

RRP:RMI 26408

ASIAN DEVELOPMENT BANK

REPORT AND RECOMMENDATION
OF THE
PRESIDENT
TO THE
BOARD OF DIRECTORS
ON A
PROPOSED LOAN
TO THE
REPUBLIC OF THE MARSHALL ISLANDS
FOR THE
MAJURO WATER SUPPLY AND SANITATION PROJECT

September 1995

CURRENCY EQUIVALENTS

The unit of currency in the Republic of the Marshall Islands is the US dollar.

ABBREVIATIONS

| | | |
|------|---|---|
| AIEC | - | Average Incremental Economic Cost |
| AIFC | - | Average Incremental Financial Cost |
| BME | - | Benefit Monitoring and Evaluation |
| DUD | - | Dalap-Uliga-Darrit |
| EPA | - | Environmental Protection Authority |
| JICA | - | Japan International Cooperation Agency |
| MPW | - | Ministry of Public Works |
| MWSC | - | Majuro Water and Sewer Company |
| NRW | - | Non-revenue Water |
| OMIP | - | Operation and Maintenance Improvement Program |
| O&M | - | Operation and Maintenance |
| PIC | - | Project Implementation Committee |
| PMO | - | Project Management Office |
| TA | - | Technical Assistance |
| UNDP | - | United Nations Development Programme |
| USA | - | United States of America |

UNITS

| | | |
|-------------------|---|---------------------------|
| m ³ | - | cubic meter |
| m ³ /d | - | cubic meters per day |
| mm | - | millimeter |
| m | - | meter |
| km | - | kilometer |
| lcd | - | liters per capita per day |

NOTES

- (i) The fiscal year of the Government ends on the 30 September.
- (ii) In this Report, \$ refers to US dollars.

CONTENTS

| | Page |
|--------------------------------------|-------------|
| LOAN AND PROJECT SUMMARY | i |
| MAP | v |
| I. THE PROPOSAL | 1 |
| II. INTRODUCTION | 1 |
| III. BACKGROUND | 2 |
| A. Sector Description | 2 |
| B. Government Policies and Plans | 3 |
| C. External Assistance to the Sector | 5 |
| D. Lessons Learned | 6 |
| E. Bank's Sectoral Strategy | 8 |
| F. Policy Dialogue | 8 |
| IV. THE PROJECT | 11 |
| A. Rationale | 11 |
| B. Objectives and Scope | 12 |
| C. Technical Justification | 14 |
| D. Cost Estimates | 16 |
| E. Financing Plan | 16 |
| F. Implementation Arrangements | 17 |
| G. The Executing Agency | 21 |
| H. Environmental and Social Measures | 21 |
| V. PROJECT JUSTIFICATION | 22 |
| A. Economic and Financial Analysis | 22 |
| B. Environmental Benefits | 24 |
| C. Social Dimensions | 25 |
| VI. ASSURANCES | 25 |
| A. Specific Assurances | 26 |
| B. Condition of Effectiveness | 28 |
| VII. RECOMMENDATION | 28 |
| APPENDIXES | 29 |

LOAN AND PROJECT SUMMARY

- Borrower** : Republic of the Marshall Islands
- Project Outline** : The Project will improve the water supply and sewerage facilities of Majuro Atoll. Water supplies are currently rationed by restricting their availability to a few hours every few days. The Project will increase the amount of water supplied, increase water storage capacity, improve the distribution of water and improve the Atoll's sewage pumping system. The Project will also provide implementation assistance, increase community awareness, improve cost recovery, and increase the efficiency and effectiveness of the Majuro Water and Sewer Company (MWSC).
- Classification** : Primary : Human Development
- Rationale** : Majuro Atoll has few natural sources of potable water. The rapidly increasing population is straining the Government's ability to provide water supply and sanitation services. There is a significant increase in water and sanitation-related disease, particularly among children. Water and sanitation institutions are generally weak. The Project, formulated in consultation with the community, will respond to the consumers' expressed needs by providing them with safe and reliable water supply and sanitation services at affordable prices. The Project will assist the Government to implement policy reforms, including the equitable distribution of services and facilities throughout Majuro, commercialization of public utility functions, reduction of unaccounted-for water, and improved management of scarce water resources, improved water conservation, and elimination of the need for Government subsidies to cover MWSC's operation and maintenance costs.
- Objectives and Scope** : The Project's objectives are to (i) provide a safe and reliable water supply and improved sewerage to improve the urban environment of Majuro Atoll; and (ii) help the Government implement policy reforms to achieve sustainability of water supply and sewerage services.

The Project consists of:

- (i) improvements to prevent wastage of water from the rainwater collection system at the runway and adjacent areas of Majuro's airport;

- (ii) improvement of an existing well field at Laura to enable the existing wells to produce more water and to develop additional wells;
- (iii) provision of increased raw water and treated water storage by enlarging existing water storage reservoirs and constructing a new water storage reservoir;
- (iv) improvements to water treatment and pumping by replacing worn-out equipment at two existing water treatment plants, providing protective water treatment at the main well field, and increasing the capacity of the water treatment plants and pumping facilities;
- (v) improvements to water transmission and distribution, through the construction of a new water transmission pipeline;
- (vi) upgrading and expansion of a piped seawater distribution system, which provides water for toilet flushing and fire fighting;
- (vii) rehabilitation of sewage pumping stations that suffer from frequent blockages, causing sewage to flood into streets and residential areas; and
- (viii) institutional support in project management and in the development of groundwater resources.

Project-related policy reforms include:

- (i) improvement of the conservation of potable water;
- (ii) improvement of the efficiency of water supply and sewerage operations;
- (iii) improvement of the legislative framework and accountability of MWSC; and
- (iv) improvement in cost recovery, by improving MWSC's billing and collection efficiency.

These policy reforms are incorporated in an Operational, Institutional and Financial Action Plan for MWSC.

Cost Estimates

: The Project is estimated to cost \$11.6 million equivalent, of which \$8.0 million is the foreign exchange cost and \$3.6 million equivalent is the local currency cost.

(\$ million)

Financing Plan :

| Source | Foreign Exchange | Local Currency | Total | Percent |
|----------------|------------------|----------------|------------|-----------|
| The Bank | 8.0 | 1.2 | 9.2 | 80 |
| The Government | - | <u>2.4</u> | <u>2.4</u> | <u>20</u> |
| | 8.0 | 3.6 | 11.6 | 100 |

- Loan Amount and Terms:** A loan of SDR 6.062 million (currently \$9.2 million equivalent) from the Bank's Special Funds resources for 40 years, including a grace period of 10 years, and service charge of one percent per annum be paid semiannually.
- Relending Terms** : The Government will relend the proceeds of the loan to MWSC at the Bank's US dollar interest rate for ordinary capital resources (currently 6.9 percent per annum), and an amortization period of 25 years including a grace period of 5 years.
- Period of Utilization** : Until 30 September 2000.
- Implementation Arrangements** : A Project Management Office has been established within the Ministry of Public Works for day-to-day supervision of implementation. A Project Implementation Committee, including representatives of MWSC, will be established for overall coordination.
- Executing Agency** : Ministry of Public Works
- Procurement** : Procurement of goods and services will be in accordance with the Bank's *Guidelines for Procurement*. One major contract will be awarded under international competitive bidding procedures for civil works and supply of materials and equipment; a smaller contract for civil works and supply of materials and equipment will be awarded under local competitive bidding procedures acceptable to the Bank; and computer hardware and software as well as two service vehicles will be procured by direct purchase. At the request of the Government, the Bank has approved advance action for prequalification and calling of tenders.
- Consultant Services** : Selection and engagement of consultants will be in accordance with the Bank's *Guidelines on the Use of Consultants*. A total of 44 person-months of consulting services will be required to assist in hydrogeological investigations, design of well field developments and project management. At the request of the Government, the

Bank has approved advance action for the direct engagement of consultants already carrying out detailed design.

Estimated Project Completion Date : 31 March 2000

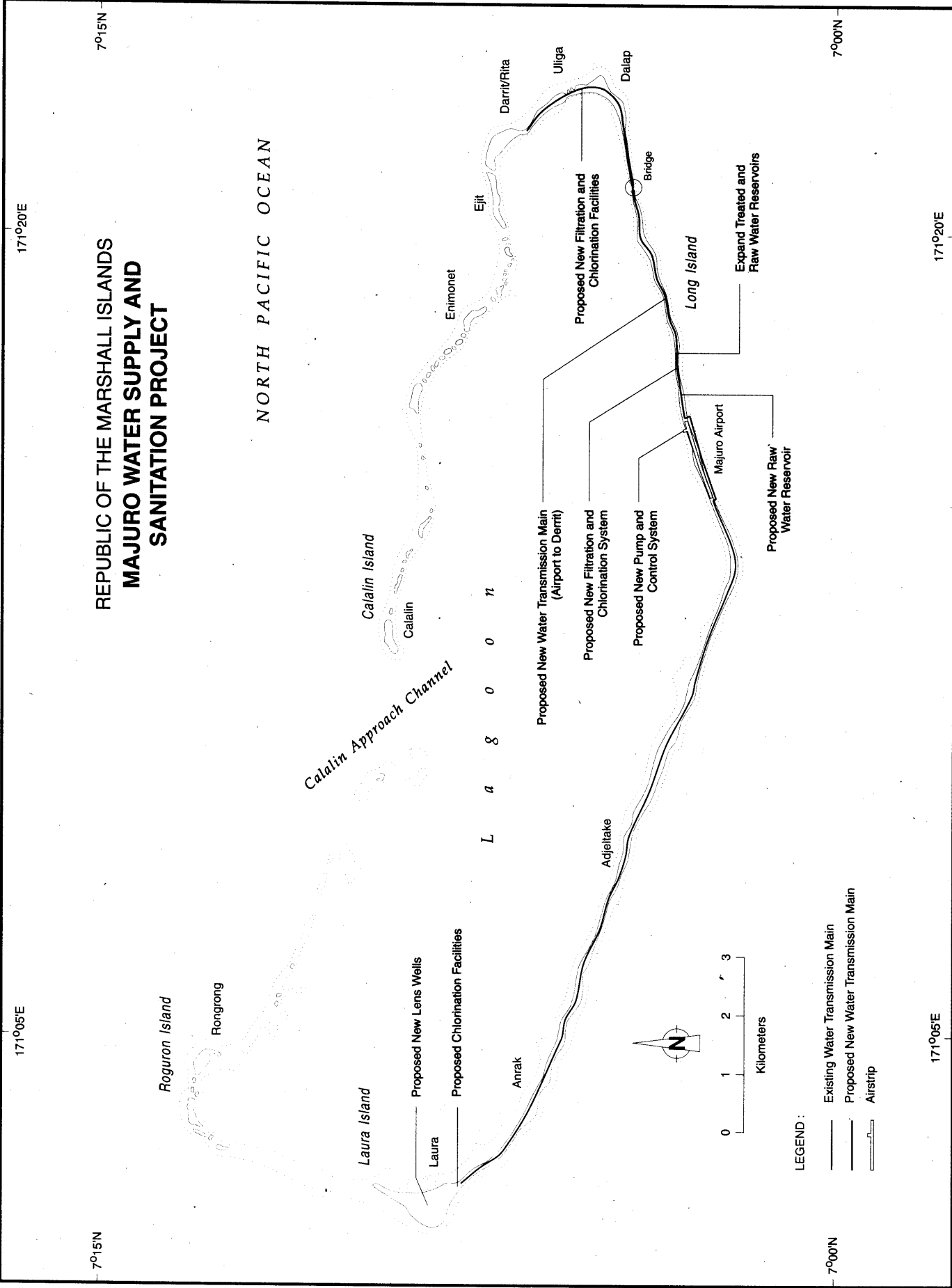
Project Benefits and Beneficiaries : The Project will improve the urban environment of Majuro Atoll through the development of water supply and sewerage services. About 27,000 people are connected to the Atoll's public water supply system, which at present is only capable of providing potable water for a few hours every two or three days. A safe, piped water supply will be provided on a 24-hour basis.

The Project will also improve the operational, institutional, and financial capabilities of MWSC. The Project will encourage conservation of Majuro's scarce resources of freshwater through the realistic pricing of water, and through improved billing and collection efficiency. By providing technology appropriate to Majuro's environment, the Project is designed to encourage the adoption of lowest cost practicable means of improving Majuro's water supply and sewerage systems.

The major economic benefit of the Project will be improved community health and welfare. Improved home sanitation cannot be effectively encouraged now because of the lack of a reliable water supply. Project facilities will encourage commensurate improvements in basic sanitation.

REPUBLIC OF THE MARSHALL ISLANDS
**MAJURO WATER SUPPLY AND
 SANITATION PROJECT**

NORTH PACIFIC OCEAN



171°20'E

7°15'N

171°05'E

7°00'N

Calalin Approach Channel

L a g o o n

7°00'N

171°20'E

171°05'E



LEGEND :

- Existing Water Transmission Main
- Proposed New Water Transmission Main
- Airstrip

7°00'N

171°05'E

I. THE PROPOSAL

1. I submit for your approval the following Report and Recommendation on a proposed loan to the Republic of the Marshall Islands for the Majuro Water Supply and Sanitation Project.

II. INTRODUCTION

2. A severe drought, which lasted from December 1991 to April 1992, almost totally depleted the supply of fresh water in Majuro, the capital of the Republic of the Marshall Islands. While there is a need to improve water supply and sanitation on other atolls and islands, the increasing urbanization of Majuro has increased the strain on the atoll's water supply facilities and priority improvements are required. The Government of the Republic of the Marshall Islands, realizing the urgency of increasing the water storage capacity, requested the Bank for the early approval of a water supply project (the Project) for Majuro. In response, the Bank fielded a Loan Reconnaissance Mission in July-August 1992 to examine various aspects of the proposed Project, which had been based on a study carried out by the Japan International Cooperation Agency (JICA). In October 1992 the Bank provided a small-scale project preparatory technical assistance (TA)¹ to prepare a project suitable for Bank assistance. Subsequently the Bank approved a loan to finance the necessary engineering work in September 1993,² together with an advisory TA for the institutional strengthening of the Majuro Water and Sewer Company (MWSC).³

3. Fact-finding for the proposed Project was carried out during April - May 1995 and an Appraisal Mission visited Majuro from 20 June to 3 July 1995. The Mission held discussions with officials of MWSC, the Ministry of Public Works (MPW), and the Environment Protection Authority (EPA), and with other Government officials and officials of the Embassy of the United States of America (USA). In particular, the Mission discussed with the Government policy issues and details of the scope, implementation arrangements, timing, costs, and environmental, economic, and financial aspects of the Project. The Mission also conducted a policy dialogue with the Government on a number of important sector issues. The dialogue led to agreement on several reforms to enhance sector efficiency. This report is based on the findings of Bank missions, reports prepared by the TA consultants, reports prepared by consultants engaged under the engineering loan project, and information supplied by the Government. Loan negotiations were held in Manila from 28 August to 31 August 1995, with the authorized representatives of the Government and MWSC.

¹ TA No. 1775-MAR: *Majuro Water Supply Project* for \$100,000, approved on 30 October 1992.

² Loan No. 1250-RMI(SF): *Majuro Water and Sewer Project*, for \$700,000, approved on 9 September 1993.

³ TA No. 1946-RMI: *Institutional Strengthening of the Majuro Water and Sewer Company*, for \$250,000, approved 9 September 1993.

III. BACKGROUND

A. Sector Description

1. The Water Supply and Sanitation Sector

4. The Republic of the Marshall Islands comprises 29 atolls and five low-lying islands, in the Pacific Ocean about 3,500 km west of Hawaii. This group of atolls and islands has a total land area of about 200 square kilometers (km²) with an average height of a little over 2 meters (m) above sea level. These low-lying atolls and islands have few natural sources of surface water; their groundwater resources are very limited because of the smallness of their land areas.

5. About 56 percent of the country's population (estimated as 50,000 people in 1994) live on Majuro Atoll; a further 22 percent of the population live at Ebeye (on Kwajalein Atoll), and the remaining population inhabit other islands and atolls. Several atolls and islands are uninhabited and several have populations of less than 2,000 people. Nationally, the population growth rate has exceeded 4 percent per year, but has recently fallen to about 3.6 per cent per year. The rate of population growth in Majuro and Ebeye is more than 6 percent per year because of internal migration to these urbanizing areas.

6. The high population growth rates are stretching the capacity of the Government to provide adequate infrastructure, health care, educational, and employment opportunities, and water and sanitation services. Health statistics indicate that the number of patients presenting disorders associated with high density living and crowded living quarters and often caused by a lack of a safe water supply and by poor sanitation is increasing. Young children are particularly at risk, with diarrhea and gastroenteric diseases being especially common. Health and nutrition experts have estimated that hospital admissions could be reduced by about 5 percent if children had access to safe water, proper sanitation, and adequately ventilated housing.

7. Only Majuro and Ebeye have piped public water supply systems. Households on other atolls and islands rely largely on rainwater, which drains from roofs and is stored in household water tanks. In the dry season household rainwater catchments are supplemented by shallow wells, many of which have brackish water. The demand for water from all sources is increasing, reflecting the country's high rate of population growth. At Majuro, the piped water supply is rationed by restricting its time of availability. Normally, water is available for about eight hours every two days, although in recent dry seasons the supply has been restricted to a few hours every three days.

8. Majuro and Ebeye are partially served by piped sewerage systems. Only about 50 percent of the country's population, but more than 70 percent of Majuro's population, is served by household flush toilet facilities, draining either to septic tanks or to sewers. A further 24 percent of the national population uses water-sealed privies or open-pit privies, and the remaining 26 percent have no toilet facilities other than the natural environment or nearby lagoons. In Majuro, water supply restrictions are severely hampering the effectiveness of flush toilets in some of the most densely populated localities. While pollution of coastal waters has not reached significant levels at the less densely populated atolls and islands, there is some evidence of nutrient enrichment of the lagoons at Majuro and Ebeye, particularly near localities where households have no toilet facilities.

9. While inadequate water supply facilities are constraining the country's economic and social development, difficulties with water and sanitation infrastructure are in turn associated with problems arising from population growth and urban drift. Urban drift is itself closely related to the state of the economy, rural development, and employment opportunities. In the Marshall Islands, water supply difficulties are exacerbated by the physical nature of the country's atoll environment, in which there are no significant natural surface water resources and only very limited groundwater resources for supplies of freshwater.

10. In the short term, water and sanitation services must be improved if deterioration of public health is to be contained. In the longer term, the population growth rate and urban drift should be reduced through economic development, improvements in education, and community awareness of the impact of high population growth rates.

2. Sector Institutions

11. MPW is responsible for the development and management of public utilities in general, and carries out capital improvement management, design, and water and sewerage facilities inspections. In Majuro, MWSC was established in 1989 for the provision and management of water supply and sewerage services. The Kwajalein Atoll Joint Utility Resource manages water and sewerage activities on Kwajalein. In other atolls the respective local governments are mandated to perform water and sewerage management activities. The Marshall Islands Environmental Protection Authority (EPA) monitors the quality of freshwater in the public supply system, the quality of coastal waters, and solid waste management and sanitation activities, together with its more general environmental quality monitoring activities. EPA is taking the lead role in the formulation of a national water and sanitation strategy (see para. 20).

12. The management of MWSC is autonomous apart from the establishment of water tariffs, which are subject to the approval of the Government's Tariff Review Board. The development of water supply and sanitation facilities has, however, been constrained by a lack of skilled manpower. Expatriate staff fill the top managerial and engineering positions in MPW and MWSC. MWSC is taking steps to improve its financial planning and management, and improve its cost recovery in line with recent recommendations made by consultants engaged under Bank-financed TA (see para. 2).

13. While MWSC is improving its managerial, engineering, and technical skills, its primary function relates to the management and operation of water supply and sanitation facilities. It has an expatriate Acting General Manager, who is also the General Manager of the Marshalls Energy Corporation, and is recruiting a professional water and sewerage engineer. MWSC's technical staff are capable of carrying out day-to-day management, operational, repair, and equipment replacement tasks, but MWSC has limited capability to implement major projects. MPW, on the other hand, employs experienced engineering and managerial staff with the skills and capability to implement water supply, sanitation, and urban development projects. In view of the country's limited resources, small population, and relatively small pool of skilled professionals, MPW is likely to remain an important implementation agency for urban development projects for the immediate future (see paras. 88 and 89).

B. Government Policies and Plans

14. Large flows of external assistance, particularly under the Compact of Free Association with the United States of America (USA) have adversely affected the allocation of the country's economic resources. The Government has developed a dominant and costly civil

service. There is a preference for replacing asset maintenance with acquisition of new assets, and there is significant subsidization of services. The Government has borrowed overseas, using payments from the Compact as collateral. Almost all future Compact flows are assigned to debt-service, and there are no further opportunities for borrowing. As a result, the Government must cut spending and enhance revenues to balance the budget.

15. The Government recognizes that immediate improvements to water and sanitation facilities are required to remove constraints to the country's economic and social development. The *Second Five Year National Development Plan 1991/92 - 1995/96* sets out the Government's objectives to (i) increase the supply of potable water which will meet the growing water needs of the people; (ii) provide adequate sewage disposal and sanitation facilities which will not adversely affect the country's environment; (iii) ensure an equitable distribution of these services and facilities nationwide; and (iv) commercialize and privatize these activities. The supply of potable water has been increased through the development of new water supply resources, particularly a source of potable groundwater at Majuro (see paras. 22 and 30). The introduction of a seawater distribution system to supply toilet flushing and fire fighting water has contributed to improvements in sanitation, by encouraging the installation of household flush toilets and water flush latrines. The establishment of MWSC has been a significant step toward the commercialization and privatization of water supply and sanitation services.

16. Government policies and strategies to increase the supply of potable water include the development of groundwater resources, encouragement of the installation or rehabilitation of rainwater catchment and storage facilities at all buildings, and expansion of central water catchment and storage facilities. While these measures will overcome short-term requirements, the Government foresees the need to include the construction of a seawater desalination plant to provide for the longer term water supply needs of Majuro.

17. For the provision of adequate and healthy sewage disposal and sanitation facilities, the Government proposes to extend seawater flushing systems and sewerage systems to the urban area and to connect private residencies and commercial buildings to these systems. To service communities on the outer islands, the Government intends to develop community toilets and sanitary facilities.

18. To ensure equitable distribution of services and facilities throughout the country, the Government proposes to allocate resources for the development of water supply and sanitation facilities equitably between the urban and rural areas. To foster commercialization, and later privatization, of public utility functions, the Government is encouraging utility companies and local governments to charge for the services they provide, and to spin off activities to the private sector once the activities have become financially self-sufficient.

19. Water supply projects identified for implementation during the *Second National Five-year Development Plan 1991/92-1995/96* include Majuro Airport Water Catchment Expansion, Dalap Water Supply System Upgrade, Laura Potable Line, Laura Lens Well Expansion, Salt Water System Long Island, Laura Waste Water, Majuro Sewer System Improvement, Majuro Sanitary Facilities, Majuro Desalination Plant feasibility Study and Construction, Ebeye Water Storage Upgrade, Gugeegu Water/Sewerage Infrastructure, Community Water Supply/Sanitation, and Public Facilities Water Catchment System Rehabilitation. Many of these projects are relatively small and relate to the water supply and sewerage systems of Majuro Atoll. The Dalap water supply system has been upgraded, the Laura potable water supply pipeline has been completed, Majuro's sewerage system has been improved and extended, and feasibility studies for a desalination plant at Majuro are in hand. Three of the proposed projects relate to the

improvement of water supply and sanitation facilities on the outer islands. The Community Water Supply/Sanitation Project, in particular, is concerned with developing cost-effective and appropriate technologies for rural households, and involves community participation to its fullest extent in project implementation. While giving priority to providing urgently needed water supply and sanitation facilities on Majuro, the Government also intends to activate programs and projects for the improvement of water supply and sanitation on the outer islands within the next two years.

20. The Government has no firm capital investment program for the water supply and sanitation sector. However, it proposes to formulate a program by January 1996, as part of the preparation of the proposed Third Five-Year National Development Plan (1996/97-2001/02), and foresees that the proposed Project will form an essential component of the program. As a starting point, to refine the Government's sector strategy, the Government has prepared a draft sector strategy and action plan with assistance from the United Nations Development Programme (UNDP). The strategy statement proposes (i) legislation to promote water conservation, and to improve the installation and inspection of sanitary fittings, stormwater drainage, and site clearing practices; (ii) improvements to formal and informal education, to improve people's understanding of the use and conservation of water and water's relationship with improved hygiene and health; (iii) projects to further improve water supply and sanitation in Majuro and Ebeye, and protect groundwater resources in rural areas; (iv) policy changes to encourage economic development, including improvement of the tax regime and facilitating land acquisition; and (v) improved external assistance coordination. The Government is refining the draft sector strategy and action plan which the Bank has reviewed.

C. External Assistance to the Sector

21. The bulk of financing for the development of the water supply and sanitation sector has been provided by the USA, under its funding arrangements for the Trust Territory of the Pacific Islands. Following independence in 1979, and the subsequent termination of the trusteeship in 1986, the Government of Japan, through JICA, provided grants for financing the rehabilitation of the water supply system at Majuro, including rehabilitation of the artificial water catchment area at the airport, increasing the capacity of the atoll's main water storage reservoirs near the airport, and rehabilitating some worn-out water supply pumps. This project was to include a new water transmission pipeline to carry water from the main storage reservoirs at the airport to the centers of demand at the eastern end of the atoll (see map). However, a well field at Laura (para. 22) was being developed and a pipeline from Laura to the airport reservoirs was constructed instead.

22. The groundwater potential of the Laura well field had been first investigated by the USA Geological Survey in 1987. The well field and associated sewerage developments, which incorporated the construction of septic tanks to dispose of household sewage away from the locality of the well field, was funded by the USA under the Compact. An overview of external assistance provided to the water supply and sanitation sector is given in Appendix 1.

23. Besides financing the preparation of the draft water supply and sanitation strategy (para. 20), UNDP is assisting in financing a "self-help" rural water supply and sanitation project for the outer islands. The implementation of this project, which includes the provision of materials for rainwater collection from house roofs and for the provision of latrines, is expected to commence in 1996.

24. The Marshall Islands receives assistance for the improvement of the operation and maintenance (O&M) of public works through an Operation and Maintenance Improvement Program (OMIP), financed by the USA. OMIP, which is a multisectoral program, is managed by the USA Army Corps of Engineers on behalf of the USA Department of the Interior. The program encourages institutional improvements for O&M and a change of emphasis of O&M from emergency repairs to systematic maintenance. OMIP arranges annual inspections and institutional reviews of public works, including water supply and sanitation facilities, by specialist consultants. While finance for some public sector O&M functions is arranged through OMIP, assistance in the O&M of water supply and sanitation facilities is generally indirect, through annual inspections and financial support to engage expatriate professional staff for public works institutions (including MPW and MWSC).

D. Lessons Learned

1. Lessons Learned from Bank Experience

25. The Bank's previous involvement in the sector in the Marshall Islands includes the provision of small-scale TA for Project preparation (TA No. 1775-RMI), TA for institutional improvement of MWSC (TA No. 1946-RMI), and a loan to assist engineering services in the preparation of detailed analyses, designs and procurement actions for the Project (Loan No. 1250-RMI). The TA has been completed, but the loan is still effective. Some procurement activities under the loan are expected to continue during the initial stages of Project implementation.

26. In general, covenants under the engineering loan are being complied with. An environmental impact assessment has been carried out, with assistance from the consultants engaged under the engineering loan. TA consultants have assisted the Government in carrying out tariff reviews, reviewing and improving MWSC's staffing and productivity levels, and carrying out public consultations. Installation and programmed replacement of consumer water meters have commenced and all consumers are to be metered by September 1995; MWSC has improved its billing and collection efficiency. The appointment of an internal auditor in MWSC has been delayed through lack of locally available expertise; however, external auditors have been appointed and are actively assisting MWSC. An outstanding covenant relates to the preparation of a capital investment program and financial plan for MWSC; understanding has been reached with the Government that this plan will be completed by May 1996.

27. Implementation of the engineering loan project has been delayed, principally through delays in the recruitment of consultants. MPW now has a clearer understanding of the Bank's policies and practices with regard to the recruitment of consultants and procurement, and will be able to ensure a smooth transition from the engineering loan for the new Project.

2. Lessons Learned from Other Projects

28. In the preparation of earlier projects, financing agencies have pointed out the need for institutional improvements to ensure adequate operation and maintenance of project facilities. Sectoral and institutional improvements recommended under the TA will lead to improvements in MWSC's operational efficiency. Key recommendations have been incorporated in an Institutional, Operational, and Financial Action Plan to be implemented under the Project (see Appendix 2). In particular, improvements in MWSC's financial status, including improvements in billing and collection, are being actively pursued.

29. Implementation of investment projects in the water supply and sanitation subsector has generally proceeded smoothly. The scope of one project was changed as sectoral priorities became clearer during project implementation.¹ This emphasizes the need for well-focused, clearly defined sectoral investment programs. The Project has been formulated within the framework to provide the most urgently needed, cost-effective facilities to improve Majuro's water supply and sewerage services. The formulation of a capital investment program and financial plan for MWSC is included in the Institutional, Operational, and Financial Action Plan.

30. The development of the Laura well field to tap a shallow "lens"² of freshwater at the western end of the atoll has provided Majuro with a much needed source which has year-round reliability. Although commensurate sanitation measures in the area of this groundwater resource have been taken, through the construction of septic tanks that discharge household wastewater into the ground at localities outside the area of the well field, water drawn from some of the wells has been shown to be contaminated by human or animal wastes. The pipes that collect water from the ground at the wells have been constructed at shallow depth below the ground surface to conserve the groundwater resource by harvesting water from its upper levels. Because of the short travel path of water from the ground surface, the groundwater itself is susceptible to contamination. There is a need for careful planning of development on the land that overlies the groundwater to prevent further deterioration of water quality. Operational experience has also indicated the need to modify the operating procedures at the Laura well field, in accordance with new procedures that have been identified through Bank-financed TA. The hydrogeological investigations that identified the groundwater resource indicated that it could be developed further but careful investigation will be required to determine the best locations for the new wells.

31. Majuro's climate, with its seawater-laden winds, high ambient temperatures, and high humidity, accelerates the corrosion of mechanical, electrical, and other susceptible equipment. Piped distribution of seawater to provide household toilet flushing and fire fighting water also leads to corrosion of pumping and similar equipment. While there is sufficient expertise available to adequately maintain robust equipment, it has become apparent that materials and equipment should be carefully chosen to lessen the requirement for specialist maintenance services. Technology should be simple, robust and appropriate for the local environment.

32. Assistance for infrastructure to support the productive sectors and protect the environment are an integral part of the Bank's Country Operational Strategy. Measurement of water consumption and assessment of water losses are difficult because of a lack of consumer metering and failure and unreliability of bulk supply meters. The installation of consumer water meters was included in the JICA-financed water supply project (see para. 21) and will be completed by September 1995. All consumers will be billed on the basis of actual water consumed, and more accurate assessments of unaccounted-for water will be possible. Assessment and reduction of water losses are important in the context of conserving Majuro's limited freshwater resources, as is demand management that will be assisted by the adoption of universal consumer metering and an appropriate tariff structure.

¹ A JICA-financed water supply project (see para. 21).

² Technically, this is a classic Ghyben-Herzberg freshwater lens. Such lenses form in the porous ground of coral atolls and are replenished by rainwater. Freshwater overlies brackish or salty groundwater, which is physically connected to the surrounding seawater.

E. The Bank's Sectoral Strategy

33. The Bank's sectoral strategy in the water supply and sanitation sector in the Marshall Islands focuses on the conservation and efficient use of water, the provision of safe and reliable water to the population, improved cost recovery to allow the sustained operation of water supply and sewerage systems, and innovation and policy change relating to the sector and its institutions. The Bank supports the upgrading and expansion of water supply and sewerage services in the urban areas, introduction of tariffs that will enhance the financial resources of water supply institutions and discourage excessive water use, improvement of the billing and collection efficiency, and the reduction of unaccounted-for water. The Bank therefore places considerable emphasis on the independence and financial viability of water and sanitation agencies to ensure continuing sustainability of service.

F. Policy Dialogue

34. During Project processing, Bank staff undertook a policy dialogue with the Government on several sector policy issues, particularly with regard to (i) the preparation of sector plans and programs, (ii) efficiency and effectiveness of MWSC's operations, (iii) cost recovery, and (iv) community participation. The Government, through its policy of commercialization of sector agencies (see para. 15), is committed to encouraging greater autonomy of these agencies. While the policy dialogue covered several sectoral issues, particular attention was paid to those issues considered essential for the sustainability of the proposed Project. This policy dialogue is within the principal structural reforms of the economy being undertaken under the Bank-financed TA for the Policy Advisory Team for Economic Management.¹

1. Sector Plans and Programs

35. The Government recognizes the need to plan carefully for water supply and sanitation development. Natural sources of freshwater are very limited, the population growth rate is high and, therefore, careful planning of water resource management is essential if economic growth is not to be constrained by lack of potable water and poor sanitation and hygiene. The Government proposes to prepare a sector investment program based on its strategy paper (see para. 20) by 31 January 1996. The strategy will include revised legislation, improved education, and projects to further improve urban water supplies and protect rural groundwater resources, and will relate to policy changes to encourage economic development. More comprehensive measures to protect reserves of natural water from contamination and pollution are being considered, as is the security of land tenure and rights with regard to the access to, and use of, natural water. The Bank will have the opportunity to review the sector investment program. The Project will provide the most urgently needed water supply and sanitation improvements for Majuro, which would be required under the proposed sector investment program.

2. Efficiency and Effectiveness of MWSC

36. The Government has undertaken to improve the operational efficiency of MWSC. In 1993, the Government introduced a number important changes to the management structure of MWSC, which resulted in the appointment of a new Acting General Manager and more effective staffing. It also increased water tariffs almost threefold, with the objective of recovering

¹ TA No. 2295-RMI for \$2.5 million, approved on 31 January 1995 and cofinanced by the USA.

MWSC's O&M costs and the Project investment costs. The adoption of key recommendations of the Bank-financed technical assistance for institutional strengthening of MWSC, which have been incorporated into the Action Plan, will further assist in improving MWSC's efficiency and effectiveness.

37. If MWSC is to become self-sustaining, it is important that it begins to operate on a commercial basis; it needs to act autonomously and actively pursue policy development, planning, and monitoring of results. To achieve these objectives MWSC needs an active and effective Board of Directors. The 1994 audit report of MWSC draws attention to the poor performance of the Board and the need for it to meet regularly and record its business properly. To address some of these issues, the Action Plan provides for changes in the membership and orientation of the Board to provide greater direct representation of water consumers, together with the commencement of regular meetings.

38. To date, the Board of Directors of MWSC has not fully participated in the planning of the Project. However, the Government has given the assurance that the Board will fully participate in the further processing of the Project through regular meetings and discussions, including participation in the Project Implementation Committee, and by ensuring that improvements specified in the Action Plan are implemented in a timely manner.

39. Improvements to the functions of departments and officials within MWSC are proposed under the Action Plan. These are aimed at improving customer service, through the separation of customer service and billing from accounting and recording, and improvements in general accounting and bookkeeping. Operations programs have been prepared, to place more emphasis on preventive maintenance to limit the necessity for emergency repairs. A management information system is included to enable MWSC's management to better monitor the company's performance. Further, training in accounting and bookkeeping has commenced; training in O&M will commence by December 1995.

40. There is a continuing need for strategic planning of water supply and sewerage developments. MWSC at present does not have a Capital Investment Program and Financial Plan. A five-year investment plan, which is to be updated annually, is to be prepared by October 1996. Preparation of such a plan is at present constrained by a lack of direction, management, and staff experience in corporate planning. Improvement in the effectiveness of the Board of Directors, and the proposed temporary employment of a qualified accountant and appointment of a professional water and sanitation engineer during 1995 will facilitate this process.

41. Merging of MWSC with the Marshalls Energy Company has been discussed. The principal benefit would be the increased efficiency and effectiveness that could be achieved by combining billing and collections. Plans for such a merger may be affected by the Government's consideration of full privatization of the Marshalls Energy Company. The merger is to be deferred until MWSC has become fully financially self-supporting.

3. Cost Recovery

42. While MWSC currently depends on subsidies from the Government to finance a large difference between its revenues and expenditure, it has already established tariffs necessary to cover all its operational expenses and debt-service obligation, together with some of its capital program costs. MWSC's present annual O&M expenditures of about \$587,000 (with a further

\$168,000 in bad debts)¹ are largely financed by annual Government subsidies of about \$400,000. The Government has decided to terminate all subsidies to MWSC in fiscal year 1996/97. In view of this, MWSC significantly increased its tariffs in 1994. The Government ministries and institutions are presently not billed for water supply and sanitation services. Meters are being installed on all such water connections, so that measurement of consumption can be used as a basis for Government appropriations for payment of water and sewerage accounts in fiscal year 1995/96. MWSC has undertaken to improve collection efficiency to ensure that monthly receipts exceed 75 percent of monthly billing by 30 September 1996, and that collection efficiency further improves so that monthly receipts exceed 90 percent of monthly billings by 30 September 1998 (these targets are included in the Action Plan).

43. MWSC's new management has inherited a large sum of overdue receivables (about \$780,000 as of January 1995), most of which are unrecoverable and many may have to be written off. MWSC intends to write off accounts designated as doubtful in the 1994 audit. In the 1993 audit, doubtful accounts amounted to about 90 percent of year-end receivables. New collection procedures, based on procedures that have proven successful for the Marshalls Energy Company, have been implemented by MWSC and receivables are now being brought under control. However, MWSC intends to introduce further measures to reduce past due amounts through discontinuation of service for accounts that have amounts 90 days and older, revision of penalties for late payment, and adoption of a policy that receivables 60 days and older should remain less than 10 percent of total receivables. Additionally, conditioning any amnesty for past outstanding debts on customers paying bills monthly and remaining current for a period of time, will motivate water users to begin paying their bills. With the improvements in billing and collection, which are now being implemented, MWSC is expected to achieve full financial independence by the end of the 1997/98 financial year.

4. Public Participation

44. MWSC has conducted participatory meetings at which the community's perceptions, aspirations, and frustrations on water supply, sewerage and environmental matters have been aired. Such meetings are to continue throughout the implementation of the Project, to enable the community to participate in the programming of Project works and to facilitate further discussion on matters pertaining to water conservation, sanitation, hygiene, and protection of the environment.

45. A public relations program to assist in sensitizing the public to the need for water metering and regular payment of bills has been introduced by MWSC (see Appendix 3). The program is aimed at all levels, from Government ministers to schoolchildren. It includes briefings for MWSC's Board of Directors and Government ministers, and involves the participation of village leaders to assist in organizing meetings and workshops. The program covers such topics as the immediate benefits to water delivery that would be obtained with the introduction of metering, the problems that are caused by indiscriminate water usage, the implications of sliding scale billing, and associated topics. The program includes workshops to instruct both men and women on simple plumbing and maintenance tasks, such as repairs to faucets and toilet fittings, and maintenance of roof catchments and water storage tanks. The program involves instruction through health service workers, school programs, radio broadcasting, and the local press.

¹ Fiscal year 1993/94.

IV. THE PROJECT

A. Rationale

46. The Project will help MWSC to alleviate the existing severe water supply deficiencies in Majuro, which have a significant deleterious impact on public health and are impeding economic development. The water shortage is also a cause of severe inconvenience to consumers. The Project will also assist MWSC to alleviate environmental problems that stem from inadequacies in Majuro's sewerage system. At present, the demand for potable water exceeds production. The Project will help introduce proactive programs for the reduction and control of unaccounted-for water and the introduction of a scale of water tariffs and other measures to improve water conservation.

1. The Bank's Approach

47. The Government is concerned with Majuro's water supply and sanitation deficiencies and has accorded high priority for improvements. The Project will enhance the water supply from existing water sources and will improve its transmission and distribution. Without the Project, water supply service levels will remain poor, water pressure will vary through the distribution system, unaccounted-for water will remain at a high level, and sanitation and hygiene will continue to deteriorate.

48. Improvements to water production, transmission, and distribution require concurrent improvements to water treatment and to wastewater disposal, to enable the realization of maximum public health benefits. Environmental degradation, caused by deficiencies in the sewerage system, will worsen if improvements are not carried out.

49. Consistent with the Bank's sectoral strategy, the Project will assist the Government in addressing these deficiencies and in implementing policy reforms covering the equitable distribution of services and facilities throughout Majuro, commercialization of public utility functions, tariff reform, reduction of unaccounted-for water, and improved management of scarce water resources.

2. The Project Area

50. Majuro's first piped water supply scheme, covering a limited area in the most densely populated part of the atoll, was constructed in 1968 and drew its water from an artificially constructed catchment in the most highly populated locality. The catchment supplied water to a storage reservoir, which fed a distribution system of limited extent. The scheme was supplemented by the construction of three shallow wells in 1972. Shortly afterwards, a system that collected the rainwater from the runway of Majuro's international airport, for storage in adjacent reservoirs, was constructed. Water collected at the airport is treated and pumped to serve consumers over a 17-km distance between the airport and Dalap, Uliga, and Darrit (DUD) and Rita (adjacent to Darrit), the main centers of population at the eastern end of the Atoll.

51. A seawater distribution system was constructed in the late 1980s to provide water for flushing toilets and fire fighting in the more densely populated localities of the Atoll. The Laura well field was developed in the early 1990s, and was connected to the storage reservoirs at the airport by means of a new transmission main. Despite this additional supply, Majuro's water demand could not be met during the drought of 1991 and 1992 and water supplies are still limited in availability. Because of the inadequacies of the public water supply system, many

households continue to supplement their supply through the use of rainwater catchment and storage systems. Sales of bottled drinking water, produced at a local bottling plant that utilizes rainwater collected from its roof as well as desalination, also form a small but significant source of potable water supply.¹

52. In March 1995 the airport catchment and storage system was producing, on average, freshwater at about 2,000 cubic meters per day (m^3/d). The well field at Laura was producing freshwater up to 600 m^3/d . These two sources, together with wells that tap a small freshwater lens at Dalap, were producing about 2,700 m^3/d in total. On average, consumers received freshwater of about 70 liters per capita per day (l/cd); at present, about 30 percent of freshwater supplied from the various sources cannot be accounted for. This will be reduced to 25 percent after the completion of the Project. Achievement depends on the installation of new bulk water meters under the Project, and the provision of a 24-hour water supply.

53. The demand for water is currently outstripping the supply available from the public water supply system. Inadequacies in the piping system, which conveys freshwater from the airport to DUD cause uneven pressures through the distribution pipe network. Consequently, if attempts are made to provide a continuous 24-hour public supply, the system would not provide water to a large number of people. Rationing is imposed by restricting the period of supply, and distribution throughout the community is ensured by pumping from the airport water storage facilities for a sufficient time to pressurize the distribution system. This method of operation does not provide equitable distribution, as consumers living at the eastern end of Majuro receive water at lower pressures, and for shorter periods, than those who live closer to the airport water storage and pumping facilities.

54. Majuro's sewerage system serves DUD through a network of gravity flow sewers, pumping stations, and pumped sewers. Sewage is discharged through an outfall into deep water on the ocean side of the atoll. There are seven pumping stations, four of which were originally equipped with submersible pumps and comminutors². The seawater, which is used in the sewerage system, and the corrosive atmosphere of Majuro have combined to irreparably damage the comminutors and have damaged the submersible sewage pumps. While recent improvements to manholes on the sewers have prevented the discharge of large solids, pump breakdowns and blockages occur frequently, causing sewage to flood in streets and residential areas.

B. Objectives and Scope

55. The Project has several objectives relating to the (i) physical objectives of the water supply and sewerage facilities, (ii) institutional improvements, and (iii) improvements to Majuro's environment. The key physical objectives are (a) to overcome restrictions in the supply, storage, treatment, and distribution of water; (b) to reduce water losses; and (c) to reduce environmental degradation through the reduction of sewage overflows. Policy and institutional objectives are to improve (a) the conservation of potable water; (b) the efficiency of water supply and sewerage operations; (c) the legislative framework and accountability of MWSC; and (d) cost recovery, by improving MWSC's billing and collection efficiency. The Project's environmental objective is to improve Majuro's urban environment through improvements to sanitation and hygiene, and reduce the incidence of water-related diseases.

¹ On average, each household purchases about 24 liters of bottled water each week during the dry season, and 4 liters of bottled water each week during the wet season.

² Comminutors are machines designed to shred sewage solids into small fragments.

56. The Project will augment the present freshwater supply of about 2,700 m³/d to about 5,000 m³/d and increase its reliability and safety, thereby improving the health and living standards of about 27,000 people served by Majuro's public water supply system. The improved water supply will also support the development of businesses and increase the effectiveness of public institutions such as schools and the hospital.

57. The Project is consistent with the Bank's strategic objectives of human development. The Project will also contribute to the enhancement of the status of women, poverty reduction, and environmental improvement. The Project will contribute to human development by increasing the quantity of water suitable for drinking, food handling, and personal cleanliness. The Project will reduce the uncertainty, time, effort, and costs to women in collecting, storing and rationing household water supplies. Through the provision of a 24-hour water supply and through improvements to distribution, the quantity of water available to the poor will be increased. The occurrence of sewage overflows will be significantly reduced and water conservation will be enhanced through the introduction of consumer water metering, realistic tariffs, reduction of water losses, and public education and consultation, to contribute to the improvement of Majuro's urban environment and conservation of water resources.

58. The physical components of the Project include (i) improvements to the airport water catchment area; (ii) construction of new wells at the Laura well field; (iii) provision of increased water storage capacity; (iv) construction of a new water transmission main from the airport to the centers of demand at DUD, and improvements to the water distribution network; (v) improvements to water pumping and treatment facilities; (vi) expansion of the seawater distribution system; (vii) improvements to sewage pumping stations; and (viii) the provision of institutional support to the implementing agency. The Action Plan (see Appendix 2) includes training of MWSC staff; improved water metering, billing, and collection; introduction of an improved legislative framework for MWSC; reduction of water losses; and an enhanced role for MWSC's Board of Directors in monitoring the company's performance. Descriptions of the physical Project components are summarized below:

- (i) Improvements to the Airport Water Catchment Area: Replacement of existing water transmission pumps with new pumps to double the pumping capacity; construction of a larger capacity delivery pipeline to the raw water storage reservoirs; and installation of an automatic pump shutoff and alarm system to be activated in the event of saltwater detection by the existing monitoring system;
- (ii) Laura Well Field Development: Construction of three new wells and installation of two new pumps to increase the transmission pumping capacity;
- (iii) Raw Water and Treated Water Storage: Construction of a new water storage reservoir and raising the height of the walls of two existing storage reservoirs, to provide additional raw water storage capacity of about 45,000 m³; raising the height of the wall of the existing treated water storage reservoir to provide additional storage capacity of about 5,700 m³; construction of a new elevated water storage tank at DUD; and demolition of three deteriorated and unsafe water towers. The water storage capacity in DUD will be reviewed to optimize or increase the storage available through the extension of existing facilities or construction of new facilities;
- (iv) Water Transmission and Distribution: Construction of about 14.6 km of water transmission pipeline, ranging from 200 millimeters (mm) to 300 mm in diameter,

from the water treatment plant at the airport to DUD, and interconnection of recently installed distribution mains to the new transmission main;

- (v) Improvements to Freshwater Treatment and Pumping Facilities: Rehabilitation of the water treatment plant near the airport, including installation of two new filters, replacement of filter feed pumps, construction of a new operations and storage building, replacement of bulk flow meters, and associated repair, upgrading, and replacement of pipework, electrical equipment, and instrumentation. The water treatment plant near the hospital will be rehabilitated, with the installation of a new filter, replacement of deteriorated pump control equipment, and replacement of filter feed pumps. New chlorination equipment will be provided at existing water treatment plants and at the Laura well field;
- (vi) Upgrading and Expansion of the Seawater Distribution System: Replacement of isolating valves, construction of two pumping stations, construction of about 7 km of new distribution pipelines, installation of service connections, and installation of fire hydrants;
- (vii) Rehabilitation of the Sewerage System: Replacement of submersible pumps and comminutors at four sewage pumping stations with self-priming centrifugal pumps, and construction of protective sheds to house the new pumping equipment; and
- (viii) Institutional Support and Consulting Services: Institutional support to the Project Management Office (PMO), including consulting services to assist in Project supervision and initiatives to improve cost recovery, development of groundwater resources, support services, and provision of service vehicles and equipment.

C. Technical Justification

59. There is a severe shortage of water in the Project area, indicated by the limited periods during which the public water supply is available and by the purchase of high cost bottled drinking water by consumers. The present sources of the public water supply system are producing water below their optimum capacities. Inadequate water storage capacity has resulted in severe water shortages during periods of drought.

60. Many households and commercial establishments utilize the public water supply system to supplement the rainwater that runs off their roofs and is stored in tanks on their premises. In view of the scarcity of natural water sources, roof water catchment systems are likely to remain a feature of water supplies throughout the Marshall Islands. To further conserve sources of freshwater, a parallel seawater distribution system has been constructed to provide toilet flushing water and fire fighting water to parts of Majuro Atoll.

61. Several options for the development of Majuro's freshwater sources were considered during the formulation of the Project. These included (i) improvement of rainwater collection systems at residential dwellings and commercial and institutional buildings, (ii) expansion of the water catchment area at Majuro airport, (iii) availability and further development of groundwater resources, and (iv) desalination of seawater.

62. Low-technology alternatives to the Project's physical components, such as the improvement of household rainwater catchment and storage systems, conveyance of water to consumers by road tanker, and collection of sewage by means of a collection vehicle would be

uneconomic. Improvement of household water catchments to provide sufficient water storage for basic drinking and cooking purposes in the dry season, even when supplemented with water from the existing freshwater distribution system, would require major repair and upgrading of roofs and collection systems, and in many cases the installation of larger storage tanks. The estimated total cost of such improvements is \$5 million for residential houses, with a further \$3 million being required for installing and upgrading the collection systems at commercial and institutional buildings. A sufficient supply of water to provide for all present household needs would require a fleet of road tankers that would cost an additional \$2 million, and cost a further \$2 million per year to operate. About 80 percent of water samples taken from household water storage tanks have been found to be bacteriologically contaminated.

63. The yield of the existing airport catchment area is restricted by limitations in the size and design of the water collection and transfer system. Improvements to the collection and transfer system are included in the Project; extension of the catchment area, by extending a filled area at the eastern end of the airport runway, was considered. The extension would have a high cost (about \$3 million), and would yield a limited quantity of water (about 380 m³/day). Further, most of the additional water would be collected during the rainy season. A major extension of water storage facilities, beyond the practicable site area near the airport, would be required to provide a year-round benefit to supply. Extension of the airport catchment area is not included in the Project.

64. Analysis has shown that the expansion of the water storage reservoirs at the airport would significantly improve the reliability of supply during periods of drought. The maximum practicable capacity of new water storage reservoirs is limited by the physical nature of the ground between the existing storage reservoirs and the airport and is limited to about 79,500 m³. Expansion by this amount would, however, require the reclamation of a coastal land that is flooded at high tide. The proposed construction of a new reservoir with a storage capacity of 30,000 m³ on vacant land that has already been reclaimed, together with increasing the capacity of existing reservoirs by raising the height of their walls, provides benefits almost as great as a reservoir of 79,500 m³ capacity at considerable cost saving.

65. The results of earlier hydrogeological investigations have indicated that the Laura well field could sustainably produce considerably more water than the existing wells were designed to produce. It is therefore proposed to develop this well field under the Project to produce an additional 2,300 m³ of water per day, at a cost of \$200,000.

66. Desalination of seawater is a high-technology solution to the expansion of Majuro's water resources. The capital cost of a plant capable of producing 1,900 m³ of water per day would be about \$2.5 million, and the plant's operating cost would be about \$1 per m³ of freshwater produced. In view of these relatively high costs, desalination has not been included in the Project. However, it may be a viable source of freshwater for use in the future, when the water sources developed under the Project are fully committed.

D. Cost Estimates

67. The total cost of the Project, including physical and price contingencies as well as service charge during construction on the Bank loan, is \$11.6 million dollars equivalent. Foreign exchange costs, including indirect foreign exchange costs, amount to \$8.0 million equivalent, or 69 percent of the total. A summary of the cost estimates is shown in Table 1, details of the cost estimates are shown in Appendix 4.

Table 1: Summary of Project Costs (\$ million)

| Project Component | Foreign Exchange | Local Currency | Total Cost |
|---|-------------------------|-----------------------|-------------------|
| Base Cost | | | |
| Civil Works | 3.23 | 1.58 | 4.81 |
| Materials and Equipment | 2.75 | 0.18 | 2.93 |
| Institutional Support | <u>1.10</u> | <u>0.14</u> | <u>1.24</u> |
| Subtotal | 7.08 | 1.90 | 8.98 |
| Service Charge and Contingencies | | | |
| Physical Contingencies | 0.46 | 0.18 | 0.64 |
| Price Contingencies | 0.17 | 0.13 | 0.30 |
| Interest During Construction | <u>0.24</u> | <u>1.41</u> | <u>1.65</u> |
| Subtotal | 0.87 | 1.72 | 2.59 |
| TOTAL PROJECT COST | 7.95 | 3.62 | 11.57 |

E. Financing Plan

68. It is proposed that the Bank provide a loan in an amount equivalent to Special Drawing Rights 6,062,000 from its Special Funds resources to cover 80 percent of the total Project cost. The loan will finance the entire foreign exchange cost of approximately \$8.0 million equivalent, including the service charge on the Bank loan, and about \$1.2 million equivalent of local currency costs. Local cost financing will cover part of the civil works, land costs, and secretarial support for the PMO. The Borrower and MWSC will provide the remaining \$2.4 million, constituting about 20 percent of the Project cost not covered under the Bank loan, comprising \$0.5 million equivalent for duties and taxes, \$1.4 million equivalent of interest on the amount lent to MWSC, \$0.1 million of salaries of MPW staff seconded to the PMO, and \$0.4 million for civil works. The Bank loan will have a term of 40 years, including a grace period of 10 years and a service charge of 1 percent per annum. The Borrower will be the Republic of the Marshall Islands.

Table 2: Proposed Financing Plan (\$ million)

| Source | Foreign Exchange | Local Currency | Total Cost | Financing Percentage |
|---------------|-------------------------|-----------------------|-------------------|-----------------------------|
| Bank | 8.0 | 1.2 | 9.2 | 80 |
| Government | - | <u>2.4</u> | <u>2.4</u> | <u>20</u> |
| Total | 8.0 | 3.6 | 11.6 | 100 |

69. Under a subsidiary loan agreement, the Government will relend the proceeds of the loan to MWSC at the rate of 6.9 percent (based on the Bank's US dollar ordinary capital resources terms) and an amortization period of 25 years, including a grace period of 5 years.

F. Implementation Arrangements

1. Project Execution

70. The Executing Agency for the Project will be MPW, which is the Government's principal project management and construction agency and which will be responsible for overall supervision, coordination, and planning of implementation. To oversee and coordinate all Project activities and to ensure appropriate liaison among agencies involved in Project implementation, the Government has established a Project Implementation Committee (PIC), chaired by the Secretary of Public Works. Members of PIC include the General Manager, Administration Manager, and representatives of the Board of Directors of MWSC; the General Manager and senior staff of MPW; and representatives of the Office of the President and the Ministry of Finance, and other agencies as are from time to time required to ensure the smooth implementation of the Project. PIC will meet as often as required but at least once every three months.

71. MPW has established a PMO, headed by a Project Manager and using existing MPW technical and administrative personnel, to supervise the ongoing Bank-financed engineering loan project for carrying out detailed design, contract packaging, prequalification of contractors, bidding procedures, tender evaluation, and contract award for the Project. PMO will continue its supervision functions throughout the duration of the Project, assisted by the existing consultants with additional input for design and contract supervision. This implementation arrangement is based on experience from the engineering loan project and the institutional development TA. MWSC staff will be seconded to PMO for training in the O&M of Project facilities. The details of Project implementation arrangements, with organization charts, are given in Appendix 5.

2. Community Participation

72. Participatory public meetings were held during the implementation of the engineering loan project and during Project processing. During these meetings, particularly at fact-finding, issues of health aspects of water use, water conservation, rights of access to water resources, water tariffs, and affordability were discussed. MWSC will continue to hold participatory discussions in response to the community interest that was demonstrated. A multifaceted public relations program is also being implemented by MWSC management, to assist their efforts to improve community acceptance of meterized billings and willingness to pay (see Appendix 3).

3. Procurement

73. Procurement of goods and services will be in accordance with the Bank's *Guidelines for Procurement*. One contract will be awarded under international competitive bidding procedures for the civil works and supply of materials and equipment for improvements to the airport water catchment area, water storage, water transmission and distribution, treatment and pumping facilities, expansion of the seawater distribution system, and rehabilitation of the sewerage system. A contract for the construction of new wells at the Laura well field will be awarded under local competitive bidding procedures acceptable to the Bank. Two service

vehicles will be purchased under direct purchase procedures to ensure compatibility with MPW and MWSC existing vehicle fleets. Computers and special software for water supply and sanitation O&M data processing are also to be purchased under direct purchase procedures. In formulating these arrangements, consideration has been given to the difficulties of coordinating separate equipment supply with construction contracts on the small, relatively remote atoll of Majuro. PMO will be assisted in the preparation and evaluation of bids by the consultants. A summary of procurement packages is given in Appendix 6.

4. Consultant Services

74. Consulting services will be required in two packages. The first package will comprise hydrogeological investigation to confirm the resources and extent of the Laura well field, to clearly ascertain its optimum sustainable water yield, and the optimum locations and layout of new production wells. The investigation will be followed by the detailed design for the construction of two new wells. This will involve about eight person-months of consulting services by international groundwater experts.

75. The second package will comprise assistance to MPW in Project management and construction supervision, and will involve about 36 person-months of international construction management consultants. The construction management consultants will assist PMO in the environmental monitoring of Project works. As both consulting packages are interrelated, the Bank has approved that both packages be carried out by experts from a single firm (see para. 87). The consultants will report to PMO and will be evaluated in accordance with the Bank's *Guidelines on the Use of Consultants*. The terms of reference for the consultants are given in Appendix 7. The Bank has approved the direct selection of consultants from the firm which has been engaged under the Bank-financed engineering loan, in view of that firm's previous knowledge and continuing involvement in the Project. It is proposed that the consultants' contract be finalized immediately after the proposed loan becomes effective.

5. Implementation Schedule

76. It is envisaged that the Project will proceed rapidly, owing to its relatively small scale and the intention to carry out the bulk of the works under a single contract. The proposed implementation schedule is given in Appendix 8. It is planned that the Project will be implemented over a period of four years and will be completed by March 2000.

6. Land Acquisition

77. The Government has agreed to make available the land required under the Project in a timely manner. Land required for the new raw water storage reservoir has been held under a 25-year Government lease, which terminates in 1995, together with the leases on the land on which the airport has been developed. This land is unoccupied and unused; no involuntary resettlement is required under the Project. The Government has agreed to secure this land by 30 April 1996. The Government leases land at the Laura well field; any additional land required for the construction of new wells will be determined when hydrogeological investigations have been completed. The Government has agreed to secure the required land at Laura by January 1997.

7. Imprest Fund Account

78. To ensure the timely release of loan proceeds, portions of the proceeds will be deposited in an imprest fund account, which will be established at a bank designated by the Government and acceptable to the Bank. Except as the Bank may otherwise agree, the imprest account will consist of advances from the Bank for eligible expenditures for the Project. The amount to be deposited will be based on estimated anticipated expenditures for a six-month period for the construction of new wells at the Laura well field, purchase of service vehicles, and secretarial support for PMO, estimated as \$250,000. The account will be established, operated, and maintained in accordance with the Bank's *Guidelines on Imprest Fund and Statement of Expenditures Procedures* (November 1986), as amended from time to time, and such other terms and conditions as may be agreed upon between the Borrower and the Bank.

79. The Bank's statement of expenditures procedures will be used for (i) reimbursing expenditures equivalent to \$50,000 or less, and (ii) liquidating advances for individual payments from the account equivalent to \$50,000 or less.

8. Reports, Accounts, and Audit

80. MWSC will maintain separate records and accounts for the Project, and will have the accounts and related financial statements, together with the imprest fund account and the statement of expenditures records, audited annually by independent private auditors acceptable to the Bank. MWSC will provide the Bank with copies of the audited accounts and financial statements, together with the report of the auditors, not later than nine months after the end of the fiscal year to which they relate. The audit of the imprest fund account and the statement of expenditures records may be carried out as part of the regular annual audit of MWSC's general accounts and financial statements as stipulated in the Loan and Project Agreements, but the opinion on that part of the examination relating to the account should be separately set out in the auditor's report.

81. MWSC will provide the Bank with quarterly progress reports on Project implementation. Within three months of the physical completion of the Project, MWSC will provide the Bank with a Project completion report on the execution and initial operation of the Project facilities, including the costs and compliance with the loan covenants.

9. Benefit Monitoring and Evaluation

82. To ensure that the Project is managed efficiently and that the works and the benefits are maximized, a benefit monitoring and evaluation (BME) system has been developed by TA consultants (see Appendix 9) and will be refined by MPW in coordination with MWSC and the community during the implementation of the Project and in accordance with the Bank's *Handbook for Benefit Monitoring and Evaluation*. MPW will coordinate with MWSC to collect records of production volumes, numbers of connections, sales volumes, quality of water, cost recovery, and impact on the community. Particular attention will be paid to supply-demand relationships, and to impacts on the poor and on women. The benefits of the Project will be evaluated after the Project has been completed. The BME system will assist MWSC in the ongoing monitoring of its operations.

10. Midterm Review

83. To supplement periodic reviews, a comprehensive midterm review will be carried out by the Government and the Bank about 12 months after loan effectiveness. The exact timing of the midterm review will be determined during the course of periodic reviews and consultation with the Government. This review will (i) critically evaluate the Project progress, Project implementation procedures, procurement, benefit monitoring and evaluation activities, the Project consultants' performance, community participation activities, and the implementation of institutional improvements in MWSC; and (ii) formulate measures to remedy identified weaknesses to ensure successful Project implementation and achievement of Project objectives. The terms of reference of the midterm review are set out in Appendix 10.

11. Operation and Maintenance

84. MWSC will take over responsibility for managing, operating and maintaining the Project components immediately after the completion of the Project. MWSC has demonstrated its ability to operate and maintain the existing water supply and sewerage facilities adequately, although further improvements are needed to ensure the sustainability of Project facilities. The Project facilities will be of appropriate technology, design, and standard to simplify operation and maintenance requirements. MWSC has been constrained in its efforts to reduce unaccounted-for water by inaccurate bulk water supply meters and by a lack of meters on consumers' connections. Bulk water meters will be replaced under the Project, and MWSC is proceeding with the installation of meters on all consumer connections, and updating its records of the location of consumer connections. The consumer meter installation program is expected to be completed during September 1995. With the installation of new bulk supply meters under the Project, MWSC will be able to gauge and locate water losses much more accurately and take immediate remedial action.

85. New sewage pumps to be installed under the Project will be of a type that has already proved reliable at several sewage pumping stations in Majuro. They will replace pumping systems that have been found to be insufficiently robust to withstand the highly corrosive nature of Majuro's seawater-borne sewage, and prone to frequent blockage. The manpower and other resources that MWSC currently diverts into clearing blocked pumps and cleaning up sewage overflows will be considerably reduced.

86. Assistance in O&M is provided by the USA through OMIP, which annually reviews the status of O&M of public works and makes recommendations for the implementation of O&M programs. To further improve the O&M capability of MWSC and provide staff training, MWSC has recently recruited an expatriate water and sanitation engineer.

12. Advance Action

87. The Bank has approved advance action in tendering for civil works and the supply of materials and equipment. It is proposed to prequalify contractors and invite and evaluate bids in preparation for award of contract immediately after the proposed loan becomes effective. The Bank has approved advance action in the engagement of existing consultants to carry out design work and assist in Project supervision (see para. 75).

G. The Executing Agency

88. MPW has over 130 managerial, professional, technical, and support staff, and is responsible for implementing all major public works in the Marshall Islands. It has an annual budget of \$1.8 million allocated by the Government. It receives support from the USA, through OMIP, for the engagement of three expatriate managerial and professional staff. MPW has implemented water supply improvements throughout the Marshall Islands and through its predecessor the Capital Improvements Program, has implemented earlier developments of the Majuro water supply system. Through its role in the implementation of other Bank-financed projects¹ it has become familiar with Bank requirements and procedures. MPW is currently providing design services, and is supervising bidding and providing construction inspection services for civil works under Bank-financed projects in the health and education sectors. MPW is a competent and well-managed organization that is capable of implementing the Project works.

89. MWSC will assist MPW in Project implementation. MWSC currently has 43 managerial, technical and support staff and is implementing institutional improvements recommended under TA No. 1946-RMI. MWSC's present annual O&M expenditures of about \$750,000 (which includes a significant sum of bad debts) are financed in large part by Government subsidy, which will cease in 1996/97 (see para. 42). The proposed institutional improvements include the passage of a new enabling act for MWSC to clearly establish appropriate powers for its operation; the definition and strengthening of the role of the Board of Directors, including changes in the composition of the Board to include more private sector involvement and improved monitoring of MWSC's performance; improved procedures for billing and collection; separate accounting for freshwater supply, seawater supply, and sewerage services; and the adoption of a new tariff structure to promote water conservation but maintain affordability for the low income consumers.² The Government has given assurances as to the timely implementation of these institutional improvements (an outline institutional, operational, and financial action plan is given in Appendix 2; the organization charts of MPW and MWSC are presented in Appendix 11).

H. Environmental and Social Measures

1. Environment

90. Consideration of the most cost-effective approach to the design of the Project was carried out in conjunction with an assessment of the environmental impacts of the Project. This integrated approach to planning and design has led to the selection of the least environmentally intrusive option for water supply development.

91. Improvement of the water collection and transfer system at the airport (see para. 63) will significantly increase the efficiency of the existing catchment, with little environmental intrusion. Extension of the airport catchment, on the other hand, would require the reclamation of an area of tidal coastal land, with the destruction of some coral reef. Extension of the catchment is not included in the Project. The construction of a larger water storage reservoir than the proposed 30,000 m³-capacity reservoir (see para. 64) would require considerable earth filling of a tidal area and the destruction of coral reef. The location of new wells at the Laura well field (see para. 65) will be determined by hydrogeological investigations carried out under the

¹ Loan No. 1249-RMI: *Basic Education Development*, for \$8.0 million, approved on 9 September 1993; and Loan No. 1316-RMI(SF): *Health and Population*, for \$5.7 million, approved on 22 September 1994.

² The present water tariff, implemented in 1994, imposes a uniform price per cubic meter of water consumed. A stepped tariff is proposed, with a low tariff being applied for low levels of consumption.

Project; the lens has capacity to provide the required sustainable yield from the existing and the proposed wells. A seawater desalination plant (see para. 66) would have some environmental intrusion, being essentially a small factory area for which noise, emissions, aesthetics, and land use would have to be carefully considered. Seawater desalination is not included in the Project.

92. The existing sewerage system, septic tanks and water-sealed latrines have been designed for households with full water supply services. They have adequate capacity to handle the additional quantities of wastewater that will be generated by the Project water supply facilities.

93. The principal direct environmental intrusion of Project works would relate to the filling of a minimal area (less than 0.25 ha) of coastal land to support one corner of the proposed new freshwater storage reservoir near the airport. The new storage reservoir will cause some limited visual intrusion. An indirect, but cumulative intrusion will be caused by the excavation of fill from a locality that is currently used for the purpose in the Majuro lagoon. There will be some temporary disturbance caused by traffic and pipeline construction during Project implementation. Consultants engaged under the Project will monitor such disturbances to ensure that they are minimized. Ongoing monitoring of the impacts of Project facilities will be carried out after the conclusion of Project implementation under the MPW's inspection procedures and through water quality and other monitoring carried out by EPA.

94. An environmental impact assessment, as defined under EPA's requirements and satisfying the requirements of an initial environmental examination in terms of the *Environmental Assessment Requirements and Environmental Review Procedures of the Asian Development Bank* and the Bank's *Environmental Requirements for Selected Infrastructure Projects*, has been prepared and has been made available for public examination and comment. Its findings have been summarized in a Summary Initial Environmental Examination.¹

2. Social Analysis

95. Public participatory meetings commenced during project preparation (see para. 44) and will be continued. The Project will incorporate a public relations program (see para. 45 and Appendix 3). No involuntary resettlement is required, as the land required for reservoir construction is vacant and land required for well field development is minimal in extent.

V. PROJECT JUSTIFICATION

A. Economic and Financial Analysis

1. Economic

96. MWSC has been operating at a loss and has required government subsidy to meet minimum operating cash requirements. This has contributed to the current deteriorated state of the system. Improvements provided by the Project are necessary before water users will willingly pay for the services of MWSC. The Project will not only increase the quantity of water available, particularly during drought periods when alternative sources are not available to consumers, but will also improve the quality of all water delivered and the distribution of water, so that if and when water rationing is required, even the poor and densely populated area of Rita at the eastern extreme of the atoll will have access to adequate quantities of water.

¹ Supplementary Appendix B, available in the Project file.

97. The health benefits of the Project will be significant, as improved sanitation and health is a serious concern for Majuro. In 1993 3,475 incidents of diseases related to water and sanitation deficiencies were recorded in Majuro (14.2 per 100 population), including 3,087 cases of gastroenteritis, 371 cases of amoebiasis, and 15 cases of typhoid. Prevention of disease by improved water supply and sanitation will become even more important over the next decade, as the Government faces declining funds available for health care as a result of reductions in Compact funding.

98. The Project yields an economic internal rate of return (EIRR) of 14.75 percent, including benefits accruing from a portion of the estimated expenditure on bulk and bottled water. The Project will also decrease the necessity of further private investment in roof catchment and storage systems; however, this benefit has not been quantified. Further details and assumptions of the EIRR calculation are shown in Appendix 12.

2. Financial

99. The Project will yield a financial internal rate of return (FIRR) of 8.96 percent. Further details and assumptions of the FIRR calculation are shown in Appendix 12. Financial projections, which are summarized along with assumptions in Appendix 13, indicate that with the implementations of recommendations of TA No. 1946-RMI set out in the Action Plan, together with improvements in service and related billing and collection performance, MWSC should be in a strong financial position. MWSC will be able to meet all cash obligations of operations, debt servicing, and increased budget for regular capital replacement by financial year 1996-97.

3. Tariffs and Subsidies

100. Government subsidies for MWSC's O&M costs are to cease in fiscal year 1996/97 (see para.42). Water tariffs have been increased accordingly; the average water tariff (assessed on the basis of charges for all MWSC's services, including freshwater supply, seawater supply and sewerage) has risen from \$0.46 per m³ of freshwater water sold in 1993 to \$1.24 per m³ in 1994. The costs of MWSC's sewerage and seawater distribution services are in part financed by direct user charges for these services, with the balance being financed from freshwater sales. Benefits of these services, which include improved sanitation and health, conservation of freshwater, and an improved urban environment, are spread community-wide.

101. At present, all domestic water consumers are charged for freshwater at a rate of \$1.58 per m³, irrespective of the amount of water they consume. Affordability analysis (see Appendix 13) has indicated that, at this price, low-income consumers will be able to afford a minimum quantity of water for domestic purposes (40 lcd, as compared with the projected average domestic consumption of 100 lcd, see para. 104). MWSC is to introduce a stepped water tariff in 1997, to ensure better affordability for lower income consumers and to deter luxurious water use by higher income consumers. The immediate introduction of stepped tariffs would unfairly discriminate against large households which have least ability to pay. The introduction of stepped tariffs will be appropriate once consumer metering and public education have taken effect, and the number of shared water supply connections has been reduced. A schedule of stepped tariffs has been recommended by consultants under TA No. 1946-RMI, and may be fine tuned in the light of experience of the effect on consumption of the recent increase in water tariffs.

102. The Government is negotiating with landowners at Laura for the use of land and water rights to enable continued and enhanced extraction of water from the Laura freshwater lens, and has decided that water would be provided free of charge to Laura landowners. The Government has assured the Bank that the quantity of free water will be restricted to the amount required for the reasonable domestic requirements of the landowners and their families. Water meters will be installed at the landowners' houses and Government will budget annually to compensate MWSC for loss of revenues incurred, based on metered water consumption. Prior to the loan becoming effective, the Government is to provide the Bank with evidence that MWSC will be adequately compensated for loss of revenues.

4. Project Risks

103. Several Project risks have been identified and assessed during Project preparation. They are (i) inadequate capacity of MPW to manage and execute the Project, (ii) insufficient capacity of local contractors to carry out all Project works, and (iii) lack of MWSC to ensure the sustainability of Project components. The ability of MPW to implement the Project effectively will be ensured through the continuation of the existing PMO, which will be assisted by international consultants. Major works will be procured through international competitive bidding to ensure that contractors are adequately prequalified to carry out the works. The capacity of MWSC to sustain the Project will be ensured by the implementation of an Action Plan, which has been based on the recommendation of the Bank-financed TA.

104. Domestic water demand projections are based on an assessed requirement of 150 lcd for household use.¹ In projecting a freshwater demand of 100 lcd, allowance has been made for the use of water from household rainwater catchments, the use by some consumers of seawater for toilet flushing, and the use by some consumers of toilets that require limited quantities of flushing water. The assessment of demand has been based on information obtained during a social analysis carried out during Project formulation (see para. 106). The Project BME system includes the assessment of metered water consumption; this data will be reviewed during the midterm review of Project implementation.

B. Environmental Benefits

105. The Project will directly improve the urban environment of Majuro. By removing constrictions in the existing sewage pumping system, the Project will provide a cost-effective means of enhancing the urban environment. Deficiencies at several of Majuro's sewage pumping stations cause pump blockages, which are a daily occurrence and which in turn cause sewage to overflow and flood onto streets and into residential areas. Sewage pumps also break down frequently because of severe corrosion caused by seawater-borne sewage. MWSC has resealed its sewer manholes to prevent the deposition of large solids into the sewerage system; replacing sewage pumps under the Project with pumps that are better suited to Majuro's conditions will virtually eliminate blockages and breakdowns. Under the Project, emergency outfall pipes are to be constructed at two pumping stations to prevent sewage from overflowing into nearby residential areas in the unlikely event of a breakdown.

¹ Household water use includes drinking, cooking, and food preparation (15 lcd); dishwashing and house cleaning (25 lcd); bathing (50 lcd); laundry (30 lcd); and toilet flushing (30 lcd).

C. Social Dimensions

106. A comprehensive socioeconomic survey was conducted during Project preparation, to assess the likely social impact of the Project, and to help identify issues of importance to Project planning, implementation, and monitoring. The results are discussed in a detailed Project social analysis and summarized in a social dimensions summary.¹ Factors surveyed included householder profiles, existing water sources and usage patterns and needs, affordability, willingness to pay for an improved water supply, attitudes towards water metering and billing, and sanitation and solid waste disposal practices. A full range of income and interest groups was sampled, reflecting the varying current levels of water service and circumstances of distinct client groups on the atoll.

107. The results show that while most households in Majuro have direct or indirect access to the public water supply system, a large number also depend on shallow wells and roof catchment systems. This is primarily because of the limited availability of the public water supply, but also in some cases for the cost savings of private rainwater catchment systems (once the initial investment has been made in a rainwater collection system, people perceive the rainwater as being free), and still in some cases for a preference for rain or bottled water for drinking purposes. Commercial users also remain dependent on nonpiped sources through the use of rainwater collection systems, wells, and bulk purchases of bottled drinking water. There is dissatisfaction with the present water supply and sewerage services, and a willingness to pay for improved services.

108. Some households are extremely poor and have a large number of occupants. Such cases, where affordability may be a significant issue, indicate the desirability of installing a few public standpipes in each village to enable the very poor (or temporarily disconnected consumers) to have access to water at an affordable cost. Reductions in national income will occur as external funding under the Compact declines. This, in turn, may have a significant deleterious impact on Government employment, household incomes, and provision of health care services. An improved water supply system will provide lasting benefits and help mitigate health costs and loss of income due to sickness.

109. Meetings and discussions with various groups and individuals have indicated that women can and are willing to play a more active role in delivery of water utility services, both through participation in the direction and policy development of MWSC and through non-traditional work such as meter reading, learning skills to be able to make plumbing repairs, and providing consumer education and liaison to advise on water usage and conservation measures to help minimize monthly expenditure on water. Of note were views expressed by the Director of Women's Affairs, that public participation has played a key role in determining the success or failure in the implementation of other projects. This is backed up by numerous examples of active support by women in certain community initiatives.

VI. ASSURANCES

110. The Government and MWSC have given the following assurances, in addition to the standard assurances, which have been incorporated in the legal documents:

¹ Supplementary Appendix C, available in the Project file.

A. Specific Assurances**1. Project Implementation**

- (i) the Minister of Public Works will bear overall responsibility for Project execution and, under the supervision of the Minister of Public Works, the General Manager of MWSC will implement the Project with the assistance of a Project Manager;
- (ii) MPW will continue to utilize a PMO, continue the appointment of a qualified and experienced Project Manager as head of the PMO, and will continue the appointment of at least one technical and one administrative officer under the supervision of the Project Manager;
- (iii) the Government will continue to utilize a PIC chaired by the Minister of Public Works and with membership including the Administration Manager and representatives of the Board of Directors of MWSC, the General Manager and senior staff of MPW, and representatives of the Office of the President and the Ministry of Finance and other agencies appointed by the Government;

2. Midterm Review

- (iv) within 15 months of the loan becoming effective, the Government will conduct a comprehensive Midterm Review in consultation with the Bank and the Project consultants; the Midterm Review will critically evaluate the progress of the Project, implementation procedures, procurement, BME, the performance of the consultants, community participation, and the implementation of institutional improvements in MWSC; measures will be formulated to remedy any weaknesses;

3. Land

- (v) except as the Bank may otherwise agree, the Government will ensure that land required for the construction of the new water storage reservoir, seawater pumping stations, and ancillary works is made available before 30 April 1996 and that land required for the construction of new wells at Laura is made available before 31 January 1997;

4. Accounts Receivable

- (vi) commencing in fiscal year 1996/97, the Government will cause MWSC to classify its customers as residential, commercial and Governmental and make provision to write off accounts overdue more than two years;
- (vii) the Government will cause MWSC to take all necessary measures to reduce its accounts receivable to less than three months of current billings before 30 September 1998;

5. Tariffs

- (viii) commencing in fiscal year 1996/97, the Government will cause MWSC to review tariffs annually to ensure that operating and maintenance costs, excluding

depreciation, and applicable loan financing costs are met and the Government will cause MWSC to annually adjust tariffs;

- (ix) the Government will cause MWSC to introduce stepped or appropriate sliding scale tariffs before 31 December 1997;

6. Collection Efficiency

- (x) the Government will cause MWSC to take all necessary measures to improve its collection efficiency to achieve the following targets:
 - (a) more than 75 percent of current monthly billings before 30 September 1996;
 - (b) more than 85 percent of current monthly billings before 30 September 1997; and
 - (c) more than 90 percent of current monthly billings before 30 September 1998;

7. Capital Investment Program

- (xi) the Government will cause MWSC to update annually MWSC's Capital Investment Program and Financial Plan (CIPFP) and provide the Bank an opportunity to comment on the CIPFP within one month of the completion of the CIPFP for fiscal year 1996/97;

8. Unaccounted-for Water

- (xii) by 30 June 1996, MWSC will furnish to the Bank a plan to:
 - (a) improve the efficiency of its salt water distribution system in order to reduce unaccounted-for water less than 30 percent of production before 31 March 2000; and
 - (b) improve the efficiency of its freshwater distribution system in order to reduce unaccounted-for water to less than 25 percent of production before 30 September 2003;

9. Community Participation

- (xiii) the Government will cause MWSC to continue to hold participatory public meetings to discuss water conservation, health aspects of water use, rights of access to water resources, water tariffs, affordability, and other Project related issues;
- (xiv) the Government will cause MWSC to inform the Bank annually of steps taken to improve community acceptance of meterized billings and willingness to pay;

10. Environmental Matters

- (xv) the Government will cause MWSC to comply with the Bank's environmental requirements and with environmental laws, and will obtain all necessary approvals with respect of environmental impact assessments;

11. MWSC Organization

- (xvi) the Government will consult with the Bank and take Bank comments into account before implementing any reorganization of MWSC;

12. Operational Training

- (xvii) MWSC will second two technical staff to the PMO for training in the operation and maintenance of the facilities provided under the Project;

13. Institutional, Operational and Financial Action Plan

- (xviii) the Government will cause MWSC to take all necessary measures to ensure that all other targets under the Institutional, Operational and Financial Action Plan are achieved as scheduled; and

B. Condition of Effectiveness

- (xix) except as the Government and the Bank may otherwise agree, the Government and MWSC will, prior to the effective date, provide evidence satisfactory to the Bank demonstrating that the Laura landowners annually receive only limited amounts of free water for their personal use or some other form of royalty and that MWSC is adequately compensated for all free water and, if applicable, royalties provided by MWSC to such landowners.

VII. RECOMMENDATION

111. I am satisfied that the proposed loan would comply with the Articles of Agreement of the Bank and recommend that the Board approve the loan in various currencies equivalent to Special Drawing Rights 6.062 million to the Republic of the Marshall Islands for the Majuro Water and Sanitation Project, with a service charge at the rate of 1 percent per annum and with an amortization period of 40 years, including a grace period of 10 years and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan and Project Agreements presented to the Board.

MITSUO SATO
President

4 September 1995

APPENDIXES

| Number | | Page | Cited on (page, para.) |
|---------------|---|-------------|-----------------------------------|
| 1 | External Assistance to the Water Supply and Sanitation Sector | 30 | 10, 22 |
| 2 | Institutional Operational and Financial Action Plan for Majuro Water and Sewer Company (MWSC) | 31 | 12, 28 |
| 3 | Public Relations Program for Sensitization for Meterization and Metered Billings | 33 | 19, 45 |
| 4 | Detailed Project Cost Estimates | 36 | 30, 67 |
| 5 | Project Implementation Arrangements | 37 | 33, 71 |
| 6 | Procurement Packages | 40 | 34, 73 |
| 7 | Outline Terms of Reference for Consulting Services | 41 | 34, 75 |
| 8 | Majuro Water Supply and Sanitation Project Implementation Schedule | 44 | 35, 76 |
| 9 | Benefit Monitoring and Evaluation Program and Criteria | 45 | 37, 82 |
| 10 | Terms of Reference for the Midterm Review | 49 | 38, 83 |
| 11 | Organization Charts of Majuro Water and Sewer Company and Ministry of Public Works | 52 | 40, 89 |
| 12 | Financial and Economic Analysis | 54 | 45, 94 |
| 13 | Financial Statements and Projections | 64 | 45, 101 |

SUPPLEMENTARY APPENDIXES:
(available on request)

- A Detailed Description of Project Components
- B Summary Initial Environmental Examination
- C Social Dimensions

EXTERNAL ASSISTANCE TO THE WATER SUPPLY AND SANITATION SECTOR

| Description | Amount (US\$) | Approved |
|---|------------------|-------------|
| The Bank | | |
| TA No. 1775-RMI: <i>Majuro Water Supply</i> | 100,000 | 30 Oct 1992 |
| TA No. 1946-RMI: <i>Institutional Strengthening of the Majuro Water and Sewer Company</i> | 150,000 | 9 Sep 1993 |
| Loan No. 1250-RMI(SF): <i>Majuro Water Supply</i> | 700,000 | 9 Sep 1993 |
| USA - Capital Improvement Project | | |
| Laura Wastewater System | 211,500 | 1984 |
| Sewer Phase II | 7,800,000 | 1984 |
| Majuro Water Catchment | 796,000 | 1991 |
| Ebeye Sewer Rehabilitation | 277,000 | 1982 |
| USA - Other | | |
| Development of the Laura Well field | 200,000 | 1980 |
| Government of Japan | | |
| Majuro Water Supply Rehabilitation | 3,000,000 | 1986 |
| United Nations Development Programme | | |
| Water and Sanitation Sector Action Plan | 657,000 | 1993 |

**INSTITUTIONAL, OPERATIONAL, AND FINANCIAL ACTION PLAN FOR
MAJURO WATER AND SEWER COMPANY (MWSC)**

Institutional

- | | | |
|----|--|-------------|
| 1. | MWSC's billing operations to be functionally separated from customer services before | 30 Nov 1995 |
| 2. | Technical training of MWSC's staff to commence before | 31 Dec 1995 |
| 3. | New enabling legislation for MWSC to be introduced before | 30 Apr 1996 |
| 4. | New MWSC Board of Directors to be appointed before | 30 Apr 1996 |

Operational

- | | | |
|-----|--|-------------|
| 5. | Benefit monitoring and evaluation program to be reviewed by the Project Management Office before | 31 May 1996 |
| 6. | Programs to reduce unaccounted-for water in the freshwater system to less than 25 percent, and in the seawater distribution system to less than 30 percent, to commence before | 30 Jun 1996 |
| 7. | Public relations program for meterized billing to be completed and reviewed by MWSC's Board of Directors to assess its effect on collections, before | 30 Jun 1996 |
| 8. | MWSC Board of Directors to commence reviews of monthly financial statements and operations indicators before | 31 May 1996 |
| 9. | Public Annual General Meetings of MWSC to commence before | 31 May 1996 |
| 10. | Policies and conditions of Laura sewerage and sanitation to be reviewed before | 30 Sep 1996 |
| 11. | Improvement in efficiency of the seawater distribution system to reduce unaccounted-for water to less than 30 percent to be completed before | 31 Mar 2000 |
| 12. | Improvement of efficiency of freshwater system to reduce unaccounted-for water to less than 25 percent of production to be completed before | 30 Sep 2003 |

Financial

- | | | |
|-----|--|-------------|
| 13. | MWSC Board to review 1995/96 budget before | 30 Sep 1995 |
| 14. | All water users to be metered before | 30 Sep 1995 |
| 15. | MWSC to classify its customers as residential, commercial, and Governmental, and make provision to write off accounts overdue by more than two years, setting aside a loss provision each year equivalent to the estimated uncollected payments before | 30 Apr 1996 |
| 16. | Month-end trial balances including all accounts payable to commence before | 30 May 1996 |
| 17. | Public notification of amnesty of outstanding residential accounts dated at the latest to 30 April 1996, on condition of customer maintaining current monthly payments for at least four months, to be approved for implementation before | 30 Apr 1996 |
| 18. | All water users to be charged on the basis of metered water consumption before | 31 Oct 1995 |
| 19. | Disconnection policy enforced on accounts over 90 days in arrears that are not maintaining current payments to be enforced before | 30 Apr 1996 |
| 20. | Five-year capital investment program, with procedure for annual review, to be prepared before | 01 Oct 1996 |
| 21. | Collection ratio of monthly receipts:billings to be improved to better than 75 percent before | 30 Sep 1996 |
| 22. | Receivables 60 days and older to be reduced to less than 10 percent of the total receivables by | 30 Sep 1996 |
| 23. | Collection ratio of monthly receipts:billings to be improved to better than 85 percent before | 30 Sep 1997 |
| 24. | Stepped or sliding scale tariffs to be introduced before | 31 Dec 1997 |
| 25. | Collection ratio of monthly receipts:billings to be improved to better than 90 percent before | 30 Sep 1998 |

PUBLIC RELATIONS PROGRAM FOR METERIZATION AND METERED BILLINGS

1. Public acceptance of metering and meterized billing will benefit from a multi-faceted public relations campaign, a task which will fall to the Board and management of MWSC. The following program is recommended for concurrent implementation at all levels:

A. MWSC Board of Directors:

- (i) to receive orientation and training about the water system and proposed improvements, the cost of water provision, and implications for revenue requirements; and the Board's responsibility for MWSC;
- (ii) to receive briefing on the impact of indiscriminate water use, and improvements in service that would be possible with proper water management, and maintenance of the system; and
- (iii) to conduct strategic planning for the introduction of meterized billing, public education, and related public relations, including the important supporting role the Board can play in obtaining a high and meaningful level of government cooperation.

B. Ministers, Senators and Senior Government Officials to be Briefed on

- (i) the necessity and implications of metering and progressive billing as a first step to managing water demand and distribution, and fairly charging for usage to pay for operations and finance improvements to the system;
- (ii) the potential for immediate improvements in water delivery (at no cost) that metering can provide;
- (iii) the longer term necessity for revenue generation for MWSC to be self-sustaining; and
- (iv) the importance of government providing a publicly supportive role.

C. Village Councils to Be Briefed on MWSC Plans, and Asked to Provide Assistance and

- (i) hold meetings, or provide representation at MWSC public meetings or workshops to learn about, and provide input on, MWSC planning and policy development;
- (ii) act as liaison with the local people to discuss plans and problems relating to the water supply; and
- (iii) take a collective responsibility for a public standpipe in each village for the use of low-income families or families who may be disconnected from time to time. The village should participate in the design and site location.

D. Women's National Council and Other Womens' Organizations

- (i) to be asked for support and advice on water conservation education, meterization, and system improvements;
- (ii) to be briefed on the necessity and implications of metering and progressive billing and the potential for related improvements in water delivery;
- (iii) to be advised about the longer term necessity for revenue generation for the water system to be self-sustaining;
- (iv) to be invited to attend and participate in MWSC public meetings or workshops to learn about and provide input into MWSC planning and policy development, and to encourage other women to do the same.

E. Health Services or Other Health Care Deliverers

- (i) to be asked to integrate public education on water use and conservation with ongoing health and sanitation education programs; and
- (ii) to be invited to participate in public liaison committees or public meetings.

F. Public School System

- (i) include programs on water and water conservation in the regular curriculum; and
- (ii) conduct campaigns and contests to raise awareness and understanding of the importance of water, why water costs money, and the reasons for the installation of meters. Such campaigns could include MWSC sponsorship of such things as essay contests on water conservation, field trips to learn about the water system, water treatment and sewerage, water conservation poster, and coloring competitions for younger grades.

G. Public Relations through the media, which could include

- (i) radio announcements about meter installations, hours of operation, changes in billing procedures, and progress on system improvements;
- (ii) radio education by broadcasting discussions, debates, and interviews with leaders and officials about water usage and problems, plans for system improvements, and the reasons and benefits of metering and charging for water usage; and
- (iii) development of a video demonstrating water conservation methods and ways to reduce metered consumption and the water bill. Such a video could also include the health education aspects of water and sanitation, practical demonstrations on plumbing repairs, roof catchment, and water storage construction and maintenance. Short clips of such a video could be aired recurrently on the TV to reinforce the impact.

H. MWSC to Continue Public Education Efforts, and Consider

- (i) distributing announcements and information (translated appropriately) as newsletters or enclosures with utility bills;
- (ii) employing women as meter readers, with the additional task of observing and advising consumers on wasteful water use and leakage; and
- (iii) holding workshops on plumbing to teach men and women how to repair faucets and leaking toilets, make proper connections to water storage tanks, and to construct and maintain roof catchment and water storage tanks.

DETAILED PROJECT COST ESTIMATES
(\$ million)

| Item | Foreign | Local | Total |
|---|-------------|-------------|--------------|
| 1. Base Cost | | | |
| A. Improvements to Airport Catchment | | | |
| Civil Works | 0.14 | 0.05 | 0.18 |
| Materials and Equipment | 0.11 | 0.02 | 0.13 |
| B. Laura Well Field Development | | | |
| Civil Works | 0.06 | 0.09 | 0.15 |
| Materials and Equipment | 0.04 | 0.01 | 0.05 |
| C. Raw Water and Treated Water Storage | | | |
| Civil Works | 1.33 | 0.42 | 1.76 |
| Materials and Equipment | 0.72 | 0.04 | 0.76 |
| D. Freshwater Transmission and Distribution | | | |
| Civil Works | 1.14 | 0.48 | 1.62 |
| Materials and Equipment | 1.04 | 0.05 | 1.09 |
| E. Improvements in Freshwater Treatment and Pumping Facilities | | | |
| Civil Works | 0.11 | 0.27 | 0.38 |
| Materials and Equipment | 0.23 | 0.02 | 0.25 |
| F. Upgrading and Expansion of Seawater Distribution System | | | |
| Civil Works | 0.46 | 0.22 | 0.69 |
| Materials and Equipment | 0.32 | 0.03 | 0.36 |
| G. Rehabilitation of the Sewerage System | | | |
| Civil Works | 0.05 | 0.04 | 0.10 |
| Materials and Equipment | 0.23 | 0.03 | 0.26 |
| H. Institutional Support and Consulting Services | | | |
| Consulting Services | 1.00 | - | 1.00 |
| Ministry of Public Works Staffing of Project Monitoring Office (PMO) | - | 0.10 | 0.10 |
| Secretarial Support for PMO | - | 0.04 | 0.04 |
| Service Vehicles | 0.04 | - | 0.04 |
| Computers and Software | 0.06 | - | 0.06 |
| Total Base Cost | 7.08 | 1.90 | 8.98 |
| II. Contingencies | | | |
| Physical Contingencies | 0.46 | 0.18 | 0.64 |
| Price Contingencies | 0.17 | 0.13 | 0.30 |
| III. Interest During Construction | | | |
| Service Charge on Bank Loan | 0.24 | - | 0.24 |
| Relending to MWSC | - | 1.41 | 1.41 |
| Total Project Cost | 7.95 | 3.62 | 11.57 |

PROJECT IMPLEMENTATION ARRANGEMENTS

1. The Ministry of Public Works (MPW) will be the Executing Agency for the Project, and will be responsible for the construction works and the further necessary design work. MPW is the Executing Agency for the engineering works being carried out for the Project under a separate Bank loan.¹ Consultants engaged under the engineering loan project are assisting MPW in the preparation of detailed designs and preparation of an environmental impact examination, as well as advising MPW on contract packaging, preparation of tenders, invitation for tenders, prequalification of contractors, tender evaluation and award of contract. Further, closely associated engineering work required under the Project includes investigation and design of wellfield extensions and construction supervision.
2. MPW has established a Project Management Office (PMO), headed by a Project Manager and utilizing existing MPW technical and administrative personnel, recruiting additional supporting staff as necessary to supervise the day-to-day implementation of the engineering work loan project. The PMO will continue its functions of day-to-day supervision throughout the Project.
3. The ongoing responsibilities of the PMO will include:
 - (i) formulation and operation of systems and procedures for Project management, including procedures for planning, monitoring, controlling, and reporting of quality; programming, accounting, financial, social and human resources aspects;
 - (ii) planning, programming and coordination of the Project, to achieve the requirements of the implementation schedule;
 - (iii) procurement of topographic survey services, engineering consultants, advisor, civil works contractors, materials, and equipment;
 - (iv) monitoring and control of progress, and preparation of quarterly reports on Project status, including details of Project costs (actual as compared with budget), progress, and quality aspects, with recommendations on appropriate actions to resolve issues that may impede Project implementation; and
 - (v) coordination of environmental monitoring (in coordination with the Marshall Islands Environmental Protection Agency), benefit monitoring and evaluation, and community participation (in coordination with the Majuro Water and Sewer Company [MWSC]).
4. The Project Manager will be a professional engineer experienced in Project management and in the engineering aspects of water supply and sanitation projects, and in dealing with and coordinating various levels of Government. The Project Manager will report to the General Manager of MPW and will liaise closely with the General Manager and senior staff of MWSC. Given the importance of PMO in ensuring the overall success of the Project, incremental salaries of secretarial and other supporting staff will be funded out of the loan,

¹ Loan No. 1250-RMI(SF): *Majuro Water Supply Project*, for \$700,000, approved on 9 September 1993.

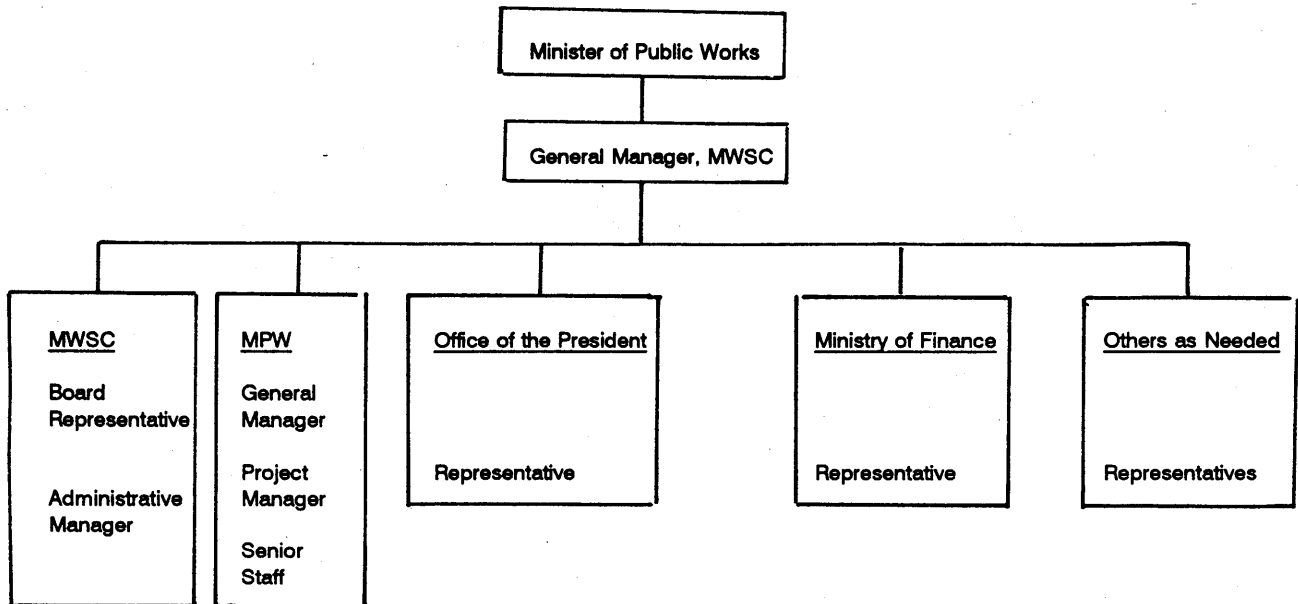
together with the procurement of service vehicles that will be handed over to MWSC on the conclusion of Project implementation.

5. The Government has established a Project Implementation Committee (PIC) to oversee and coordinate Project implementation and to ensure appropriate liaison among agencies involved in Project implementation. PIC will be chaired by the Secretary of Public Works. Members of PIC include the General Manager and senior staff of MPW, representatives of the Board of Directors of MWSC, the General Manager and Administration Manager of MWSC, representatives of the Office of the President, and representatives of the Ministry of Finance. Representatives of other concerned agencies will join PIC from time to time as required to ensure the smooth implementation of the Project. The Project Manager will act as secretary. Organization charts showing the relationships between the agencies involved in Project implementation are presented in Figures 1 and 2.

6. PIC will meet at least once each quarter, or more frequently as required, to address Project implementation issues. Copies of minutes of PIC meetings will be promptly forwarded to the Bank for information. PIC, in consultation with the Bank, will be responsible for the planning and implementation of the midterm review of the Project.

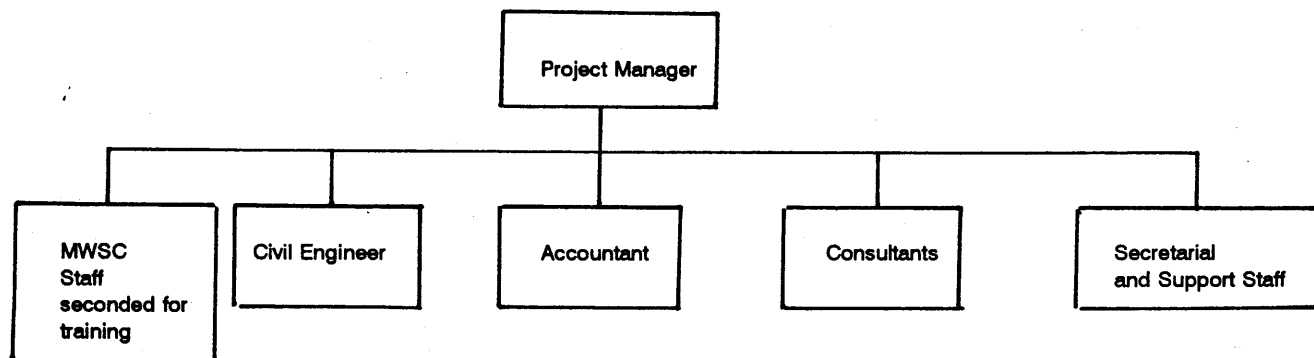
PROJECT IMPLEMENTATION ORGANIZATION CHARTS

1. PROJECT IMPLEMENTATION COMMITTEE



2. PROJECT MANAGEMENT OFFICE

MINISTRY OF PUBLIC WORKS



PROCUREMENT PACKAGES

| Package | Type | Amount (\$million) |
|--|-------------|---------------------------|
| 1. Construction of water storage reservoir; freshwater and seawater transmission mains; elevated storage tank; seawater pumping stations; sewage pumphouses and overflows; modification of airport raw water pumping station and construction of new pipeline; rehabilitation of water treatment plants; modification of existing raw water and treated water reservoirs. Includes supply of pumps, pipes, valves and other fittings, synthetic membranes for lining and covering reservoirs, flow meter, water filters, chlorinators, controls, alarms and other ancillary equipment. | ICB | 7.80 |
| 2. Construction of three new water wells at Laura, with supply of pumps, pipework and ancillary equipment. | LCB | .20 |
| 3. Supply of computers and associated hardware. | DP | .04 |
| 4. Supply of water supply and sanitation operation and maintenance software. | DP | .02 |
| 5. Supply of two light pick-up trucks. | DP | .04 |

ICB = international competitive bidding

LCB = local competitive bidding

DP = direct purchase

OUTLINE TERMS OF REFERENCE FOR CONSULTING SERVICES

A. Objectives

1. The objectives of the consulting services are to assist the Government in developing the groundwater resources of Majuro to the optimum extent, and to assist in supervising the construction and installation of Project facilities. Tender prequalification and bidding documents for the development of surface water resources are under preparation by the Ministry of Public Works (MPW), assisted by consultants engaged under an earlier Bank-financed project¹ who will also assist MPW in tender evaluation.

2. The consultants under the Project will support the Project Management Office (PMO) within MPW and will report to the Project Manager. Two packages of consulting services are required, as summarized in Table 1. A team of experts from an international firm of consulting engineers will be required.

Table 1: Summary of Consulting Services

| Groundwater Investigation and Design | |
|--|------------------|
| 1. Groundwater investigation and design engineer | 6 person-months |
| 2. Groundwater operations technician | 2 person-months |
| Construction Supervision | |
| 3. Construction supervision engineer | 24 person-months |
| 4. Construction supervision inspector | 12 person-months |

B. Specific Tasks

3. The tasks of the consultants shall include, but will not necessarily be limited to groundwater investigation and design, and construction supervision.

1. Groundwater Investigation and Design Engineer

- (i) Critically review all studies and reports pertaining to the groundwater resources of Majuro Atoll.
- (ii) Collect and collate all production data of the existing groundwater production facilities.

¹ Loan No. 1250-RMI(SF): *Majuro Water Supply Project*, for \$700,000, approved on 9 September 1993.

- (iii) Analyze existing data from groundwater resource testing and production.
- (iv) Conduct pumping tests and other tests as necessary to ascertain the efficiency of the groundwater collection facilities.
- (v) Incorporate the observations and results of the above investigations in a groundwater flow model to enable accurate projection of the optimum sustainable yield from the Laura well field.
- (vi) Make predictions of the optimal sustainable yield of other groundwater resources on Majuro Atoll.
- (vii) Prepare detailed designs for the construction of additional production units at the Laura well field.
- (viii) Assist in the preparation of prequalification and tender documents for the construction of additional production units at the Laura well field.

2. Groundwater Operations Technician

- (i) Assist in carrying out pumping tests of existing wells to verify theoretical predictions of additional production capacity.
- (ii) Review the current operating routines and draw up operating and maintenance schedules for the well field.
- (iii) Assist in determining the optimal layout of the new wells and their pumps, controls, and associated pipework.
- (iv) Carry out on-the-job training for MWSC staff in operating and maintaining the wells, pumps, chlorination plant, and ancillary facilities at the Laura well field.

3. Project Supervision Engineer

- (i) Develop and make recommendations regarding quality criteria to be met for the acceptance of construction works, materials, and equipment.
- (ii) Inspect materials and equipment delivered to the construction sites and witness tests of materials and equipment to be incorporated in the works.
- (iii) Supervise, inspect, measure, and control the quality of the construction of the works and the installation of equipment to ensure compliance with contract drawings and specifications.
- (iv) Carry out construction supervision, including supervision of pressure tests of pipelines and tests of equipment start-up.

- (v) Assist in commissioning and evaluating the performance of completed facilities and assist in familiarizing Majuro Water and Sewer Company staff in their operation.
- (vi) Assist and advise PMO in setting up Project cost accounting procedures and cost records.
- (vii) Prepare contract payment certificates and present them to PMO for payment.
- (viii) Assist PMO in the preparation of progress reports.
- (ix) Prepare "as built" drawings.
- (x) Inspect completed works and make recommendations to PMO on the issuance of certificates of completion.
- (xi) Carry out on-the-job training of Majuro Water and Sewer Company staff in the operation of the Project facilities.
- (xii) Assist and generally advise the PMO on all matters relating to the Project.

4. Construction Supervision Inspector

- (i) Carry out day-to-day inspection of site works to ensure that works are carried out in compliance with drawings and specifications.
- (ii) Verify measurements and quantities for the assessment of contractors claims.
- (iii) Assist in witnessing tests of materials and equipment delivered to the site.
- (iv) Assist in the inspection of completed works.
- (v) Deputize for, and assist, the Construction Supervision Engineer in all other construction supervision activities, as required.

IMPLEMENTATION SCHEDULE

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|--|------|------|------|------|------|------|
| Ongoing actions under Loan No. 1250-RMI(SF) | | | | | | |
| Tender prequalification | ■ | | | | | |
| Tender bids and evaluation | | ■ | | | | |
| New Loan Project | | | | | | |
| Consulting services | | | | | | |
| Recruitment | | ■ | | | | |
| Design | | ■ | | | | |
| Construction supervision | | | ■ | ■ | ■ | ■ |
| Construction | | | | | | |
| Contractor mobilization | | ■ | | | | |
| Construction operations | | | ■ | ■ | ■ | |
| Communications | | | | | | ■ |

BENEFIT MONITORING AND EVALUATION PROGRAM AND CRITERIA

A. Objectives

1. The following is a description of the objectives of benefit monitoring and evaluation (BME) of the implementation and benefits of the water project, and a proposed method of incorporation of such a program into the ongoing operations of Majuro Water and Sewer Company (MWSC) and the Project Management Office (PMO).

2. For the Bank and PMO, the purpose of project benefit monitoring is to determine if planned results of project implementation are in fact achieved. For MWSC, incorporation of a BME program in a planning and monitoring process for MWSC will increase the quality of management and direction of MWSC, and improve its ability to become an independent and self-sustaining operation that is responsive to the needs of the community. The periodic review of results will enable the MWSC Board and management to evaluate progress, identify problems, and take remedial action on a timely basis.

B. Standards, Criteria, and Measurement Indicators

3. The proposed BME program follows a four-step process of defining a program, developing a system to collect information, periodically reviewing and evaluating results and, most importantly, taking action based on the findings. The process is as follows:

1. Defining the Program

- a. Determine the scope of the program;
- b. Identify the nature of the benefits to be monitored and general goals for each;
- c. Select appropriate criteria for measuring and evaluating the performance in meeting the specific goals; and
- d. Define realistic standards and targets, and the time in which they are to be met.

2. Collecting Information

- a. Collect baseline data to provide a basis for comparison and ensure goals are realistic;
- b. Establish timing and method to collect and record data;
- c. Regularly analyze data and summarize findings; and
- d. Report findings.

3. Evaluating Results

- a. Periodically, as appropriate to the objectives and monitoring process, compare results to objectives and standards. For some items this may be a simple check, regularly performed by management. For other items this may be a monthly, annual, or less frequent review by management, the Board, or the Bank;
- b. Determine significant variances and determine why they have arisen;
- c. Consider the impact of the variance, the necessity and nature of action to be taken; and
- d. Review goals and standards to ensure they are realistic, attainable, and remain applicable.

4. Acting on Results

- a. Set a course of action to correct the problem; or
- b. Adjust the goals and standards, or means of measurement, if necessary; and
- c. Determine a process to reevaluate results at a specific time in the future.

C. Implementation

4. MWSC, together with PMO, will review the attached schedule of items and develop a plan for adoption by the MWSC Board of Directors and the approval of the Bank. Records of results and evaluation should be maintained by MWSC, and available for the periodic review by Bank Project review missions.

BENEFIT MONITORING AND EVALUATION PROGRAM AND CRITERIA

Project Benefit Monitoring Objectives and Indicators

| Objective | Evaluation Criteria | Achievement Indicator(s) |
|--|---|---|
| Delivery of improved quality of water | Water quality vs predefined standards. Measured by systematic and regular water testing and recording after treatment and throughout the distribution system. | Numbers of failed tests per month; severity of test results; trend. |
| Delivery of improved quality of service | Average water availability per day (hours) meets target | <u>Hours operating per month</u> Days in month |
| | Minimum water availability per day meets target | Daily hours of operation per day for each area logged, lowest monthly are reported. |
| | Adequate pressure and delivery is maintained for all users, ie uniform distribution. | Periodic checking and pressure testing at problem points in the system. |
| | Customer complaints are addressed and reviewed. | Customer problems logged and resulting action/response noted. |
| Delivery of adequate quantity of water | Total population served = target | Number of HC connections x average persons per HC + Number of SP x Persons per SP |
| | Daily water production = target | <u>Monthly water production</u> No. of days in month |
| | Total connections = target | number of total connections |
| | Population served by HC = target, new connection rate = growth rate | Number of domestic connections x avg household size |
| | Average production per capita per day = target | <u>Daily water production</u> Population served |
| | Average consumption per capita per day = target | <u>Metered water sold in month</u> Population served x days in month |
| Affordability | HC tariff affordable for basic needs (not exceeding target) | Average household size x minimum m3 per capita x tariff |
| | Actual tariff affordable | <u>Billings for all HC</u> Consumption for all HC |
| | Active connections as an indicator of satisfaction and ability to pay. | <u>Active HC</u> Total HC |
| Cost effectiveness | Unit Production Cost vs target | <u>O&M Costs (monthly)</u> Production vol per month |
| | Cost per User vs target | <u>O&M Costs (monthly)</u> Active Connections |

BENEFIT MONITORING AND EVALUATION PROGRAM AND CRITERIA

| Project Objective | Evaluation Criteria | Achievement Indicator |
|---|---|--|
| Cost effectiveness | Unaccounted water ratio < target | 100% - $\frac{\text{Water sold (metered)}}{\text{Water produced}}$ |
| | Revenues sufficient for target cost recovery | Monthly comparison of actual to budget in financial statements, and variances. |
| | Billing Efficiency = target | $\frac{\text{Meters read and billed in month}}{\text{Total Metered connections}}$ |
| Operational Efficiency | Staff per 1,000 connections within target | $\frac{\text{Staff (full time equivalent)}}{\text{Total connections}/1000}$ |
| | Operations (connections, meter maintenance, on/off's are completed promptly. | $\frac{\text{Work orders complete in month}}{\text{Work orders initiated in month}}$ |
| | Preventative maintenance program is developed and maintained. | Maintenance completed should be logged daily, reviewed monthly. |
| Financial Sustainability | Accounts Receivable rate of current collections is stable, within target | $\frac{\text{Accounts Receivable or Curr. Collections}}{\text{Average Day Sales} \quad \text{Curr. Billings}}$ |
| | Budget sufficient to cover cost of operations, and greater of finance charges, or interest plus depreciation | Budget prepared annually. Long range planning undertaken at least every five years; updated annually. |
| | Actual operations meet budget | Monthly comparative financial statements produced with major variances noted and addressed |
| | Cash flow sufficient to maintain operations | Cash flow plan, including capital budget, prepared annually and updated quarterly |
| Governance Issues and accountability | The utility corporation maintains a forum for public input into decision making process. If not through direct representation on the Board of Directors, liaison committees to be developed through the village councils. | -Public Annual General Meeting held within 4 months of year end; -Public meetings held on a regular basis; -Surveys or other assessments of the utility services is conducted periodically and reviewed. |
| | The utility communicates its plans and results of operations to client groups. | Reporting and public relations initiatives planned and reviewed regularly |
| | The utility is sensitive to parties whose interests may not be adequately represented through normal channels. | Corporate policies reviewed regularly to ensure they are non-discriminatory and take appropriate opportunities to include women, lower income, or other groups in their application. |

TERMS OF REFERENCE FOR THE MIDTERM REVIEW

A. Objectives

1. The midterm review will (i) comprehensively evaluate the Project progress, implementation arrangements, procurement, Project consultants' performance, environmental impacts and environmental monitoring, community participation, benefit monitoring and evaluation activities, and the implementation of legislative changes and institutional improvements in Majuro Water and Sewer Company (MWSC); and (ii) formulate measures to remedy any identified weaknesses.

B. Timing

2. The review will be carried out by the Government and the Bank about 12 months after loan effectiveness. The exact timing will be determined during the course of periodic reviews and consultation with the Government. The timing will be such that corrective measures can be implemented in a timely manner during the Project implementation period.

3. Based on the Project implementation schedule, the review is expected to be carried out during the third quarter of 1997. By that time the majority of important Project activities should be in progress. The construction of storage reservoirs, the new transmission pipeline, and other works should have commenced, and delivery of materials and equipment should be well advanced. The timing of the midterm review will be such as to enable evaluation of sectoral and institutional improvements prior to the commencement of budget preparation for the Government's 1997/98 fiscal year.

C. Methodology

4. The Government, through the Project Implementation Committee, and the Bank will jointly carry out the midterm review and formulate necessary actions to ensure the achievement of Project objectives. The midterm review will be carried out in addition to regular annual reviews to be undertaken during the Project implementation period.

5. The findings of the midterm review will be incorporated into the midterm review mission report, and recommendations will be made for any necessary actions to be undertaken to improve the implementation of the Institutional, Operational, and Financial Action Plan (the Action Plan), and any necessary modifications to the scope and phasing of the Project. The tasks listed below should be undertaken, subject to review by the Government and the Bank.

D. Tasks

1. Institutional, Operational, and Financial Action Plan

6. Assess the progress of the Institutional, Operational, and Financial Action Plan, including actions to streamline the legislative, institutional, and management framework of MWSC, improve the system operation and maintenance procedures, and improve collection efficiency and cost recovery.

2. Review of Project Concept and Implementation Performance

7. Assess the overall Project concept to ascertain whether the scope and phasing are succeeding in meeting Project objectives. Review the actual implementation performance, as compared with the implementation schedule. Identify constraints to Project performance, and recommend any necessary modifications to the scope and phasing of the Project.

3. Implementation Arrangements

a. Project Implementation Committee Performance

8. Assess the adequacy of coordination of all Project activities. Determine whether concerned agencies are adequately represented and coordinated, and whether the results of the discussions and reviews are adequately reflected in Project implementation. Review the number of meetings held and their effectiveness in resolving Project Implementation issues.

b. Project Management Office (PMO) Performance

9. Review the performance of the PMO to determine its effectiveness in supervising the Project. Review the responsibilities of the PMO and assess whether there are any gaps or overlaps of responsibility with other Project participants. Evaluate Project coordination, monitoring, control, and reporting procedures and their effectiveness in meeting implementation program targets. Make recommendations on any necessary changes to the role and responsibilities of PMO, to enhance Project coordination and management.

c. Performance of Project Consultants

10. Assess the adequacy and effectiveness of the consulting services. Evaluate the adequacy of coordination between the consultants and PMO, the consultants' output in terms of adherence to the program, and compliance with agreed upon terms of reference. Recommend any modifications required to ensure successful Project implementation.

d. Procurement

11. Assess the adequacy and performance of the procurement arrangements for civil works and equipment procurement, including contractor performance. Assess the need for any modifications necessary to achieve the Project objectives, and recommend appropriate actions.

4. Sustainability of Project Benefits

a. Institutional Framework and Management

12. Review the effectiveness of changes to the institutional framework of MWSC, adoption of enabling legislation, improved management information systems, and improved financial arrangements and procedures, and improved billing and collection procedures.

b. Cost Recovery

13. Assess the effectiveness of cost recovery measures taken up by the Government, including actual performance as compared with the Action Plan. Monitor the performance of

these actions and assess the effects on the affordability and sustainability of the Project. Update the Action Plan as appropriate, and recommend any further actions to be taken.

c. Benefit Monitoring and Evaluation (BME)

14. Review BME data compiled to date. Assess the application of the Project BME system. Assess whether the monitoring system appropriately covers all key socioeconomic and performance issues, whether the system has been incorporated into MWSC's ongoing management information systems, and whether the system allows prompt feedback in the Project implementation arrangements.

d. Social Dimensions

15. Assess the social dimensions of the Project, and identify the positive and negative effects of the Project on the population. Assess the effect of the public relations program in increasing awareness on matters related to domestic water usage, health, sanitation, payment of water accounts, and the environmental impacts of the Project. Identify any constraints that may hamper equitable distribution of Project benefits and recommend any appropriate corrective measures.

e. Environmental Impacts

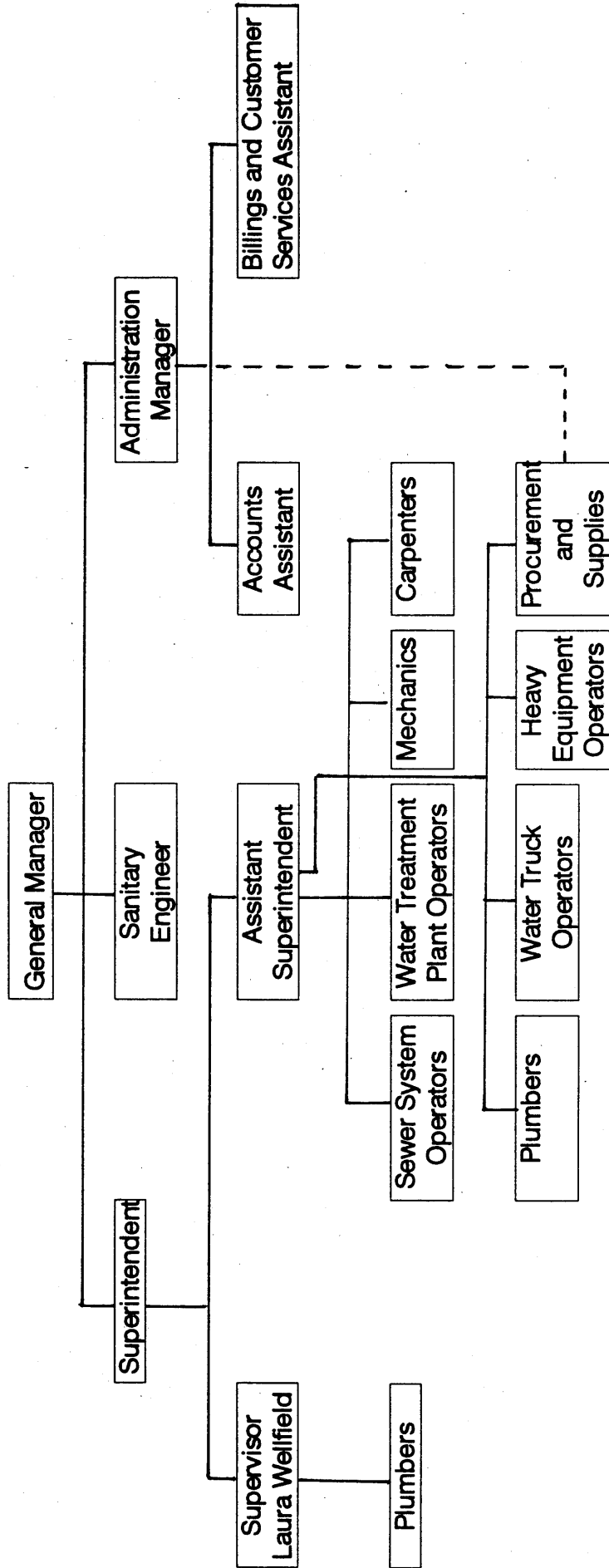
16. Assess the environmental impacts of Project works and operations, and identify any measures that need to be implemented to mitigate negative impacts. Assess the effectiveness of environmental monitoring procedures and identify any necessary measures that may need to be taken to improve environmental monitoring.

f. Operation and Maintenance

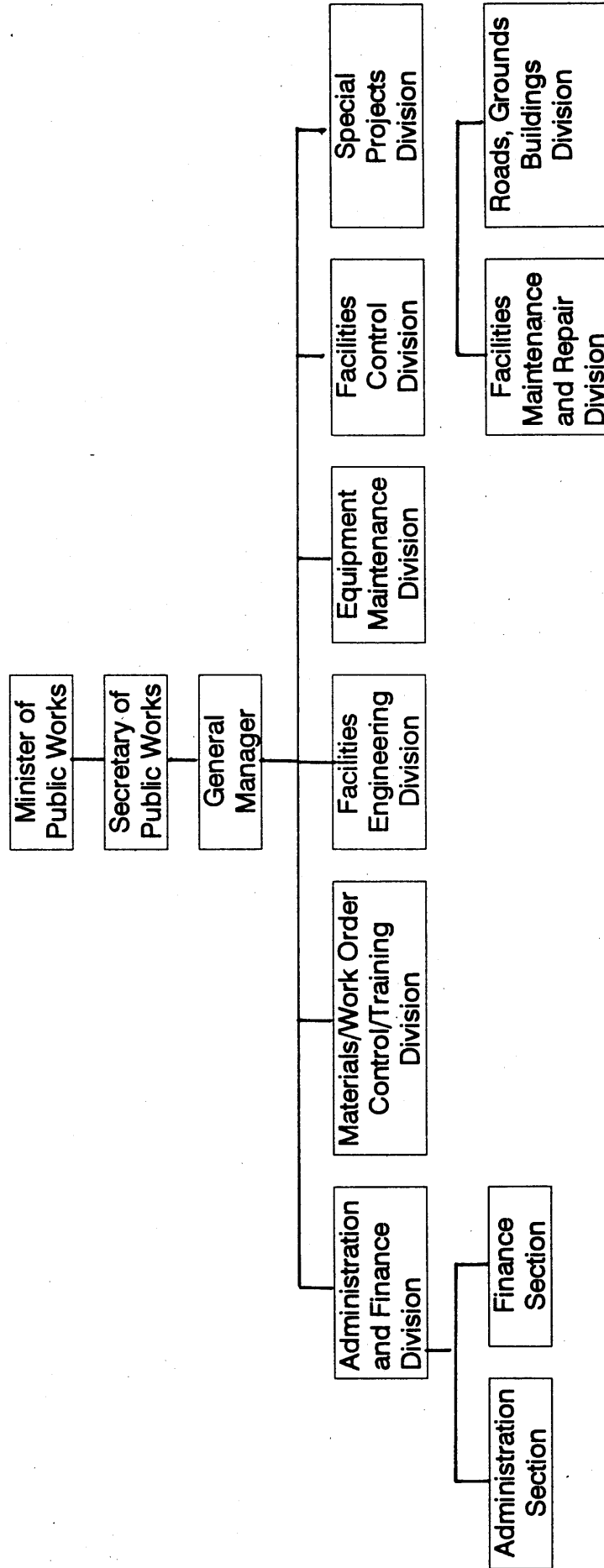
17. Assess the effectiveness of MWSC's operation and maintenance work plans and programs in terms of their adequacy and sustainability.

**ORGANIZATION CHART OF
MAJURO WATER AND SEWER COMPANY AND
MINISTRY OF PUBLIC WORKS**

A. MAJURO WATER AND SEWER COMPANY



B. MINISTRY OF PUBLIC WORKS



FINANCIAL AND ECONOMIC ANALYSIS

A. General

1. The Majuro Water and Sewer Company (MWSC) has been operating at a loss and has required government subsidization to meet minimum operating cash requirements. This has contributed to the current deteriorated state of the water supply and sewerage systems. Improvements to the system are badly needed before water users will willingly pay for MWSC's services. Insufficient water supply, irregular hours of availability, and poor quality of water will all be addressed by the improvements under the Project.

2. The Project includes several components, which have varying economic and financial impacts on the capacity of MWSC to supply water. These comprise:

- (i) improvements to the current distribution system, which will enable MWSC to manage rationing, when necessary, and provision of water to customers at the eastern end of the system. While this does not increase sales (as there is unmet demand), it will improve the distribution to the poorest communities and decrease their need to purchase bulk and bottled water, or use alternative (contaminated) shallow wells;
- (ii) increased capacity of the main reservoirs that will improve storage and water availability in the dry season;
- (iii) improvements and expansion of Laura well field to increase daily production to 2,271 cubic meters (m³)/day from the current potential of 1,514 m³/day and actual production of 606 m³ per day.
- (iv) improvements and expansion of the seawater system, to reduce the demand for fresh water for toilet requirements, and improve the efficiency of the existing system; and
- (v) demolition of corroded elevated storage tanks. This will provide no benefit other than to remove the hazards and potential avoidance of costly lawsuits some time in the future.

3. Institutional strengthening and improved operations and maintenance, resulting from TA No. 1946-RMI,¹ will also contribute to the results through (i) improved water production from existing wells and systems; and (ii) reduction of nonrevenue water (NRW) from improved billing and collection performance, and reduction of illegal connections and pumping.

4. MWSC is currently operating at a loss and is dependent on Government subsidization. Apart from problems in billings and collections procedures, the system is unable to distribute water equitably or regularly, with the result that some water users are not willing to pay for the current quality of service, further contributing to MWSC's financial problems. The Project improvements outlined above, will not only increase the quantity of water available,

¹ *Institutional Strengthening of Majuro Water and Sewer Company*, for \$250,000, approved on 9 September 1993.

particularly during drought periods when alternative sources are not available to consumers, but will also improve the quality of all water delivered, providing substantial health benefits. They will ensure that if and when water rationing is required, distribution will be much improved ensuring that even the poorer and most densely populated area of Rita, at the eastern extreme of the atoll, will have access to adequate quantities of water.

5. The financial internal rate of return (FIRR) and economic internal rate of return (EIRR) have been calculated using an incremental cost and incremental revenue basis. A comparison of estimated results of operation with the Project, to the 1995 level before the Project was made. This approach is considered appropriate under the circumstances; a marginal cost and benefit approach on only additional water produced under the Project would not adequately capture such things as would improved collection of revenues arising from improved and equitable distribution of water.

6. Projected sales potential is limited to projected yield of water from the current systems plus increases through Project improvements and expansion of the system, less equivalent freshwater demand met by the seawater system for toilet requirements. As a result, per capita consumption has been assumed to level off to 100 liters per capita per day (lpcd) and decline by year 2007 as a consequence of the limited production capacity of the existing and improved production yield from the Project.

7. This sales level has been assumed to be constant throughout the year although, in fact, more water could be supplied during the wet season at a very low marginal cost. Conservative financial projections are advisable because it is not yet possible to accurately predict how consumers' water consumption habits may change. The introduction of meters and meterized tariffs may decrease the demand for MWSC water during the wet season, when an alternative supply of roof catchment rainwater is readily available. Conversely, improved quality and availability of MWSC water may increase demand, regardless of season.

8. Further sources will therefore be required at some time in the future, depending on population growth and water usage patterns, either through extension of the airport water catchment area and increased reservoir capacity, or through the installation of a seawater desalination plant. As these are both estimated to have a significantly higher cost and initially serve only to supplement supply at the end of the dry season, deferral of further investment is financially advisable.

9. According to the projections, the Project should meet the needs of water users into the next century. However, some factors that may affect sales and cash flows of MWSC cannot be determined at this stage. These include the current and future use of roof catchment, which, although they require an initial investment of \$1,000 to \$2,000 per household, can make a household self-sufficient during the rainy season. The recent increases in MWSC tariffs, combined with ongoing shortages of system water, have caused a steady increase in investment in roof catchment and storage systems. Unfortunately, these are most easy to use at the same time that MWSC may also have readily available water. Conversely MWSC must invest in expensive storage systems to supply water when users' roof catchments are inadequate. Regardless, the unmet demand appears to be such that demand and sales of water should be expected to increase.

B. Economic

1. Unquantifiable Benefits

10. It is difficult to fully quantify all the soft benefits of a water project. In the case of the Marshall Islands, poverty reduction and hardship are not considered to be a factor, as a very high proportion of the population have piped connections. With the improvements of the Project, the connections will be able to deliver potable water in adequate supply.

11. Improved sanitation and health are a serious concern for Majuro. In 1993, 3,475 incidents of diseases related to inadequate water supply and sanitation were recorded (14.2 per 100 population), including 15 incidents of typhoid. Despite the piped water system and access to the relatively good health services of Majuro, between 1989 and 1993, infant mortality rates for Majuro exceeded those in Ebeye and all outer islands. Severe dehydration (arising from diarrhea) ranked tenth as the main cause of death, and seventh among infant deaths in the Marshall Islands. From 1986 to 1988, gastrointestinal disease as a major cause of morbidity ranked fifth in children under 5 years of age, and third in children between 5 and 15 years of age.

12. The importance of improved water supply and sanitation will grow, as the Ministry of Health is facing a declining budget for health care as a result of reductions in funding from the Compact of Free Association with the United States of America. However, it is not possible to quantify the benefits of improved water supply with a reasonable degree of confidence, and they have therefore been excluded from EIRR calculation.

13. Benefits from improved health, together with productivity and income benefits, and improved school attendance and performance, will be obtained in the future. As no data are available on days of sickness, these economic benefits have not been quantified.

14. Roof catchments have been examined as an alternative to a piped water supply. If no piped water is available, roof catchments are a necessary investment that can provide water for part of the year. However, if piped water is available (and there will be a surplus available under the Project at a low marginal cost during the wet season), then further private investment in roof catchment and storage is redundant and a misallocation of resources. An estimate of the opportunity cost of a roof catchment and storage system adequate to supply the needs of a family of eight during the rainy season is \$12.50/month, which is similar in cost to piped water. From the socioeconomic survey, although 70 percent of households had some form of roof catchment system, fewer than 40 percent had storage capacity of over 3.4 cu m, and therefore further investment in roof catchments could be avoided. However, it is unlikely that water users would act as a result of rational economic analysis and may construct further catchments, perceiving the cost of rainwater to be free. Until further experience is gained with water users' behavior in reaction to water metering, it is not possible to estimate how further investment in roof catchments will increase, or decrease. Such investment is therefore excluded from calculation of the EIRR. However, a related issue is the possible need for a seasonal water tariff.

2. EIRR

15. An economic internal rate of return (EIRR) of 14.75 has been calculated using the following assumptions:

- (i) taxes of 4 percent, and estimated \$320,000 cost of Government provision of land are removed from the base costs of the Project, which include physical but not price contingencies. The land earmarked for the Project is raw land without economic use at the moment;
- (ii) incremental revenue and expense arising from the Project ("with and without" approach) are included because user benefits received translate into improved willingness to pay, which is implicit in revenue assumptions of improvements to receivable collections. Incremental expenses are adjusted by a shadow pricing factor of .75 on labor, which comprises 51 percent of expenses and, in the absence of a shadow cost for imports, all other costs have been adjusted only to remove taxes, a factor of .9615. All goods in Majuro must be imported or produced with imported components and materials, including power from diesel generation;
- (iii) incremental benefits of water consumed but not charged for (NRW) is calculated as the incremental amount of non-revenue water priced at the annual cost of production which has been adjusted as in (ii) above; and
- (iv) savings in reduction of expenditure on bottled and private bulk water purchase is conservatively estimated at 25 percent of current household expenditure on water (as calculated from socioeconomic survey results). No estimate of savings in commercial expenditure has been attempted;
- (v) Sensitivity analysis shows the EIRR most sensitive to a shortfall of 10 percent in revenues falling to 12.39 percent but remains economically feasible even in the combined scenario.

16. This EIRR is considered acceptable, particularly considering the importance of additional benefits that could not be quantified and included in the calculation.

C. Financial

1. Tariffs and Affordability

17. MWSC strongly favors a flat rate per cubic meter (m^3), as implemented in the 1994/1995 tariff increase of \$1.58/ m^3 for domestic consumption. Considering the consumption levels of other consumer classifications and the sewer service customers, the blended average tariff per cubic meter is \$1.24 for 1995. Arguments in favor of a flat rate per cubic meter domestic tariff are that many households exceed the assumed average family size of 8 to 9 members; results of the social survey indicated an average number of 10.7 people per household connection, with 15 percent of households having 15 or more members. Table 1 demonstrates that the current tariff is below 5 percent of the income of low-income families with a typical consumption of 40 lcd. A step tariff structure based on smaller families unfairly discriminated against large households, which also tend to have the least ability to pay. The current metering program being undertaken by MWSC and the increase in their collection efficiency to about 65 percent of billings indicates the growing awareness of the people for the need to pay for improved water supply facilities. In the future adopting stepped tariffs designed to provide relief to low-income families may be appropriate once consumer metering and public

education have taken effect. There should also be parallel efforts to minimize sharing of connections and encourage individual connections.

2. FIRR

18. A FIRR of 8.96 percent is shown in detail in Table 2, along with a sensitivity analysis (Table 3) based on a 10 percent increase in revenue, and a one-year delay in construction. The FIRR calculation is based on the following assumptions:

- (i) base costs are presented in the Project cost estimates, and include physical but not price contingencies or interests during construction. Provision is made in the 15th year of operations for substantial replacement of mechanical and electrical components; and
- (ii) incremental revenues and expenses are derived from the financial projection, converted to constant dollars, with a base year of 1995.

19. The weighted average cost of capital for the Republic of the Marshall Islands is estimated at 6.597 percent, being the weighted average of interest rates of recent government bond issues and loans.

20. Sensitivity analysis shows the FIRR to be most sensitive to a 10 percent shortfall in revenue falling to 6.45 percent but remains positive at 3.08 percent even in the combined scenario. At extreme conditions such as a 20 percent reduction in revenues, the FIRR stands at 2.79 percent.

21. The FIRR and EIRR results, along with quantified social and economic benefits constitute a strong Project justification.

3. Other Considerations

22. The average incremental financial cost (AIFC) of the project is \$1.35/m³ of water, which is almost equal to the average tariff charged per cubic meter in the first year of the project, 1996. This indicates that the Project is the most financially feasible option, which will not precipitate an exorbitant tariff increase in real terms. The provision of additional freshwater sources through other alternatives such as the delivery truck system presents an extremely high AIFC, about \$7.17 per m³. Other options such as the extension of the airport rainwater catchment area and desalination plants yielded higher AIFC than the proposed Project. Detailed calculations for the Project's AIFC and average incremental economic cost (AIEC) are presented in Tables 4 and 5.

23. The AIEC of the Project is \$1.60/m³. The AIEC for the other options are higher. The extension of the airport water catchment area and the desalination plant carried an estimated AIEC of \$1.83 and \$1.80/m³, respectively.

24. The least-cost analysis revealed that the Project is presently the financially and economically sound option that can be undertaken to improve the deteriorating condition of the water supply facilities in Majuro atoll.

Table 1. Analysis of Affordability

| Consumption and Cost | Members per household: | | | | | | | | | |
|-------------------------------------|------------------------|-----------------------------|----------|--------------|-----------------------------|-----------|------------|-----------------------------|----------|-----------------------------|
| | 8.8 persons | Percent of income if: \$984 | Income = | 10.7 persons | Percent of income if: \$984 | Income = | 16 persons | Percent of income if: \$984 | Income = | Percent of income if: \$500 |
| Daily Consumption (Lcd) | | | | | | | | | | |
| Basic requirements | 40 | 10.56 cum | | 12.84 cum | | 19.20 cum | | | | |
| Projected average | 100 | 26.40 cum | | 32.00 cum | | 48.00 cum | | | | |
| Cost: Basic requirement level | | | | | | | | | | |
| Current base | | \$1.58/cum | \$16.58 | 1.5% | 3.3% | \$20.28 | 2.0% | \$30.33 | 4.0% | 6.0% |
| Cost: Projected Average Consumption | | | | | | | | | | |
| Current base tariff | | \$1.58/cum | \$41.70 | 4.2% | 8.0% | \$50.56 | 5.0% | \$75.84 | 10.0% | 15.0% |

1991 income and Expenditure Study. Office of Planning and Statistics, found average annual income to be \$8,426 per employee (\$1,479/household per month). The average monthly household income for the lowest 40% of the households was \$820. Adjusted for 5% inflation per year, this would be \$8,984 in 1995.

Table 2. Projected Financial Internal Rate of Return (FIRR)
 US\$ '000 (Base = 1994)

| Year | Capital Costs | Incremental Revenue | Incremental Oper. Costs | Net Cash Flow | FIRR |
|------|---------------|---------------------|-------------------------|---------------|-------|
| 1995 | | 0.0 | 0 | 0.0 | 8.96% |
| 1996 | (1,059.0) | 361.0 | (22.0) | (720.0) | |
| 1997 | (4,235.0) | 844.1 | (129.2) | (3,520.1) | |
| 1998 | (3,176.0) | 1,002.0 | (170.5) | (2,344.6) | |
| 1999 | (1,271.0) | 1,069.7 | (197.6) | (398.9) | |
| 2000 | (847.0) | 1,140.3 | (239.1) | 54.1 | |
| 2001 | | 1,213.9 | (315.3) | 898.5 | |
| 2002 | | 1,290.5 | (361.7) | 928.9 | |
| 2003 | | 1,370.5 | (402.3) | 968.2 | |
| 2004 | | 1,453.8 | (444.5) | 1,009.3 | |
| 2005 | | 1,540.6 | (488.2) | 1,052.3 | |
| 2006 | | 1,631.1 | (533.7) | 1,097.4 | |
| 2007 | | 1,646.8 | (571.1) | 1,075.7 | |
| 2008 | | 1,659.9 | (609.5) | 1,050.4 | |
| 2009 | | 1,670.2 | (648.9) | 1,021.3 | |
| 2010 | | 1,677.3 | (689.4) | 987.9 | |
| 2011 | | 1,681.0 | (730.9) | 950.1 | |
| 2012 | | 1,681.1 | (773.6) | 907.5 | |
| 2013 | (741.0) | 1,727.3 | (823.7) | 162.7 | |
| 2014 | | 1,721.1 | (868.9) | 852.2 | |
| 2015 | | 1,710.2 | (915.3) | 795.0 | |
| 2016 | | 1,751.2 | (970.0) | 781.2 | |
| 2017 | | 1,732.4 | (1,019.2) | 713.2 | |
| 2018 | | 1,769.5 | (1,077.3) | 692.2 | |
| 2019 | | 1,769.5 | (1,077.3) | 692.2 | |
| 2020 | | 1,769.5 | (1,077.3) | 692.2 | |
| 2021 | | 1,769.5 | (1,077.3) | 692.2 | |
| 2022 | | 1,769.5 | (1,077.3) | 692.2 | |
| 2023 | | 1,769.5 | (1,077.3) | 692.2 | |

Table 3: FIRR Sensitivity Analysis

| Key Variable | % Change | FIRR | Sensitivity Indicator |
|--|-----------------|-------------|------------------------------|
| Base Cost | | 8.96% | |
| Case 1 - Capital Cost | + 10% | 7.52% | 1.44 |
| Case 2 - Operating Costs | + 10% | 8.11% | 0.85 |
| Case 3 - Incremental Revenues | - 10% | 6.45% | 2.51 |
| Case 4 - Project Completion Delay 1 Year | | 8.84% | 0.12 |
| Case 1,2,3, and 4 Combined | | 3.88% | 5.08 |

TABLE 4: AVERAGE INCREMENTAL FINANCIAL COST ANALYSIS

| Year | Capital Costs | Incremental Volume Sold (Cu. M.) | Incremental Oper. Costs | AIFC |
|------|---------------|----------------------------------|-------------------------|------|
| 1995 | | 0 | 0 | 1.35 |
| 1996 | (1,059.0) | 179.1 | (22.0) | |
| 1997 | (4,235.0) | 452.5 | (129.2) | |
| 1998 | (3,176.0) | 477.7 | (170.5) | |
| 1999 | (1,271.0) | 501.4 | (197.6) | |
| 2000 | (847.0) | 534.0 | (239.0) | |
| 2001 | | 582.4 | (315.0) | |
| 2002 | | 636.4 | (362.0) | |
| 2003 | | 692.7 | (402.3) | |
| 2004 | | 751.4 | (444.5) | |
| 2005 | | 812.5 | (488.2) | |
| 2006 | | 876.2 | (533.7) | |
| 2007 | | 883.3 | (571.1) | |
| 2008 | | 888.2 | (609.0) | |
| 2009 | | 890.7 | (648.9) | |
| 2010 | | 890.6 | (689.4) | |
| 2011 | | 887.7 | (730.9) | |
| 2012 | | 881.8 | (773.6) | |
| 2013 | (741.0) | 910.5 | (823.7) | |
| 2014 | | 899.3 | (868.9) | |
| 2015 | | 884.2 | (915.3) | |
| 2016 | | 908.1 | (970.0) | |
| 2017 | | 886.4 | (1,019.0) | |
| 2018 | | 906.6 | (1,019.0) | |
| 2019 | | 877.2 | (1,019.0) | |
| 2020 | | 893.0 | (1,019.0) | |
| 2021 | | 907.4 | (1,019.0) | |
| 2022 | | 887.3 | (1,019.0) | |
| 2023 | | 902.7 | (1,019.0) | |

TABLE 5: AVERAGE INCREMENTAL ECONOMIC COST ANALYSIS

| Year | Capital Costs | Incremental Volume Sold (Cu. M.) | Incremental Oper. Costs | AIEC |
|------|---------------|----------------------------------|-------------------------|------|
| | | | | 1.60 |
| 1995 | | 0 | 0 | |
| 1996 | -837.1 | 165.87 | -17.4 | |
| 1997 | -3099.5 | 387.91 | -94.6 | |
| 1998 | -2152.2 | 379.20 | -115.5 | |
| 1999 | -797.5 | 368.54 | -124.0 | |
| 2000 | -492.1 | 363.42 | -138.9 | |
| 2001 | 0.0 | 367.01 | -169.5 | |
| 2002 | 0.0 | 371.34 | -180.3 | |
| 2003 | 0.0 | 374.25 | -185.5 | |
| 2004 | 0.0 | 375.87 | -189.8 | |
| 2005 | 0.0 | 376.34 | -193.0 | |
| 2006 | 0.0 | 375.78 | -195.4 | |
| 2007 | 0.0 | 350.77 | -193.6 | |
| 2008 | 0.0 | 326.59 | -191.2 | |
| 2009 | 0.0 | 303.25 | -188.6 | |
| 2010 | 0.0 | 280.77 | -185.5 | |
| 2011 | 0.0 | 259.13 | -182.1 | |
| 2012 | 0.0 | 238.32 | -178.5 | |
| 2013 | -158.3 | 227.85 | -176.0 | |
| 2014 | 0.0 | 208.37 | -171.9 | |
| 2015 | 0.0 | 189.71 | -167.6 | |
| 2016 | 0.0 | 180.39 | -164.5 | |
| 2017 | 0.0 | 163.04 | -160.0 | |
| 2018 | 0.0 | 154.41 | -148.2 | |
| 2019 | 0.0 | 138.33 | -137.2 | |
| 2020 | 0.0 | 130.40 | -127.0 | |
| 2021 | 0.0 | 122.69 | -117.6 | |
| 2022 | 0.0 | 111.08 | -108.9 | |
| 2023 | 0.0 | 104.63 | -100.8 | |

FINANCIAL STATEMENTS AND PROJECTIONS

1. The financial position of the Majuro Water and Sewerage Company (MWSC) has been analyzed in depth during the initial findings of ADB TA 1775-RMI in 1993, and recently by the institutional strengthening study undertaken through ADB TA 1946-RMI.¹ A review of the various assumptions were focused on the findings of financial projections as presented in the Final Report of TA 1946-RMI. The assumptions indicated in the aforementioned document were validated through an examination of some records of MWSC and dialogues conducted with the officials of MWSC. Modifications in the assumptions were undertaken in the context of the results of these dialogues and review of the MWSC records.

A. Projections of Revenues

2. Projections of revenues and costs of water were based on the proposed Project improvements and did not consider the other alternative options (extension of the airport runway water catchment, desalination plan and the delivery truck system) since they were found to be less financially and economically viable than the proposed Project. Tables 1, 2 and 3 show MWSC's projected income statement, cashflow statement, and balance statement.

3. Sales are based on domestic demand estimated at 100 lcd to provide for the shortfalls in the daily system yield during the dry season (including other sales). Industrial, commercial, and institutional (ICI) revenues are expected to increase initially as connections are metered, and as the Government becomes a paying customer.² The consumption pattern will not be affected, but there will be revenue increases.

4. Tariffs remain constant in real terms with current 1995 levels (following major increases by MWSC in 1993 and 1994). It is assumed tariffs will increase with inflation, although it is recognized that in practice, they would be raised periodically.

5. Tariffs for domestic users remains constant in real terms, allowing only increases due to inflation. The present billing and metering efforts of MWSC have improved collection of billings from 60 percent in the beginning of 1995 to 65 percent to date. With the public relations program in place, and with periodic public meetings, it is expected that the need for tariff increases will be well understood by consumers. Tariff adjustments due to seasonal demand may be an alternative for implementation of tariff adjustments.

6. Government subsidy at \$125,000 for financial year 1995/96 is included but discontinued thereafter.

B. Projections of Expenditure

7. MWSC staffing has been assumed to increase to a maximum complement of 48. Real increases in wages are expected as skill levels and quality of staff improve; actual average rates are indexed to inflation. The staffing ratio is estimated at 20 per 1,000 connections, declining to 10 per 1,000 connections by 2007, as the number of connections grows.

¹ TA No. 1946-RMI: *Institutional Strengthening of the Majuro Water and Sewer Company*, for \$700,000, approved 9 September 1993.

² Government institutions will be billed at the commencement of fiscal year 1995/96.

8. Chemicals, power, materials, and maintenance are adjusted to adequate levels for the current system, and incremented proportionate to production. To date MWSC has not been charged for power. Financial statements have been adjusted and provision based on 1994 meter records and prevailing power tariff rates.

C. Inflation and Exchange Rates

9. The projected inflation rate for Project capital costs is projected at 3.1 percent per annum for foreign cost, and 5 percent per annum for local costs. The general rate used for operations in the financial projection is 5 percent per annum. Exchange rates are not considered a risk factor, as the currency of exchange for the Republic of the Marshall Islands is the US dollar; any risk arising from Bank lending in SDRs is assumed to be born by MWSC.

D. Depreciation

10. Depreciation has been calculated based on an average asset economic life of 29 years, or 3.4 percent. Given the harsh salt environment, this assumes that a good level of preventive maintenance is conducted. Depreciation is calculated on the average annual asset base, revalued at 5 percent per year, which will result in a higher provision for depreciation than would be calculated using historic costs, a consideration when assessing performance indicators based on net income.

E. Interest Expenses

11. Interest on the current engineering loan¹ is 6.64 percent, in accord with the terms of relending. Interest for the Project loan is 6.9 percent with a repayment period of 25 years with 5 years grace.

F. Taxes

12. An EPA surcharge of 1 percent tax on all capital construction is included in addition to the standard 3 percent sales tax in Project base cost estimates. MWSC is not currently taxable, nor is likely to realize taxable profits in the event it becomes subject to a corporate tax.

G. Fixed Assets

13. No asset register is maintained by either MWSC or the Government. A compilation of major system components, their historic cost, current replacement cost, and estimate of residual life was conducted by Bank-financed TA No. 1775-RMI in January 1993. This was since updated by Bank-financed TA No. 1946-RMI, with recent additions included. The projections include annual revaluation of assets and revaluation surplus arising.

H. Working Capital Items

14. Receivables collection efficiency is calculated to achieve 90 percent of current billings (35 days in receivables) by 1998, from the current estimated rate of 60 percent (60 days)

¹ Loan No. 1250-RMI(SF): *Majuro Water Supply Project*, for \$700,000, approved on 9 September 1993.

for 1995 (50 percent for 1994). The rate at which this is achieved takes the current physical limitations of the system into consideration and allows time for MWSC to implement public relations and education as part of a process of customer adjustment to meterized billings.

15. Payables are calculated at 75 days of current years operating expenses.

16. Inventories are carried equivalent to 50 percent of annual expenditure for chemicals, materials, repairs and maintenance, and fuels. Although this may seem high, lead times and shipping problems are a factor; adequate maintenance has been a critical problem in past years because of lack of parts.

I. Conclusions Drawn from Projections

17. Rate of return on both revalued and historical cost asset base is negative throughout the analysis. This is to be expected because of the remote location and high capital cost of extensive water catchment, reservoir capacity, and sewerage to a relatively small population on an extremely small land mass. MWSC makes no attempt at full cost recovery of the salt seawater and sewerage system costs as (i) it would not be affordable to consumers, and (ii) the systems are provided not for individual benefit, but for the protection of limited groundwater sources or displacement of demand for fresh water.¹

18. Operating revenues are projected to increase in real terms as sales grow to absorb existing unmet demand and new services. Once new production potential arising from the Project is fully subscribed, sales are constant in volume, and only increase in price with inflation. This situation may precipitate the need for MWSC to augment their water resources by year 2007 when a demand of 100 lcd may not be satisfied by the current and proposed improvement. It would not be realistic to claim any further price increases for cost recovery of this Project, as construction of further capacity will be required in the next decade, for which tariffs will again have to be raised in real terms.

19. Although break-even is not an appropriate performance standard for cost recovery, it is a realistic objective in this Project as it ensures that MWSC can sustain operations on a cash flow basis without Government subsidy. This is extremely important to the water supply, considering the macroeconomic outlook for RMI as Compact funding is withdrawn over the next few years.

20. The recent domestic tariff increase imposed by MWSC has overcome the initial public resistance normally encountered during such tariff increases. This is manifested in improved payment of the water bills by consumers. It may be necessary for MWSC to maintain the present domestic rate until such time that its cash requirements demand an increase in the domestic tariffs. A periodic review of the tariff is essential to pave the way for the introduction of step tariff structure as a modified tariff arrangement which will consider socialized pricing structure for consumption levels of low income families.

21. Of critical importance to the projections is the projected reduction of unaccounted for, or non-revenue water (NRW), and the improvement in collections. A data on gross water

¹ Operation and maintenance costs of these systems are cross-subsidized from income from the freshwater tariff.

production is unreliable, due to lack of accurate bulk flow metering, current figures of NRW may well be understated. Major losses from illegal connections, pumping, and non-charging of water has been observed and is considered a significant problem. While MWSC is in the process of meterization, the rate of progress needs improvement. Meter reading and billing efficiency requires more attention by the management of MWSC. It is also essential that the current bills paid on time be monitored to ensure that the build-up of arrears for uncollected current billing is controlled.

22. Debt Service Ratio is good in all years except 2001, when debt repayment requirements are still relatively high and the available production becomes a limitation on consumption and growth in sales. Cash surpluses are adequate to cover this period.

23. Self-financing (ability to contribute to investment) is good, but should be interpreted with caution, due to the lack of long range planning and capital budgeting by MWSC.¹ It is, therefore, based on an estimate of annual capital replacement budget significantly higher than has been expended in previous years, and which is indexed to inflation. Provision is also made in the 15th year of operations for major capital replacement of mechanical and electrical components.

24. The current ratio is acceptable, and falls only briefly to a low of 1:1. Working capital, excluding cash, remains positive throughout. Again, critical to this outcome are the assumptions of improvement in billings and reduction of bad debts, which should be realistic given improvement in service levels provided by the Project, as well as changes in management the MWSC has made.

25. Debt/equity ratio is excluded as not meaningful. MWSC is a Government-owned corporation and implied Government equity contribution of the historic asset base cannot be determined. Assets are officially "leased" at no cost to MWSC, but are included as an asset of MWSC in the consolidated financial statements of the RMI Government.

¹ The preparation of such a plan is included in MWSC's Institutional, Operational and Financial Action Plan.

Table 1. MAJURO WATER AND SEWER COMPANY
Projected Income Statement
 Years Ending September 30, 1993 through Onwards
 In Current US \$ unless otherwise noted

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2003 | 2005 | 2007 |
|---|-------------|-------------|-------------|-------------|-------------|-----------|-----------|-----------|-------------|-------------|-------------|-------------|
| | (Actual) | (Estimated) | | (Forecast) | | | | | | | | |
| mcm | 1,188,118 | 1,403,391 | 1,445,581 | 1,677,528 | 2,062,492 | 2,068,874 | 2,101,808 | 2,117,654 | 2,154,457 | 2,272,821 | 2,432,538 | 2,526,926 |
| % Non-Revenue Water | 30.00% | 30.00% | 30.00% | 29.00% | 29.00% | 28.00% | 28.00% | 27.00% | 26.00% | 25.00% | 25.00% | 25.00% |
| Volume Sold (Cubic Meters) | 831,683 | 982,374 | 1,011,907 | 1,191,045 | 1,464,369 | 1,489,589 | 1,513,302 | 1,545,888 | 1,594,298 | 1,704,616 | 1,824,403 | 1,895,195 |
| Average Tariff per Cubic Meter | 0.46 | 0.66 | 1.24 | 1.32 | 1.44 | 1.54 | 1.65 | 1.77 | 1.87 | 2.08 | 2.32 | 2.57 |
| Allowance for bad debts | 43% | 50% | 40% | 25% | 15% | 10% | 10% | 10% | 10% | 10% | 10% | 10% |
| Operating Revenues | | | | | | | | | | | | |
| Tariff Revenues | 389,978 | 659,588 | 1,287,711 | 1,612,392 | 2,151,668 | 2,347,015 | 2,560,409 | 2,793,535 | 3,048,236 | 3,630,608 | 4,326,021 | 4,991,987 |
| Less Allowance for Bad Debts | (167,786) | (329,794) | (515,084) | (403,098) | (322,750) | (234,701) | (256,041) | (279,354) | (304,824) | (363,061) | (432,602) | (499,199) |
| | 222,192 | 329,794 | 772,626 | 1,209,294 | 1,828,918 | 2,112,313 | 2,304,368 | 2,514,182 | 2,743,413 | 3,267,547 | 3,893,419 | 4,492,788 |
| Operating Costs | | | | | | | | | | | | |
| Personnel | 373,169 | 413,512 | 500,673 | 538,849 | 592,824 | 638,026 | 701,604 | 755,101 | 829,968 | 961,364 | 1,113,562 | 1,289,854 |
| Power | 92,900 | 109,732 | 118,683 | 144,612 | 186,688 | 196,629 | 209,747 | 221,895 | 237,039 | 275,693 | 325,310 | 372,571 |
| Chemicals | 32,007 | 64,734 | 70,014 | 85,310 | 110,132 | 115,996 | 123,735 | 130,901 | 139,835 | 162,638 | 191,908 | 219,789 |
| Materials and Supplies | 50,667 | 50,700 | 64,141 | 39,076 | 72,308 | 84,274 | 76,572 | 98,837 | 145,461 | 196,567 | 246,146 | 307,052 |
| Repairs & Maintenance | 51,144 | 53,960 | 57,641 | 65,141 | 85,216 | 93,587 | 99,528 | 104,900 | 110,481 | 122,450 | 135,646 | 150,194 |
| Oil and Fuel | 16,566 | 17,667 | 19,319 | 22,904 | 26,407 | 30,539 | 35,800 | 41,281 | 45,658 | 54,655 | 65,425 | 78,317 |
| Administrative and General Expense | 38,907 | 41,492 | 44,881 | 52,655 | 60,101 | 68,835 | 79,944 | 91,360 | 100,182 | 117,996 | 139,155 | 164,303 |
| | 655,360 | 751,797 | 875,351 | 948,547 | 1,133,675 | 1,227,886 | 1,326,929 | 1,444,274 | 1,608,623 | 1,891,362 | 2,217,152 | 2,582,081 |
| Income before Depreciation | (433,168) | (422,003) | (102,725) | 260,747 | 695,243 | 884,427 | 977,439 | 1,069,908 | 1,134,789 | 1,376,186 | 1,676,267 | 1,910,707 |
| Depreciation | 790,670 | 812,441 | 862,660 | 949,087 | 1,162,235 | 1,382,114 | 1,492,746 | 1,580,193 | 1,664,857 | 1,845,648 | 2,044,796 | 2,264,356 |
| | (1,223,838) | (1,234,444) | (965,385) | (688,340) | (466,992) | (497,688) | (515,307) | (510,285) | (530,068) | (469,462) | (368,528) | (353,648) |
| Non-Operational Income and Expense | | | | | | | | | | | | |
| Other Income | - | 1,050 | 1,103 | 1,158 | 1,216 | 1,276 | 1,340 | 1,407 | 1,477 | 1,629 | 1,796 | 1,980 |
| Director's Honoraria | - | - | - | - | 17,689 | 17,689 | 19,549 | 21,398 | 22,696 | 27,524 | 33,525 | 38,214 |
| Interest on Long-Term Debt | - | - | - | 46,480 | 45,899 | 43,381 | 39,508 | 316,173 | 601,606 | 535,413 | 469,221 | 403,029 |
| | (1,223,838) | (1,235,494) | (966,487) | (735,978) | (514,107) | (560,034) | (575,704) | (849,264) | (1,155,847) | (1,034,028) | (873,071) | (796,872) |
| Net Income | | | | | | | | | | | | |
| Retained Earnings_ net of Revaluation Surplus | (17,517) | (1,690,248) | (1,916,823) | (1,655,560) | (1,159,244) | (422,525) | 49,187 | 224,712 | (243,828) | (990,753) | (1,479,583) | (2,202,263) |
| Comparators and Ratios | | | | | | | | | | | | |
| Average Expenses | 0.79 | 0.77 | 0.87 | 0.80 | 0.77 | 0.82 | 0.88 | 0.93 | 1.01 | 1.11 | 1.22 | 1.36 |
| Increase in Operating Revenues | | 48% | 134% | 57% | 51% | 15% | 9% | 9% | 9% | 9% | 9% | 6% |
| Increase in Water Sold | | 18% | 3% | 18% | 23% | 2% | 2% | 2% | 3% | 3% | 3% | 0% |
| Operating Ratio | 651% | 474% | 225% | 157% | 126% | 124% | 122% | 120% | 119% | 114% | 109% | 108% |
| Break-even Indicator | 34% | 44% | 88% | 122% | 153% | 159% | 162% | 138% | 102% | 112% | 123% | 130% |
| Rate of return on Net Assets (Historic Cost) | -7.6% | -7.8% | -6.3% | -4.4% | -2.4% | -2.1% | -2.2% | -2.3% | -2.5% | -2.4% | -2.2% | -2.4% |
| Rate of return on Net Assets (Revalued) | -7.6% | -7.6% | -5.9% | -3.9% | -2.1% | -1.8% | -1.8% | -1.8% | -1.9% | -1.7% | -1.4% | -1.4% |
| Labour % of operating expense | 56.9% | 55.0% | 57.2% | 56.8% | 52.3% | 52.0% | 52.9% | 52.3% | 51.6% | 50.8% | 50.2% | 50.0% |

Notes: 1. Due to rounding the last digit in totals may appear different than the sum of columns.

Table 2. MAJURO WATER AND SEWER COMPANY
Cash Flow Statement
Years Ending September 30, 1993 through Onwards
In Current US \$ unless otherwise noted

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2003 | 2005 | 2007 |
|--|-----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | (Actual) | (Estimated) | | (Forecast) | | | | | | | | |
| SOURCES OF FUNDS: | | | | | | | | | | | | |
| Internal | | | | | | | | | | | | |
| Income before depreciation | (433,166) | (422,003) | (102,725) | 265,306 | 716,926 | 897,504 | 991,567 | 1,085,223 | 1,151,376 | 1,395,675 | 1,699,215 | 1,937,783 |
| Other income (net) | - | 1,050 | 1,103 | 1,158 | 1,216 | 1,276 | 1,340 | 1,407 | 1,477 | 1,629 | 1,796 | 1,980 |
| User's Contributions (Conn. Fees) | 14,325 | 17,871 | 12,770 | 52,188 | 53,050 | 60,282 | 84,848 | 79,802 | 52,089 | 44,827 | 48,672 | 52,846 |
| Total Internal Cash Generation | (418,843) | (403,082) | (88,852) | 318,652 | 771,191 | 959,062 | 1,077,775 | 1,166,431 | 1,204,942 | 1,442,131 | 1,749,683 | 1,992,609 |
| Operational Grants | 401,883 | 400,000 | 525,000 | 125,000 | - | - | - | - | - | - | - | - |
| Equity Contributions | - | - | - | 211,760 | 847,037 | 635,278 | 254,111 | 169,407 | - | - | - | - |
| Borrowing | | | | | | | | | | | | |
| ADB loan - 1250 MAR (SF) | - | - | 700,000 | - | - | - | - | - | - | - | - | - |
| ADB loan - Nc. | - | - | - | 847,037 | 3,388,149 | 2,541,112 | 1,016,445 | 677,630 | - | - | - | - |
| Total Borrowing | (16,960) | (3,082) | 1,136,148 | 1,502,449 | 5,006,377 | 4,135,452 | 2,348,331 | 2,013,468 | 1,204,942 | 1,442,131 | 1,749,683 | 1,992,609 |
| TOTAL SOURCES OF FUNDS | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| APPLICATIONS OF FUNDS: | | | | | | | | | | | | |
| Capital Expenditures | - | - | - | 1,058,797 | 4,235,186 | 3,176,390 | 1,270,556 | 847,037 | - | - | - | - |
| Majuro Water Supply Project | - | - | 23,240 | 29,223 | 175,337 | 379,896 | 502,632 | 561,078 | - | - | - | - |
| Interest Capitalized | - | - | - | - | - | - | - | - | - | - | - | - |
| New Connections | 14,325 | 17,871 | 12,770 | 52,188 | 53,050 | 60,282 | 84,848 | 79,802 | 52,089 | 44,827 | 48,672 | 52,846 |
| Other Works | 11,698 | 100,000 | 427,000 | 80,000 | 100,000 | 105,000 | 110,250 | 115,762 | 121,551 | 134,010 | 147,746 | 162,889 |
| Debt Service | 26,023 | 117,871 | 463,010 | 1,220,208 | 4,563,573 | 3,721,568 | 1,968,286 | 1,603,679 | 1,73,639 | 178,837 | 196,418 | 215,736 |
| Repayment of loans | - | - | - | 46,480 | 17,500 | 58,333 | 58,333 | 58,333 | 481,852 | 481,852 | 481,852 | 481,852 |
| Interest on long-term debt | - | - | - | 46,480 | 45,899 | 43,381 | 39,508 | 35,635 | 601,606 | 535,413 | 469,221 | 403,029 |
| Other Internal | - | - | - | 46,480 | 63,399 | 101,715 | 97,841 | 93,968 | 1,083,458 | 1,017,265 | 951,073 | 884,881 |
| Director's Honoraria | - | - | - | - | 17,950 | 17,950 | 19,832 | 21,704 | 23,028 | 27,913 | 33,984 | 38,756 |
| Increase in Working Capital | 47,828 | (31,715) | 76,466 | 75,738 | 205,081 | (41,141) | (191,326) | 5,320 | 4,777 | 11,535 | 14,483 | 5,202 |
| TOTAL APPLICATION OF FUNDS | 73,851 | 86,156 | 539,475 | 1,342,427 | 4,832,053 | 3,800,092 | 1,894,633 | 1,724,671 | 1,284,902 | 1,235,551 | 1,195,958 | 1,144,575 |
| INCREASE (DECREASE) IN FUNDS | (90,811) | (89,238) | 596,672 | 160,023 | 174,324 | 335,360 | 453,698 | 288,797 | (79,960) | 208,580 | 553,725 | 848,035 |
| CASH: BEGINNING OF YEAR | 93,053 | 2,242 | (86,996) | 509,676 | 669,699 | 844,023 | 1,179,383 | 1,633,081 | 1,921,878 | 1,886,711 | 2,466,501 | 3,769,751 |
| CASH: END OF YEAR | 2,242 | (86,996) | 509,676 | 669,699 | 844,023 | 1,179,383 | 1,633,081 | 1,921,878 | 1,841,918 | 2,093,291 | 3,020,226 | 4,617,785 |
| Comparators and Ratios | | | | | | | | | | | | |
| Debt Service Ratio | NA | NA | NA | 6.9 | 12.2 | 9.4 | 11.0 | 12.4 | 1.1 | 1.4 | 1.8 | 2.3 |
| % Contribution to Investment | -1793% | -315% | -36% | 16% | 11% | 24% | 58% | 65% | 54% | 216% | 382% | 493% |
| % Capital expend. of Net Assets (revalued) | 0% | 1% | 3% | 7% | 21% | 14% | 8% | 6% | 1% | 1% | 1% | 1% |

**Table 3. MAJURO WATER AND SEWER COMPANY
BALANCE STATEMENT**
Years Ending September 30, 1993 through 2007
In Current US \$, unless otherwise noted
(Forecast)

| | 1993 (Actual) | 1994 (Estimated) | 1995 | 1996 (Forecast) | 1997 | 1998 | 1999 | 2000 | 2001 | 2003 | 2005 | 2007 |
|--|-------------------|---------------------|-------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| ASSETS | | | | | | | | | | | | |
| Current Assets | | | | | | | | | | | | |
| Cash | 2,242 | (86,996) | 509,676 | 697,484 | 870,646 | 1,206,169 | 1,660,042 | 1,949,030 | 1,869,277 | 2,121,114 | 3,048,596 | 4,646,800 |
| Accounts Receivable, net of doubtful account | 51,473 | 54,218 | 127,020 | 181,394 | 228,615 | 232,354 | 241,959 | 251,418 | 263,368 | 313,685 | 373,768 | 431,308 |
| Inventories | 71,923 | 93,530 | 105,557 | 103,866 | 136,115 | 155,579 | 160,656 | 180,207 | 212,321 | 258,289 | 307,946 | 363,970 |
| Other Current Assets | 2,500 | 3,759 | 4,377 | 4,719 | 5,559 | 6,073 | 6,563 | 7,144 | 7,959 | 9,358 | 10,970 | 12,773 |
| Advances to Contractors | - | - | 23,150 | 59,695 | 228,179 | 186,078 | - | - | - | - | - | - |
| Total Current Assets | 128,138 | 64,512 | 769,780 | 1,047,159 | 1,469,114 | 1,786,254 | 2,069,220 | 2,387,799 | 2,352,924 | 2,702,446 | 3,741,280 | 5,454,851 |
| Fixed Assets | | | | | | | | | | | | |
| Fixed Assets, revalued | 23,255,000 | 24,535,621 | 26,209,090 | 28,729,774 | 34,729,835 | 40,187,895 | 42,770,980 | 45,089,331 | 47,486,606 | 52,658,202 | 58,348,860 | 64,622,812 |
| Accumulated Depreciation | 7,127,660 | 8,296,484 | 9,573,968 | 10,986,627 | 12,614,772 | 14,519,112 | 16,655,368 | 18,981,762 | 21,504,811 | 27,195,062 | 33,846,314 | 41,595,792 |
| Net Fixed Assets | 16,127,340 | 16,239,137 | 16,635,122 | 17,743,147 | 22,115,064 | 25,668,784 | 26,115,612 | 26,107,569 | 25,981,796 | 25,463,140 | 24,502,546 | 23,027,020 |
| Work in Progress | - | 0 | 16,322 | - | - | - | 1,394,596 | 2,537,934 | 2,558,764 | 2,622,208 | 2,720,004 | 2,855,546 |
| Total Fixed Assets | 16,127,340 | 16,239,138 | 16,651,444 | 17,743,147 | 22,115,064 | 25,668,784 | 27,510,208 | 28,645,503 | 28,550,560 | 28,085,348 | 27,222,550 | 25,882,566 |
| TOTAL ASSETS | 16,255,478 | 16,303,649 | 17,421,224 | 18,790,306 | 23,584,178 | 27,455,037 | 29,579,428 | 31,033,302 | 30,903,484 | 30,787,794 | 30,963,829 | 31,337,418 |
| LIABILITIES | | | | | | | | | | | | |
| Current Liabilities | | | | | | | | | | | | |
| Accounts Payable | 111,111 | 154,479 | 179,867 | 193,941 | 228,461 | 249,585 | 269,714 | 293,583 | 327,089 | 384,582 | 450,805 | 524,932 |
| Other Current Liabilities | 53,703 | 67,662 | 74,405 | 75,508 | 83,388 | 85,025 | 85,319 | 85,726 | 92,326 | 102,940 | 120,666 | 140,507 |
| Current Portion of Long-Term Debt | - | - | - | 17,500 | 58,333 | 58,333 | 58,333 | 481,852 | 481,852 | 481,852 | 481,852 | 481,852 |
| Accrued Annual Leave | 26,437 | 29,295 | 35,470 | 38,174 | 41,998 | 45,201 | 49,705 | 53,495 | 58,799 | 68,107 | 78,890 | 91,379 |
| Total Current Liabilities | 191,251 | 251,436 | 289,741 | 325,124 | 412,181 | 438,144 | 463,071 | 914,656 | 960,065 | 1,037,481 | 1,132,213 | 1,238,670 |
| Long-Term Debt (net) | - | - | 700,000 | 1,529,537 | 4,859,353 | 7,342,131 | 8,300,243 | 8,496,021 | 8,014,169 | 7,050,465 | 6,086,761 | 5,123,057 |
| TOTAL LIABILITIES | 191,251 | 251,436 | 989,741 | 1,854,661 | 5,271,533 | 7,780,276 | 8,763,314 | 9,410,677 | 8,974,234 | 8,087,946 | 7,218,974 | 6,361,727 |
| Equity | | | | | | | | | | | | |
| Assets Revaluation Surplus | - | 786,600 | 1,538,168 | 2,266,403 | 3,003,340 | 3,904,933 | 4,920,532 | 5,887,957 | 6,780,298 | 8,302,370 | 9,411,953 | 10,026,056 |
| Retained Earnings | (17,517) | (1,253,011) | (2,219,498) | (2,935,651) | (3,344,503) | (3,801,003) | (4,300,060) | (5,069,270) | (6,140,795) | (8,096,736) | (9,733,383) | (11,094,477) |
| Capital | 16,081,744 | 16,518,624 | 17,112,812 | 17,604,893 | 18,653,807 | 19,570,831 | 20,195,642 | 20,803,939 | 21,289,747 | 22,494,215 | 24,066,285 | 26,044,112 |
| TOTAL EQUITY | 16,064,227 | 16,052,213 | 16,431,483 | 16,935,645 | 18,312,644 | 19,674,761 | 20,816,114 | 21,622,626 | 21,929,250 | 22,699,848 | 23,744,856 | 24,975,691 |
| TOTAL LIABILITIES AND EQUITY | 16,255,478 | 16,303,649 | 17,421,224 | 18,790,306 | 23,584,178 | 27,455,037 | 29,579,428 | 31,033,302 | 30,903,484 | 30,787,794 | 30,963,829 | 31,337,418 |
| Comparators and Ratios | | | | | | | | | | | | |
| Current Ratio | 0.7 | 0.3 | 2.7 | 3.2 | 3.6 | 4.1 | 4.5 | 2.6 | 2.5 | 2.6 | 3.3 | 4.4 |
| Working Capital, excluding cash | (36,918) | (70,633) | 5,833 | 80,226 | 286,619 | 245,474 | 54,144 | 59,460 | 64,233 | 93,811 | 121,213 | 142,612 |
| # Days Accounts Receivable | 85 | 60 | 60 | 55 | 46 | 40 | 38 | 37 | 35 | 35 | 35 | 35 |
| % Debt/(Net Fixed Assets + WIP) | - | - | 4% | 9% | 22% | 29% | 30% | 31% | 30% | 27% | 24% | 22% |