

APPENDIX 1A:

SCOPE OF WORK

Exhibit 1. WRMP Summary of Tasks

Task Name			Phase			
			1	2	3a	3b
Task 1. Project Planning						
1.1 Developing Planning Team						
1.1.1	Project Kick-off Meeting		■	■		
1.1.2	Identify and Select Planning Team Members		■			
1.1.3	Conduct a Team Development Orientation Meeting		■			
1.1.4	Monthly Meetings/Conference Calls		■	■	■	
1.2 Organization Development						
1.2.1	Assess Optimization Opportunities		■			
1.2.2	Assess Formal Approach		■			
1.3 Project Communication						
1.3.1	Research/Communication Plan		■			
1.3.2	External Communication - Public Outreach			■	■	
1.3.3	Internal Communication					
1.4 Identify and Implement Early Gains				■		
Task 2. Identify Planning Requirements						
2.1 Stipulated Order				■		
2.2 Population and Land Use Projections			■	■		
2.3 Resource Constraints				■		
2.4 Regulatory Requirements				■		
2.5 Affordability			■			
2.6 Privatization					■	
2.7 Military System Privatization and Consolidation					■	
2.8 Other Requirements					■	
2.9 Planning Requirements Summary				■		
Task 3. Define Levels of Service				■		
Task 4. Conduct Current Status Assessment						
Monthly Meetings/Conference Calls						
4.1 Data Collection						
4.1.1	Identify Data Collection Needs		■			
4.1.2	Conduct Document Search		■			
4.1.3	Develop Data Collection Database		■			
4.1.4	Identify Data Collection Team		■			
4.1.5	Train Data Collection Teams			■		
4.1.6	Initiate Field Data Collection Test			■		
4.1.7	Conduct Quality Assurance Checks			■		
4.1.8	Distribute Data to Planning Team			■		
4.2 Facility Assessments						
4.2.1	Wastewater System Assessment					
4.2.2	Water System Assessment			■		
4.2.3	Corrosion Assessment			■		
4.2.4	Electrical System Assessment		■	■		
4.2.5	Instrumentation and SCADA System			■		
4.2.6	Automation Assessment			■		

Exhibit 1. WRMP Summary of Tasks

<i>Task Name</i>		<i>Phase</i>			
		<i>1</i>	<i>2</i>	<i>3a</i>	<i>3b</i>
Task 5. Develop Assessment Toolbox					
5.1 Develop GIS Database					
5.1.1	Develop database to meet current and future needs	■			
5.1.2	GIS Database Design & Development	■			
5.1.3	Digitize wastewater/water system based on as-built/design drawings		■		
5.2 GIS Based Population Projection Tool			■		
5.3 Capacity Assurance Planning Environment		■	■		
5.4 Hydraulic model for 5 Wastewater collection systems			■		
5.4.1	Wastewater Hydraulic Modeling Planning Criteria		■		
5.4.2	Model Selection		■		
5.4.3	Flow Projections		■		
5.4.4	Model Development		■		
5.4.5	Capital Projects		■		
5.4.6	Training		■		
5.5 Hydraulic model of 3 water systems			■		
5.5.1	Planning Criteria		■		
5.5.2	Model Selection		■		
5.5.3	Demand Projections		■		
5.5.4	Develop Model		■		
5.5.5	Capital Projects		■		
5.5.6	Training		■		
5.6 Replacement Planning Model				■	
5.6.1	Develop Database			■	
5.6.2	Create CIP			■	
5.6.3	Test R&R Options			■	
5.6.4	Train GWA Personnel			■	
5.7 Financial Models				■	
5.7.1	Develop Water Rate Model			■	
5.7.2	Prepare Wastewater Financial Model			■	
Task 6. Develop and Analyze Opportunities					
6.1 Water Supply Alternatives		■	■		
6.2 Water Treatment Alternatives				■	
6.3 Expansion/Consolidation Alternatives				■	
6.4 Biosolids Recycling Alternatives				■	
6.5 Wastewater Treatment Alternatives			■	■	
6.6 Water Distribution and Wastewater Collection Options			■	■	
6.7 Water Conservation				■	
6.8 Leak Detection Program Assistance		■		■	
6.9 Prepare Master Plan Input				■	

Exhibit 1. WRMP Summary of Tasks

<i>Task Name</i>		<i>Phase</i>			
		<i>1</i>	<i>2</i>	<i>3a</i>	<i>3b</i>
Task 7. Prepare Strategic Master Plan					
7.1 Asset Management					
7.1.1	AM Team Workshops and Training Sessions			■	
7.1.2	Conduct Business Process Reviews			■	
7.2 Financial Plan Combined Tasks					
7.2.1	Project Management			■	
7.2.2	Combined Kick-off Meeting and Workshop			■	
7.2.3	Conduct Meetings and Financial Plan Workshops			■	
7.3 Wastewater Service Charges					
7.3.1	Determine Customer Discharge Characteristics and Loadings			■	
7.3.2	Analyze Financing Options for the New Projects Identified in the CIP			■	
7.3.3	Determine Wastewater Revenue Requirements			■	
7.3.4	Allocate Wastewater Costs to Billable Parameters			■	
7.3.5	Develop Wastewater Service Charges			■	
7.4 Prepare Wastewater Financial Plan Report and Workshop					
7.4.1	Prepare Draft Wastewater Financial Plan Report			■	
7.4.2	Public Hearings			■	
7.4.3	Prepare Final Wastewater Financial Plan Report			■	
7.5 Water Service Charges					
7.5.A1	Evaluate Water Use Classes and Characteristics			■	
7.5.A2	Analyze Water Operation and Maintenance Costs			■	
7.5.A3	Analyze Financing Options for the CIP			■	
7.5.A4	Determine Water Revenue Requirements			■	
7.5.A5	Allocate Water Costs of Service			■	
7.5.A6	Develop Miscellaneous Water Service Fees			■	
7.5.A7	Develop Water Service Charges and Surcharges			■	
7.6 Develop Water Connection Fees					
7.6.1	Evaluate Water Facility Values for Connection Fees			■	
7.6.2	Evaluate Unit Water Demands			■	
7.6.3	Determine Water Connection Fees			■	
7.7 Prepare Water Financial Plan Report and Workshop					
7.7.1	Prepare Draft Water Financial Plan Report			■	
7.7.2	GWA Water Workshop			■	
7.7.3	Prepare Final Water Rate and Financial Plan Report			■	
7.8 Develop Draft WRMP					
7.8.1	Prepare draft WRMP			■	
7.8.2	Review draft WRMP with GWA Management			■	
7.9 Prepare Final WRMP					
7.10 Prepare Water and Wastewater PUC Financial Plan Document					■
Task 8. Develop Implementation Plan					
8.1 CAPE				■	
8.2 Replacement Planning Model					■
8.3 Water System Hydraulic Model					■
8.4 Wastewater System Hydraulic Model					■
8.5 Geographical Information System					■
8.6 SCADA					■
8.7 Financial Models					■

Phase I

Task 1. Project Planning

Development of GWA’s WRMP provides an excellent opportunity for staff development and to build staff ownership. This task will develop a process for input and involvement of GWA staff in the master planning process to build their ownership for successful implementation.

Subtask 1.1 Develop Planning Team

We will facilitate the development of a planning team comprised of representative GWA management and staff, external stakeholders, and consultant team members. This task will identify a team that will follow the master planning process from inception to implementation. GWA staff representatives will be responsible for ensuring effective communication of the planning process throughout the GWA organization.

1.1.1 Project Kick-off Meeting

We will present the proposed project schedule, develop project vision, goals and expectations and steps to achieve them with GWA management and staff. In addition we will clarify roles and responsibilities, communication channels, and QA/QC procedures.

1.1.2 Identify and Select Planning Team Members

We will work with GWA management to identify potential planning team members. These members should represent a cross-section of the GWA divisions. In addition, we will work with GWA in identifying appropriate external stakeholders. The external stakeholders will be comprised of individuals from Guam’s business community, construction industry, regulators, etc. The stakeholders would serve as the community resource group that would participate in the project process. Once potential planning team members are identified, they will be interviewed by GWA management and the consultant team for their interest and commitment. Planning team members will be selected based on the interviews.

1.1.3 Conduct a Team Development Orientation Meeting

A facilitated meeting will be held with the planning team to outline roles and responsibilities, the internal communication process, key GWA/consultant interfaces, and initial information needs. A stakeholder’s workshop will be scheduled to introduce the group to the project and define roles and expectations.

1.1.4 Conduct Monthly Planning Team Meetings throughout the Planning Process

Conduct monthly planning team meetings during the master planning process. These meetings will consist of on-site, face-to-face sessions, and conference calls, depending on the proposed agenda. Meeting minutes and decision logs will be maintained to record key decisions and identified action items made throughout the planning process.

One stakeholder meeting will be scheduled over the duration of this project phase period.

Subtask 1.2 Organization Development

An organizational assessment will be performed as part of the master planning process to prepare an organizational development plan that will help GWA develop a culture of continual improvement. As part of this process we will assess the interrelationships among people, processes, structures, and outputs and identify institutional/organizational enablers as well as barriers to continuous improvement. Progress is assessed at each phase and if it is not satisfactory, it is not recommended that additional phases be pursued.

1.2.1 Assess Optimization Opportunities

This phase will be accomplished with facility tours, interviews and work sessions. We will take the lead in conducting these efforts using Process Applications, Inc. in a technical advisory role.

1.2.2 Assess Formal Approach

We will assess a formal approach to create a mechanism for accomplishing identified change objectives in future phases. This mechanism would take into consideration the unique personalities and situations that exist for GWA. Example approaches could be the formation of an optimization leadership team or the identification of a single facility optimization champion.

Future implementation activities would be developed in partnership with the GWA staff once the decision is made to forge ahead in earnest with the Organization Development process.

- Assumptions:*
- GWA will provide the necessary staff resources to support the successful completion of the WRMP.
 - GWA PRO will serve as the Project Leader in communicating with the community and Villages.
 - Consultant team will provide technical resources to guide and mentor the process.

- GWA Tasks:*
- Identify potential planning team members.
 - Identify external stakeholders.
 - Facilitate formal Village meetings.
 - Implement Early Gain opportunities identified.

- Deliverables:*
- Select planning team members.
 - Select external stakeholders.
 - Conduct one stakeholder meeting.
 - Conduct monthly planning team meetings.
 - Prepare meeting summaries.
 - Prepare Technical Memorandum of Optimization Opportunity Assessment.
 - Make assessment for pursuing formal organizational change implementation and prepare Technical Memorandum.
 - Prepare Communication Plan.
 - Review Task Scope to reassess consultant role.
 - Prepare Technical Memorandum outlining communication tools.
 - Document Village meetings (40) using court reporter.
 - Schedule 6 GWA staff meetings to seek input and provide project status.
 - Identify Early Gain opportunities.

Subtask 1.3 Project Communication

Communication both internally and externally is critical for successful development and implementation of the WRMP. It is expected that internal and external communication will occur throughout the planning process. We will work in partnership with GWA's Public Relations Officer (PRO) in developing the required Outreach Scope, designing the most effective approach to accomplish GWA's communication objectives and providing strategic guidance to the PRO in the implementation of the Outreach Program.

Initiation of the communication task will begin with a research activity to gain an understanding of the community's position with regards to the performance of GWA. Based on the research findings a communication plan will be developed to guide the implementation of the projects communication activities. The communication plan development will determine the requirement to reassess our level of involvement during the implementation process.

1.3.1 Research/Communication Plan Task

Public opinion research will be conducted to obtain quantitative data about the input from the current village meetings and provide data on which to base a communication plan. We will work with the PRO to determine the appropriate survey methodology, design and conduct the survey, and prepare a report documenting the survey findings. Messages developed for the communication plan will be tested in the survey.

Working with the PRO, we will draft a communication plan that identifies the communication goals, messages and audiences, as well as the methods to be used to implement the public outreach program with an associated timeline. We will assist the PRO and the project team to clearly articulate GWA's communication objectives and design a public outreach process to accomplish them.

As the WRMP tasks are initiated and carried out, it will be necessary to keep GWA staff and the public informed on its progress. It will also be important for task leaders to expedite exchange of information to prevent duplication of effort. We will work with GWA to establish applicable communication tools for consideration that we have used successfully to accomplish these efforts. Examples of possible tools are:

- Informational materials including fact sheets, frequently asked questions fact sheets, program or project brochures.
- Project newsletters (printed and electronic versions).
- Website.
- Displays/exhibits.
- Speakers' bureau that actively solicits opportunities to make presentations about GWA to community groups.
- School education programs.

Information materials and the website should include contact names and numbers so that citizens can pose questions or ask for additional information, as well as a feedback mechanism so citizens can provide input to GWA.

Task 2. Identify Planning Requirements

Planning requirements will be identified early to set the stage for subsequent planning activities. Population and land use projections serve as a basis for future demands and customer requirements. Water resources are limited, so these constraints must be identified. In many cases, regulations establish minimum performance standards that must be followed. Other considerations including affordability, potential military utility consolidation, and privatization must also be understood at the outset to help establish the requirements and context under which the WRMP will be completed.

Subtask 2.2 Population and Land Use Projections

Population and land use projections will be developed based on the best available information and projection studies. Projections will be developed for 5, 10, 15, 20, 50, and 100 years from the start of the planning period. Data and information generated from other Guam Government studies will be reviewed and used as a resource in completing this task. Update most recent Guam Land Use Plan (1967) for infrastructure determination. Scope task items include:

- Determine population projections using census track data and recently generated projection studies (Guam Highway master Plan).
- Develop Land use Plan based on population and master plan designations, etc.

Subtask 2.5 Affordability

Near the start of the project, we will conduct a top-level assessment of GWA’s financial position and work with GWA to identify a range of acceptable water and wastewater utility rates. This range will then be used to as a general guide and first look to help estimate potential O&M and capital budgets for future alternatives. The results of this effort will be incorporated into the development of the water and wastewater rates. The findings of this task will be summarized in a Technical Memorandum.

Task 4. Conduct Current Status Assessment

In order to properly determine necessary input to the WRMP, the combined resources of GWA and the consulting team will conduct a comprehensive current status assessment of the water and wastewater system’s assets. Data gathering and assessment is best accomplished with a structured approach. We are proposing an approach used successfully in several similar projects that have received favorable results as attested to by the participants. In this Phase of the project we will prepare the needed protocols and IT tools to collect required project data for all tasks.

Subtask 4.1 Data Collection

The current status assessment of the water and wastewater systems will require a significant amount of field data. A team based approach will be used to enhance efficiency and data consistency rather than having each task leader collect field data independently.

4.1.1 Identify Data Collection Needs

Conduct a planning team meeting to identify information specific to each task that will be needed. This meeting will serve as a basis for the development of a field checklist for verification and assessment at the various water and wastewater treatment facilities. At this meeting the concept of “early gains” will be discussed.

4.1.2 Conduct Document Search

Existing plans, drawings, and operations and maintenance manuals for each location will be inventoried and reviewed. Operations and maintenance records and logs will be reviewed to ascertain the operational history and reliability of the facilities.

4.1.3 Develop a Data Collection Database

A database will be developed for collecting the information identified in the field checklist. Handheld, electronic data collection devices will be programmed with the database to facilitate thoroughness and consistency of data collection.

4.1.4 Identify Data Collection Team Members

Identify team members with the overall skills to conduct the field data collection effort. The number of teams and members will depend on the skills set and the data collection needs. The teams should consist of consultant team members and GWA staff.

Assumptions:

- GWA will provide at least one staff member for each team to provide access to GWA facilities.

GWA Tasks:

- Provide staff resources to support completion of task.

- Provide available water and wastewater system data and reports.

Deliverables:

- List of field data requirements.
- Database for field data requirements.
- Training for GWA staff members involved in field data collection.

4.2.4 Electrical System Assessment

As part of the facilities assessments, the electrical systems and their respective components will be assessed. Conditional and spot electrical information on the system and equipment parameters (such as voltage, current, vibration, insulation resistance, etc.) will be obtained where possible. In critical areas, an infrared scan of the electrical system can be performed using an infrared camera to determine any “hot spots”.

The objective is to work with and empower GWA maintenance personnel in using preventive and predictive maintenance tools as a part of a routine program. Training on the use of equipment will be conducted such that GWA staff will be actively involved with this phase of the project. The effort for this subtask will include:

- Review existing electrical plans, drawings, and operations and maintenance manuals for each location.
- Review electrical maintenance records and logs to ascertain and compare the level of maintenance performed with the manufacturer recommendations.
- Interview maintenance and operational personnel on training levels, equipment usage, and strengths and weaknesses of the existing electrical and SCADA equipment.
- Work with and solicit GWA staff involvement in the review and assessment process.
- In conjunction with GWA maintenance personnel, conduct a site survey at each facility to observe and inventory the existing electrical switchgear, motor control centers, panelboards, and equipment. Also included will be the type of instrumentation and control methodology (i.e. bubbler, float, transducer, programmable controllers, relay logic, etc.).
- Survey data sheet will used and be included in the final assessment report.
- During this survey phase and also in conjunction with GWA maintenance staff, the removal and exposure of the electrical equipment (to the Electrical BUS, where possible) to photograph and visually inspect terminations, connections, and interior conditions will be made. In many cases this is not accomplished under routine maintenance.
- Depending on the condition of the observed equipment, cleaning and repairs (if required) may be recommended or work order issued for scheduled maintenance.
- In conjunction with GWA maintenance staff, obtain conditional and spot electrical information on the system and equipment parameters such as voltage, current, vibration, insulation resistance, etc., where possible. In critical areas, an infrared scan of the electrical system can be performed using an infrared camera to determine any “hot spots”. Electronic electrical data recordings of the station motor and or equipment operation will be made. This data will be used as a reference for future operational comparisons.
- The objective is to work with and empower GWA maintenance staff in using preventive and predictive maintenance tools as a part of a routine program. Training on the use of these types of equipment will be conducted such that GWA Personnel will be involved with this phase of the project.
- Prepare an electrical assessment report of the equipment and installation directed to the existing equipment and installation incorporating the field data and notes, sketches, photographs, recorded data, and survey sheets.

- Attend review and coordination meetings, as required.
- Prepare a report of finding and recommendations consisting of existing conditions, estimated equipment remaining life, cost estimates for maintenance and capital improvements budgeting.
- Prepare electronic files of the report, recorded information, and data on compact disk (CD or DVD).

Task 5. Develop Assessment Toolbox

Electronic tools and software make the development and evaluation of information faster and more thorough. This task describes both an integrated program and individual electronic tools and software that will be used for GWA's WRMP. The assessment tools that we develop and use will be transferred to GWA for future use, so it is important that GWA staff be involved in their development and use. Each task involving a specific tool also has a training element included.

5.1 Geographical Information System (GIS)

Develop a water and wastewater GIS database that will provide improved data management of GWA's water and wastewater infrastructure and provide better data access for operations and analysis. The GIS database will be developed considering both GWA's immediate and future application needs. Once the water and wastewater related data are stored in a GIS database, many operational and analytical tasks can be performed automatically. The GIS database will be the foundation for the assessment tools that are covered in this task.

5.1.1 Identify Existing & Future Needs for GIS

A key step in developing the GIS is determining the current and future uses of the GIS and its related data requirements. Working with the planning team we will be able to identify and prioritize these uses. Some potential long-term uses of GWA GIS may be asset management, work order management or new connection management. The result of the planning team's recommendations will be the basis for a thorough and flexible database design.

Needs Assessment & Current Business Processes

This task will identify and document the current business process, potential uses and functional requirements in sufficient detail to design the ArcGIS geodatabase and select functions to implement during this project. In order to identify the current business process, potential uses and functional requirements we will:

- Conduct a workshop with GWA staff to identify and document the current business process and potential uses as related to the geodatabase. Also discuss the types of functions that would support the current uses and potential uses.
- Interview GWA staff for more detailed information as needed.
- Review information provided by GWA.
- Document the business processes related to the GIS in standard business diagrams.

Identify and Prioritize Potential Functions

Potential functions that are important to support the business processes documented in Task 1 will be identified and prioritized. To identify potential functions and prioritize them we will:

- Conduct a workshop with GWA staff to identify potential functions related to the geodatabase.
- Develop ranking criteria with GWA staff during the workshop to prioritize the development or implementation of the identified functions.
- Characterize functions as near term or long term based on it's ranking.

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- Assumptions:*
- There is an adequate electronic base map either in parcel based GIS layer, Census track based GIS layer or georeferenced satellite imagery.
- GWA Task:*
- Identify staff who will be involved in the discussion of the current business practices and needs of the geodatabase.
 - Identify staff who will be involved in the discussion of the potential business practices and future use of the geodatabase.
- Deliverables:*
- A technical memorandum documenting the applicable business processes, potential uses and functions needed in both printed and electronic format.
 - A technical memorandum documenting the applicable potential functions and their ranking in both printed and electronic format.

5.1.2 GIS Database Design & Development

The core of the GIS database design will be drawn from our previous project experience to expedite GWA’s database development.

GIS Database Design

The geodatabase will be designed to incorporate as many functions as feasible. Feasibility is defined by the availability of data and information and by the ability to define data fields from the initial business process and functional requirements identified in Task 5.1.1. Near term functions identified in Task 5.1.1 will be the primary focus of the geodatabase design with as many of the future functions being integrated as possible. To complete this task we will:

- Meet with GWA staff to review the core of the geodatabase design.
- Develop additional tables and customize fields as needed to suit GWA’s needs.

Develop Data Entry and Updating Tools

An ArcGIS extension for ArcInfo for editing and updating the water and wastewater geodatabase will be customized for GWA. The extension will provide efficient tools for updating and editing the data and help maintain a high level of data integrity, quality controls and standards. Tools will have default values set as often as possible, calculating items like slope, and have an error checking system prior to posting data to the database. This editing tool will be developed prior to data entry, to ensure that all data goes in with the same standards and quality control measures. The following steps will be needed:

- Customize ArcGIS extension to work with GWA’s geodatabase design.
- Test the extension on the system with ArcInfo and the geodatabase.
- Refine extension if necessary.

- Assumption:*
- GWA has an ArcInfo license available for use in future development, editing and updating the geodatabase.
- GWA Task:*
- Identify staff who will be involved in the discussion of the different potential uses of the geodatabase.
 - Identify GWA staff who will be involved in the development of GIS tools.
- Deliverable:*
- A technical memorandum documenting the ArcGIS geodatabase design with a database diagram and a data dictionary with field descriptions both printed and electronic format.
 - The ArcGIS data entry and update extension will be developed and installed prior to data entry to ensure that all the data goes in with the same quality controls and standards.

Installation of ArcGIS Extension and Training

A one day training session will be conducted to:

- Explain the database design.
- Explain the features of the extension.
- Provide a hands-on demonstration of the ArcGIS Extension and procedures for editing the databases.

Assumptions: ● GWA will provide a room for training and at least one (1) computer with ArcInfo, and the GWA geodatabase for training.

GWA Task: ● Provide live examples for data entry.
● Identify staff that should be trained to update the geodatabase.

Deliverable: ● A printed version of the on-line help tool.

Future Applications

An evaluation of other useful tools and value added functions will be conducted. This will be a plan for maximizing the use of the water and wastewater data in the geodatabase. This task will evaluate the identified functions from Task 1 with more detail and input from the end user's and GWA management. The evaluation will take the potential functions categorized as short-term functions and prepare initial estimates on cost and effort for these functions.

- Interview GWA's end-users and management short-term potential functions discussed in Task 5.1.1 for evaluation. No more than 5 short-term potential functions will be evaluated.
- Develop cost and effort estimates for the short-term potential functions discussed in the previous step.
- An initial implementation plan will be developed and include the following areas:
 - Required hardware and software
 - Additional software customization
 - Additional data entry
 - Schedule and time tables
 - Installation
 - Operation and business case
 - Cost Estimates

Assumptions: ● GWA will have the appropriate staff available for discussing the short-term potential functions.

GWA Tasks: ● Identify the appropriate staff to discuss short-term potential functions and its benefits.

Deliverable: ● Technical memorandum documenting the short-term potential functions.

Subtask 5.3 Capacity Assurance Planning Environment (CAPE)

CAPE is a suite of integrated software applications and decision support tools designed specifically to support the master planning process. Its primary use is in integrating information technology to reduce data handling complexity and provide the decision-making tools that are essential in the master planning process.

Among the master planning activities supported by CAPE are the following:

- Testing of Management Strategies
- Sophisticated Water/Wastewater Forecasting
- Just-In-Time Planning
- Living Master Plan

CAPE will be customized to suit GWA's needs and to work with the geodatabase. The following steps to meet this goal are:

- Meet with GWA staff and demonstrate CAPE's current capabilities.
- Discuss and identify feasible enhancements that would enhance CAPE's capabilities for GWA.
- Customize CAPE to work with GWA's geodatabase.
- Implement features identified previously.
- Hold a workshop that will include an overview on the functions and use of CAPE along with a hands-on demonstration.

Assumptions: N/A.

GWA Tasks: ● Identify staff to be involved in the development of CAPE.

Deliverables: ● CAPE with feasible enhancements to suit GWA's needs.
● Conduct a one (1) day training session on the use of CAPE.

Task 6. Develop and Analyze Opportunities

This task will assess and identify opportunities that fit into a 20 to 100 year horizon and recommend steps to attain GWA goals. We will examine and recommend how GWA and military installations might be incorporated to provide greater efficiencies and provide recommendations that will be guided by a holistic view incorporating GWA's and the community's level of service expectations. The results from previous tasks will be used to predict future water requirements and status assessments to determine existing system capacities. These factors will be combined with water resource predictions, water conservation, water reuse, and other water supply factors to create cost-effective and efficient water supply alternatives. During this Phase of the project the existing water supply ground water and surface water systems will be evaluated.

Subtask 6.1 Water Supply Alternatives

In this subtask we will assess the viability of the existing groundwater and surface water supplies. This effort will include the following scope activities.

- Update estimates of sustainable yield of the Northern Guam aquifers using the Northern Guam lens Study from the 1980's as the base of knowledge.
- Prepare estimates on water availability for potable and non-potable use.
- Coordinate with the University of Guam Water and Environmental Research Institute (WERI) and the U.S.G.S. in re-defining the water resources of Guam.
- Study the entire system of water management areas including the establishment of parameters and procedures.
- Review monitoring systems and recommend changes as necessary. Conditions include rainfall, pumping, head, salinity and other water quality considerations.

- Develop plans to optimize development of water resources within the constraints of existing infrastructure and without constraints.

Subtask 6.8 Leak Detection Program Assistance

We will assist GWA with audit results collected in the GWA leak detection program and use the collected data in our financial and hydraulic models being prepared under separate tasks. This audit will include estimates of apparent and real water losses for the purposes of more accurately defining water system leaks as defined by the International Water Association. Factors for production and customer meter reading inaccuracies will be included.

As a part of GWA’s internal leak detection program it will be necessary to sample both customer and production meters to define the level of accuracy of these meters. With this information, the audit can be implemented.

The Infrastructure Leakage Index and Economic Level of Leakage as defined by the *Performance Indicators for Water Supply Services* (IWA, 2000) will be calculated for each of three potable water systems. These indicators will provide the level of cost-effective main replacement and leak repair within each system.

Phase II

Task 1. Project Planning

Development of GWA's WRMP provides an excellent opportunity for staff development and to build staff ownership. This task will develop a process for input and involvement of GWA staff in the master planning process to build their ownership for successful implementation.

1.1.1 Phase Kick-off Meeting

We will present the proposed Phase II project schedule; develop Phase II goals, expectations and steps to achieve them with GWA management and staff. In addition we will clarify roles and responsibilities, communication channels, and QA/QC procedures.

1.1.4 Conduct Monthly Team Meetings throughout the Planning Process

Conduct monthly team meetings during the master planning process. These meetings will consist of on-site or conference calls, depending on the proposed agenda. Meeting minutes and decision logs will be maintained to record key decisions and identified action items made throughout the planning process.

Subtask 1.2 Organization Development

An organizational assessment will be performed as part of the master planning process to prepare an organizational development plan that will help GWA develop a culture of continual improvement. As part of this process we will assess the interrelationships among people, processes, structures, and outputs and identify institutional/organizational enablers as well as barriers to continuous improvement. Progress is assessed at each phase and if it is not satisfactory, it is not recommended that additional phases be pursued.

Subtask 1.3 Project Communication

Communication both internally and externally is critical for successful development and implementation of the WRMP. It is expected that internal and external communication will occur throughout the planning process. We will work in partnership with GWA's Public Relations Officer (PRO) in developing the required Outreach Scope, designing the most effective approach to accomplish GWA's communication objectives and providing strategic guidance to the PRO in the implementation of the Outreach Program.

Initiation of the communication task will begin with a research activity to gain an understanding of the community's position with regards to the performance of GWA. Based on the research findings a communication plan will be developed to guide the implementation of the projects communication activities. The communication plan development will determine the requirement to reassess our level of involvement during the implementation process.

The implementation of the communication plan will involve the identification of communication tools and then implementation of an Internal and External Communication Program.

1.3.2 External Communication - Public Outreach

GWA and the CCU's village meetings are a good starting point for fostering community awareness and building community ownership of the WRMP. We will augment GWA's public outreach efforts with long-term strategy development and consistent and sustained effort to support and effective public outreach program.

The public outreach process will include one meeting in each of the 20 villages to refine project priorities. We will coach and mentor the PRO to design an effective approach to obtain the desired level of public input, as well as support GWA staff in a variety of ways such as providing training to staff and

commissioners as desired. We will document village public input using a court reporter, and help to determine the next steps.

We will continue to coach and mentor the PRO to design an effective approach to obtain the desired level of public input, as well as support GWA staff in a variety of ways such as providing training to staff and commissioners as desired. We will document village public input using a court reporter, and help to determine the next steps.

1.3.3 Internal Communication

Develop a process for input and involvement of GWA staff in all aspects of the master planning process to obtain input, promote involvement, and build ownership of the master plan. We will work in partnership with the GWA planning team and the PRO to solicit input and information exchange.

1.3.3.1 Develop Staff Communication Process

The first step in building ownership for the WRMP is to actively seek staff input with an on-going communication process. A maximum of six formal meetings to obtain input will be conducted with GWA staff. In addition, there will be an on-going informal process for staff input. We will work with GWA's staff to combine their knowledge of GWA's water and wastewater systems with our team's experience for successful assessment and development of the WRMP.

1.3.3.2 Develop Communication Feedback and Closure Process

Bringing closure to the formal input process is as important as seeking it in the first place. When people provide input into a process, they typically want to know if and how the input was used. In previous projects we have used a wide array of successful communication processes including newsletters, project websites, and meetings. GWA's input and feedback process will be tailored to the specific communication means and needs of GWA.

Subtask 1.4 Identify and Implement Early Gains

Early gains through implementation of quick wins build confidence and momentum. Staff input, along with our assessment of existing facilities and conditions, will identify opportunities that can be implemented well before the master plan is finalized. These opportunities can range from a simple process change to GWA initiating a capital improvement project (CIP) to resolve a system bottleneck. Implementation of these early gains will build GWA staff confidence of GWA's commitment to change and improve its utility. Implementation of early gains will be supported by providing staff the tools and knowledge needed for success. The success of these early gains will be documented and integrated into the public outreach communication process.

Task 2. Identify Planning Requirements

Planning requirements will be identified early to set the stage for subsequent planning activities. Population and land use projections serve as a basis for future demands and customer requirements. Water resources are limited, so these constraints must be identified. In many cases, regulations establish minimum performance standards that must be followed. Other considerations including affordability, potential military utility consolidation, and privatization must also be understood at the outset to help establish the requirements and context under which the WRMP will be completed.

Subtask 2.1 Stipulated Order

The EPA issues Stipulated Order will be reviewed and key Order requirements summarized with an emphasis on those that affect planning of future facilities and utility management. A technical memorandum will be prepared summarizing the impact of the Order and the role of the WRMP in future regulatory actions.

Subtask 2.2 Population and Land Use Projections

Population and land use projections will be developed based on the best available information and projection studies. Projections will be developed for 5, 10, 15, 20, 50, and 100 years from the start of the planning period. Data and information generated from other Guam Government studies will be reviewed and used as a resource in completing this task. Update most recent Guam Land Use Plan (1967) for infrastructure determination.

Scope task items include:

- Prepare Base Maps.
- Prepare Technical Memorandum.

Subtask 2.3 Resource Constraints

Working with GWA and historical information our team will identify specific resource constraints that could affect specific service alternatives. For example, the existing island-wide groundwater extraction rate is approximately 40 mgd, while the aquifer sustainable yield may be in the range of 50 to 60 mgd. Consequently, groundwater availability will likely be a future resource constraint that must be considered when balancing future drinking water needs with water resource management options.

Subtask 2.4 Regulatory Requirements

Current and future regulatory requirements have a significant influence on feasible alternatives. We will summarize current regulatory requirements and project likely future requirements in the near- and long-term. We will begin by identifying significant compliance gaps that need to be addressed. Our principal focus will be water and wastewater regulations derived from the Safe Drinking Water Act, Clean Water Act and Guam EPA rules and regulations.

Subtask 2.9 Planning Requirements Summary

The results of subtasks 2.1 through 2.4 will be summarized in a “Basis of Planning” document. We will first prepare a draft summarizing available information and identify key information gaps. A final summary will be prepared following additional data collection and analysis.

Assumptions: N/A.

GWA Tasks:

- Make available studies and reports applicable to Guam’s population and land use projection and planning.
- Make available studies and reports applicable to Guam’s population and land use projection and planning.
- Make available any GIS based maps, electronic plans, etc. in possession by Government of Guam.

Deliverables:

- Technical Memorandums.
- Basis of Planning Report.

Task 3. Define Levels of Service

Level of Service links directly to the internal and external customer expectations; those delivering the service set the performance measure to ensure the expectations are being met. We will conduct an inventory and assessment of the current condition of the existing equipment and facilities that are essential for master planning. This task establishes the foundation for planned repair, maintenance, replacement, purchase and construction of new equipment and facilities.

The WRMP planning team in communication with GWA management and the CCU will be involved with defining levels of service early on in the project. The defined level of service will drive planning decisions and be reinforced during the team and utility ownership building. The planned scope activities include:

- Identify internal and external customers.
- For each customer group, identify the services GWA provides that are most important to them (service measures).
- Define quantitatively customers' expectations in terms of these service measures (levels of service). The information to help define the desired levels of service will come from several sources, including past experience and public outreach research.
- Identify current levels of service. This will serve as a starting point for continuous improvement and a measure of cost per unit of service level currently being provided.
- Define suppliers of service. The individuals or groups within GWA responsible for managing delivery of specified levels of service will be identified.
- Define performance measures. Performance measures supporting provision of the specified levels of service will be defined.
- Define quantitative measures. Short-term and long-term continuous improvement quantitative targets will be assigned to the performance measures. These will be communicated to the entire WRMP team and GWA staff.
- Conduct internal workshops with GWA team.

- Assumptions:*
- We will evaluate the current GWA operations and develop level of service benchmarks in partnership with the GWA team. GWA staff will actively participate in this task.
- GWA Tasks:*
- Participate in project team workshops to establish GWA Level of Service benchmarks.
- Deliverables:*
- Prepare Level of Service Report presenting the process used to establish GWA Level of Service benchmarks.

Task 4. Conduct Current Status Assessment

In order to properly determine necessary input to the WRMP, the combined resources of GWA and the consulting team will conduct a comprehensive current status assessment of the water and wastewater system's assets. Data gathering and assessment is best accomplished with a structured approach. We are proposing an approach used successfully in several similar projects that have received favorable results as attested to by the participants.

Subtask 4.1 Data Collection

The current status assessment of the water and wastewater systems will require a significant amount of field data. A team based approach will be used to enhance efficiency and data consistency rather than having each task leader collect field data independently.

4.1.5 Train Data Collection Team(s)

Train the team members to refine their skills for obtaining quality field data.

4.1.6 Initiate Field Data Collection

Dispatch teams for field data collection. During the course of the assessment all team members will be tasked to consider system problems and possible early gains that can be achieved.

4.1.7 Conduct Quality Assurance Checks

Conduct periodic meetings to ensure quality and consistency of field collection techniques and data. The meetings will be frequent (e.g., weekly) early in the process and will reduce in number as data collection progresses.

4.1.8 Distribute Data to Planning Team

Upload data in the handheld devices to a central database at a frequency determined by the planning team for use by the task leaders.

- Assumptions:*
- GWA will provide at least one staff member for each team to provide access to GWA facilities.
- GWA Tasks:*
- Provide staff resources to support completion of task.
 - Provide available water and wastewater system data and reports.
- Deliverables:*
- List of field data requirements.
 - Database for field data requirements.
 - Training for GWA staff members involved in field data collection.

Subtask 4.2 Facility Assessments

Field data collection for the current status assessment will include all aspects of the wastewater collection and treatment systems, the water treatment and distribution systems, and supporting auxiliary services. Dependent on the condition of the observed equipment, recommendations will be made to GWA personnel for early gains.

4.2.1.1 Wastewater Facilities

We will initiate the process to work in partnership with GWA operations staff in performing the assessment of the seven (7) GWA wastewater treatment facilities (Northern District STP, Agana STP, Inarajan STP, Agat STP, Baza Gardens STP, Umatac/Merizo STP, and Pago Socio STP). The recently performed CPE evaluation of the Northern District, Agana, Agat, Baza Gardens, and Umatac Merizo STP's will be used as the basis for the facility assessments.

The objective of this task is to determine the condition of the existing wastewater treatment facilities, facility capacity, and identify shortcomings at the facilities. This assessment will serve as the basis for determining the future wastewater treatment capacity requirements to meet the projected growth within GWA boundaries and determine the consolidation viability with the military systems.

Comprehensive performance evaluation reports performed over the past five years will be used to provide an initial baseline for the wastewater treatment facilities assessment. It is vital that the GWA operation personnel be actively involved in the assessments both for their knowledge of past and present operations and opportunity to gain new skills and knowledge.

The approach to meeting the objectives of this task include:

Data Collection

We will use the existing GWA operational records and operation protocols as the basis for determining the current state of the wastewater facilities. The process used to collect data will be developed to be consistent with the other WRMP data collection activities. Using the information provided by GWA and other resources, we will perform the following activities to initiate the assessment process.

- Review existing information - plans, specifications, reports, studies, operating data, inspection reports, NPDES reports, maintenance records, etc.
- Interview GWA staff regarding O&M procedures, O&M problems, unusual occurrences, facility recommendations, etc.
- Prepare field inspection criteria/forms including electronic data collection devices if applicable.

Facility Assessments

Field data collection for the current status assessment will include all aspects of the treatment facilities and supporting auxiliary services. Dependent on the condition of the observed equipment, recommendations will be made to GWA personnel for early gains. Working with the GWA operations staff the team will undertake the following activities to assess the current condition of the wastewater treatment facilities.

- Perform field inventory to assess the condition of major equipment (e.g., pumps, generators, large valves) at these facilities and evaluate facilities unit processes operation and current capacity.
- Evaluate field inventory considering adequacy, reliability, redundancy, service-life, safety, and odor concerns.
- Prepare field inventory technical memorandum.
- Provide input to facility hydraulic profile and/or process capacity assessment models.
- Perform facility solids balance calculations.
- Provide input to hydraulic and process evaluation technical memorandum.
- Prepare assessment report.
- Develop list of potential CIP projects based on findings in the assessment.

The results of this task will provide the opportunity to identify possible early gains that GWA could pursue to immediately enhance their current operation.

- Assumptions:*
- The Ugum water treatment facility assessment will be performed as a team effort with GWA.
 - The wastewater treatment facility assessment will be performed as a team effort with GWA.
 - GWA staff input is essential in determining the condition of the existing facility, O&M concerns and obtaining recommendation for improvements. GWA staff will benefit by learning assessment procedures and methodology thus allowing GWA personnel to continue to independently assess their facilities.
- GWA Tasks:*
- Provide copies of all relevant records, reports, files, studies, etc.
 - Identify GWA staff to participate in the team assessments and evaluations.
- Deliverables:*
- Field inspection forms.
 - Field inventory technical memorandum.
 - Hydraulic and process technical memorandum.
 - Identify early gains.
 - Wastewater Treatment Facilities Assessment Report.
 - Water Treatment Facilities Assessment Report.

4.2.1.2 Wastewater Collection System

Our assessment of GWA's wastewater collection system will be the basis for developing a program that meets the objectives of the WRMP and provides GWA with a road map to comply with current and future regulations. GWA's 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. Current and future regulations include the EPA's proposed SSO policy, Capacity Assurance, Management, Operation and

Maintenance (CMOM) Programs, and GASB 34 requirements. The 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. During this task the flow monitoring program will be initiated.

4.2.1.3 Evaluation of Existing Programs (O&M/CIP)

Review/evaluate existing CIP recommendations

Evaluate GWA’s existing CIP list and recommend project prioritization adjustments, as necessary, to minimize dry weather spills and reduce wet weather I/I.

Review/evaluate existing O&M program

GWA’s Collection System O&M program will be evaluated for its adequacy based on the CMOM rule and the currently applied Best Management Practices. Recommendations will be proposed that will enhance the current program and optimize the utilization of existing personnel. The evaluation of existing records will include:

- Interview collection system staff.
- Collect/review existing asset data.
- Collect/review existing spill and maintenance data.

4.2.1.4 Infiltration and Inflow (I/I) Evaluation and Minimization Plan

Basic elements of a comprehensive I/I Evaluation and Minimization Plan task include:

Collection System Assessment

The Collection System Assessment subtask will establish an accurate inventory of the wastewater collection system as well as gain an understanding of current condition in order to effectively plan for future expansion and rehabilitation. Three general steps will define the existing system and progressively narrow down and identify those areas within the system that require the most attention.

- **System Inventory.** Field locate and visually inspect the entire large diameter collection system (pipes >8”), and 10-percent of the small diameter pipes (≤ 8 ”) by walking the lines, opening and visually inspecting the manholes, and confirm locations via GPS. Inspect pump stations in the same manner as wastewater treatment plants. Inspection crews will be two-person crews with multiple crews working concurrently.
- **Flow metering.** Install a minimum of one long-term flow meter and the associated rain gages for each of the service districts. Identify and conduct short-term flow monitoring at 32 locations to corroborate prior recommendations directed at I/I areas as well as serve the purpose of providing current data for present modeling efforts. Short-term flow metering will be conducted for a period of at least 28 days at each location in order to capture baseline, dry-weather data and at least one significant rain event. Standard rain gage and flow meter monitoring and maintenance will be included in this task.
- **Detailed Investigation.** Once flow data is obtained and analyzed, the collection system will be prioritized for further (detailed) investigation or elimination from further review as a non-excessive I/I or operational problem area.

Hydraulic Capacity Assessment

A hydraulic capacity assessment will be performed to identify which sewers or pumping stations are hydraulically deficient. The effort will include modeling (scope described in Subtask 5.4) of select

trunk sewers for determination of current or future hydraulic capacity deficiencies. The effort will include the following:

- Selection of a design rainfall event.
- Selection of trunk sewers for hydraulic modeling.
- Development of model basins.
- Flow and rain gage data assessment.
- Wet and dry weather inflow and infiltration factor determination.
- Flow modeling.

Hydraulic Alternative Analysis

The hydraulic alternative analysis will identify the least cost approach for handling wet weather I/I. To optimize rehabilitation effectiveness, the analysis will be performed on basins and subbasins.

Sewer Rehabilitation Program Development

Develop a protocol to produce a prioritized CIP list for the rehabilitation of the collection system. CIP list will be a 20 year prioritized project list with detailed project descriptions for the first 5 years.

- Assumptions:*
- GWA staff will be utilized, where applicable, to offset cost.
 - GWA/BC will jointly select design rainfall event – wet weather spill reduction will be based the selected design even, higher intensity rainfall will be considered force majeure conditions.
- GWA Tasks:*
- Collect and organize the most up-to-date information regarding the existing collection system assets and current O&M process and recently completed work.
 - Collect and organize the most up-to-date historical spill record data.
- Deliverables:*
- Letter report stating suggested O&M program improvements (early gains).
 - Letter report summarizing initial evaluation of existing CIP (early gains).

4.2.2 Water System Assessment

The objective of this assessment is to inventory and assess the condition of major equipment (e.g., pumps, generators, large valves) at these facilities. As members of the data collection team, GWA staff will play an important role in this assessment because of their familiarity with the existing equipment, and in particular, to gain knowledge in the performance testing and condition assessment activities. This will allow staff to become accustomed to performing these tasks for continuous maintenance and improvement the database. As with the wastewater facilities, this effort is an excellent opportunity to establish the foundation of a computerized maintenance management system.

Water Distribution System Assessment

The water distribution system assessment subtask will establish an accurate inventory of the water system as well as gain an understanding of current condition in order to effectively plan for future expansion and rehabilitation. The scope steps that will define the existing system and progressively narrow down and identify those areas within the system that require the most attention are:

- Review operational records and system performance data.
- Perform a System Inventory. Building on the data from the vulnerability Analysis project, field locate and visually inspect the booster pump stations, storage tanks, wells, and auxillary systems. Inspection crews will be two-person crews with multiple crews working concurrently.

Data Collection

We will use the existing GWA operational records and operation protocols as the basis for determining the current state of the water facilities. The process used to collect data will be developed to be consistent with the other WRMP data collection activities. Using the information provided by GWA and other resources, we will perform the following activities to initiate the assessment process.

- Review existing information - plans, specifications, reports, studies, operating data, inspection reports, NPDES reports, maintenance records, etc.
- Interview GWA staff regarding O&M procedures, O&M problems, unusual occurrences, facility recommendations, etc.
- Prepare field inspection criteria/forms including electronic data collection devices if applicable.

Facility Assessments

Field data collection for the current status assessment will include all aspects of the Ugum treatment facility and supporting auxiliary services. Dependent on the condition of the observed equipment, recommendations will be made to GWA personnel for early gains. Working with the GWA operations staff our team will undertake the following activities to assess the current condition of the Ugum treatment facility.

- Perform field inventory to assess the condition of major equipment (e.g., pumps, generators, large valves) at these facilities and evaluate facilities unit processes operation and current capacity.
- Evaluate field inventory considering adequacy, reliability, redundancy, service-life, safety, and odor concerns.
- Prepare field inventory technical memorandum.
- Provide input to hydraulic and process evaluation technical memorandum.
- Prepare assessment report.
- Develop list of potential CIP projects based on findings in the assessment.

The results of this task will provide the opportunity to identify possible early gains that GWA could pursue to immediately enhance their current operation.

Hydraulic Capacity Assessment

- A hydraulic capacity assessment will be performed to identify which basins or pumping stations are hydraulically deficient. The effort will include modeling (scope described in Subtask 5.5).

4.2.4 Electrical System Assessment

The electrical systems and their respective components will be assessed. Conditional and spot electrical information on the system and equipment parameters (such as voltage, current, vibration, insulation resistance, etc.) will be obtained where possible. In critical areas, an infrared scan of the electrical system can be performed using an infrared camera to determine any “hot spots”.

The objective is to work with and empower GWA maintenance personnel in using preventive and predictive maintenance tools as a part of a routine program. Training on the use of equipment will be conducted such that GWA staff will be actively involved with this phase of the project. The effort for this subtask will include:

- Review existing electrical plans, drawings, and operations and maintenance manuals for each location.
- Review electrical maintenance records and logs to ascertain and compare the level of maintenance performed with the manufacturer recommendations.
- Interview maintenance and operational personnel on training levels, equipment usage, and strengths and weaknesses of the existing electrical and SCADA equipment.
- Work with and solicit GWA staff involvement in the review and assessment process.
- In conjunction with GWA maintenance personnel, conduct a site survey at each facility to observe and inventory the existing electrical switchgear, motor control centers, panelboards, and equipment. Also included will be the type of instrumentation and control methodology (i.e. bubbler, float, transducer, programmable controllers, relay logic, etc.).
- Survey data sheet will used and be included in the final assessment report.
- During this survey phase and also in conjunction with GWA maintenance staff, the removal and exposure of the electrical equipment (to the Electrical BUS, where possible) to photograph and visually inspect terminations, connections, and interior conditions will be made. In many cases this is not accomplished under routine maintenance.
- Depending on the condition of the observed equipment, cleaning and repairs (if required) may be recommended or work order issued for scheduled maintenance.
- In conjunction with GWA maintenance staff, obtain conditional and spot electrical information on the system and equipment parameters such as voltage, current, vibration, insulation resistance, etc., where possible. In critical areas, an infrared scan of the electrical system can be performed using an infrared camera to determine any “hot spots”. Electronic electrical data recordings of the station motor and or equipment operation will be made. This data will be used as a reference for future operational comparisons.
- The objective is to work with and empower GWA maintenance staff in using preventive and predictive maintenance tools as a part of a routine program. Training on the use of these types of equipment will be conducted such that GWA Personnel will be involved with this phase of the project.
- Prepare an electrical assessment report of the equipment and installation directed to the existing equipment and installation incorporating the field data and notes, sketches, photographs, recorded data, and survey sheets.
- Attend review and coordination meetings, as required.
- Prepare a report of finding and recommendations consisting of existing conditions, estimated equipment remaining life, cost estimates for maintenance and capital improvements budgeting.
- Prepare electronic files of the report, recorded information, and data on compact disk (CD or DVD).

4.2.5 Instrumentation and Supervisory Control and Data Acquisition System (SCADA)

An assessment of instrumentation and telemetry will be conducted as part of the facilities assessments. Although GWA has an existing SCADA and some instrumentation, it has been our observation that its current usefulness is both limited and in need of either extensive renovation or complete replacement. In this task our team working in conjunction with GWA staff will prepare an assessment of the existing hardware, software and communications systems and make recommendations based on or findings for either renovation or replacement.

This subtask will be performed as a joint venture with Automation Consulting and Educations, Inc. The effort for this subtask will include:

-
- Onsite review of all existing hardware related to the operation of the existing SCADA system including but not limited to the following:
 - Computers & Servers
 - Uninterruptible Power System
 - Network wiring
 - Switches, Hubs and Routers
 - Mounting racks and enclosures
 - Telemetry & Communication systems (leased telephone, licensed and unlicensed radio, copper and fiber Ethernet and other data highways)
 - Programmable Logic Controllers (PLCs and RTUs)
 - Field instrumentation
 - Other proprietary equipment and manually operated equipment

The main intent of this task is to determine which parts of the system can be integrated into an updated process control, SCADA and Information Management system for the future. This information may also be used to determine if any of the equipment can be used as part of the “Real-Time Flow Data Collection Option”.

The Real-Time Flow Data Collections Option is the installation of a web-based SCADA system during the assessment phase for the project team members and is being proposed separately.

- Onsite review of all existing software related to the operation of the existing process control, SCADA and Information Management systems including but not limited to the following application software:
 - Operating System software
 - SCADA software
 - Historical collection software
 - Historical display software
 - Report generation software
 - I/O drivers
 - Database software (relational and flat databases)
 - PLC programming software
 - Instrumentation communication software
 - Internet Information Service related software
 - Thin Client software
 - Other custom or proprietary software applications
- Perform a survey of the existing maintenance staff to determine their level of training on the existing installation. The survey will include a “needs assessment” on the amount of training required in order to transfer the responsibility of the process control, SCADA and Information Management Systems to the GWA staff. This will set the benchmark for the GWA staff to ensure competent and efficient ongoing maintenance.
- A detailed report will be prepared which contains all of the findings. The report will consist of the following components:
 - Assessment of existing hardware
 - Evaluation of existing SCADA system
 - Recommend improvements and/or replacement of existing hardware
 - Recommend upgrade or replacement of existing software
 - Recommend training requirements

- Review the existing SCADA System and prepare an assessment of the existing hardware, software, and communications systems.

4.2.6 Automation Assessment

As a part of the data collection activity, we will observe and record potential opportunities for automation of GWA facility operation and control. A major consideration in developing our recommendations will be the requirement that the updated SCADA system can be maintained and updated by the local Guam resources and GWA staff.

Task 5. Develop Assessment Toolbox

Electronic tools and software make the development and evaluation of information faster and more thorough. This task describes both an integrated program and individual electronic tools and software that will be used for GWA's WRMP. The assessment tools that we develop and use will be transferred to GWA for future use, so it is important that GWA staff be involved in their development and use. Each task involving a specific tool also has a training element included.

Subtask 5.1.3 Develop GWA's GIS

GWA's GIS geodatabase will start on a clean slate. The following should be identified prior to developing the potable water distribution system and wastewater collection system:

- Datum that the GIS will be based in.
- Base map that the piping network will be digitized in.

A review of the available base map information will be performed and a selection of the best available information will be made. This may include but is not limited to information from the government of Guam, GWA, University of Guam, USGS data sets and IKONOS satellite imagery.

The potable water distribution system and wastewater collection system will be developed based on:

- Hard-copy record drawings.
- Electronic versions of record drawings.
- Field collected data.

In order to efficiently collect and digitize the GIS data, the following tasks must be performed:

- Inventory of record drawings that accurately report the potable water distribution system and wastewater collection system.
- Identify all areas of the potable water distribution system and wastewater collection system that do not have record drawings.
- Develop a list of areas of the potable water distribution system and wastewater collection system that will need to be field investigated.
- Develop a field investigation plan to GPS survey the system.
- Update field investigation plan at 30%, 60% and 90% to accommodate further investigation in areas where data does not appear to be correct to GWA staff.

Field Data Collection

Field data collection is common to many of the WRMP tasks. If conducted separately, these would require multiple trips to same facilities by different team members. Our approach will be:

- Develop a system for collecting field data into handheld electronic devices for uploading into the GIS database.

- Use one or more field data collection teams with the skills needed to collect most of the field data required for each task.
- Hold a workshop that will include an overview on the functions and use of the ArcGIS extension tools for ArcInfo along with instructional use of the handheld electronic device for field data collection.

- Assumptions:*
- GWA staff will assist in gathering and cataloging drawings.
 - GWA staff will participate and assist in locating assets in the field and collecting field data.
 - Engineering judgment can be used in areas where data about assets can not be found on drawings or determined in the field.

- GWA Tasks:*
- Identify the appropriate staff to participate in the collection of drawings, organization of the data, field data collection and QA/QC process.
 - Collect and organize the record drawings and make them available to the consultant team for digitizing and data collection.

- Deliverable:*
- Technical memorandum documenting steps taken to develop GIS geodatabase with a section detailing any assumptions made during effort.
 - Maps of potable water system and wastewater collections system at 30%, 60%, 90% (for QA/QC) and completion.
 - Instructional manual for using handheld electronic device for field data collection.

Subtask 5.2 GIS Based Population Projection Tool

The GIS will play a key role in determining population projections. A common population projection tool will be applied to the water and wastewater components of this project using locally available data sources. We will:

- Develop current population projections based on the best available information.
- Customize a GIS-based population project tool to meet GWA's needs.
- Generate an interim and long-term population project based on census track or land use data.
- Use interim and long-term population projections with hydraulic models for the potable water distribution system and wastewater collection system.
- Hold a workshop to provide hands-on training on the use of the population project tool for GWA staff.

- Assumptions:*
- There is an adequate electronic ArcGIS based layer with Guam's current and future population.
 - Census track and block approach or a parcel and land use based approach will be used to project population.
 - Data sets will be generated for an interim and long-term population to support of the development of the master plan. We will use the interim population projection and long-term population projection in the water system and wastewater collection system hydraulic models.

- GWA Tasks:*
- Identify staff to participate and assist in developing population projections.

- Deliverables:*
- ArcGIS tool to project population based on census track data or land use data.
 - Population projections for use with WRMP hydraulic models.

Subtask 5.3 Capacity Assurance Planning Environment (CAPE)

CAPE is a suite of integrated software applications and decision support tools designed specifically to support the master planning process. Its primary use is in integrating information technology to reduce data handling complexity and provide the decision-making tools that are essential in the master planning process.

Among the master planning activities supported by CAPE are the following:

- Testing of Management Strategies
- Sophisticated Water/Wastewater Forecasting
- Just-In-Time Planning
- Living Master Plan

CAPE will be customized to suit GWA's needs and to work with the geodatabase. The following steps to meet this goal are:

- Meet with GWA staff and demonstrate CAPE's current capabilities.
- Discuss and identify feasible enhancements that would enhance CAPE's capabilities for GWA.
- Customize CAPE to work with GWA's geodatabase.
- Implement features identified previously.
- Hold a workshop that will include an overview on the functions and use of CAPE along with a hands-on demonstration.

Assumptions: N/A.

GWA Tasks: ● Identify staff to be involved in the development of CAPE.

Deliverables: ● CAPE with feasible enhancements to suit GWA's needs.
● Conduct a one (1) day training session on the use of CAPE.

Subtask 5.4 Wastewater System Hydraulic Model

Overflows and bypasses of peak wet weather flows can be significantly reduced by providing sufficient conveyance and treatment capacity to handle the design flows and/or by reducing the wet weather I/I through sewer rehabilitation. The hydraulic alternative analysis will identify the most cost effective approach for handling wet weather I/I.

5.4.1 Wastewater Hydraulic Modeling Planning Criteria

We will document the specific methods that will be used to prepare the master plans. The criteria will include parameters to prepare the flow projections for ultimate dry and wet weather flow conditions, computer model development and calibration, guidelines for identifying hydraulic deficiencies and unit costs for capital improvement projects. We will summarize planning criteria in a technical memorandum. The technical memorandum will also present the recommended flow monitoring program.

Assumptions: ● GWA will need to provide existing design standards and/or performance criteria developed for previous projects.

GWA Task: ● Identify staff to assist in the development and approval of the planning criteria.

Deliverables: ● A technical memorandum documenting the planning criteria developed.

5.4.2 Model Selection

We will work with GWA to develop technical and non-technical requirements for the wastewater

collection system model. We will review available hydraulic modeling software and select the two most appropriate software programs for GWA. The advantages and limitations of each of the models will be documented in a technical memorandum for GWA review.

Assumptions: N/A.

GWA Task:

- Identify staff to involve in the discussion of the different hydraulic models available and assist in making a selection based on the advantages and limitations presented.

Deliverables:

- A technical memorandum documenting the two most appropriate models and the rationale for the hydraulic model selection.

5.4.3 Flow Projections

Base flow projections will be calculated based on land use and population information developed in Task 5.2 and the dry weather flow monitoring data. For flow projection purposes, existing land use classifications will be reduced to approximately five to seven classifications. Current and future land use designations from the GIS will be used to develop the flows. Dry weather flow monitoring data will be used to develop unit flow factors for each land use classification. Base flow projections will be developed for each planning horizon (current and future conditions).

We shall use wet weather flow monitoring data to project wet weather flows under the design storm conditions. Appropriate design storm conditions will be developed in conjunction with GWA staff with a focus on the 5-year return event winter storm. Areas with high wet weather I/I will be identified based on the monitoring information. Individual rainfall characteristics for each basin will be developed, including: “R” factors, the time of concentration, and time for the system to recover from instantaneous rainfall. Wet weather and dry weather flow monitoring data will be compared to determine the ground water infiltration component in each drainage basin. System parameters will be used with the design storm rainfall and base flow to develop synthetic hydrographs for each basin.

Assumptions:

- Data for determining the land use classification will be provided by GWA. Monitors will record data during one significant wet weather event so that “R” factors can be developed.

GWA Task:

- Identify staff to provide land use classification data and flow data.

Deliverables:

- A technical memorandum documenting the assumptions, analysis methods and results of the analysis.

5.4.4 Model Development

The hydraulic model will be constructed and simulations performed to evaluate the capacity of all pipes in the collection system. The modeling network will be imported into the selected model directly from the GIS developed in Task 5.1.3. Modeling will be performed using the base flow projections with the synthetic hydrographs developed in Task 5.4.3. We will prepare a dry weather model run for each basin to verify flows with flow monitoring information. Model runs will be prepared for dry and wet weather conditions for each existing, interim and future population projections. The hydraulic deficiencies identified by the model will provide part of the basis for CIP development in Task 8. Pumping station capacities will also be evaluated for current and future flow conditions. We will use the hydraulic model to determine if alternative approaches to hydraulic problems such as sewer rehabilitation, flow diversions, or storage facilities should be considered.

Assumptions:

- Pumping data needed to develop the model will be provided by GWA.
- Best engineering judgment will be allowed where pumping data is not available or unobtainable.

- The model calibration will be consistent with the quality of data available while developing the GIS.
- GWA Task:*
- Identify staff to involve in the development and operation of the collection system model.
 - GWA will assist in the development and calibration of the models.
 - GWA will assist in the analysis of the model results and develop alternatives to alleviate hydraulic constraints.
- Deliverables:*
- A technical memorandum documenting any assumptions made in the development of the model and calibration of the model. The technical memorandum will also document the hydraulic deficiencies in the collection system.

5.4.5 Capital Projects

We will develop alternative projects to improve GWA’s sewer system based on the results of the previous tasks and from discussions with GWA staff. Improvements will be identified to mitigate hydraulic deficiencies. The CIP will contain projects that will benefit existing and future customers. Criteria to evaluate and prioritize the alternatives will be developed and we will prioritize projects by critical need. In addition to cost, factors may include the importance of the pipeline or facility, age and condition, ease of operation (including safety), maintenance considerations and public disruption during construction. Project summary sheets will be provided for each capital project. A technical memorandum summarizing the program will be provided to GWA. A final listing of the capital projects will be provided with the project report.

Assumptions: N/A.

GWA Task:

- Identify staff to involve in the development of a CIP program to address water distribution system hydraulic issues.

Deliverables:

- A technical memorandum summarizing the improvements, prioritization methods and program to GWA with a list of CIP projects and summary sheets.

5.4.6 Training

We will provide two days of training for up to four GWA staff members on the use of the collection system models and modeling files at the conclusion of the project.

Assumptions: N/A.

GWA Task:

- Identify staff to involve in the development, operations and updating of the water distribution system hydraulic models.

Deliverables:

- Training materials to support the two day training session.

Subtask 5.5 Water System Hydraulic Model

Before we can complete the Opportunity Analysis task, we will determine the hydraulic and process capacities and performance for each facility. Design documents, process data, and information from the field assessments will be used to develop hydraulic and process models to determine the capacity for each facility. This task will provide the “limiting” capacity for the facilities. We will recommend cost-effective improvements to facilities and processes to improve capacity and/or process reliability.

5.5.1 Planning Criteria

We will document the specific methods that will be used to prepare the master plans. The criteria will include parameters to prepare the flow projections and water demands for current and ultimate conditions, maximum day and peak-hour multipliers, allowable pipeline headloss, pumping and storage

requirements, computer model development and calibration, recommended residual pressures and unit costs for capital improvement projects. We will summarize planning criteria in a technical memorandum.

- Assumptions:*
- GWA will provide existing design standards and/or performance criteria developed for previous projects.
- GWA Task:*
- Identify staff to assist in the development and approval of the planning criteria.
- Deliverables:*
- A technical memorandum documenting the planning criteria developed.

5.5.2 Model Selection

We will work with GWA to develop technical and non-technical requirements for the water distribution system model. We will review available hydraulic modeling software and select the two most appropriate software programs for GWA. The advantages and limitations of each of the models will be documented in a technical memorandum for GWA review.

- Assumptions:*
- N/A.
- GWA Task:*
- Identify staff to be involved in the discussion of the different hydraulic models available and assist in making a selection based on the advantages and limitations presented.
- Deliverables:*
- A technical memorandum documenting the two most appropriate models and the rationale for the hydraulic model selection.

5.5.3 Demand Projections

We will initiate the assessment of the existing water demand imposed on GWA's water supply system and develop future demand projections. As part of this task, we will complete the following subtasks:

- Analyze annual, monthly, daily, and diurnal water demand information to estimate the GWA's existing water requirements.
- Evaluate necessary fire flow based on information provided by the Insurance Services Office and in the current Guam Fire Code and input from the Fire Department. Consultant and GWA staff will identify key structures in the service area where maximum fire flows will be required, such as hospitals and schools.
- We will estimate future water requirements based on the population and land use projections developed in Task 5.2.

- Assumptions:*
- Data for determining the existing system demands will be provided by GWA. This information could include electronic billing data and supply source data.
- GWA Task:*
- Identify staff to gather data needed to perform the analysis mentioned above. Assist in determining the required fire flow needed in the GWA distribution system.
- Deliverables:*
- A technical memorandum documenting the analysis methods, results of the analysis, fire flows required and estimated future water demands.

5.5.4 Develop Model

The hydraulic models will be constructed and run to evaluate the capacity of all pipes in the water distribution system. The modeling network will be imported into the selected model directly from the GIS developed in Task 5.1.3. Modeling will be performed using the population projections developed in Task 5.2. We will provide a listing of recommended locations for GWA to perform pressure tests. These tests will serve as the basis for the model calibration. We will prepare a model run for each pressure zone in the service area to verify calibration. Model runs will be prepared for average and maximum day conditions and peak hour conditions. Up to 20 model scenarios will also be prepared to

simulate fire flow conditions under maximum day demands. Replacement pipeline will be developed to mitigate hydraulic deficiencies identified by the hydraulic model. Pumping station and storage capacities will also be evaluated for current and future demand conditions.

- Assumptions:*
- All required fire flow simulations can be completed within 20 model scenarios.
 - Best engineering judgment will be allowed where pumping data is not available or unobtainable.
 - The model calibration will be consistent with the quality of data available while developing the GIS.
- GWA Task:*
- Identify staff who will be involved in the development and operation of the water distribution system model.
 - GWA will assist in locating points for pressure testing and perform pressure tests as needed to calibrate the hydraulic model.
- Deliverables:*
- A technical memorandum documenting any assumptions made in the development of the model and calibration of the model. The technical memorandum will also document the hydraulic deficiencies in the water distribution system.

5.5.5 Capital Projects

We will develop alternative projects to improve GWA's water distribution system based on the results of the previous tasks and discussion with GWA staff. Improvements will be identified to mitigate hydraulic deficiencies. The CIP will contain projects that will benefit existing and future customers. Criteria to evaluate and prioritize the alternatives will be developed and we will prioritize projects by critical need. In addition to cost, factors may include the importance of the pipeline or facility, age and condition, ease of operation (including safety), maintenance considerations and public disruption during construction. Project summary sheets will be provided for each capital project. A technical memorandum summarizing the program will be provided to GWA. A final listing of the capital projects will be provided with the project report.

5.5.6 Training

We will provide two days of training for up to four GWA staff members on the use of the water system models and modeling files at the conclusion of the project.

- Assumptions:* N/A.
- GWA Task:*
- Identify staff to involve in the development of a CIP program to address water distribution system hydraulic issues.
 - Identify staff to involve in the development, operations and updating of the water distribution system hydraulic models.
- Deliverables:*
- A technical memorandum summarizing the improvements, prioritization method and program to GWA with a list of CIP projects and summary sheets.
 - Training material to support the two day training session.

Task 6. Develop and Analyze Opportunities

This task will assess and identify opportunities that fit into a 20 to 100 year horizon and recommend steps to attain GWA goals. We will examine and recommend how GWA and military installations might be incorporated to provide greater efficiencies and provide recommendations that will be guided by a holistic view incorporating GWA's and the community's level of service expectations. The results from previous tasks will be used to predict

future water requirements and status assessments to determine existing system capacities. These factors will be combined with water resource predictions, water conservation, water reuse, and other water supply factors to create cost-effective and efficient water supply alternatives. During this Phase of the project the existing water supply ground water and surface water systems will be evaluated.

A similar exercise will be performed for wastewater treatment and disposal. We will review and update alternatives from prior master planning efforts and identify new alternatives.

Subtask 6.1 Water Supply Alternatives

Guam has several water supply opportunities that should be considered in a 20-year and 100-year master planning effort. Our assessment of water supply opportunities will seek to preserve the highest quality water for potable uses, and alternative sources for non-potable uses. Water supply opportunities that will be assessed are:

- Groundwater
- Surface water
- Seawater
- Recycled water
- Stormwater
- Inter-jurisdictional agreements.

Subtask 6.5 Wastewater Treatment Alternatives

In conjunction with the evaluation of the various water reuse alternatives, we will also assess wastewater treatment and disposal capacity versus quantity. Factors such as disposal options, disposal capacity, appropriate level of treatment, continued use of existing treatment facilities, current and future permitting requirements, and treatment facility expansions will be considered.

Subtask 6.6 Water Distribution and Wastewater Collection Options

Options for water distribution and wastewater collection will be developed for a build-out scenario. The alternatives will reflect the supply and reclamation alternatives and will reflect policies of when to provide service to new areas. The 1994 Facilities Plan identified six different wastewater collection system districts based upon drainage basin and watershed boundaries. The analysis of options for wastewater collection system service will be based on these previously established districts and take into account anticipated future service areas. Specific collection system options will be evaluated based on O&M information, physical condition data, and hydraulic capacity assessment as described in the Hydraulic Analysis Task.

Phase IIIA

Task 1. Project Planning

Development of GWA's WRMP provides an excellent opportunity for staff development and to build staff ownership. This task will develop a process for input and involvement of GWA staff in the master planning process to build their ownership for successful implementation.

1.1.4 Conduct Monthly Planning Team Meetings throughout the Planning Process

Conduct monthly team meetings during the master planning process. These meetings will consist of on-site or conference calls, depending on the proposed agenda. Meeting minutes and decision logs will be maintained to record key decisions and identified action items made throughout the planning process.

Three stakeholder meetings will be scheduled over the duration of this project phase period.

Subtask 1.3 Project Communication

Communication both internally and externally is critical for successful development and implementation of the WRMP. It is expected that internal and external communication will occur throughout the planning process. We will work in partnership with GWA's Public Relations Officer (PRO) in developing the required Outreach Scope, designing the most effective approach to accomplish GWA's communication objectives and providing strategic guidance to the PRO in the implementation of the Outreach Program.

Initiation of the communication task will begin with a research activity to gain an understanding of the community's position with regards to the performance of GWA. Based on the research findings a communication plan will be developed to guide the implementation of the projects communication activities. The communication plan development will determine the requirement to reassess our level of involvement during the implementation process.

The implementation of the communication plan will involve the identification of communication tools and then implementation of an Internal and External Communication Program.

1.3.2 External Communication - Public Outreach

GWA and the CCU's village meetings are a good starting point for fostering community awareness and building community ownership of the WRMP. We will augment GWA's public outreach efforts with long-term strategy development and consistent and sustained effort to support and effective public outreach program.

The public outreach process will include two meetings in each of the 20 villages to refine project priorities. We will coach and mentor the PRO to design an effective approach to obtain the desired level of public input, as well as support GWA staff in a variety of ways such as providing training to staff and commissioners as desired. We will document village public input using a court reporter, and help to determine the next steps.

Task 2. Identify Planning Requirements

Planning requirements will be identified early to set the stage for subsequent planning activities. Population and land use projections serve as a basis for future demands and customer requirements. Water resources are limited, so these constraints must be identified. In many cases, regulations establish minimum performance standards that must be followed. Other considerations including affordability, potential military utility consolidation, and privatization must also be understood at the outset to help establish the requirements and context under which the WRMP will be completed.

Subtask 2.6 Privatization

Privatization is being considered by the CCU as one option for meeting water and wastewater service needs. In this task we will summarize the options that the CCU is taking under consideration.

Subtask 2.7 Military System Privatization and Consolidation

We will summarize the interfaces and interagency agreements between the separately operated water and wastewater utilities serving the Navy and Air Force. We will also summarize the general configuration and production/treatment requirements to begin evaluation of potential consolidation of utilities.

A Technical Memorandum will be prepared presenting the evaluation process and recommendations.

Subtask 2.8 Other Requirements

We will work with GWA to identify other requirements, constraints and drivers that need to be considered in the evaluation and development of planning alternatives. For example, the proposed organizational changes or processes may impact the conditions of the Order. When specific items are identified, we will assist GWA in discussions and negotiations with EPA.

Subtask 2.9 Planning Requirements Summary

The results of subtasks 2.6 through 2.8 will be summarized in a “Basis of Planning” document. We will first prepare a draft summarizing available information and identify key information gaps. A final summary will be prepared following additional data collection and analysis.

Assumptions: N/A.

GWA Tasks:

- Make available studies and reports applicable to Guam’s population and land use projection and planning.
- Make available studies and reports applicable to Guam’s population and land use projection and planning.
- Make available any GIS based maps, electronic plans, etc. in possession by Government of Guam.

Deliverables:

- Technical Memorandums.
- Basis of Planning Report.

Task 5. Develop Assessment Toolbox

Electronic tools and software make the development and evaluation of information faster and more thorough. This task describes both an integrated program and individual electronic tools and software that will be used for GWA’s WRMP. The assessment tools that we develop and use will be transferred to GWA for future use, so it is important that GWA staff be involved in their development and use. Each task involving a specific tool also has a training element included.

5.6 Replacement Planning Model (RPM)

Working with the designated GWA staff we will provide a proven methodology that can help GWA identify and cost future R&R needs and develop financial policies to address these needs. The methodology includes four principal steps.

5.6.1 Develop Database

Develop a database of the GWA’s system assets including estimated R&R needs, costs, and years likely to be incurred (the underlying asset database will be developed in other project assessment tasks).

5.6.2 *Create CIP*

Create an R&R CIP based on these needs and costs, which will become a part of GWA's WRMP.

5.6.3 *Test R&R options*

Use a RPM to test a variety of R&R funding options to define funding policies and specific funding mechanisms that can best meet your R&R needs.

5.6.4 *Train GWA Personnel*

Place the RPM and the system asset database in the hands of the GWA staff and provide training so that staff can update the R&R analysis in future years as the physical system continues to develop and age.

In implementing this methodology, we will take advantage of an existing RPM computer program.

Assumptions: N/A.

GWA Tasks:

- Review assumptions regarding asset classifications, asset useful lives, replacement costs, and refurbishment programs. Provide feedback as appropriate.

Deliverables:

- Completed RPM and Master Database; User's Manual; Update Instructions.

Subtask 5.7 **Financial Models**

Develop a wastewater and water financial model for GWA. The model development is described below and the details of the financial analysis and financial plan development are presented in Task 7 – Prepare Strategic Master Plan.

5.7.1 *Develop Water Rate Model*

Develop and deliver to GWA an Excel-based water rate model. The model will be specifically tailored for the unique circumstances of GWA's water utility. The rate model will use an open and unprotected modeling architecture. We will use the model during the course of Task 7 to examine the impact of various variables on water rates.

We will provide a training session to GWA personnel on the use of the model and on documentation provided.

5.7.2 *Prepare Wastewater Financial Model*

Develop and deliver to GWA an Excel-based wastewater rate model. As the model is developed as part of the other technical study elements, there are minimum costs associated with this task. The model will be specifically tailored for the unique circumstances of GWA's wastewater utility. The rate model will use an open and unprotected modeling architecture. We will use the model during the course of Task 7 to examine the impact of various variables on wastewater rates.

Assumptions: N/A.

GWA Tasks:

- Provide staff resources to support task and teaching.

Deliverables:

- Excel-based wastewater rate model.

Task 6. **Develop and Analyze Opportunities**

This task will assess and identify opportunities that fit into a 20 to 100 year horizon and recommend steps to attain GWA goals. We will examine and recommend how GWA and military installations might be incorporated to provide greater efficiencies and provide recommendations that will be guided by a holistic view incorporating

GWA's and the community's level of service expectations. The results from previous tasks will be used to predict future water requirements and status assessments to determine existing system capacities. These factors will be combined with water resource predictions, water conservation, water reuse, and other water supply factors to create cost-effective and efficient water supply alternatives.

A similar exercise will be performed for wastewater treatment and disposal. We will review and update alternatives from prior master planning efforts and identify new alternatives.

Subtask 6.2 Water Treatment Alternatives

Alternatives for water treatment will depend in part on conclusions regarding raw water supply. Among the alternatives to be considered, we will evaluate the option of expanding the Ugum Water Treatment Plant.

Subtask 6.3 Expansion/Consolidation Alternatives

Expansion and/or consolidation of existing wastewater treatment facilities will be evaluated. Alternatives for cooperative use of facilities inside and outside of GWA will be identified. The alternatives will reflect scenarios of converting areas served by septic tanks into sewer service areas.

Subtask 6.4 Biosolids Recycling Alternatives

We will evaluate the feasibility and possible strategies for implementing Class A and Class B biosolids reuse. This will include climatological, environmental, market, and geographical considerations for biosolids reuse, including annual rainfall, impact on potable water source, and location of treatment plants in relation to point of use.

Project recommendations will be prioritized on an island-wide basis. The first step in opportunity analysis and development will be a facilitated session with the planning team.

Subtask 6.5 Wastewater Treatment Alternatives

In conjunction with the evaluation of the various water reuse alternatives, we will also assess wastewater treatment and disposal capacity versus quantity. Factors such as disposal options, disposal capacity, appropriate level of treatment, continued use of existing treatment facilities, current and future permitting requirements, and treatment facility expansions will be considered.

Subtask 6.6 Water Distribution and Wastewater Collection Options

Options for water distribution and wastewater collection will be developed for a build-out scenario. The alternatives will reflect the supply and reclamation alternatives and will reflect policies of when to provide service to new areas. The 1994 Facilities Plan identified six different wastewater collection system districts based upon drainage basin and watershed boundaries. The analysis of options for wastewater collection system service will be based on these previously established districts and take into account anticipated future service areas. Specific collection system options will be evaluated based on O&M information, physical condition data, and hydraulic capacity assessment as described in the Hydraulic Analysis Task.

Subtask 6.7 Water Conservation

We will assist GWA with planning and implementation of a water conservation and demand management program.

6.7.1 Water Conservation Measures

We will provide GWA with the tools to assess and better control water losses through application of innovative water audit methods, which are newly adopted by the American Water Works Association. Applicable activities to accomplish this task will draw on information gathered in other asset data collection tasks. Useful data for defining conservation measures include:

- Development of demand projections.
- Evaluation of existing water conservation measures.
- Description of existing and planned sources of water available.
- Present water supply reliability data for normal and dry years.
- Quantification of current and projected amounts of wastewater collected and treated in the service area.
- Determination of the potential for recycled water.

6.7.2 Provide Training Services for Water Conservation Coordinators

We will provide training for selected GWA staff that can be designated for overall program planning, cost effectiveness evaluations, preparing cost effectiveness exemptions, and detail aspects of program design.

6.7.3 Provide Database Input for the Water Conservation Program

Pertinent aspects of the conservation program will feed into the databases of the finance model described in Task 7. The database will incorporate a cost estimate using a schedule of planned number of water conservation activities as designed by our team in close coordination with GWA staff.

Subtask 6.8 Leak Detection Program Assistance

Based in part on GWA leak history, we will quantify system losses and defined main replacement programs. We will develop a Capital Improvement Prioritization Model as part of the RPM described in Task 3 for the GWA which will lead to targeted areas for leak repair versus main replacement.

Subtask 6.9 Prepare Master Plan Input

As each subtask discussed above is completed, a summarizing section of the WRMP will be prepared. These will then be compiled into the draft and final versions of the WRMP.

Assumptions: N/A

GWA Tasks:

- GWA will complete its leak detection program and provide results to consultant team.
- GWA will make available all reports, operational data and studies to the consultant team.
- GWA will identify staff to support completion of this task.

Deliverables:

- Technical Memorandums for the respective alternative evaluation tasks.

Task 7. Prepare Strategic Master Plan

The preceding tasks, including the facility, system and overall operation and management assessments, will provide the key steps in development of the WRMP. The financial plan will be completed in this task, using input from other tasks to develop the final financial master plan and set the economic tone for the near and far term.

Elements of the WRMP will include a preliminary document for review by GWA personnel. When completed, the deliverable will be a bound document supported by an array of computer programs and supplemental manuals for future updates to models, etc. The WRMP will include the strategies for implementing actions defined in the following Implementation Task.

The WRMP will be based on the overall integration of the business process, information systems, asset knowledge, financial planning and assessment tools developed by the project team for GWA. User friendly, dynamic and “GWA-owned” master plans are the primary objectives in developing this plan. The results of the

preceding tasks will provide the key elements for creating the WRMP. In addition, the WRMP will provide EPA with a committed approach to ensure that Guam's water and wastewater system will not compromise the island's environment and its people.

As a precursor to formulating the WRMP a financial plan must be created to understand the impacts of utility improvements on GWA's customers. We will use the asset management concept in conjunction with the RPM. In addition, the respective financial models will be developed as discussed in Task 5 and turned over to GWA to use in their future financial budgeting activities.

The scope approach using asset management practices and data collection tools are described in the following subtasks.

Subtask 7.1 Asset Management (AM)

This task will educate and engage GWA in concepts of AM. The planning team will assist in developing the overall strategy for use of data gathered during the asset inventory tasks. An integral part of the success of this task will be formulation of a GWA AM team whose roles and responsibilities will be determined during the Project Management Team Kickoff Meeting in Task 1. This task includes AM team workshops as well as other project activities. AM team training will be a continuous process.

7.1.1 AM Team Workshops and Training Sessions

In the AM Team Kickoff Meeting we will communicate the basic tenets of AM, discuss Levels of Service, and examine the role of Risk Analysis in AM. In concert with the AM team, we will also begin developing a business case for AM that addresses issues specific to GWA and its customers. The business case will include consideration of service levels, risk, and economic benefit. An example of an economic benefit might be the anticipated return on investment from the AM program itself, expressed in clear financial terms. We believe that this is a core element for buying into the AM program, not just for AM team members but for other stakeholders as well.

We will introduce the concepts of criticality and risk analysis by conducting a tabletop exercise using one or more actual GWA issues suggested by the AM team. As an example, the exercise might address an actual repair/replace decision on a stretch of pipeline through the application of risk and economic analysis. Six subsequent half-day to full-day workshops will address specific AM issues.

7.1.2 Conduct Business Process Reviews

We will deploy a methodology called Asset Management Program Evaluation (AMPE). It addresses 80 elements of AM that we have developed specifically for the United States water and wastewater industry.

Several meetings will be held to examine the above areas of your system. These meetings will focus on three main topics:

- Asset knowledge (including costs and practices).
- Decision-making business processes at key points in the asset life-cycle – acquisition, maintenance, assessment, refurbishment/rehabilitation, replacement, and disposal.
- Availability and quality of existing data/information relating to infrastructure assets.

The AMPE methodology has proven to be effective and comprehensive. A computerized tool called Asset Management Program Manager (AMPM) has been developed to manage and document the meetings and specifically to manage and streamline the observations, conclusions and potential recommendations resulting from the interviews. This tool uses a question tree format that is logical and extensive and addresses every topic necessary for a complete AM program assessment.

Use of the previously developed and proven AMPM will optimize GWA's staff's time and will ensure that your AM practices are documented completely and consistently.

Much of the necessary information will be derived from the water and wastewater systems assessment tasks. As noted, it is anticipated knowledge transfer will be a reciprocal activity with the GWA staff supplying information and the consulting team supplying the tools to evaluate and assess the current status of GWA's assets.

Assumptions: N/A.

GWA Tasks:

- Identify key personnel for AM training; identify personnel for interviews and schedule group interviews.

Deliverables:

- Twelve AM Business Process Review meetings and eight workshop/training sessions.
- Workshop presentations, case studies, and agendas.
- Current Status Report comparing GWA AM practices with “best practices.”
- All software and hardware purchased to support the development of the WRMP will be turned over to GWA.

Subtask 7.2 Financial Plan Combined Tasks

This section defines the scope for both the wastewater and water financial plans that will be conducted concurrently for efficiency. Separate scope approaches are defined below for the balance of the two plans.

7.2.1 Project Management

Project execution includes management control tools and emphasizes responsive client communication. A project management and control plan will be developed as the guidance tool for this task.

7.2.2 Combined Kickoff Meeting and Workshop

To enhance project efficiency the combined task will commence with a kickoff meeting and financial policy workshop. The kickoff meeting and workshop will confirm study goals and update the project schedule. The financial policy and study issues workshop will serve to address and document the GWA's financial policies and guidelines.

7.2.2.1 Combined Kickoff Meeting

Major topics covered in the kickoff meeting will include:

- Reserve Fund types, target levels and Stipulated Order accrual rates for fund reserves including working cash, contingency, and rate stabilization.
- The calculation of asset replacement reserves is addressed in other tasks.
- Financial stability (fixed versus variable revenues, seasonal variations).
- Financing for capital projects with debt, cash and rates.
- Local system surcharges versus system-wide utility service pricing.
- Escalation factors for operation and maintenance costs, including inflation and levels of service.

7.2.2.2 Combined Workshop

Workshop issues may include:

- Rate model format, organization and documentation.
- Rate setting policies and alternative structures (generally accepted vs. locally based).

- Customer classifications, loading, strength and demand alternatives.
- Sewer utility hook-up fee levels and funding options.
- Billing and collection issues.
- Customer class-based water return to sewer factors.
- Cost of service allocations (historical flow, capacities, accounts, base demands, sewage strengths, I/I).
- Methods to estimate wastewater discharge quantities.
- Alternative water rate structures with conservation incentives.
- Lifeline utility rates for certified low-income customers.
- Water cost of service functional cost categories for average and peak demands.
- Service, commodity and supply-related rate blocks.
- Wastewater rate parameters and proxies for flow, BOD, TSS, I/I allocation methods.
- Conservation incentive rate structures.
- Guam PUC rate calculation and notification requirements.
- Public outreach and information coordination.
- Other issues that may arise.

7.2.2.3 Technical Memorandum

At the conclusion of the kickoff meeting and workshop, we will prepare a technical memorandum documenting GWA financial policies and describing workshop results.

7.2.3 Conduct Meetings and Financial plan Workshops

We will conduct a total of three meetings and workshops to present the combined wastewater and water financial plan studies, as described in the following subtasks:

7.2.3.1 Conduct Meetings

During the course of the financial plan and rate study, Brown and Caldwell will meet twice with GWA staff to discuss issues including data review, study findings, and the draft report.

7.2.3.2 Conduct Workshop

At an appropriate time during the study, we will conduct one combined workshop with GWA staff for both the wastewater and water studies to discuss technical issues relating to the financial plan assumptions, findings and conclusions.

Subtask 7.3 Wastewater Service Charges

This subtask outlines the detailed scope of work for the wastewater financial plan. This and the water financial plan studies will be conducted concurrently. Data collected in the population assessment task and other wastewater system assessment tasks will be used to provide input for this task.

7.3.1 Determine Customer Discharge Characteristics and Loadings

We will estimate the typical, average and total wastewater flow and strength loadings discharged by each of the user classes, including number of users by class, seasonal and annual water use and return to sewer rates of each class, waste strength estimates for each class, and projected growth in the number of users.

The subtasks to be addressed include:

- Develop a mass balance for flows and strengths between the treatment plant influent loadings and the water usage from all dischargers for calibrating the estimated loading factors. Contrast residential loading factors for single and multi-family discharges with the 2000 Census data on persons per household. Identify the proportion of residential low-income households. Analyze customer use statistics by examining water use, plant influent data, and any other sampling or metered wastewater information available. Prepare summary charts and graphs identifying homogeneous and/or dissimilar loading characteristics among the different customers.
- Review the existing customer classification system detail, including user class definitions and number, for rate equity sufficiency and accuracy.
- Recommend appropriate classification and monitoring of customers, with an emphasis on new wastewater customer discharge characteristics.
- Review five years of historical plant influent data and number of customers, and prepare a five year projection of future discharge characteristics including billable parameters and number of customers.
- Identify any additional information useful for improving the equity of needed.
- Determine whether any additional monitoring of industrial dischargers is needed.

7.3.2 Analyze Financing Options for the New Projects Identified in the CIP

Analyze GWA's wastewater utility CIP that was developed for the funding alternatives based on local customer user fees and creation of property-related benefit assessment districts, low interest rate revolving bond funding, sources of grant funding, and moneys earmarked from federal appropriation bills. We will recommend a project financing program based on anticipated fund sources and availability using combinations of grants, debt and cash financing. In addition, we will review and make recommendations on reserve funds and rate of accrual to reach reserve targets, as discussed in the financial policy discussions of the kickoff meeting. We will identify the annual debt service and cash-based project costs.

7.3.3 Determine Wastewater Revenue Requirements

Project and summarize five years of wastewater service rate-based revenue requirements under the following subtasks:

- Validate the current rate-based revenues based on the customer loads by comparing the calculated and actual revenues by customer class under the current rate structure.
- Based on Authority financial documents, prepare a five-year tabulation of customer counts, utility revenues, expenditures, and fund reserves levels.
- Project the future annual O&M costs from the first year budget, as provided by GWA. Identify and project any non-operating revenues and increased O&M costs associated with new treatment facilities. Divide all costs between wastewater and recycled water services.
- Review and project the annualized capital-related costs based on GWA's CIP.
- Develop net rate-based revenue requirements from the annual utility cashflows, including funding of reserves such as asset rehabilitation and replacement funding, O&M and capital-related expenditures, rate stability objectives, revenue adjustments for non-payment of billed services, and net revenues from recycled water sales.
- Calculate the level of fixed versus variable costs and revenues, and determine an appropriate proportion of fixed revenues for financial stability. Review and make recommendations on reserve funds and rate of accrual to reach reserve targets, as discussed in the financial policy discussions of the Kickoff Meeting. Identify the annual debt service and cash-based project costs.

7.3.4 Allocate Wastewater Costs to Billable Parameters

A system of billable parameters is required to relate the costs of providing wastewater service to GWA's customers, as prescribed by CCU and Guam PUC rate setting recommendations. Specific subtasks to be accomplished include, but may not necessarily be limited to the following:

- Evaluate GWA's cost of service for each customer class and billing parameter.
- Determine appropriate wastewater billable parameters based on service load factors, including customer meter size and service, I/I, BOD, TSS and flow.
- Determine unit costs for each billable parameter over the five-year study period.
- Determine the variations in billing levels from the different loads within each customer class.

7.3.5 Develop Wastewater Service Charges

Based on the unit costs developed in the prior task, we will prepare three alternative rate structures, with each alternative deriving the same rate-based revenues and verified to work on the current billing system. The alternatives will include one rate structure comparable to the current structure, a rate structure including utility service subsidies for residential low-income households, and a flat rate structure using homogeneous customer class characteristics. We will list the advantages and disadvantages of each alternative.

We will identify a methodology for determining use-based charges for customers, whose wastewater discharge is not metered, including the use of fixture units, building footage, water meter size, or persons per household. For the recommended alternative, we will project the annual unit rates for each customer class, and the current versus proposed bills for typical customers in each class.

The development and recommendations of these concurrent rate studies include an evaluation of the effects of combined water and wastewater bills on customers. With both wastewater and water rate structures being modified, it is important to identify and avoid rate shock from excessive and compounding changes. As such, a phase-in of the changes to the combined bills will be appropriate.

Subtask 7.4 Prepare Wastewater Financial Plan Report and Workshop

We will document the results of the financial plan in a detailed report. The wastewater financial plan report documentation will include:

- Executive Summary.
- Chapter 1 – Introduction: Funding Wastewater Services.
- Chapter 2 – Wastewater Services and Loads.
- Chapter 3 – Revenue Requirements and Project Funding.
- Chapter 4 – Costs of Service.
- Chapter 5 – Rate Structure Alternatives.
- Chapter 6 – Recommended Wastewater Service Charges.
- Appendices.

The report and information shall be documented and presented in a clear and concise manner. In the report the information and methodology that support development of the rates shall be clearly presented, with all acronyms clearly defined. This task shall also include the following subtasks:

7.4.1 Prepare Draft Wastewater Financial Plan Report

We will prepare and provide five (5) bound copies of a draft report for GWA review.

7.4.2 Public Hearings

Coordinate hearing activities with the Community Outreach effort. The wastewater and water task assumptions, findings and conclusions will be presented at required number of public hearings on the proposed rate structure. The hearings will be scheduled during the development of the draft reports.

7.4.3 Prepare Final Wastewater Financial Plan Report

Incorporate GWA's comments on the final draft report into a final report. Provide GWA with five (5) bound copies of the final report, along with an unbound, reproducible copy and a PDF-based digital copy suitable for electronic distribution.

7.5 Water Service Charges

The water service charge determination, will be conducted concurrently with the wastewater financial plan study. Data collected in the water system assessment tasks will be used to provide input for this task.

7.5.1 Evaluate Water Use Classes and Characteristics

We will determine the number of current and projected water utility customers and demand levels in each customer class based on available GWA data. In addition we will determine the trends and ranges of water demands and summarize annual and peak water demands by class, identify the lowest residential water commodity use for health and sanitation, identify the proportion of residential low-income households from census data and develop recommendations regarding customer classifications, and the use of water rate blocks for different water service levels and locations.

7.5.2 Analyze Water Operation and Maintenance Costs

We will analyze and project the utility O&M and net non-operating costs as provided by GWA to determine annual rate-based revenue requirements. We will incorporate the effects of demand levels based on identifying the portion of fixed versus variable cost factors. We will identify and project increased O&M costs associated with new treatment facilities and prepare a detailed evaluation of the water source of supply costs.

7.5.3 Analyze Financing Options for the Capital Improvement Program

We will analyze GWA's new CIP developed in a separate project task for funding alternatives. The alternatives can be based on local customer user fees and creation of property-related benefit assessment districts, low interest rate revolving bond funding, sources of grant funding, and moneys earmarked from federal appropriation bills. We will recommend a project-financing program based on anticipated fund sources and availability using combinations of grants, debt and cash financing and identify the annual debt service and cash-based project costs.

7.5.4 Determine Water Revenue Requirements

Based on GWA financial documents, we will prepare a five-year tabulation of customer counts, utility revenues, expenditures, and fund reserves levels. We will review and make recommendations on reserve funds and rate of accrual to reach reserve targets, as discussed in the financial policy discussions of the kickoff meeting. Using the results of prior sub-tasks, we will summarize total cashflows for a defined study period of five years. We will develop net rate-based revenue requirements from the annual utility cashflows, including funding of reserves such as asset rehabilitation and replacement funding, O&M and capital-related expenditures, revenue adjustments for non-payment of billed services, and rate stability objectives.

We will calculate the level of fixed versus variable costs and revenues, and determine an appropriate proportion of fixed revenues or rate stabilization reserves for financial stability. We will validate the current rate-based revenues based on the customer loads by comparing the calculated and actual revenues by customer class under the current rate structure.

7.5.5 Allocate Water Cost of Service

We will conduct a cost-of-service analysis to allocate costs to the various customer classes commensurate with their loading contributions and actual service and reliability levels, and enhance the equity of water services. We will use the functional cost procedure as defined by the American Water Works Association (AWWA) and recommended by the Guam PUC to determine the revenue requirements from the customer classes. We will identify the following:

- Unit costs of service rates for customer service and meter rates, and geographical zone-based charges.
- Incremental power costs for serving elevation zones in the Authority service area.
- Estimated cost and customer value for interruptible services to large and or commercial customer accounts.

7.5.6 Develop Miscellaneous Water Service Fees

We will review current water utility miscellaneous service fees, including: delinquent fees, service initiation fees, turn on/off fees, service reinstatement fees, meter and service installations, backflow value installations, and construction meter rental. The fees will be calculated based on GWA provided data, including equipment costs, hourly wages and benefits for staff, and typical hours for each miscellaneous service task.

7.5.7 Develop Water Service Charges and Surcharges

Based on the unit costs developed in the prior task, we will prepare three alternative rate structures, with each alternative deriving the same rate-based revenues. The alternative rate structures for potable supplies will include variations of the current rate structure with surcharges for high water consumption, a rate structure including utility service subsidies for residential low-income households, a conservation-oriented inclining block tiered water rate structure, and service level variations in commodity rates. We will identify the advantages and disadvantages of each alternative, and list examples where the alternative rate structures are implemented.

We will also discuss with GWA staff variations of the current rate structure, and will model and evaluate the effects of modifying the unit water rates. With the results of this evaluation, we will define alternative rate blocks and unit water rates that will derive the targeted annual water commodity sale revenues. The rate structure alternatives will include one comparable to the current rate structure, one that enhances the proportion of fixed revenues through fixed service charges, one conservation-oriented block rate structure, and one that reduces the water bills for low demand residential customers while enhancing financial inducements for water conservation. For the recommended alternative, we will project the annual unit rates for each customer class, and the current and projected bills for typical customers in each classification.

The development and recommendations of these concurrent rate studies will include an evaluation of the effects of combined water and wastewater bills on customers. With both wastewater and water rate structures being modified, it is important to identify and avoid rate shock from excessive and compounding changes. As such, a phase-in of the changes to the combined bills will be appropriate to maintain rate in line with regional trends.

Assumptions: N/A

GWA Tasks:

- Provide project and utility O&M and net non-operating costs.
- Provide current CIP information.
- Provide user fees/rate schedules.
- Provide GWA financial documents.

Deliverables:

- Database for use in the financial model.

Subtask 7.6 Develop Water Connection Fees

Water system connection fees for new development will be developed. The recommended fees will be identified using typical methodologies for water utilities, as prescribed by the AWWA, and in compliance with the requirements of the Guam PUC.

7.6.1 Evaluate Water Facility Values for Connection Fees

A projection of system existing and future water facility values will be identified in this task. We will forecast future facility values using the current system fixed assets plus the CIP-related facility costs to serve future development, net of projected depreciation and debt principal. We will calculate the combined projected (then current) value of the water system based on both the buy-in and incremental cost basis.

7.6.2 Evaluate Unit Water Demands

Based on the historical peak and average water demands by customer class, we will estimate residential and non-residential water demands for new connections. These demands will be cross-referenced by water meter size, customer class, fixture counts, average daily occupancy or attendance, hotel bed counts, or similar indices. The unit loads will include peak factors for costs associated with the water storage and distribution, and average demands for water treatment facility costs.

7.6.3 Determine Water Connection Fees

We will identify the appropriate fees for new development. The recommended fees will be based on user class and anticipated water demands, in compliance with Guam PUC requirements and in consultation with District staff.

Assumptions: N/A

GWA Tasks:

- Provide project and utility O&M and net non-operating costs.
- Provide current CIP information.
- Provide user fees/rate schedules.
- Provide GWA financial documents.

Deliverables:

- Calculations of projected water system costs.
- Unit water demand calculations.
- Compilations of connection fees.

Subtask 7.7 Prepare Water Financial Plan Report and Workshop

Provide documentation of the results of the financial plan in a detailed report. The water rate report documentation will include:

- Executive Summary
- Chapter 1 – Introduction: Funding Water Services

- Chapter 2 – Water Services and Loads
- Chapter 3 – Revenue Requirements and Financial Plan
- Chapter 4 – Costs of Service
- Chapter 5 – Rate Structure Alternatives
- Chapter 6 – Recommended Water Service Charges
- Appendices.

The report and information shall be documented and presented in a clear and concise manner. In the report the information and methodology that support development of the rates shall be clearly presented, with all acronyms clearly defined. This task shall also include the following subtasks:

7.7.1 Prepare Draft Water Financial Plan Report

We will prepare and provide five (5) bound copies of a draft report for GWA review.

7.7.2 GWA Water Workshop

We will make one presentation of the water rate draft report findings and recommendations to the CCU or other GWA committees, in a public workshop format. The presentation will include graphics and color handouts of the assumptions, methodologies, findings and conclusions, and will include a discussion period for questions and answers.

7.7.2.3 Prepare Final Water Rate and Financial Plan Report

We will incorporate GWA's comments on the draft report into a final report. We will provide GWA with five (5) bound copies of the final report, along with an unbound, reproducible copy and a PDF-based digital copy suitable for electronic distribution.

Subtask 7.8 Develop Draft WRMP

The WRMP will present a culmination of multiple exercises in integrating the community's values with GWA's business values. The end result will be a comprehensive WRMP that will guide GWA and the CCU in making business case decisions to elevate the water and wastewater utility to premier level status.

The draft WRMP will outline the approach that GWA will utilize to reflect their commitment to comply with the requirements of the Order.

7.8.1 Review Draft WRMP with GWA Management

Ten bound copies of the draft WRMP will be provided to GWA for review and input. Together with GWA staff we will present the draft WRMP to GWA management and the CCU in a workshop setting to ensure that the plan reflects your vision, policies and priorities. Based on feedback from the workshop, we will make any revisions required.

Subtask 7.9 Prepare Final WRMP

The final WRMP will be prepared based on discussion and comments received during the draft WRMP review workshop with GWA management and the CCU. If desired, we will support GWA and the PRO in preparing a presentation that GWA would use in sharing the WRMP with GWA's customers and the regulatory agencies.

Assumptions: N/A

GWA Tasks:

- Identify GWA staff to participate in the AM task.

Deliverables:

- Provide 12 AM team meetings and 8 workshops.

- Provide a technical memorandum documenting GWA financial policies and describing kickoff meeting/workshop results.
- Coordinate hearing activities with the projects Community Outreach effort.
- Five bound copies of the wastewater final report, along with an unbound, reproducible copy and a PDF-based digital copy.
- One presentation of the water rate draft report findings and recommendations to the CCU or other GWA committees, in a public workshop format.
- Five bound copies of the water rate and financial final report, along with an unbound, reproducible copy and a PDF-based digital copy suitable for electronic distribution.
- Ten hard copies and 1 electronic copy of the final WRMP will be delivered to GWA with the associated financial models used to develop the rate package and RPM.
- All software and hardware purchased to support the development of the WRMP will be turned over to GWA.

Task 8. Develop Implementation Plan

Implementation of the WRMP will be the true test of GWA's buy in to the ownership of their utility and providing "best in class" service to their customers. We will provide a one day workshop for GWA management and key project staff to present a suggested approach to implement the WRMP and use of the developed tools.

Specific activities will be identified for continued implementation by the GWA staff. A number of workshops have to be built into the various WRMP development tasks and identified within the body of the task write-up. The workshops, guidance documents, calibrated models and the WRMP printed document will form the basis for the implementation of the recommended alternatives. Major tools in this category include:

- Capacity Assurance Planning Environment (CAPE).
- Replacement Planning Model (RPM).
- Water system hydraulic model.
- Wastewater system hydraulic model.
- GIS system.
- SCADA system.
- Water and wastewater financial models.

Subtask 8.1 CAPE

The CAPE system is described in Task 5 and provides GWA with a toolbox of capabilities for use in a number of areas. Continued use of CAPE will provide the desired ongoing capabilities to keep GWA at the forefront of utility management and effective cost control by planning for system expansion and related system financing.

Subtask 8.2 Replacement Planning Model (RPM)

The RPM is described in Task 5 and will be the tool used to determine replacement and refurbishment elements of the CIP and will also link to certain parts of the financial plan.

Subtask 8.3 Water System Hydraulic Model

The water system model development is described in Task 5 and will be a useful tool for future system expansion purposes. The procedures for keeping it up-to-date will be provided.

Subtask 8.4 Wastewater System Hydraulic Model

The wastewater system model development is described in Task 5 and will be a useful tool for future system expansion purposes. The primary use will be to define needed system expansion but will also provide valuable

information on I/I correction. It will be linked to the GIS system as well. The procedures for keeping it up-to-date will be provided.

Subtask 8.5 Geographical Information System

GIS will be a major tool developed and used for data collection during the Master Planning effort. Information on the GIS development is included in Task 5. Orientation of the fundamentals and future use will be provided in workshops and hands-on field training as part of the plan.

Subtask 8.6 SCADA

The procedures for analyzing the existing system and recommending refurbishment or replacement of the system are presented in Task 4. Orientation on the selected system will be provided as part of this task.

Subtask 8.7 Financial Models

Financial models for both water and wastewater will be developed as added tools for forecasting future needs in both systems. Training on their use will be included in Task 7.

Assumptions: N/A.

GWA Tasks:

- Participate in workshops and training sessions.
- Identify staff to transfer ownership of WRMP.

Deliverables:

- Meeting summaries.
- WRMP Final Report.

Phase IIIB

Task 7.10 Prepare Water and Wastewater PUC Financial Plan Document

Working in partnership with GWA staff and the CCU Chief Financial Officer prepare a Financial Plan document that complies with the PUC reporting requirements.