Forecast: a $750M bond issuance in the third quarter of FY2015, a $210M bond issuance in FY2017, a $115M bond issuance in FY2018, and a $110M bond issuance in FY2019. PRASA would rely on interim financing in other years of the Forecast as a partial funding source for its CIP. A summary of the projected debt service for the forecast period is presented in Table 7-19. Table 7-20 summarizes PRASA's projected DSC over the forecast period (as shown in Exhibit 1). The projected DSC results for the forecast period have been calculated using the Rate Covenant requirements as per the 2012 MAT. PRASA's forecasted Operating and Authority Revenues would be sufficient to meet all DSC requirements through FY2019.

Table 7-19:
FY2014 – FY2019 Projected Debt Service ($, Thousands)

Debt Service Level	FY2014 Preliminary Results	FY2015 Projection	FY2016 Projection	FY2017 Projection	FY2018 Projection	FY2019 Projection
Senior Debt	$237,255	$278,599	$310,123	$332,375	$344,548	$356,191
Senior Subordinate Debt	-	1,821	2,732	2,732	911	-
Subordinate Debt	-	-	-	-	-	-
Commonwealth Guaranteed Indebtedness	81,275	85,440	90,329	94,025	95,275	97,317
Commonwealth Supported Obligations	-	1,594	8,999	8,999	8,999	8,999
Total	**$318,530**	**$367,454**	**$412,183**	**$438,131**	**$449,733**	**$462,507**

Table 7-20:
FY2014 – FY2019 Debt Service Coverage

Debt Service Level	DSC Requirement	FY2014 Preliminary Results[3]	FY2015 Projection	FY2016 Projection	FY2017 Projection	FY2018 Projection	FY2019 Projection
Senior Debt[1]	2.50	4.92	3.46	3.64	3.52	3.53	3.49
Senior Subordinated Debt[1]	2.00	4.92	3.44	3.61	3.49	3.52	3.49
Subordinated Debt [1]	1.50	4.92	3.44	3.61	3.49	3.52	3.49
All Obligations[2]	1.00	1.01	1.00	1.00	1.00	1.00	1.00

[1]DSC calculated with respect to Operating Revenues.
[2]DSC calculated with respect to Authority Revenues.
[3]Senior DSC Preliminary Results consider available balance of $43.6M in the Senior Bond Fund.

7.6.1. Additional Bonds Tests (ABT)

For ABT purposes, Operating Revenues are divided by the maximum annual debt service for any fiscal year. Table 7-21 summarizes PRASA's projected ABT compliance over the forecast period (as shown in Exhibit 1). The projected ABT results for the forecast period have been calculated using the requirements of the 2012 MAT (as further amended and supplemented by the Fourth Supplemental Agreement of Trust by and between PRASA and the Trustee in connection with the 2015 Series A Senior Lien Revenue Bonds), and the PRASA-provided debt service re-payment schedule. Note that actual ABT calculations will depend on the actual amount borrowed by PRASA in each of its projected bond issuances during the forecast period, including the projected 2015 Senior Lien Revenues Bonds.

Table 7-21:
FY2015 – FY2019 Projected ABT Calculation

Debt Service Level	Requirement[1]	FY2015	FY2016	FY2017	FY2018	FY2019
Senior Debt	2.5/1.5	3.11	3.64	3.52	3.53	3.49
Senior Subordinate Debt	2.0/1.5	3.08	3.61	3.49	3.52	3.49
Subordinate Debt	1.5	3.08	3.61	3.49	3.52	3.49

[1] Two tests apply to future debt. The first test is Operating Revenues divided by existing and proposed debt service (at the existing lien level); the second test is Operating Revenues divided by existing and proposed debt service (regardless of lien level) plus specified Reserve Fund deposits.

7.7. Reserve Funds

7.7.1. Debt Service Reserve Funds

In accordance with the 2012 MAT, Reserve Funds for Senior Debt, Senior Subordinate, and Subordinate Debt must be maintained in a reserve account at least equal to:

(i) The amount set forth in the Supplemental Agreement authorizing the issuance of a particular Series of Bonds, or

(ii) If not otherwise specified in a Supplemental Agreement authorizing the issuance of a particular Series of Bonds, the lesser of:

- Maximum Annual Debt Service on the Outstanding Bonds secured by such Account, payable in any fiscal year for the related Bonds,
- Ten percent (10%) of the proceeds of the Outstanding Bonds secured by such Account calculated in accordance the Code and
- 125% of the average Annual Debt Service for the payment of the principal of and interest on the Outstanding Bonds secured by such Account.

Requirements for debt service reserve funds for FY2015, as calculated by PRASA and reviewed by Banco Popular de Puerto Rico as Trustee, were provided to MPPR/ARCADIS. Debt service costs include the required contributions to the debt service reserves which were originally created and funded with 2008 bond proceeds. Similarly, PRASA plans to contribute the additional funds in each of these reserves over the forecast period, as necessary.

7.7.2. Operating Reserve Fund

In accordance with the 2012 MAT, an Operating Reserve Fund must be established in the amount of $150M until March 1, 2013; thereafter:

(i) If there is a line of credit on deposit in the reserve fund, the reserve shall mean for the term of line of credit an amount equal to at least ninety (90) days of current expenses determined on the first day of the fiscal year in which such line of credit is delivered or renewed as set forth in the annual budget for such fiscal year; or

(ii) If the reserve fund is funded from revenues, the reserve shall mean an amount equal to not less than ninety (90) days of current expenses determined annually based on the current expenses relating to the fiscal year of such calculation as set forth in the annual budget for such fiscal year.

PRASA has established and continues to maintain a line of credit on deposit with the GDB to ensure the Operating Reserve Fund will be in compliance with the 2012 MAT requirements. In February of 2012, in connection with its bond issuance, PRASA renewed its line of credit with the GDB through June 30, 2016, and increased it from $150M to $180M in order to adequately meet requirement (i) above. A renewal of this line of credit is expected prior to June 30, 2016.

7.7.3. Capital Improvement Fund

In accordance with the 2012 MAT, a Capital Improvement Fund must be established and funded for each fiscal year, for the purpose of partially or entirely funding the annual CIP, in an amount equal to the greater of:

(i) The amount set forth in the annual budget for such fiscal year, or

(ii) The amount recommended by the Consulting Engineer.

Equal monthly deposits over the fiscal year must be deposited to the Fund to make the balance of the Fund equal to the requirement. In addition, the following must be credited to the Fund:

(i) The proceeds of any condemnation awards,

(ii) The proceeds of insurance (other than use and occupancy insurance),

(iii) The proceeds of sales of property constituting a part of the Systems, and

(iv) The proceeds of any termination or similar payment received by PRASA under any interest rate swap or similar hedge agreement.

In FY2014, PRASA funded its CIP with a private bank facility and with federal funds, as previously mentioned. PRASA's projections include additional deposits to the Capital Improvement Fund in each year of the Forecast. A summary of these deposits is provided in Table 7-22.

Table 7-22:
Projected Deposits to the Capital Improvement Fund ($, Thousands)

Fiscal Year	Deposit Amount	Funding Source
2015	$25,000	$25M – Special Charge ($2)
2016	$50,000	25M – Special Charge ($2) $25M – Net Authority Revenues
2017	$50,000	$25M – Special Charge ($2) $25M – Net Authority Revenues
2018	$75,000	$25M – Special Charge ($2) $50M – Net Authority Revenues
2019	$75,000	$25M – Special Charge ($2) $50M – Net Authority Revenues

7.7.4. Budgetary Reserve Fund

Under the 2012 FOA, a new Budgetary Reserve Fund was created. PRASA initially funded the Budgetary Reserve Fund with $240M of the 2012 bond proceeds. According to the 2012 FOA, GDB will hold the Budgetary Reserve Fund in trust for, and for the benefit of, PRASA. The Commonwealth agrees that, no later than February 1, 2013 and by each February 1st thereafter it shall either (i) obtain an appropriation or a commitment for another source of funding for the projected Budgetary Reserve Requirement applicable to the next succeeding fiscal year (for example, in FY2013 the Commonwealth will request an appropriation or funding source sufficient to cover the estimated Budgetary Reserve Requirement for FY2014) or (ii) advise PRASA that it does not intend to request an appropriation or provide a commitment for another source of funding to cover all or a portion of the projected Budgetary Reserve Requirement for that fiscal year. The Budgetary Reserve Requirement will be projected by PRASA in its five-year *Fiscal Improvement Plan* (a requirement of the 2012 FOA) which will be reviewed and commented, as necessary, by GDB. The Budgetary Reserve Requirement will be recalculated annually in connection with the update to the *Fiscal Improvement Plan* each February 1st.

If the DSC requirement under the Rate Covenant is not met, and neither the Commonwealth nor the GDB advance funds to PRASA to cover shortfalls, PRASA would then be required to

implement rate increases and/or revenue enhancement, expense reducing measures, or a combination of these measures, in order to satisfy the requirements of the Rate Covenant.

In FY2013, PRASA drew the $145M balance available in the Budgetary Reserve Fund for the purposes of satisfying the requirements of the Rate Covenant. Upon receiving the GDB's notice that it would not intend to request an appropriation or provide a commitment for another source of funding to cover all or a portion of PRASA's projected Budgetary Reserve Requirement for FY2014, PRASA proceeded to activate its rate revision process in order to implement the necessary rate increase which would allow it to meet all its obligations over the forecast period. No additional deposits to the Budgetary Reserve Fund have been included in PRASA's Forecast.

7.7.5. Surplus Fund and Rate Stabilization Account

After all the deposits required by the 2012 MAT have been accordingly made, any remaining moneys shall be deposited to the credit of the Surplus Fund which shall then be used to fund the Rate Stabilization Account. As previously presented, PRASA is projecting deposits to and withdrawals from the Rate Stabilization Account in each year of the Forecast. The projected deposits, withdrawals and annual balances are summarized in Table 7-23.

Table 7-23:
Rate Stabilization Account Annual Balances ($, Thousands)

Fiscal Year	FY2015	FY2016	FY2017	FY2018	FY2019
Projected Starting Balance	$93,000	$235,266	$208,646	$141,113	$68,628
Projected Deposit To/ (Withdrawal From)	142,266	(26,620)	(67,533)	(72,485)	(54,225)
Projected Ending Balance	$235,266	$208,646	$141,113	$68,628	$14,403

7.8. Sensitivity Analysis

MPPR/ARCADIS preformed a sensitivity analysis of PRASA's Forecast. The objective of the sensitivity analysis is to demonstrate the impact that a change in certain Forecast assumptions (specifically those deemed as aggressive by MPPR/ARCADIS) will have on PRASA's projected financial results and DSC. MPPR/ARCADIS evaluated the potential effects on PRASA's Forecast of budget deviations in the following revenue and expense categories: Adjustment for Uncollectibles and Additional Savings from Operational Initiatives. These, in turn, have an effect on Capitalized Expenses and either to the amount of Transfers to the Rate Stabilization Account or to the deposits to the Capital Improvement Fund.

Higher Adjustment for Uncollectibles (Rate of Uncollectibles) – As previously stated, MPPR/ARCADIS believes that PRASA's Adjustment for Uncollectibles for FY2018 and FY2019 is aggressive. While MPPR/ARCADIS believes that PRASA will exhaust its efforts to improve and hold collection rates from both its residential and non-residential accounts; considering Puerto Rico's economic situation, the Commonwealth's fiscal crisis, the decreasing customer and

consumption trends, and the planned rate adjustments during those two fiscal years, MPPR/ARCADIS believes it is aggressive to assume that the rate of uncollectibles will continue to decrease at the rates projected by PRASA in its Forecast. MPPR/ARCADIS recommends the use of a more conservative uncollectibles rate of 5.75% of Service Revenues and additional billings from Operational Initiatives for both FY2018 and FY2019. Holding all other assumptions constant, these modified rates for the Adjustments for Uncollectibles would result in a shortfall of $3.0M in FY2018 and of $6.2M in FY2019. In order to offset these shortfalls, and to avoid CIP funding shortfalls during these two years, PRASA could reduce its projected Transfer to the Rate Stabilization Account by the same amounts. Doing so would allow PRASA to adequately meet its DSC requirements and fund its CIP. The projected available funds in the Rate Stabilization Account in FY2019 would be reduced by $9.2M (modified ending balance of about $5.2M).

Lower Additional Savings from Operational Initiatives – As previously stated, MPPR/ARCADIS believes that PRASA's Forecast for Additional Savings from Operational Initiatives is aggressive. Holding all other assumptions constant, if PRASA is not able to achieve the projected additional savings from the operational initiatives previously mentioned, and considering the effect this would also have on PRASA's Capitalized Expenses Forecast, eliminating these savings from the Forecast would result in shortfalls of about $7.1M in FY2016, $9.2M in FY2017, $13.0M in FY2018, and $14.5M in FY2019. In order to partially offset these shortfalls, PRASA could reduce its projected Transfer to the Rate Stabilization Account until the funds are depleted. Doing so, would allow PRASA to meet its DSC requirements and fund its CIP through FY2016. However, PRASA would not be able to meet its DSC requirements starting in FY2017. The projected cumulative shortfall in FY2019 would amount to approximately $29.4M. In this scenario, in order for PRASA to meet its DSC requirements from FY2017 through FY2019, PRASA would have to either reduce its projected transfers to the Capital Improvement Fund, or adjust rates accordingly.

Finally, MPPR/ARCADIS cautions that the following events could have material negative effects on PRASA's Forecast:

- Elimination of the approved PREPA electric energy all-in-rate, which would result in higher Electric Power costs to PRASA.
- Lower savings achieved than those projected as a result of the enactment of Act 66-2014.
- Indirect increases in the costs of goods and services as a result of the implementation of a VAT by the Commonwealth of Puerto Rico.
- Higher interest rates on future bond issuances, as a result of PRASA's credit rating and overall market risk assessment.

7.9. Conclusions

PRASA is forecasting to meet all DSC requirements for each fiscal year, while also including deposits to the Rate Stabilization Account (in FY2015 and FY2016) and deposits to the Capital Improvement Fund starting in FY2015. PRASA's Forecast is reasonable considering recent historical performance, with the exception of the projected Adjustments for Uncollectibles in FY2018 and FY2019, and Additional Savings from Operational Initiatives over the forecast period which MPPR/ARCADIS has deemed aggressive. MPPR/ARCADIS conducted an analysis to stress PRASA's Forecast and determine how sensitive it is to changes in these two categories.

As shown in the sensitivity analysis, PRASA's Forecast is very sensible to deviations in the critical assumptions previously listed and projected deposits to certain accounts could be affected, although DSC would not be affected. In the case that one, or a combination of these sensitivity analysis scenarios occurs, PRASA's ability to meet its Forecasted transfers to/from the Rate Stabilization Account and/or projected deposits to the Capital Improvement Fund would be negatively affected. To meet its DSC requirements and projected deposits as shown in PRASA's Forecast, PRASA would have to increase the transfers from the Rate Stabilization account and/or implement larger rate increases than currently projected for FY2018 and FY2019.

The probability of PRASA achieving its Forecast and meeting its DSC requirements throughout the forecast period is conditioned on the following key assumptions:

1. **PRASA's ability to maintain its Service Revenues, billings, and collections in a very challenging economic environment** – Continued uncertainty and strain on the economy, and population shifts, and consumption patterns could continue to cause further declines in PRASA's billings and collections.

2. **PRASA's ability to continue to successfully implement all of its Operational Initiatives** – PRASA's Forecast includes results from select Operational Initiatives that are described throughout this report. The Forecast also includes certain revenue enhancing and cost reduction initiatives that are currently underway. MPPR/ARCADIS's conclusions regarding the Forecast assume the framework and execution of the Operational Initiatives will not materially change; any changes could significantly alter the findings contained and presented in this report. Although PRASA has made a dedicated commitment to implement the initiatives described in this report, there is a possibility that the projected results and, more specifically, the timing of those results may not be achieved.

3. **PRASA's ability to maintain the PREPA preferential all-in-rate** – Changes to the PREPA preferential all-in-rate would materially affect PRASA's Forecast. MPPR/ARCADIS's conclusions regarding the Forecast assume that the preferential all-in-rate will be maintained as currently implemented (excludes any additional potential savings that could be achieved from the second phase reduction which is unlikely to be implemented). The currently favorable

market costs of crude oil could work in PRASA's favor by offsetting part of the savings that could be lost if the preferential all-in-rate is eliminated; however, there is a possibility that the offset amount may not be sufficient to reach the savings amount being achieved through the preferential all-in-rate.

4. **PRASA's ability to secure future CIP financing sources at an affordable cost** – PRASA's Forecast assumes that PRASA will be able to secure future financing from either interim sources or through bond issuances to partially finance its CIP. However, given Puerto Rico's current economic and fiscal situation there is a possibility that the projected bond issuances and, more specifically the timing of these, and/or the assumed issuance terms will not be achieved. In this case PRASA would need to implement one, or a combination of the following measures: a) reduce its CIP spending, b) increase Operating and/or Authority Revenues, or c) further decrease its Operating Expenses; in order to increase the projected Deposits to the Capital Improvement Fund.

Considering the overall conclusions presented above, MPPR/ARCADIS recommends the following with regards to PRASA's Forecast:

1. PRASA should consider adopting the more conservative assumptions discussed in this section, and consider the results of the sensitivity analysis as part of its fiscal planning process.

2. PRASA must continue the implementation and monitoring of Operational Initiatives so that adjustments, if needed, are made on a timely basis to both the program's operational elements and budget projections. If results are not achieved as projected over the course of each fiscal year, PRASA shall re-assess the implementation and performance of Operational Initiatives.

3. PRASA should fast track the implementation of the organizational assessment recommendations in order to capitalize on the expected cost reductions in its Payroll and Benefits. Coupled with the projected savings to be realized from Act 66-2014, these expected cost reductions could give PRASA unprecedented savings in its Payroll and Benefits expenses.

4. Considering the current economic outlook and limited access to financing sources, PRASA should maintain its existing line of credit to meet the Operational Reserve Fund requirement of the 2012 MAT.

EXHIBIT 1

	PRASA FINANCIAL FORECAST PRO FORMA[a] ($, Thousands)	FY2014 PRELIMINARY RESULTS	FY2015 PROJECTION	FY2016 PROJECTION	FY2017 PROJECTION	FY2018 PROJECTION	FY2019 PROJECTION
	OPERATING REVENUES						
1.	Service Revenues (Base Fee and Service Charges, Net of Subsidies)	$1,020,055	$1,071,346	$1,065,989	$1,060,659	$1,101,739	$1,142,613
2.	Transfer from/(to) Rate Stabilization Account	(93,000)	(142,266)	26,620	67,533	72,485	54,225
3.	Operational Initiatives - Additional Billings	97,567	91,609	92,525	93,451	94,385	95,329
4.	Operational Initiatives - Collections from Prior Years	5,546	6,300	5,400	4,500	4,500	3,600
5.	Adjustment for Uncollectibles	(86,443)	(72,705)	(69,511)	(66,361)	(65,787)	(64,992)
6.	Other Income (Miscelaneous/Special Assessments/ZumFiber-PRASA Holdings)	8,814	9,000	9,000	9,000	9,000	13,000
7.	**Total Operating Revenues [Sum Lines 1-6]**	**$952,539**	**$963,285**	**$1,130,024**	**$1,168,782**	**$1,216,322**	**$1,243,775**
	OTHER REVENUES						
8.	Other Sources of Revenue						
9.	Transfer from Budgetary Reserve Fund	-	-	-	-	-	-
10.	General Fund Contributions	-	-	-	-	-	-
11.	Additional External Support/Other Measures	-	-	-	-	-	-
12.	**Total Other Sources of Revenue [Sum Lines 9-11]**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
13.	**Total Authority Revenues [Line 7 + Line 12]**	**$952,539**	**$963,285**	**$1,130,024**	**$1,168,782**	**$1,216,322**	**$1,243,775**
	OPERATING EXPENSES						
14.	Payroll and Benefits	$324,988	$329,378	$338,268	$347,263	$356,258	$365,253
15.	Electric Power	166,720	154,844	154,303	153,195	151,606	151,371
16.	Maintenance and Repair	45,841	50,224	56,731	58,433	60,186	61,991
17.	Chemicals	28,659	29,475	30,359	31,270	32,208	33,174
18.	Superaqueduct O&M Contract Fee	3,908	3,838	3,953	4,072	4,194	4,320
19.	Insurance	9,492	9,523	9,809	10,103	10,406	10,718
20.	Other Expenses	162,577	156,062	160,780	165,604	170,572	175,689
21.	Additional Savings from Operational Initiatives	-	-	(7,473)	(9,711)	(13,675)	(15,293)
22.	Act 66-2014 Expense Reductions	-	(37,000)	(43,000)	(43,000)	(43,000)	(43,000)
23.	Capitalized Operating Expenses	(32,295)	(35,514)	(35,890)	(36,579)	(37,167)	(37,955)
24.	**Total Operating Expenses [Sum Lines 14-23]**	**$709,890**	**$660,830**	**$667,841**	**$680,650**	**$691,589**	**$706,268**
25.	Adjustment for Non-Cash Reserves	(39,927)	-	-	-	-	-
26.	**Total Operating Expenses, Adjusted [Line 24 - Line 25]**	**$669,963**	**$660,830**	**$667,841**	**$680,650**	**$691,589**	**$706,268**
	DEBT SERVICE						
27.	Senior Lien Debt Service (S, SSub,Sub)	$193,611	$280,420	$312,855	$335,107	$345,459	$356,191
28.	Subordinated Debt Service (CGI & CSO)	81,275	87,034	99,328	103,024	104,274	106,316
29.	**Total Debt Service [Line 27 + Line 28]**	**$274,886**	**$367,454**	**$412,183**	**$438,131**	**$449,733**	**$462,507**
	DEPOSITS						
30.	Deposit to the Senior Bond Fund	-	-	-	-	-	-
31.	Deposit to the Senior Subordinate Bond Fund	-	-	-	-	-	-
32.	Deposit to the Subordinate Bond Fund	-	-	-	-	-	-
33.	Deposit to the Current Expense Fund	-	-	-	-	-	-
34.	Deposit to the Operating Reserve Fund	-	-	-	-	-	-
35.	Deposit to the Capital Improvement Fund	-	25,000	50,000	50,000	75,000	75,000
36.	Deposit to the Commowealth Payments Fund	-	-	-	-	-	-
37.	Deposit to the Surplus Fund	7,690	-	-	-	-	-
38.	**Total Deposits [Sum Lines 30-37]**	**$7,690**	**$25,000**	**$50,000**	**$50,000**	**$75,000**	**$75,000**
39.	Repayment from CIP to the Current Expense Fund		**($90,000)**				
40.	**Net Authority Revenues After Obligations and Deposits [Line13-Line 26-Line 29-Line 38-Line 39]**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
	DEBT SERVICE PAYMENTS DUE						
41.	Senior (S), Net of Deposits in Senior Bond Fund	$193,611 [b]	$278,599	$310,123	$332,375	$344,548	$356,191
42.	Senior Subordinated (SSUB), Net of Deposits in Senior Subordinated Bond Fund	-	1,821	2,732	2,732	911	-
43.	Subordinated (SUB), Net of Deposits in Subordinated Bond Fund	-	-	-	-	-	-
44.	Commonwealth Guranteed Indebtednes (CGI), Net of Deposits in the Commonwealth Payments Fund	81,275	85,440	90,329	94,025	95,275	97,317
45.	Commonwealth Supported Obligations (CSO), Net of Deposits in the Commonwealth Payments Fund	-	1,594	8,999	8,999	8,999	8,999
46.	**Total Debt Service, Net of Existing Deposits [Sum Lines 40-44]**	**$274,886**	**$367,454**	**$412,183**	**$438,131**	**$449,733**	**$462,507**

[a] *Numbers may not add up due to rounding.*

[b] *Debt Service Amount reduced by available balance of $43.6M in the Senior Bond Fund.*

EXHIBIT 1

	PRASA FINANCIAL FORECAST PRO FORMA DEBT SERVICE COVERAGE[a] ($, Thousands)	FY2014 PRELIMINARY RESULTS	FY2015 PROJECTION	FY2016 PROJECTION	FY2017 PROJECTION	FY2018 PROJECTION	FY2019 PROJECTION
1.	Operating Revenues (Net of Transfers to Rate Stabilization Account)	$952,539	$963,285	$1,130,024	$1,168,782	$1,216,322	$1,243,775
2.	Other Sources of Revenue	-	-	-	-	-	-
3.	Authority Revenues [Line 1 + Line 2][b]	$952,539	$963,285	$1,130,024	$1,168,782	$1,216,322	$1,243,775
4.	Senior Debt						
5.	Annual Debt Service	$193,611 [b]	$278,599	$310,123	$332,375	$344,548	$356,191
6.	**DS Coverage Required = 2.50**	**4.92**	**3.46**	**3.64**	**3.52**	**3.53**	**3.49**
7.	Senior & Senior Subordinated Debt						
8.	Annual Debt Service	$193,611 [b]	$280,420	$312,855	$335,107	$345,459	$356,191
9.	**DS Coverage Required = 2.00**	**4.92**	**3.44**	**3.61**	**3.49**	**3.52**	**3.49**
10.	Senior, Subordinated Subordinated & Subordinated Debt						
11.	Annual Debt Service	$193,611 [b]	$280,420	$312,855	$335,107	$345,459	$356,191
12.	**DS Coverage Required = 1.50**	**4.92**	**3.44**	**3.61**	**3.49**	**3.52**	**3.49**
13.	Operating Expenses	$669,963	$660,830	$667,841	$680,650	$691,589	$706,268
14.	Total Subordinated Debt	81,275	87,034	99,328	103,024	104,274	106,316
15.	Repayment from CIP to the Current Expense Fund		(90,000)				
16.	Total Deposits to Capital Improvement Fund	-	25,000	50,000	50,000	75,000	75,000
17.	**Authority Revenues / All Obligations DS Coverage Required = 1.00**	**1.01**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**

[a] *Numbers may not add up due to rounding.*

[b] *Debt Service Amount reduced by available balance of $43.6M in the Senior Bond Fund.*

8. Conclusions and Recommendations

8.1. Considerations and Assumptions

In preparation of this report and the conclusions contained herein, MPPR/ARCADIS has relied on certain assumptions and information provided by PRASA with respect to the conditions which may exist or events which may occur in the future. MPPR/ARCADIS believes the information and assumptions are reasonable, but has not independently verified information provided by PRASA and others. To the extent that actual future conditions differ from those assumed herein or provided by others, the actual results will vary from those forecast.

In the preparation of this report, MPPR/ARCADIS has made a number of considerations and assumptions (as provided throughout this report); some of the most notable are as follows:

1. MPPR/ARCADIS has made no determination as to the validity and enforceability of any contracts, agreements, existing laws, rules, or regulations applicable to PRASA and its operations. However, for purposes of this report, MPPR/ARCADIS has assumed that all such contracts, agreements, laws, rules and regulations will be fully enforceable in accordance with their terms.
2. PRASA will continue the current policies of employing qualified and competent personnel; properly operating and maintaining the System in accordance with generally accepted industry practices; and of operating the System in a prudent and sound businesslike manner.
3. The proposed CIP reflects the general needs of the System, the CIP will be largely implemented as planned and reflected in this report, and PRASA will make modifications to the CIP investment forecast if the overall System condition is negatively affected by the lower capital investment levels projected in future years.

Set forth below are the most relevant opinions which MPPR/ARCADIS has reached regarding the review of PRASA's System, CIP and financial projections.

1. PRASA's current organization is sufficient for the operation, management and maintenance of the System. PRASA continues to invest in the training of its staff, focusing on achieving greater job understanding, productivity, and ownership. Although PRASA continues to have some staffing needs at individual facilities or departments and despite notable improvements over recent fiscal years, PRASA's overall staff levels continue to be high when compared to industry benchmarks. PRASA is in the process of adopting recommendations made in the organizational assessment completed during FY2014.

2. PRASA's Executive Management Team continues to assess administrative and operational performance, and to implement organizational and policy changes, focusing on customer

service, System performance, and budget controls as stipulated in the Strategic Plan 2014-2018 which is currently under revision. The revised Strategic Plan should continue to provide the necessary guidance for PRASA to meet its management, operational, organizational development, and financial goals. Key performance indicators and metrics being measured, along with stronger management oversight are contributing to improvements and optimization of operations and overall organization.

3. The enactment of Act 66-2014 should help PRASA modify some of its O&M processes and lower O&M costs; however, expected O&M savings will be offset by lower revenues to be generated from certain government accounts.

4. In general, the condition of the facilities visited for the 2014 condition assessment, varied from those recently upgraded/rehabilitated to those requiring capital upgrades. The data indicates that 97% of the facilities inspected are in the adequate to good range, and the condition of the System has generally improved when compared to the condition assessment conducted in FY2012. Comparing the 2014 assessment results by asset category with those of the 2012 assessment, significant changes were found for WTPs, WPS, Water Storage Tanks, and WWPSs. Only one dam, Las Curías, was degraded to poor, in comparison to the previous inspection. A number of WTPs declined from good to adequate. This was mostly driven by a decrease in the compliance criteria and, more specifically, as a result of the implementation of Stage 2 D/DBPR. Regarding the WWTPs, most of the facilities that obtained a low rating/score have at least one project identified in PRASA's CIP or will be addressed by the operational region. Finally, some of the facilities which have been rehabilitated, are still experiencing compliance exceedances of one or more discharge parameters, and process control continues to be a challenge in some of the facilities.

5. PRASA recognizes that the current amount of NRW is high and is implementing sound strategic programs and initiatives to measure, manage, and reduce water losses and NRW. PRASA continues to work on and improve its leak detection and monitoring practices, and continues to aggressively address leak occurrences among other initiatives currently being implemented. PRASA is now conducting periodic water audits which are used to implement the necessary controls and develop action items to address NRW. PRASA's FY2014 ending NRW level was 58.7%, or 0.2% less than estimated at the end of FY2013. The year over year reduction (volume) in NRW was 13 MGD. PRASA's FY2014 ILI was calculated at 11, which is a two point reduction from FY2013 results. The current decreasing trend reported by PRASA for FY2012 through FY2014 demonstrates a positive change in PRASA's efforts to reduce water losses and NRW.

6. Although the number of sanitary overflows is also high compared to the industry benchmarks, PRASA has continued to improve its response time and attention/repair effectiveness in order to minimize the duration of these overflow events and their environmental impact. PRASA is implementing sanitary sewer evaluations and repair plans to reduce levels of infiltration and

inflow (I/I) that must be treated in their WWTPs. PRASA has also significantly improved (reduced) its attention time to address overflow occurrences.

7. PRASA's Operational Initiatives are well developed and address critical aspects of PRASA's operation such as NRW, energy management and efficiency, and revenue stream diversification. The Revenue Optimization Program, in particular, continues to provide significant benefits to PRASA in the form of increased revenues. During FY2014, the Electric Power preferential all-in-rate went into effect; however, it remains to be seen if it will remain in place beyond FY2015. PRASA continues to implement energy management and reduction measures, and diversify its energy sources as part of its Comprehensive Energy Management Program. Finally, PRASA is diversifying its service offerings, and is working on diversifying its revenue streams, through the development of its private subsidiary, PRASA Holdings, LLC.

8. With the possible exception of buried infrastructure improvements, the planned CIP along with the O&M initiatives are in alignment with the System needs. However, as PRASA is projecting lower CIP investment levels going forward, it is important that it maintain an adequate level of R&R spend in order to continuously renovate and maintain the System. A detailed analysis of PRASA's R&R needs, budget, and uses is recommended in order to optimize PRASA's R&R capital spending.

9. PRASA's proposed CIP adequately addresses all mandated requirements of existing consent decrees and agreements with Regulatory Agencies, and considers modifications currently under re-negotiation between PRASA and Regulatory Agencies. The full impact of future regulations and other regulatory requirements on PRASA's System are not known at this time. In some cases, future regulations and additional regulatory requirements are expected to require minor process changes and in other cases major capital improvements, such as construction of new treatment processes and intensive repair programs. PRASA's existing CIP includes a limited contingency to address future regulations and any other regulatory requirements. However, as the impact of future regulations becomes more defined, CIP modifications will be required to adequately accommodate resulting needs. It is expected then, that the identified needs will be prioritized following the process discussed with and approved by the Regulatory Agencies, considering PRASA's financial capacity.

10. PRASA's Master Plan Update, which included the service area re-assessment evaluation and demands update; and the water and wastewater infrastructure needs and project scopes update estimates a substantial decline in water demand from about 556 MGD in 2013 to 427 MGD in 2030 as a result of the projected continuing decline in population and demand. As a result, certain future infrastructure expansion and new infrastructure needs that had been previously planned for future years are no longer required. However, changes in Puerto Rico's long-term population projections may affect these results.

11. The insurance program covering PRASA's exposures to risks of accidental property and liability losses arising from on-going operations provides reasonable coverage. Also, the OCIP covering PRASA's exposures to risks of accidental property and liability losses arising from construction activities provides reasonable coverage. PRASA should address the following key recommendations:

    - Re-Conduct a PML Study considering new CAT Modellings and parameters.
    - Consider creating a Fund or Reserve in order to manage the considerable deductibles, in terms of severity and frequency, current and future, contained in Insurance Programs. (Property, General Liability, D&O, EPL, OCIP).
    - Revise the Coverage Termination Date under PRASA's OCIP General Liability Program for Completed Operations, from five years to 10 years after projects' completion.
    - Complete a thorough evaluation of PRASA's current Professional Liability Programs.
    - Consider adding underground storage tank coverage to the pollution liability policy.
    - Consideration of Terrorism Coverage, which is excluded under all current PRASA's Insurance Programs.

12. PRASA is forecasting to meet all DSC requirements for each fiscal year, while also including deposits to the Rate Stabilization Account (in FY2015 and FY2016) and deposits to the Capital Improvement Fund starting in FY2015. PRASA's Forecast is reasonable considering recent historical performance, with the exception of the projected Adjustments for Uncollectibles in FY2018 and FY2019, and Additional Savings from Operational Initiatives over the forecast period which MPPR/ARCADIS has deemed aggressive. The sensitivity analysis conducted by MPPR/ARCADIS on these two forecast categories shows in the case that one, or a combination of these sensitivity analysis scenarios occurs, PRASA's ability to meet its Forecasted transfers to/from the Rate Stabilization Account and/or projected deposits to the Capital Improvement Fund would be negatively affected. To meet its DSC requirements and forecasted deposits as included in Exhibit 1, PRASA would have to increase the transfers from the Rate Stabilization account and/or implement larger rate increases than currently projected for FY2018 and FY2019.

13. The probability of PRASA achieving its Forecast and meeting its DSC requirements throughout the forecast period is conditioned on the following key assumptions:

    - **PRASA's ability to maintain its Service Revenues, billings, and collections in a very challenging economic environment** – Continued uncertainty and strain on the economy, and population shifts, and consumption patterns could continue to cause further declines in PRASA's billings and collections.

- **PRASA's ability to continue to successfully implement all of its Operational Initiatives** – PRASA's Forecast includes results from select Operational Initiatives that are described throughout this report. The Forecast also includes certain revenue enhancing and cost reduction initiatives that are currently underway. MPPR/ARCADIS's conclusions regarding the Forecast assume the framework and execution of the Operational Initiatives will not materially change; any changes could significantly alter the findings contained and presented in this report. Although PRASA has made a dedicated commitment to implement the initiatives described in this report, there is a possibility that the projected results and, more specifically, the timing of those results may not be achieved.

- **PRASA's ability to maintain the PREPA preferential all-in-rate** – Changes to the PREPA preferential all-in-rate would materially affect PRASA's Forecast. MPPR/ARCADIS's conclusions regarding the Forecast assume that the preferential all-in-rate will be maintained as currently implemented (excludes any additional potential savings that could be achieved from the second phase reduction which is unlikely to be implemented). The currently favorable market costs of crude oil could work in PRASA's favor by offsetting part of the savings that could be lost if the preferential all-in-rate is eliminated; however, there is a possibility that the offset amount may not be sufficient to reach the savings amount being achieved through the preferential all-in-rate.

- **PRASA's ability to secure future CIP financing sources at an affordable cost** – PRASA's Forecast assumes that PRASA will be able to secure future financing from either interim sources or through bond issuances to partially finance its CIP. However, given Puerto Rico's current economic and fiscal situation there is a possibility that the projected bond issuances and, more specifically the timing of these, and/or the assumed issuance terms will not be achieved. In this case PRASA would need to implement one, or a combination of the following measures: a) reduce its CIP spending, b) increase Operating and/or Authority Revenues, or c) further decrease its Operating Expenses; in order to increase the projected deposits to the Capital Improvement Fund.

14. Finally, PRASA should closely follow the developments regarding the potential implementation of a VAT by the Commonwealth of Puerto Rico. Although the proposed bill states that the sale of goods and services to agencies and instrumentalities of the U.S. Government, its States, the District of Columbia, and the Commonwealth of Puerto Rico shall be exempt of the VAT, PRASA's Forecast could be materially affected by it as a result of an indirect increase in the costs of goods and services. It is recommended that PRASA begin analyzing the effects that the proposed 16% VAT could have on its Forecast, and include the necessary allowances in future years.

Respectfully Submitted,

MP ENGINEERS OF PUERTO RICO, P.S.C.

/s/ Melissa L. Pomales, P.E.
President

Puerto Rico Aqueduct and Sewer Authority

COMMONWEALTH OF PUERTO RICO

Puerto Rico Aqueduct and Sewer Authority

MP ENGINEERS of PUERTO RICO

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