CHAPTER 3 – ORGANIZATION ASSESSMENT

3.1 Introduction

A team of experienced environmental professionals was assembled by Brown and Caldwell to review the existing organization structure and composition. Certain recommendations were made for modifying areas where improvements were warranted and reinforcing areas that were functioning well. The following discussion covers this effort.

GWA's initiative to change its culture and develop a long-term WRMP to map its future is a challenging task. Development of the WRMP is one element or opportunity required for GWA to achieve its goal of becoming a best-in-class utility. The necessary cultural change of its personnel resources requires total commitment from all levels of the organization. The role of and acceptance by GWA's staff in developing the WRMP will dictate the long-term success of the master plan and achieving a best-in-class utility rating.

An organizational assessment was performed by the evaluation team as part of the master planning process. The purpose was to prepare an organizational development plan that will help GWA develop an in-house culture directed to continual improvement. As part of this process, the team assessed the interrelationships among people, processes, structures, and outputs and identified institutional/organizational enablers as well as barriers to achieving such improvement.

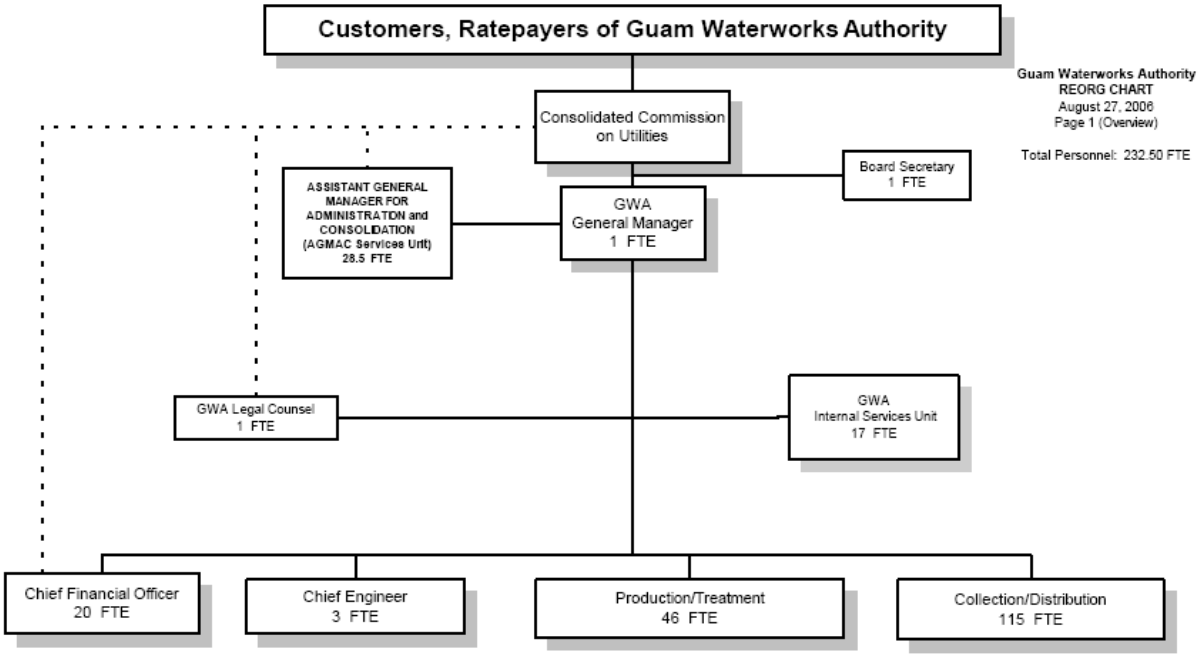
Topics addressed in the organization development are:

- Current Organization
- Organization Improvement Opportunities
- Internal Communication
- External Communication
- Identify and Implement Early Gains
- Barriers to Personnel Success
- Organization Aspects of Levels of Service
- Sewage Treatment Facilities - Training and Certification
- Sewage Collection System
- Water Treatment Facilities
- Water Distribution System
- Summary of Facility Assessments and Operations and Maintenance (O&M) Factors

3.2 Current Organization

GWA is authorized to have 246 full-time equivalent positions for FY 2006, of which 232.5 are currently filled. Figure 3-1 presents GWA's Reorganization Chart dated August 27, 2006. Expanded reorganization organization charts with details of the entire organization are included in Exhibit 1 at the end of this chapter. Various measures have been taken over the past several years to optimize the staffing level of the organization. The results of this activity reduced the organization full-time equivalent positions by approximately 100 employees while improving service to GWA's customers. A joint GWA/GPA structural review project is in progress. The objective of this project is to address the recommendations for personnel depth identified during the QualServe peer review and cited by EPA. This project will also address GWA organizational issues intended to enhance the efficiency of GWA operations.

Figure 3-1 – GWA Reorganization Chart



Recommendations in the master plan emphasize the need for cultural change necessary to achieve the levels of service identified in Volume 1, Chapter 4 – Levels of Service.

To gain a historical and initial perspective on the status of the organization, summary observations drawn from several sources are presented below. The sources were:

- The *2005 QualServe™ Peer Review* report issued in May 2005 (Volume 1, Appendix 1D).
- The *Preliminary Assessment of Affordability and Early Gains Report* completed by Hunter Water Australia in October 2004 (Volume 1, Appendix 1C).
- *Comprehensive Performance Evaluations* by Winzler and Kelly for three WWTPs in June 2004.
- EPA comments in the Stipulated Order and subsequent communications on December 11, 2003, and April 6, 2004.
- Statements contained in Quarterly Reports discussing the status of Stipulated Order compliance.
- Outside consultant training activities by Skeet Arasmith.

A major objective of the WRMP is to identify and make recommendations for areas of improvement. Key observations that establish the basis for a comprehensive approach to accomplish recommended improvements are summarized below.

3.2.1 Peer Review Task Observations

The QualServe peer review activity resulted in a 30-page report; QualServe is a trademark of the American Water Works Association (AWWA). The Water Environment Federation (WEF) has joined with AWWA to cosponsor QualServe. AWWA and WEF have also formed a Joint QualServe Advisory Committee to oversee ongoing operations and improvements to the QualServe program.

The report pertaining to GWA was compiled by a peer review team of utility professionals under the QualServe program, jointly sponsored by AWWA and WEF. The peer team worked from materials and other information provided by the utility being reviewed. Interviews and visits to facilities and workplaces supplemented written utility information. The team followed processes outlined in QualServe program guidance to conduct the review in accordance with the Participating Utility Agreement. The information presented in this report summarizes the team findings, and focuses on the topics that the team believes are the most pertinent conclusions from the review. This information is intended as one of several resources that the utility can use to prepare a program for improvement. AWWA and WEF make no warranty relative to the suitability of this report for any other purpose.

Summary comments from the QualServe report include:

- There is a need to implement a program among GWA employees that promotes continuous improvement and makes the concept very visible to staff and visiting customers.
- Employees need to be held accountable to performance expectations. Chronic non-performance by individuals should be addressed by their supervisors, including coaching and training, as appropriate. If that approach is unsuccessful, the next step is initiating a performance improvement program that will lead either to recognized improvement or ultimate termination.
- Staffing for collection and distribution may benefit from restructuring.
- Technical training is needed for operators, mechanics, electricians, and other key trade members.

3.2.2 2004 Hunter Water Australia Report Findings

Hunter Water Australia, one of team members, prepared a report in 2004 on GWA that included information on organization factors. Following are some of their key findings:

- GWA is currently in the process of changing from a poorly performing organization to a best-in-class utility. However, some decisions that will lead to a more efficient organization are beyond the control of management. For example, new laws are required to allow the organization to act more efficiently independent of government oversight.
- GWA has had to recruit a new management team over the past 2 years and has now largely accomplished that task. The management structure has qualified engineering specialists focused on implementing the activities required by the Stipulated Order. Specialist financial and legal managers are shared with GPA.
- A major issue and potential risk for GWA is its ability to recruit and retain good professional staff.
  - Guam has lost many young educated people to the mainland U.S. over the past decade because salaries are far higher elsewhere.
  - Additionally, GWA has had to abide by government rules that have placed a freeze on salary increases for many years.

3.2.3 Comprehensive Performance Evaluation Observations

Comprehensive Performance Evaluations (CPEs) were performed on two sanitary treatment plants (STPs) in 2002: Hagatna and Northern District. An additional three plants were evaluated in 2004: Agat-Santa Rita, Umatac-Merizo, and Baza Gardens. Observations relative to personnel are summarized below for the five STPs.

3.2.3.1 2002 CPEs

When evaluating the following comments, it must be recognized that the CPE observations were made in 2002 for tasks performed on the Hagatna and Northern District STPs. The following Hagatna and Northern District report excerpts are from the sections dealing with personnel and organization and reflect observations as of that date:

For the Hagatna STP, the pertinent items were:

- While the total number of staff appears to be sufficient, it is weighted toward operations at the expense of maintenance staff.
- Emphasis was placed on the need to update certification levels to the GEPA-required levels. To a large extent this has been accomplished.
- A hiring freeze in effect at the time of the evaluation imposed restrictions on obtaining personnel with the necessary certification and skill levels for efficient operation.
- Overall, the personnel situation (hiring freeze, lack of certification, etc.) at the time of the evaluation posed a performance limiting factor.

Essentially the same items from the 2002 CPE apply to the Northern District STP.

3.2.3.2 2004 CPEs

The CPEs performed in 2004 resulted in several recommendations addressing personnel and organization observations at the three plants:

- Plant personnel appear to be reluctant to make any process changes unless instructed to do so by a supervisor.
- There is a strong need to establish operator expectations.
- There is a need to establish measures of training effectiveness, and to recognize individuals when goals are met.
- Follow-up training is needed to reinforce taught concepts and expectations.
- An open communication exercise should be established within GWA to present the budget and procurement process to all GWA personnel.

To be consistent with the norm for utilities of this size, the approach to training should focus on the performance and/or efficiency of the water and sewage facilities. The training should be provided to facilitate continuous improvement in staff performance and be tied to measurable facility success. The differentiator in the training approach is to provide training that protects the integrity and performance of the physical infrastructure. To attain this, it requires a cultural change.

3.2.4 EPA Stipulated Order and Quarterly Report Summaries

The Stipulated Order set out specific guidance and time tables for reorganization activities followed by related communications. GWA prepared quarterly reports outlining progress in meeting EPA's expectations. Internal activities included an active recruiting program and strong emphasis on meeting required certification levels. As a result, "…Direct Responsible Charge (DRC) operators were in place by April 29, 2005 and all critical positions identified in the reorganization were recruited, hired and in place by June 24, 2005…", according to the GWA Quarterly Report dated August 22, 2005. Several of the key DRC positions were filled through contract hires and will need to be finalized prior to the end of their personal service contracts.

3.2.5 Outside Consultant Training Activities

In addition to training provided internally, Skeet Arasmith, a specialist in training presentations specific to water systems, presented four sessions for water system personnel. These were held on March 9-10, June 21-24, August 19-27, and October 3-7, 2005. The focus was on all aspects of water treatment and distribution. The October sessions were most intense, and the trip report is included in Appendix 1E.

A second consultant activity was the CPE performed at the Ugum WTP by Belanger& Associates coupled with the comprehensive technical assistance provided by EPA Region 9. These activities have assisted in raising the competence level of the staff, resulting in a successful reduction in downtime and increased efficiency in water delivery during and following wet weather incidents.

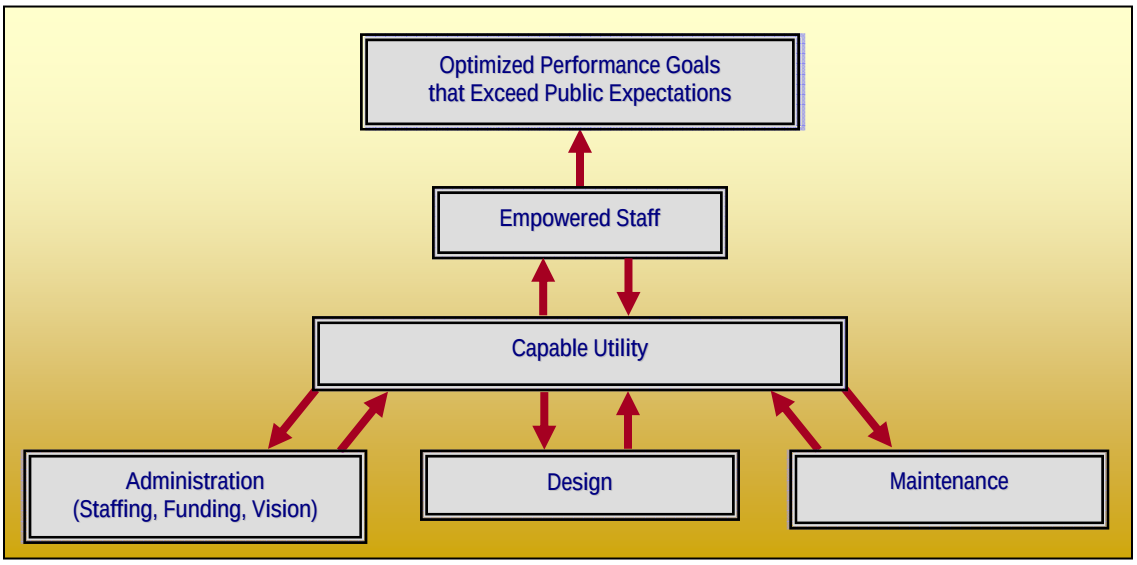
To complement these training activities, GWA has submitted a grant application to the Department of Interior for a one-year comprehensive training program for operation and maintenance personnel. The CCU approved GWA's matching funds for this grant on March 07, 2006.

3.3 Organization Improvement Opportunities

After reviewing the observations and recommendations cited in the referenced reports, and considering options for improvement, the consultant team outlined a process that has been successfully used by other entities to reach intended levels of service, as illustrated in Figure 3-2, Organization Improvement Pathway. Success in this effort requires strong support from the GWA administration in providing the necessary personnel, funding, and technical resources to the staff. It is also a given that facilities must be designed with the capability to perform at a level that consistently meets regulatory requirements and be properly maintained. When such a foundation is provided, it enables an empowered staff to achieve the desired performance goals. Ideally, an empowered staff would be the driver in this model and could assist management, designers, and maintenance personnel in accomplishing their mutual goals. GWA currently is not equipped to make the transition to the identified organizational improvement pathway.

A successful method for making the necessary transition is implementation of a long-term development process led by a "champion" who is totally supported by the administration and has the respect of his/her peers and staff. This individual, together with his or her support team, is responsible for successfully transferring priority-setting and problem-solving skills to the staff. Administrative, design, and maintenance support must be available to the champion and associated support team to allow the necessary transition to proceed as indicated in Figure 3-2.

Figure 3-2 – Organization Improvement Pathway



As noted above, there are a number of factors that limit the overall success of the organization. One element of the EPA Clean Water Program emphasizes a process termed Comprehensive Technical Assistance, which is designed to follow a CPE assessment to address all factors that limit the performance of the utility. This process is a formalized procedure for following the Organization Improvement Pathway outlined in Figure 3-2 and is patterned after successfully implemented programs in other EPA-mandated correction actions.

The Comprehensive Technical Assistance is a natural follow-on to the CPEs performed in 2004 and, if properly implemented, can provide a successful road map for GWA personnel to reach their goal of becoming a "best in class" utility. GWA has demonstrated the effectiveness of this approach with the CPE performed at the Ugum Water Treatment Plant in 2004 and the subsequent Comprehensive Technical Assistance, which produced positive results. The application of this process to the sewage personnel should increase their capability to determine potential noncompliance before it occurs and make recommendations to prevent violations of National Pollutant Discharge Elimination System (NPDES) permits. To achieve this success, several mandated elements are necessary:

- A strong commitment by GWA's management and administrative personnel to support the entire program.
- An identified "champion" with sufficient management backing to lead the identified implementation steps, including formation of a guidance committee to set priorities and establish a course of action. The committee should also include a management representative, appropriate motivated staff members, and (potentially) consultants who can support the process.
- Access to the necessary resources to address the identified priorities.
- A "coach" with experience in carrying out the steps of a successful program. This person may or may not be the "champion."

3.4 Internal Communication

An important goal of the WRMP was to encourage GWA staff input in all aspects of the master planning process to obtain and build ownership of the master plan.

The consulting team worked in partnership with the GWA planning team and the Public Relations Officer to solicit input from staff and ensure information exchange. The team was composed of:

- Paul Kemp
- Prudencio Aguon
- Mark Miller
- Tony Chargualaf
- Efern Alano
- Ray Matasci
- Danny Galiza
- Don Antrobus
- Victor Torres
- Ed Taimanglo

GWA has made positive changes in communicating with and involving its staff in the development of their annual budget. Specifically, in the preparation of the FY 2006 budget, GWA involved mid-level and operations staff in its development. This process both encouraged and empowered the staff to take on ownership of their operations.

As a first step in creating a sense of ownership through a communication process, GWA staff input was sought. Two initial group meetings and additional monthly meetings were held as part of this process. In addition, there have been ongoing informal discussions to promote staff participation and solicit input. Contact was maintained with the GWA staff during every consultant site visit and during meetings with GWA management.

The rollout of a CCU initiative to privatize GWA created confusion about the WRMP among GWA staff. The consultant team participated in several group meetings with the staff to present the WRMP objectives and to distinguish the WRMP consultant team from the privatization consultant. Identification badges were created for the WRMP consultant team to help gain the support of the GWA staff and prevent negative feelings from those who opposed the privatization effort.

Bringing closure to the formal input process is as important as seeking it in the first place. The most visible method of feedback is the WRMP Web site that was created at the time the WRMP project was initiated. Through this site, GWA personnel can access important WRMP information at any time. Features include a bulletin board, chat room, calendar of events, summary reports on specific topics, Stipulated Order updates, as well as access to important GWA-related news linked to the local newspaper – *The Guam Pacific Daily News*. Figure 3-3 shows the home page of the WRMP Web site.

Figure 3-3 – GWA WRMP Web Site

In addition to interviews with current staff, the consultant has urged field personnel to contact former employees and contractors who have considerable knowledge relating to specific areas of the system. Their knowledge and experience can add to the database of information gleaned from written records and drawings. Other utilities have used this resource effectively to fill in gaps in the knowledge and record base for historical data.

3.5 External Communication

Chapter 5 - Strategic Communication Plan of this volume presents a detailed discussion of the external communication plan. The following text summarizes how the communications effort is pertinent to Organization Development.

The primary thrust of the external communication effort was to solicit input from the Guam community through a telephone survey and public presentations of the WRMP to all 22 villages on Guam. Each of the villages has a mayor, and each receives its water and sewage services from GWA. The meetings consisted of a PowerPoint presentation of key elements of the master plan, followed by an opportunity for residents to ask questions or offer comments to GWA representatives regarding water and sewage needs in their particular village. The meetings also provided a forum for GWA employees living in the villages to gain insights into the program as well. Table 3-1 depicts a typical announcement of village meetings listed on the WRMP Web site.

Table 3-1 – Village Meetings

Date	Day	Village	Location & Time
08/17/04	Tues	Inarajan	Community Center 6:30 pm
08/18/04	Wed	Asan-Maina-Piti	Asan Community Center 6:30 pm
08/19/04	Thurs	Tamuning	Community Center 6:30 pm
09/08/04	Wed	Hagatna	Mayor's Office 5:30 pm
09/10/04	Fri	Agat	Community Center 6:00 pm
09/15/04	Wed	Talofofo	Community Center 6:30 pm
09/16/04	Thurs	Umatac	Community Center 6:00 pm
09/20/04	Mon	Mangilao	Community Center 6:30 pm
09/22/04	Wed	Yigo	Community Center 6:30 pm
09/23/04	Thurs	Mongmong-Toto-Maite	Mongmong Community Center 5:00 pm
09/24/04	Fri	Sinajana	Community Center 6:30 pm
09/27/04	Mon	Merizo	Community Center 7:00 pm
09/28/04	Tues	Yona	Community Center 6:00 pm
09/29/04	Wed	Agana Heights	Community Center 6:00 pm
09/30/04	Thurs	Santa Rita	Community Center 6:30 pm
10/13/04	Wed	Dededo	Community Center 6:30 pm
10/14/04	Thurs	Barrigada	Community Center 6:30 pm

Public meetings were conducted in each village to outline and present Guam's water and sewage system and to discuss today's challenges. The WRMP major points were presented and identified how the public could be involved. A PowerPoint presentation was used as a tool to generate discussion led by GWA personnel.

Another vehicle for keeping the public informed is the WRMP newsletter that was created to communicate with GWA's customers. The newsletter includes current events associated with the WRMP and includes a mail-in attachment addressed to GWA for comments. The newsletter is distributed quarterly to all GWA customers.

3.6 Implementation of Early Gains

GWA staff input, together with the consultant's assessment of existing facilities and conditions helped identify activities that could be implemented well before the master plan is finalized. Such an early gain opportunity can range from a simple process change to GWA's initiation of a CIP that could resolve a system bottleneck. Implementation of these early gains can build GWA staff confidence in management's commitment to changing and improving its utility.

One such early gain took place at the Agat STP in response to a plugged return sludge pump. A suggested plan of action was discussed, and then plant and maintenance staff successfully restored the pump to normal operation. The treatment process was markedly improved, resulting in a corresponding improvement in effluent quality.

Examples of other early gain action and opportunities:

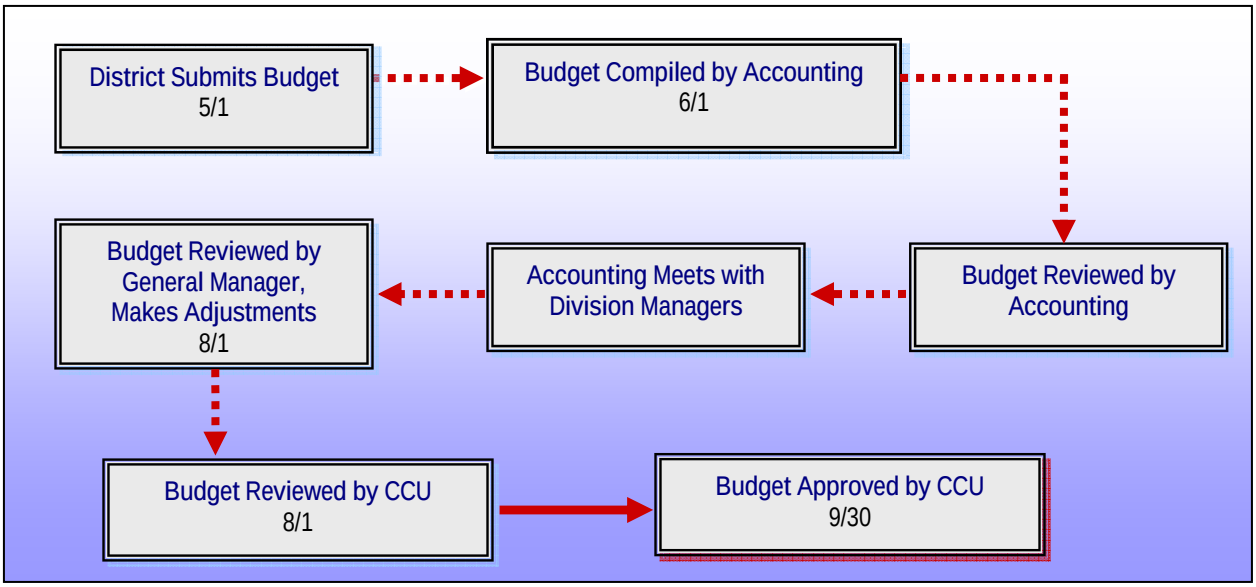
- Collection system staff locating, cleaning system blockages and flushing of lines during the manhole inspection task.
- Reassign supervisory staff to engage their knowledge and skills to improve the performance of the sewage treatment plants (STPs).
- Install flow meters at the STPs. There are components of existing installed flow meters that could readily be rehabilitated to gain true flows.
- Rehabilitate existing SCADA system. System components remain functional and could readily be tested and rehabilitated.
- Reconfigure the split sewer manhole that conveys sewage to the Northern District STP and Southern Link sewage pump stations (SPSs) to divert flow to the gravity line that flows directly to the Northern District STP.
- Rehabilitate the Bayside SPS to lower level in the gravity collection system.

3.7 Barriers to Personnel Success

One of the organizational barriers for operation and maintenance staff for all facilities has been the inability to obtain critical equipment parts and materials in a reasonable time. The Guam Legislature has passed special legislation that will assist in streamlining the process.

At this time, the purchase request still goes through a number of steps, apparently for the sake of the auditors. The recent legislation allows some slight gains for those in Direct Responsible Charge in that they have acquired increased approval authority. However, three quotes are still required for purchases under $15,000, and requests must go out to bid if the purchase is over $15,000. The current acting procurement manager makes some sole-source determinations for compatibility or time constraint reasons, but it is still at least a four-layered process. Figure 3-4 depicts the purchasing process.

Figure 3-4 – Purchasing Process



The GWA accounting department uses an accounting system supported by J.D. Edwards (JDE). The system is capable of incorporating a number of modules, such as accounting, inventory control, and other functions, for agencies like GWA.

There are plans to incorporate information about equipment spare parts into the JDE accounting system portion, namely the Parts Inventory Management module. The next step will be to enter the prioritized list of spare parts.

A significant barrier to expediting purchase of repair and replacement parts, as well as new equipment, has been a process that required multiple levels of approval, several outside of GWA's organization. As mentioned earlier, an act of the legislature was required to change and improve the process. The major features of the legislation are summarized below:

Key features of the legislation include:

- Allows GWA to independently administer financial accounts
- Increases the ability to make personnel changes
- Improves the ability to procure equipment and services

3.8 Organization Aspects of Levels of Service

Level of service links directly to internal and external customer expectations; those delivering the service set the performance measure to ensure that expectations are being met. Chapter 4 - Levels of Service of this volume defines the process used in setting specific measuring methods to define agreed-upon levels of service. Their application to the topic in this chapter is in the area of positive changes to the organization achieved by following this method of demonstrating progress in overall performance improvement. Evidence that this is happening are noted in the following examples:

- Reduction in complaints about lack of water pressure
- Reduction in number of sewage spills during wet weather

- Reduction in number of "boil water" episodes
- Significant improvement in Ugum WTP operations

Success in incorporating these levels of service will depend on staff buy-in. To ensure this happens, the manager and staff of each section need to be involved in the development of an appropriate set of performance measures for them. Performance measures relating to their section's part in achieving specified service levels, once established and agreed upon, will then be nonnegotiable whereas other measures are best developed through participatory processes.

3.9 Sewage Treatment Facilities – Training and Certification

Seven GWA sewage treatment facilities were included in the team's assessment:

- Northern District STP
- Hagatna STP
- Inarajan STP
- Agat-Santa Rita STP
- Baza Gardens STP
- Umatac-Merizo STP
- Pago Socio STP

The 2004 CPEs performed at the Northern District, Hagatna, Agat-Santa Rita, Baza Gardens, and Umatac-Merizo STPs also supplemented the facility assessments.

Significant progress has been made in the spring and summer of 2005 in filling operation's DRC positions identified in the Stipulated Order. These mandated slots were previously covered by administrative personnel having a myriad of other duties. Currently, dedicated personnel with appropriate certification levels have oversight of the plants, as required by GEPA. Additional GWA personnel have taken advantage of GWA training, become certified, and will assume DRC responsibilities. Participants in the April 06, 2005 Operator Certification Examinations given by GEPA yielded a 30% passing rate, which now matches the national average for this kind of examination. Notable is the completion of the desired complement of five Certified Operators at Ugum Water Treatment Facility well in advance of the compliance date. DRC positions filled to meet the requirements of this paragraph are outlined in Table 3-2.

Table 3-2 – Certification Status

Position Minimum	Certification Level	Minimum No. Actual	No. Actual Level	Level
S Treatment	III	3	3	III
Water Treatment	III	3	3	III
			1	IV
Water Treatment	II	2	2	III
S Collection	IV [a]	2	3	IV[b]
	III	2	3	III
Water Distribution	IV	2	2	IV

[a] Required certification will become Level III.

[b] Two Level IV operators will be reassigned to other activities, leaving three Level III WW ODRC and one Level IV WW ODRC (minimum of two required).

The foregoing information was presented in the August 22, 2005, Compliance Report to EPA. Several more staff additions have been made to further augment this information.

Several skill improvement training programs have been held and others are in progress. Examples of training sessions either completed or in progress include the following:

- A "one-on-one" instruction session was presented by Lyman Morikawa for GWA electrical maintenance personnel in the field.
- Certification orientation classes were held to fulfill the GEPA certification requirements for personnel in areas of sewage collection and treatment.
- Opportunities were also offered to sewage personnel to take voluntary classes toward both GEPA certification and obtain a GED.
- Certification was obtained at the required level for three personnel at Certification Level III, meeting the Stipulated Order's requirement.
- National WEF conference was attended by two GWA staff members and five individuals attended the AWWA conference.
- Additional sessions were presented by Arasmith Consulting Resource personnel as detailed in section 3.2.5 of this chapter.

GWA is encouraged to supplement its existing training program with focused workshops on management skill training and application. Training programs should incorporate performance-based training concepts in order to gain maximum and long lasting results. Training activities involving classroom work should also include field testing and application.

Information on operator certification requirements is detailed in Volume 2, Chapter 2 – Water Regulatory Issues.

3.10 Sewage Collection System Organization

The consultant team's assessment of GWA's sewage collection system focused on developing a program that met WRMP objectives and also provided GWA with a road map to compliance with current and future regulations. The Stipulated Order requires a program that will improve the operation of municipal sanitary sewer collection systems, reduce the frequency and occurrence of sewer overflows, and provide more effective public notification when overflows do occur.

An emphasis was placed on meeting current and future regulations which include:

- EPA's proposed SSO policy
- Capacity assurance
- Management
- O&M
- CMOM programs
- Governmental Accounting Standards Board (GASB) 34 requirements

EPA's proposed SSO regulations are intended to provide communities with a framework for minimizing and reducing overflows from sewers, thereby reducing the health and environmental risks associated with such overflows. One important task initiated to help meet these goals was the flow monitoring program, the results of which were used to identify areas of high infiltration and inflow (I/I) and to calibrate the collection system hydraulic model.

Certification was obtained for two individuals for the Collection System Level III and three individuals for Collection System Level IV.

3.10.1 Collection System Assessment

A major goal of the Collection System Assessment subtask was to establish an accurate inventory of the sewage collection system, as well as to gain an understanding of current conditions in order to effectively plan for future expansion and rehabilitation. Three general steps were taken to define the existing system and progressively narrow down and identify those areas in the system that requires the most attention:

- Duenas & Associates entered available information from collection system as-built maps into a Geographical Information Systems (GIS) geodatabase.
- Based on the MGD Technologies field crew manhole inspection information, the consulting team has been able to make general assumptions about collection system conditions. Sewage treatment plant and pump station conditions have been assessed by Brown and Caldwell field inspection personnel.
- Collection system assessment and prioritization have identified areas that require most attention.

3.10.2 Review/Evaluation of Existing Collection System O&M Program

GWA's Collection System O&M program has been evaluated for its adequacy based on the CMOM rule and currently applied Best Management Practices. Recommendations have been proposed that will enhance the current program and optimize the utilization of existing personnel. Results include:

- The collection system staff has been interviewed regarding known trouble spots in the collection system and O&M practices.
- Pertinent data have been entered into the GIS database.
- Existing spill and maintenance data has been collected and reviewed, although a limited amount of information on spills and maintenance was available.

3.11 Water Treatment Facilities Organization

Significant progress has been made in Ugum Surface WTP reliability and personnel competence during the course of the master plan development. The plant continued to function without a shutdown during severe weather conditions in August 2005, in contrast to past years. Continuity of water supply is one of the major level-of-service measures cited in Chapter 4 in this volume, and continuous operation of the WTP demonstrates measurable improvement.

A significant training effort has been in progress during the period of October 2004 through April 2006 resulting in five staff members reaching the required certification level of Water Operator III and the addition of one Level IV individual.

A 40-hour course titled "Introduction to Small Water Systems" was presented by the Department of Interior and GWA on the topic of Potable Water Treatment and Distribution in August 2005. Fifteen employees attended the sessions.

3.12 Water Distribution System

A major problem in continuous delivery of water to various parts of the island has been equipment failure in water pumping stations and deep wells. Many of the problems were associated with power fluctuations that caused pump motors to fail. In a concentrated effort by Morikawa and Associates, one of the WRMP consultants, GWA maintenance personnel were trained to diagnose power problems. In addition, they worked jointly with the GPA in installing components that helped modulate power surges, thus reducing pump drive motor failures. The staff is to be commended for significant improvements in implementation and operation of the wellhead chlorination system over the past 3 years. This has resulted in a significant decrease in the number of microbiological contamination events (presence of coliform bacteria) in the distribution system, and far fewer monthly violations of the total coliform rule than previously occurred. Documentation of this is presented in Volume 2, Chapter 2 - Section 2.5.1.1.

Two water distribution personnel achieved their Level IV certification in April 2005. They also participated in the Potable Water Treatment and Distribution course in August 2005 presented by the Department of Interior and GWA.

3.13 Summary of Facility Assessments and O&M Factors

A significant part of the WRMP is the assessment of the four major segments of GWA's facilities from both an infrastructure and a personnel standpoint. Reviewing O&M functions is inseparable from the assessments. Each of these topics is expanded on in separate chapters in this WRMP, but key features observed to date are summarized below:

3.13.1 Sewage Treatment Facilities

As noted earlier, seven treatment facilities were visited a number of times to collect information, observe operation procedures, and discuss pertinent information with treatment personnel at all levels. For the most part, these visits were made by certified treatment operators on the consultant's staff. Generally, it was determined that the staff is open to being trained and eager to upgrade their operation skills. In an island environment, personnel have not had the opportunities to visit other facilities or have access to many of the tools available to those on the mainland. Access to practical training is improving, and continuance of entry level and skill upgrading will be a necessity.

The addition of certified personnel from outside hiring and concentrated training sessions for current GWA operators has improved work practices at all the facilities. This has increased the number of individuals with DRC capabilities and expanded oversight of the plants.

In performing plant evaluations, it is evident that there is a degree of interest in operation of facilities, but there is also a lack of application of basic operation principles and processes normally found in similar facilities. The emphasis on implementing a Comprehensive Technical Assistance phase as presented earlier in this chapter would be an excellent starting point. Numerous reports have emphasized the need for training, but success will be realized only when there is a support system in place that establishes expectations. In addition there is the necessity to ensure that resources are available to facilitate follow-on teaching to reach the goal of getting the facilities up to a fully functioning status.

3.13.2 Sewage Collection

An integral part of the collection system assessment has been the side-by-side work of the consultant team and collection system crew. Much of the assessment has involved determining the actual location of manholes and sewer lines that do not appear on maps. Personal knowledge has been a key factor in mapping of the system. Coincident with finding and recording system components has been the task of developing the GIS details that have been used for recording in the master plan and will be used for performing future maintenance work. The goal has been to use the guidance by the consultants as a learning tool to build local competence in all phases of the work.

Work performed in resolving power and associated electrical problems in the sewage pump stations was an exercise of one-on-one training by the electrical consultant. A number of improvements were made to increase reliability in the stations while working with the maintenance personnel and specialists from the GPA.

Five operators increased their certification levels, documenting their increased understanding of competent operation procedures.

3.13.3 Water Treatment

Improvements in the reliability of the Ugum WTP have been a major success story. This outcome is mainly due to upgrading essential equipment and changing operation practices as a result of several intensive and specific training sessions. A number of operators have gained higher certification levels as testimony to their increased knowledge of treatment fundamentals and application of new skills.

A concentrated course on water treatment fundamentals was attended by 15 system personnel in August 2005 and five persons have increased their level of certification since spring of 2005.

3.13.4 Water Distribution

Electrical outages and equipment failure in the past have led to many citizen complaints. This situation, coupled with significant loss of water from deteriorating water lines, has been a constant source of irritation to customers. Improvements have been noted in reduced pump motor failures at pumping stations as the severity of power surges was reduced due to the electrical consultant's work with GWA maintenance personnel and GPA specialists. Additionally, improvements in wellhead chlorination systems have significantly reduced coliform exceedance compared to past years.

As noted above, two operators moved up to Level IV certification in April 2005.

3.14 Conclusions

The role of and acceptance by GWA's staff in developing the WRMP will dictate the long-term success of the master plan. The evaluation team assessed the interrelationships among people, processes, structures, and outputs and identified institutional/organizational enablers, as well as barriers, to achieving a culture of continual improvement.

- Comments and observations from several independent sources have noted the importance of internal performance incentive programs, technical training, and competitive salaries. Restructuring may improve staffing for collection and distribution systems.

- Barriers to the organization's effectiveness include a cumbersome purchasing process, and hiring and salary freezes. These conditions can be streamlined or remedied with legislation changes.
- CPE observations and facility assessments determined that staff is receptive to training and upgrading certification or skills.
- Implementing early gains can build staff confidence and foster a culture of improvement.
- Staff involvement in establishing level of service performance measures and developing annual budgets can create a sense of ownership in operations.
- Progress has been made in filling DRC positions and operator training and certification at STPs.
- Equipment upgrades, operation practice changes, and intensive training have contributed to marked improvement in Ugum WTP reliability.

3.15 Recommendations

The Organization Improvement Pathway process has been successfully used to reach intended levels of service. Success will require strong support from GWA administration in providing personnel, funding, and technical resources to the staff. A designated "champion" with administration and staff support can facilitate successful implementation of the process.

Implementing the Organization Improvement Pathway with the EPA Clean Water Program's Comprehensive Technical Assistance procedure can be a very effective approach, as demonstrated at the Ugum WTP.

3.16 CIP Impacts

There are no specific CIP impacts specifically addressed in this chapter; subsequent chapters particularly in Volumes 2 and 3 present CIP impact figures and Volume 1, Chapter 15 – Capital Improvements Program, summarizes the entire plan topic.

Exhibit 3A – Customers, Ratepayers of GWA Organization Chart

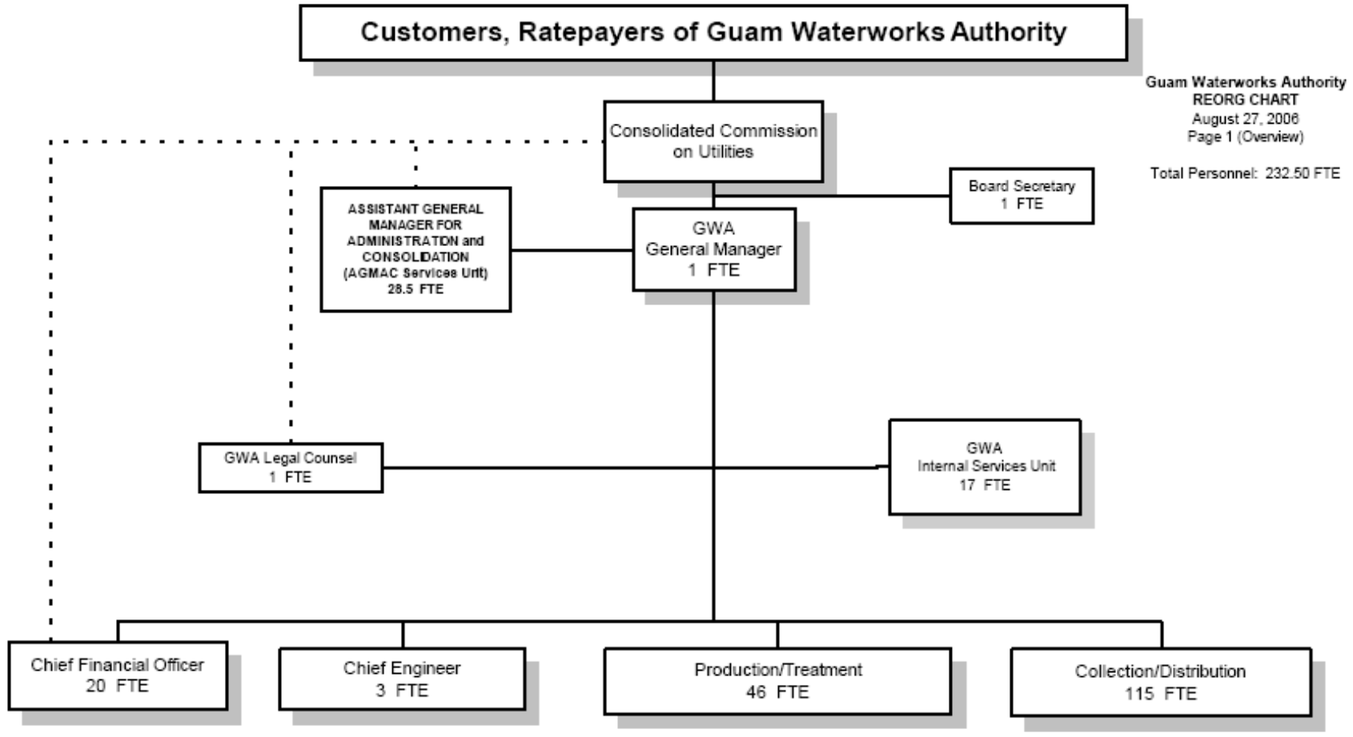


Exhibit 3B -– Production and Treatment FTE Organization Chart

Guam Waterworks Authority
REORG CHART
August 27, 2006 - Page 3
(Production and Treatment)

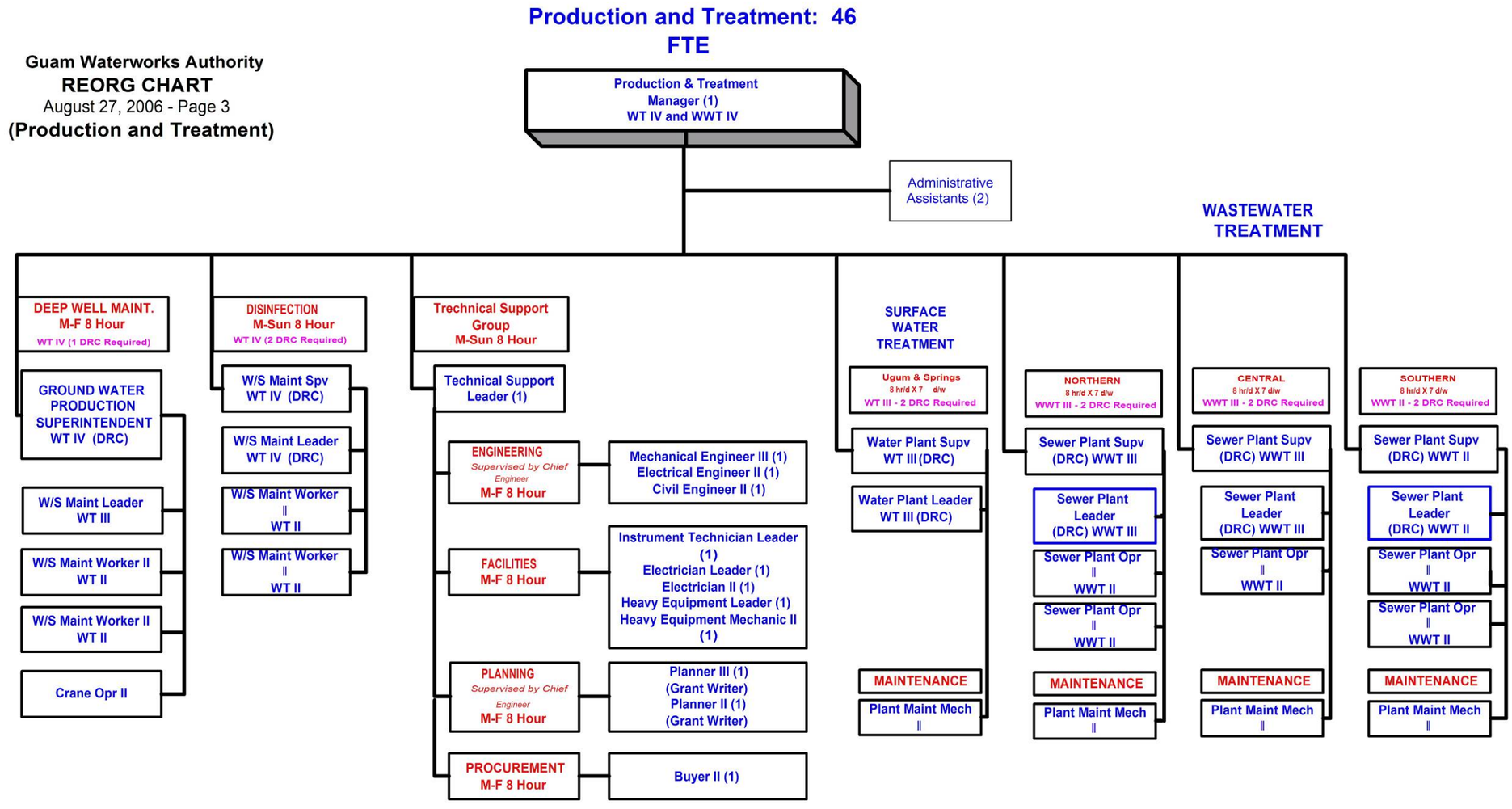


Exhibit 3C – Collection and Distribution FTE Organization Chart

Guam Waterworks Authority
REORG CHART
August 27, 2006 - Page 4
(Collection and Distribution)

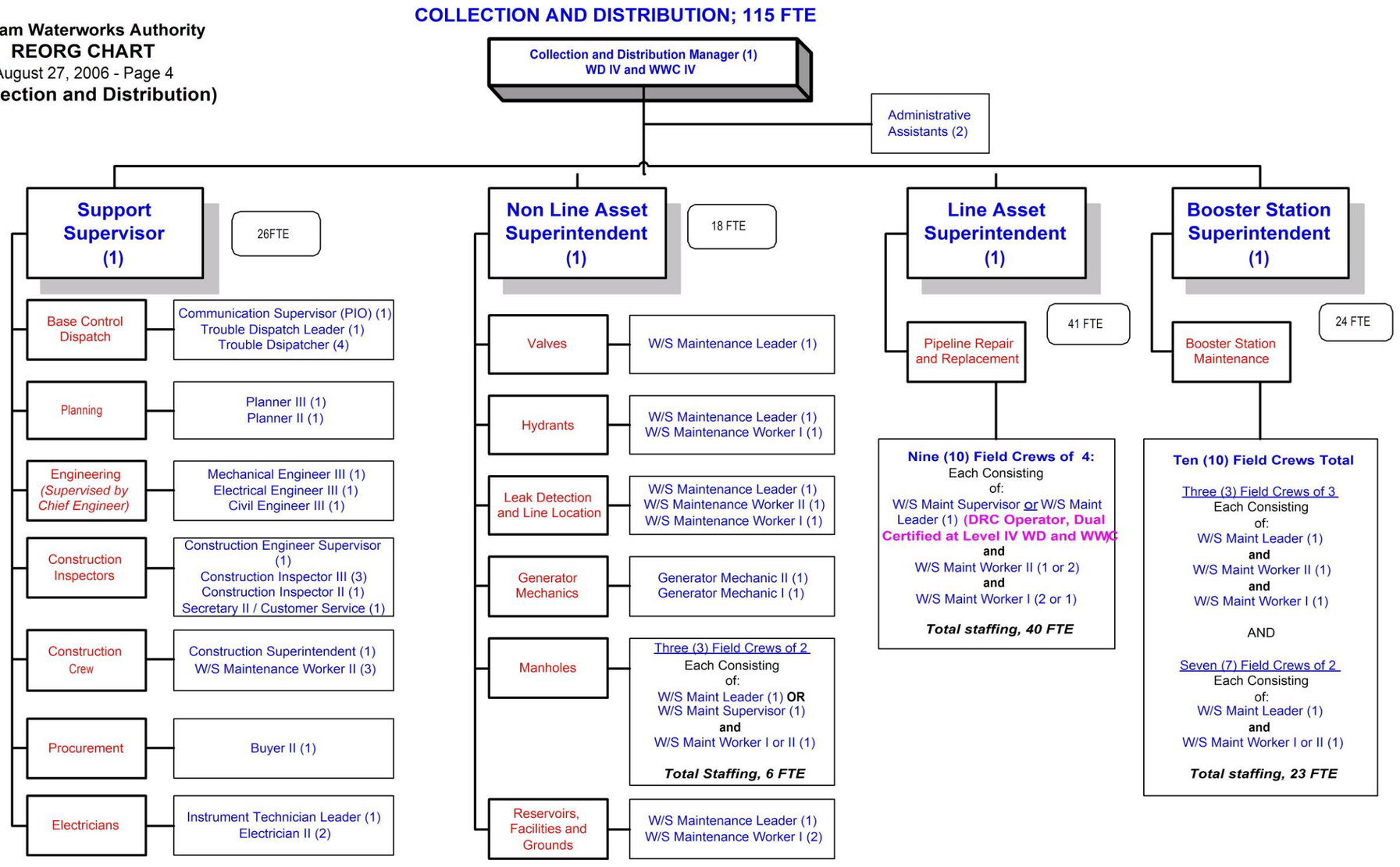


Exhibit 3D – Finance FTE Organization Chart

Guam Waterworks Authority
REORG CHART
August 27, 2006 - Page 5
(Financial)

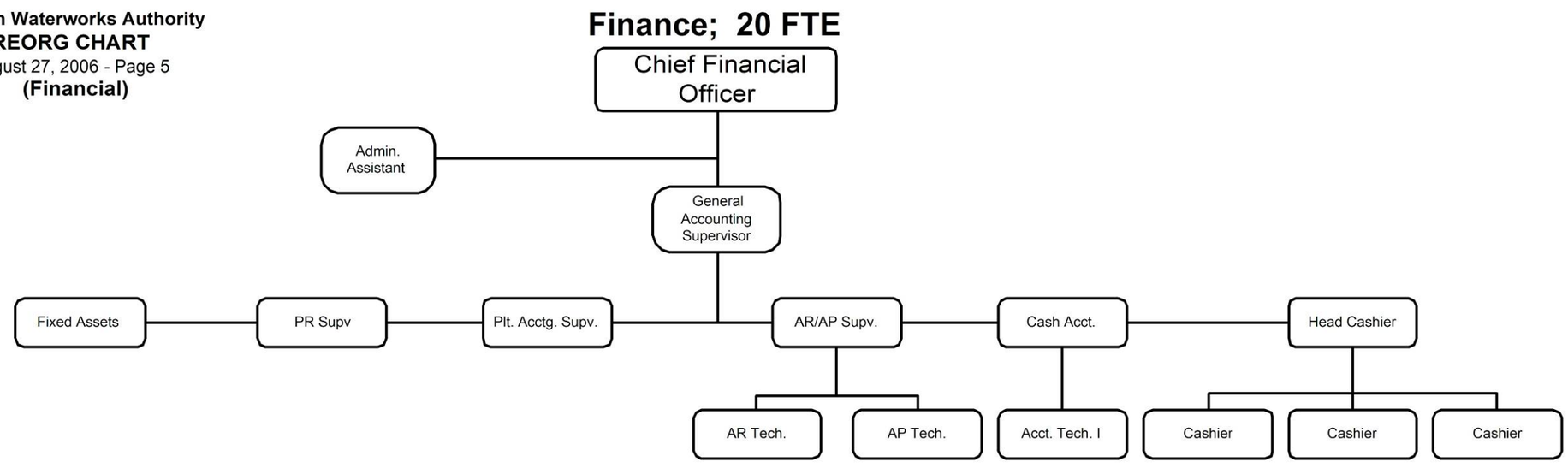


Exhibit 3E – AGMAC Services FTE Organization Chart