

**REPORT AND RECOMMENDATION
OF THE
PRESIDENT
TO THE
BOARD OF DIRECTORS
ON A
PROPOSED LOAN TO THE
MARITIME AND PORTS AUTHORITY OF FIJI
FOR THE
FIJI PORTS DEVELOPMENT PROJECT
IN THE
REPUBLIC OF THE FIJI ISLANDS**

January 2002

CURRENCY EQUIVALENTS

(as of 15 November 2001)

Currency Unit	–	Fiji Dollar (F\$)
F\$1.00	=	US\$0.4395
US\$1.00	=	F\$2.2753

- (i) Since mid-1975, the Fiji dollar has been linked to a weighted basket of currencies of the country's major trading partners.
- (ii) For the purpose of this report, an exchange rate of US\$1.00=F\$2.30 is used.

ABBREVIATIONS

ADB	–	Asian Development Bank
CSA	–	Commercial Statutory Authority
EIB	–	European Investment Bank
IEE	–	Initial Environmental Examination
FIMSA	–	Fiji Maritime Transport Safety Authority
GDP	–	gross domestic product
km	–	kilometer
km ²	–	square kilometer
LIBOR	–	London interbank offered rate
m	–	meter
m ²	–	square meter
mm	–	millimeter
MARPOL	–	International Convention for the Prevention of Pollution from Ships
MCICPE	–	Ministry of Commerce, Industry, Cooperatives and Public Enterprises
MCWE	–	Ministry of Communications, Works and Energy
MOTT	–	Ministry of Tourism and Transport
MPAF	–	Maritime and Ports Authority of Fiji
PAF	–	Port Authority of Fiji
PTL	–	Ports Terminal Ltd.
RORO	–	roll-on-roll-off
TA	–	technical assistance
TEU	–	twenty-foot equivalent unit

NOTE

The fiscal years of the Government and of the Maritime and Ports Authority of Fiji coincide with the calendar year. For other entities, FY before a calendar year denotes the year in which a fiscal year ends.

CONTENTS

	Page No.
LOAN AND PROJECT SUMMARY	i
MAP	iv
I. THE PROPOSAL	1
II. INTRODUCTION	1
III. BACKGROUND	1
A. Sector Description	3
B. Government Policies and Plans	4
C. External Assistance to the Sector	12
D. Lessons Learned	12
E. ADB's Sector Strategy	13
F. Policy Dialogue	13
IV. THE PROPOSED PROJECT	17
A. Rationale	17
B. Objectives and Scope	18
C. Technical Justification	18
D. Cost Estimates	20
E. Financing Plan	20
F. Implementation Arrangements	21
G. The Executing Agency	23
H. Environmental and Social Measures	28
V. PROJECT JUSTIFICATION	29
A. Financial and Economic Analyses	29
B. Risks	31
VI. ASSURANCES	32
VII. RECOMMENDATION	33
APPENDIXES	34

LOAN AND PROJECT SUMMARY

Borrower	Maritime and Ports Authority of Fiji (MPAF). The Republic of the Fiji Islands will guarantee the loan.
Project Description	The Project supports the country's macroeconomic goal of enhancing the competitiveness of the economy by developing the port sector facilities and operations. The Project will rehabilitate Suva Port by strengthening King's Wharf to the required seismic standard, improving the port's container layout, and extending the capacity of Lautoka Port with additional berthing and container storage space. The Project supports sector performance improvements through a multipronged reform program.
Classification	Economic growth
Environment Assessment	Category B. An initial environmental examination was undertaken, and its summary is a core appendix.
Rationale	Suva Port, the country's busiest international entry port, is degenerating with (i) aging wharf apron with inadequate capacity to handle the current cargo levels, (ii) wharf structure and its land-fill reclamation being below minimum seismic standards, and (iii) insufficient storage space for containers. Additional storage and berth capacity is needed at Lautoka Port to support the local export industries, improve shipping services to Lautoka and Fiji, and ensure optimal intermodal allocation of cargo traffic to reduce impact on the road system and the environment.
Objectives and Scope	<p>The Project aims to improve regional competitiveness of the port system by (i) extending the life of King's Wharf by 15 years, (ii) ensuring that the wharf complies with the required seismic standards, (iii) improving the wharf deck and container yard to efficiently handle the increasing cargo loads, and (iv) extending Lautoka Port facilities to facilitate trade opportunities with reduced time and cost impact of port and cargo handling operations.</p> <p>The Project will (i) arrest deterioration of the ports in Suva and Lautoka; (ii) strengthen critical sections of the King's Wharf, enabling it to comply with internationally recognized seismic standards assessed for Fiji and the site; (iii) improve King's Wharf deck and container yard capacity to efficiently handle the increasing cargo loads; (iv) increase berthage space by a total of 300 meters at Lautoka Port; and (v) increase container storage area at Lautoka Port by six hectares.</p> <p>The Project provides a framework for sector performance improvements inducing introduction of competition in stevedoring, crystallization of agency responsibilities, optimization of operational management, rationalization of financial management, and enhancement of environmental management of Fiji ports.</p>

Cost Estimates	The cost of the Project is estimated at US\$32.26 million equivalent, of which the foreign exchange cost is about US\$17.6 million (55 percent) and the local currency cost (including taxes and duties) is about US\$14.65 million equivalent (45 percent).
Financing Plan	The Project will be financed by an Asian Development Bank (ADB) loan of US\$16.8 million and MPAF's own resources of US\$15.46 million equivalent.
Loan Amount and Terms	A loan of US\$16.8 million from ADB's ordinary capital resources will be provided under ADB's LIBOR-based lending facility. The loan will have a 25-year term, including a grace period of 4 years; an interest rate determined in accordance with ADB's LIBOR-based lending facility; a commitment charge of 0.75 percent per annum; a front-end fee of 1.0 percent; conversion options that may be exercised in accordance with the terms of the draft Loan Agreement, the Loan Regulations, and ADB's Conversion Guidelines; and other terms and conditions set forth in the draft Loan Agreement. MPAF has stated that its decision to borrow under ADB's LIBOR-based lending facility on the basis of these terms and conditions were its own independent decisions and were not made in reliance on any communication or advice of ADB.
Period of Utilization	Until 30 June 2006.
Executing Agency	MPAF will be the Executing Agency.
Implementation Arrangements	The general manager of technical services at MPAF will be the project manager responsible for the overall administration of the Project. Preconstruction activities will be undertaken by consultants assisted by MPAF supervisory staff.
Procurement	Five civil works contract packages have been identified: (i) King's Wharf maintenance repairs, (ii) King's Wharf seismic upgrade and deck strengthening, (iii) demolition of two storage sheds, (iv) container yard civil works, and (v) Lautoka Wharf extension and bridge construction. These will be awarded through international and local competitive bidding in accordance with ADB's <i>Guidelines for Procurement</i> . Procurement of equipment is not envisaged under the Project.
Consulting Services	International and domestic consulting services will be needed for detailed engineering design and construction supervision. Consultants will be selected in accordance with ADB's <i>Guidelines on the Use of Consultants</i> .
Estimated Project Completion Date	31 December 2005.

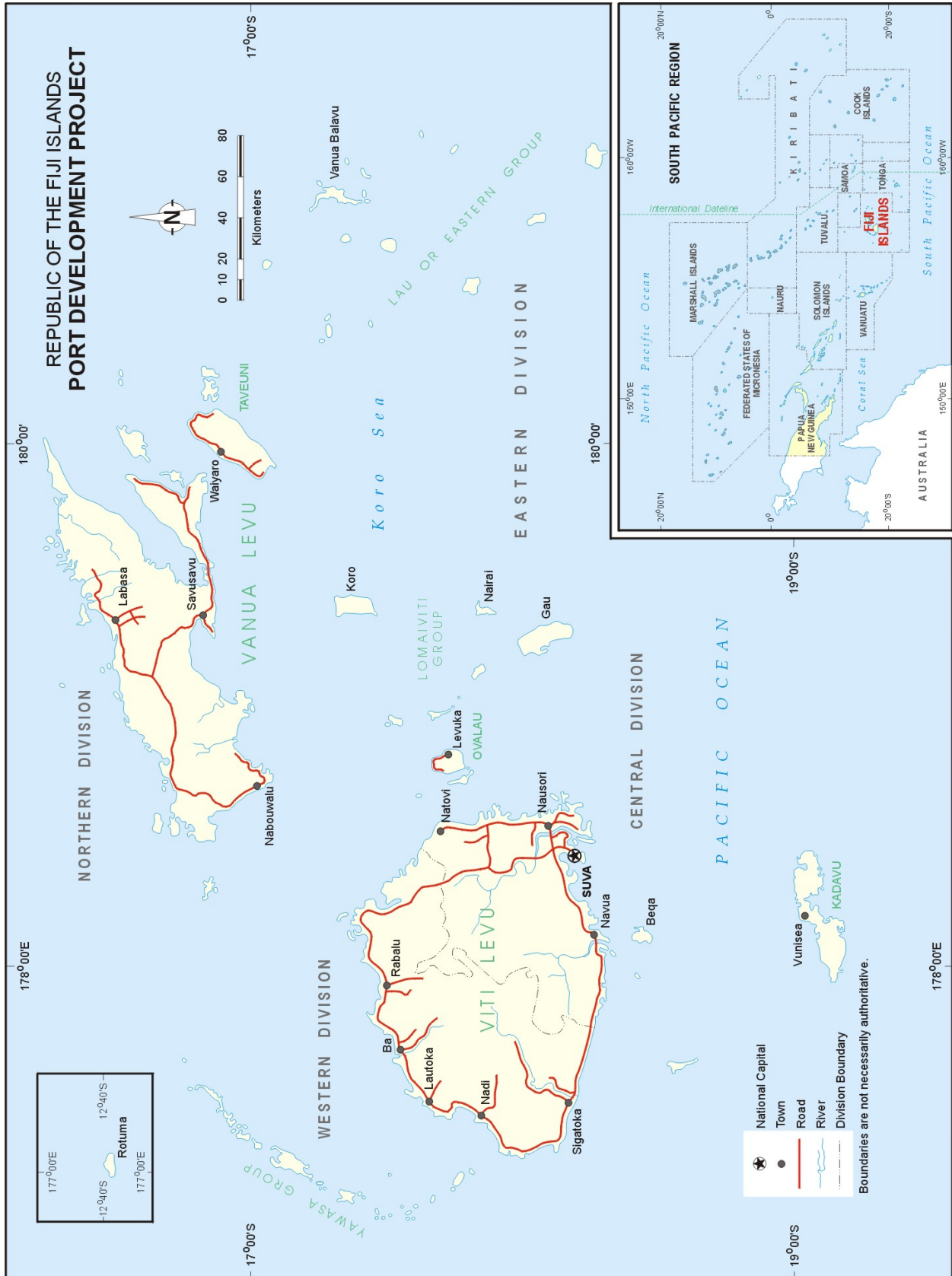
**Project Benefits
and Beneficiaries**

The port sector is critical for Fiji, which is an island country and totally reliant on its two main ports of Suva and Lautoka for imports, exports, and domestic and regional transport of cargo and passengers. The port facilities are the country's strategic assets. The Project will establish Suva Port as a lifeline facility complying with the minimum seismic design standard, and reducing the environmental impact of the transport system by improving intermodal allocation of cargo volumes between land and maritime sectors.

The Project through its Suva Port component will increase the capacity of the existing port facilities and enable them to cope with the anticipated throughput and vessel traffic for an additional 15 years. The primary benefit is the additional 15 years of use from the existing port facility. Through its Lautoka Port component, the Project induces trade and the related employment. The primary benefit is the facilitation of significant trade growth.

The Project will rehabilitate the wharf infrastructure to allow more efficient use of modern technology in cargo operations. It will expand the capacity of the container yard both in Suva and Lautoka. The related benefits, namely (i) improved vessel turnaround time, (ii) enhanced cargo handling productivity, and (iii) increased frequency and competitiveness of vessel calls, accrue directly to the port users, involving both importers and exporters.

Increasing trade opportunities will become available for Fiji through expanded facilities in Lautoka with growth inducing employment, income impacts, and export earnings. The consumers will also benefit from the (i) lowered cost of freight per volume of cargo due to improved port operations and sector reforms; and (ii) reduced negative environmental impacts, road safety impacts, and noise as a result of less heavy container traffic on the main road system.



I. THE PROPOSAL

1. I submit for your approval the following Report and Recommendation on a proposed loan to the Maritime and Ports Authority of Fiji (MPAF), to be guaranteed by the Republic of the Fiji Islands, for the Fiji Ports Development Project.

II. INTRODUCTION

2. King's Wharf at Suva Port was constructed in 1963. The first loan of the Asian Development Bank (ADB) to the port sector, approved in September 1979,¹ was to this port and was evaluated and rated as generally successful.² Under this project, the Port was rehabilitated and developed for containerized cargo. Twenty years later—at the end of the expected life of the rehabilitation—and despite a regular maintenance program, Suva Port is degenerating with (i) an aged wharf apron with a reduced structural capacity to handle the current cargo requirements, (ii) an aged wharf structure and its landfill reclamation at below minimum seismic standards, and (iii) insufficient storage space for containers. Corrosion is significant and will severely affect the expected life of the port facility in the next few years.³

3. The Lautoka Port was constructed in 1961 and is the second largest port of Fiji and a relief port to Suva. Rehabilitation and upgrading of the port was carried out under a loan from the European Investment Bank (EIB) in 1992. In light of forecast increases in demand for port services in the area, extension of the port's berth and storage space is necessary to facilitate trade.

4. Reconnaissance for the Project was carried out in November 1998, fact-finding in January 1999, and appraisal in May 1999. These missions confirmed the feasibility of the King's Wharf Rehabilitation Project. Accordingly, management review and staff review committee meetings were conducted on 22 March and 27 May 1999. As a result of the political events in Fiji since May 2000, the Project has awaited the government's guarantee for the Loan. In this period, additional requirements have emerged at the Lautoka Port. As requested by the Borrower and the Government, a project-specific consultation mission⁴ in June 2001 appraised these requirements and this report incorporates an expansion component for the Lautoka Port. The new project component together with the inflation incurred in construction prices led to a 2.4-fold increase in the project cost since the prior appraisal, and a doubling of the ADB loan amount since the 1999 appraisal. The report is based on findings of the ADB consultation mission, a review of the feasibility reports, visits to the project sites, and discussions with relevant officials. The loan is the fourteenth loan to the Fiji Islands and the second in its port sector. The project framework is given in Appendix 1.

III. BACKGROUND

5. The Fiji Islands comprise 330 islands with a total land area of 18,272 square kilometers (km²). Most of the population (94 percent) live on the two largest islands, Viti Levu and Vanua Levu, which account for 87 percent of the land area. Fiji's current population is 839,106, and is expected to reach 951,760 in 2010. The Suva urban area accounts for about 30 percent of the population. Suva is the principal commercial and service center, and the seat of the Government. It is also an education center, and a regional hub with numerous regional institutions and embassies.

¹ Loan 0411-FIJ: *Suva Port*, for US\$7.0 million, approved on 20 September 1979.

² PPAR: PEO 0258: *Suva Port*, September 1988.

³ Suva Port Master Development Plan, Final Report, 1996.

⁴ The Mission comprised S. Jarvenpaa, Sr. Project Economist and Mission Leader; I. Bone, Engineer-Consultant; and D. Hopkins, Engineer-Consultant.

6. The Government maintained macroeconomic stability over a five-year period marked by the Asian economic crises and, more recently, a period of political instability, and the falling world prices of primary products. Gross domestic product (GDP) at current factor costs grew by 1.4 percent in 1998 and by 8.0 percent in the subsequent year, and reached F\$3,092 million (US\$1,345 million), or F\$3,766 per capita in 1999. However, in May 2000, parliamentary members were taken hostage by an armed group of civilians, the government resigned, and an interim caretaker administration was formed. National elections were conducted in August 2001 and a cabinet formed in September 2001. These events adversely affected the economy, and GDP contracted by about 8.2 percent in the year 2000. The first half of 2001 has seen a partial recovery with GDP now forecast to grow by 1 percent for the year, revised downward from an earlier forecast of 4.8 percent.

7. The economy of Fiji Islands is open and driven by exports, with its main markets in Australia, United Kingdom, and United States. Exports of goods and services correspond to about 70 percent of GDP, while imports of goods and services equal about 50 percent of GDP. Sugar and garments continue to dominate commodity exports, although receipts from both industries have declined in the last year. A number of garment factory closures since mid-2000 indicate a likely continuation of a downward trend in the textile, clothing, and footwear industry. World prices for gold and copra, Fiji Islands' two primary product exports, have also declined and both volume production and receipts are down in recent years. However, strong growth in fresh fish exports, good performance from timber and nonsugar agricultural production, and newly emerging export products such as bottled water are helping to offset the decline in traditional exports.

8. Imports comprise manufactured goods; machinery and transport equipment; food; minerals and fuels; and chemicals from Australia, Japan, New Zealand, and the United States. While the trade balance has been negative, the services' exports, primarily travel and transport, brought the current account into surplus for 1996 and 1997, although this declined to near balance in 1998 and 1999. Foreign reserves have been maintained and were equivalent to 5.2 months of imports at the end of April 2001 and compare well with the high level of 5.8 months of imports in the previous year. In the 1990s, the Government has curtailed its external borrowing over the past four years. Total debt declined from 1992-1996; the public outstanding debt remaining stable at F\$200 million; and the private sector debt decreased through to 1997, and thereafter more than doubled by 1999. From 1997 to 1999, the Government's external debt service ratio maintained a level of between 2 and 3 percent of GDP. The total external debt rose from a low point of 11.3 percent of GDP in 1997 to 15.9 percent in 2000. While relatively low compared with other developing countries, this marks a change from the falling trend over the previous five years.

9. In an effort to restore competitiveness in the aftermath of the Asian crises, the Reserve Bank devalued the Fiji dollar by 20 percent in January 1998. Inflation reached 8.1 percent in 1998, but fell during 1999. Following the political events in mid-2000, prices experienced a short period of deflation. Influenced, in part, by high petroleum prices that have increased by 5 percent, inflation has remained at a moderate 2 percent.

10. The Government's macroeconomic objectives are to maintain low inflation and external stability, and to restore private investor confidence. Over the year to March 2001, Government revenue declined by 19.2 percent while expenditure increased by 9.5 percent. Although expenditure was held to 20 percent below forecast, the Government nevertheless recorded a deficit of 3.8 percent of GDP to March 2001. In the short term, until the political situation stabilizes, the current stagnation of economic activity appears likely to continue.

11. The economy is characterized by a duality between an agricultural and subsistence farming population, and an urban and employed population. The pattern of income inequality reflects an

uneven distribution of economic activity by geographic area. Accordingly, the national poverty line defined in 1997 in the Suva capital area (F\$100 per week) is higher than that in the nonurban areas (F\$83 per week). Twenty-five percent of the total population is estimated to live below the poverty line. As a result of the 1998 drought and subsequent floods, another 25 percent were expected to fall below the poverty line. The poorest and the richest 20 percent of households are estimated to account for 5 and 50 percent of the GDP, respectively.⁵ The Government pledges paramount attention to improve the condition of the poor, and targets reduction of the cost of living, improved access to health services by all, employment generation, and rationalization of the Government's privatization program to achieve this goal.

A. Sector Description

12. Transport is well developed and multimodal, consisting of road, maritime, rail, and air transport. The gateway international airport is at Nadi, with regional air traffic handled by the Nausori airport near Suva. Domestic aviation infrastructure includes 22 airports. The two main islands, Viti Levu and Vanua Levu, contain 90 percent of the country's road network of 5,206 kilometers (kms).

13. Income inequality in the country is primarily related to the remoteness of the disadvantaged population centers. Developments in the transport sector are reducing isolation and improving the transition from subsistence farming—characteristic livelihood of households below the poverty line—to cash crop farming and marketing. This is currently realized under the Government's Third Road Upgrading Program, funded by an ADB loan.⁶ Similarly, the ADB-supported franchise scheme for interisland shipping, implemented in 1998, has helped to ensure more affordable transport to the isolated outer islands.⁷

14. The country is well served by international and regional shipping. There are a total of 26 public ports including wharves and jetties. In 2000, the three main ports, Suva, Lautoka, and Levuka, received a total of 940 port calls and handled a total of 2.5 million gross revenue tons with 56 percent being imports. This consists of 1.6 million tons of bulk cargo and 34,656 containers carrying 854,635 tons of cargo. Since 1999, a slight decline of throughput of about 1 percent has been attributed to the politically unstable situation in Fiji since May 2000. Suva Port handles half of this cargo and 69 percent of the port calls, 89 percent of the total containerized traffic, 63 percent of the import cargo, and 32 percent of the exports.

15. Throughput in Suva has been reduced by 1.5 percent since 1999 as the gross national product declined consequent to the political events in 2000. Lautoka Port predominantly facilitates bulk exports of raw sugar, molasses, and pine chips. It receives about one-fourth (26 percent) of the port calls, but handles about half of the total cargo throughput, 36 percent of the imports, and 68 percent of the exports, mainly break-bulk cargo. Recently, Lautoka has had increased demand for the port facilities for transport of bottled water through to Suva and to the United States. This is expected to add 100 full container loads per week, more than doubling Lautoka Port's container traffic. Also, further increase is expected from the export of grass to the Arab Emirates in 2001. Levuka Port receives 5 percent of the port calls as it services Fiji's tuna cannery. It handled 7,333 tons of cargo in 2000, having experienced a 47 percent decline in the tuna cargo throughput. Malau Port facilitates the adjacent sugar and wood-chip exports, and petroleum imports for local distribution on Vanua Levu. In January 2001, Malau Port was declared an entry port with customs and immigration facilities to handle international cargo. A number of private wharves and jetties are operated by industries such as the Fiji Sugar Corporation.

⁵ Government of the Republic of Fiji Islands, United Nations Development Programme. 1997. *Fiji Poverty Report*. Suva.

⁶ Loan 1350-FIJ: *Third Road Upgrading (Sector) Project*, for US\$40.0 million, approved on 26 August 1997.

⁷ TA 2321-FIJ: *Transport Sector Institutional Strengthening*, for US\$600,000, approved on 12 April 1995.

B. Government Policies and Plans

1. Long-Term Development Strategy

16. The Government recognizes the importance of transport service underpinning economic growth. It particularly emphasizes the need to improve efficiency and productivity of the port operations by increasing the role of the private sector, commercializing services, maintaining high safety levels, and ensuring intermodal coordination. The Government's aim is to ensure future competitive and lower cost port services, and provide adequate capacity to meet the anticipated traffic and cargo growth.

17. MPAF manages port infrastructure within the four major ports. Its fourth corporate plan (fiscal year [FY] 2000-2001) defines its vision, mission, corporate objectives and strategies, and financial outlook. The MPAF is a landlord and a regulatory authority with responsibilities for the management, administration, and development of the declared entry ports of Suva, Lautoka, Levuka, and Malau. MPAF's statement of corporate intent for FY2001 focuses on its performance forecast and identifies the need for (i) rehabilitation of the King's Wharf with seismic upgrading and deck strengthening in 2001, (ii) completion of the bi-annual dredging at the Princes and Walu-bay wharves, (iii) reclamation work and wharf extension at Lautoka Port, (iv) commencement of international operations at Malau Port in Vanua Levu, (v) acquisition of two tug boats, (vi) implementation of a simplified port tariff, and (vii) introduction of a marine environmental (pollution) control levy.

18. MPAF is also pursuing its long-term goals of becoming a Pacific hub port, developing free-port facilities, and creating greater transshipment capacity. Its infrastructure development plan⁸ outlines MPAF's infrastructure development needs and was recently reconfirmed by an evaluation report commissioned by the Ministry of National Planning.⁹ As a long-term plan, these plans propose an eventual replacement of Suva Port by a multipurpose cargo facility at Rokobili, a site 5 km from the current Suva Port location. However, a geotechnical analysis in 1998¹⁰ concluded that the soil sediments in the Rokobili lagoon were soft. This made the new facility uneconomical, and consequently, the Project was postponed to 2015.

19. In the interim and in the absence of the port relocation project, the master plan demonstrates a need for repairs and rehabilitation of Suva Port to extend its life to 2020. The rehabilitation is also needed to improve competitiveness of the port and its ability to cope with the anticipated throughput. It will establish King's Wharf as a lifeline wharf as warranted by the seismic risk in the area.

20. Extension of facilities at Lautoka Port will increase capacity for cargo storage and handling by (i) allowing additional berthage of long distance vessels to north America and Asia, (ii) increasing port productivity between the Suva and Lautoka ports, (iii) improving intermodal interfacing between the land and maritime transport, (iv) reducing road deterioration, and (v) supporting tourism by enabling development of attractive berthing possibilities for small- and large-scale cruise vessels. Together with greater flexibility in vessel scheduling, the proposed Project in Lautoka will catalyze long-term benefits from local export industries and from international cargo vessels as it will enable these to include Lautoka as a single point of call in Fiji.

⁸ MPAF. 1996. Master Development Plan. Funded by the European Investment Bank.

⁹ Study on Port Developments in Fiji Islands, Final Report, PSA International Pte Ltd, Singapore, March 2001

¹⁰ Geotechnical Investigation and Preliminary Design of Rokobili Development, April 1998.

2. Sector Institutions

a. Legal Framework

21. The port sector is governed by two acts: The Marine Act of 1986 and the Ports Authority of Fiji Act of 1975. These have been amended to reflect the port sector reorganization (para. 22). Until late 1997, the sector was managed by two institutions, the Marine Department of Ministry of Communications, Works and Energy (MCWE) and the Ports Authority of Fiji (PAF). Since then, far-reaching reforms have been implemented under the Government's public enterprise reform. The objectives of these are to (i) allow government entities to operate on a commercial basis and in a competitive environment; and (ii) make the government entities more efficient, productive, accountable, and better organized. The Public Enterprise Act took effect in 1996 and established a legal framework and mechanism for the reorganization of Government entities. It provides for the adoption of reorganization charters and the appointment of interim boards, and sets forth the legal framework for the establishment of Government commercial companies and commercial statutory authorities (CSAs).

b. Maritime Sector Agencies Prior to Reorganization

22. PAF, established in 1975 pursuant to the PAF Act,¹¹ was under the overall supervision and control of MCWE and was responsible for the regulation and operation of the three ports at Suva, Lautoka, and Levuka. The functions of PAF were to (i) provide and maintain adequate and efficient port services, and facilities in ports and the approaches to ports; (ii) regulate and control navigation the approaches to ports; (iii) promote the use, improvement, and development of ports; (iv) coordinate all activities within the ports; (v) acquire land and execute works as necessary for the functioning of the ports; and (vi) take necessary action related to the performance of its functions. PAF had the authority to enter into contracts; sue and be sued; acquire, hold, and dispose of land; and act as necessary to perform its functions. PAF could, with the consent of MCWE and the minister of finance, borrow and raise international loans. In fact, PAF borrowed from ADB in 1979 (footnote 1) and from the European Investment Bank (EIB) in 1992 and 1995. The assets of PAF were evaluated at US\$25.7 million (F\$59 million) in 1997.

23. The activities of the Marine Department of MCWE were diverse: its Marine Fleet Section owns a fleet of vessels, which included cargo/passenger crafts, landing crafts, navigational aids, hydrographic vessels, and other crafts; its Statutory Shipping Office enforces maritime laws and ensured that hull, machinery, life-saving, and fire-fighting surveys were carried out by qualified surveyors; and it ran an apprentice scheme and a program for maintenance of navigational aids, and conducted hydrographic surveys.

c. Maritime Sector Reorganization

24. The PAF Reorganization Charter¹² was adopted in October 1997 in accordance with the Public Enterprise Act by the Ministry of Commerce, Industry, Cooperatives and Public Enterprise (MCICPE). The aim was to reorganize PAF and restructure it as a corporation (e.g., "corporatize" it); increase its operational efficiency; and operate it as a successful commercial business. To achieve this, the reorganization comprises three phases constituting the sector reform program:

¹¹ Act No. 20 of 1975.

¹² PAF Reorganization Charter of 15 October 1997, under the Public Enterprise Act of 1996.

- (i) incorporation of Ports Terminal Limited (PTL) under the Companies Act of 1983 as a Government commercial company to undertake stevedoring and cargo handling, storage, and pilotage;
- (ii) establishment of MPAF as a CSA to regulate and supervise all maritime activities within ports and Fiji waters, and to undertake port asset management, maritime sector regulation, and policy formulation currently performed by the Marine Department; and
- (iii) further reform of MPAF to separate asset management functions from sector regulation.

d. Implementation of Reorganization

25. PTL was incorporated under the Company Law and declared a Government commercial company in December 1997. This implemented the first component of the reform. US\$1.17 million (F\$2.7 million) of PAF's assets were transferred to PTL. In accordance with its Articles of Association, PTL is a private company limited by shares and managed by its directors. The shares are held in trust by the State. The directors exercise all powers of PTL, including the power to borrow money. PTL undertakes cargo handling and storage services under a five-year nonexclusive license agreement with MPAF, for which it is expected to pay MPAF an annual rental of US\$0.17 million (F\$0.4 million). PTL is subject to the direction of the port master within MPAF regarding the use of its equipment. While PTL is responsible for the wharf cleaning, MPAF maintains its infrastructure. The objective of establishing PTL as a commercial cargo handling company was to facilitate commercialization and privatization of port operations, and to enable PTL to compete with privately owned business with comparable functions. PTL is expected to adopt (i) a customer-focused and business-oriented structure; (ii) a private sector philosophy for its organization, conditions, patterns, attitudes, and ethics; and (iii) a tariff structure to enhance efficiency and productivity.

26. To carry out its services, PTL has a permanent staff of 99 including 33 stevedores. It contracts additional labor from private sector firms, as needed. PTL's employees are currently engaged for three years under contracts that have replaced the past civil service contracts with union-negotiated salary increases, but include no incentives for wet-weather work or performance reward. In the process of transferring from the civil service contracts, PTL confronted labor action that was resolved in a judicial process in favor of PTL. PTL collects charges under the regulations within the PAF Act. These include charges for cargo handling, storage, equipment rental, and a piloting fee. The organization chart of PTL is in Appendix 2.

27. MPAF was declared a CSA in December 1997. This implemented the second component of the reform. Effectively, MPAF began operating on 1 March 1998, when PAF assets were segregated to MPAF and PTL. MPAF was established to undertake (i) port asset management, (ii) ports and maritime regulation and licensing within ports, (iii) port state control, and (iv) maritime regulation and policy formulation of the Marine Department. Currently, MPAF manages port assets and implements regulations established for the maritime activities within the Fiji ports and waters. Revenues of MPAF included dues for wharfage, dockage, and mooring; revenues from piloting services; the environmental fee, and a share of the towage charge. MPAF was authorized to collect navigation aids' dues when these were incorporated into its responsibilities. To carry out its responsibilities, MPAF had 54 staff. MPAF's organization chart is in Appendix 3.

28. MPAF became the legal successor of PAF. The revised PAF Act specifies that any reference to PAF in any contract, instrument, register, document, or court proceedings is to be read and construed as a reference to MPAF. Thus, MPAF assumed all liabilities of PAF. The borrowing powers of PAF remained unchanged with MPAF. Under the Finance Act, any Government guarantee of loans to MPAF is subject to parliament approval.

29. In April 1998, MCICPE declared the Marine Department a “reorganization enterprise”. The corresponding “reorganization charter” was adopted by MCICPE in November 1998. In accordance with this charter, the functions of the Marine Department relating to aids to navigation, port state control, and hydrographic charting were to be transferred to MPAF. The charter also renames the Marine Department as the Fiji Maritime Policy Unit. This unit and the Marine Board would take over the regulatory functions of the Marine Department as listed in the amended Marine Act.¹³ Under the Reorganization Charter, the Government’s vessel fleet was established as the Shipping Corporation of Fiji, Ltd. Under this reorganization, MCWE would continue to supervise both the Fiji Marine Policy Unit and MPAF. In November 1999, the name of the Marine Department was changed to the Fiji Islands Maritime Safety Administration (FIMSA).

e. Further Reform Proposals

30. During the last two years, political events in the country and the significant changes in the composition of the cabinet have affected implementation of the reform process. The Government was not able to pursue implementation, and MPAF only nominally absorbed the port state control, and has yet to incorporate staff for the operation of the aids to navigation and the hydrographic responsibilities. The PTL did not establish commercial operations and was not sold to private sector as intended.

31. A Cabinet decision in October 2000, however, established MPAF, PTL, and FIMSA as reorganization enterprises. The Ministry of Public Enterprises established a task force to study further reform and performance improvement in the maritime sector. In May 2001, an interim final report of this study was circulated within the Government for comments. It focused on restructuring the activities of MPAF and PTL into a port company that would manage, promote, and develop port resources to facilitate trade through the ports of Suva and Lautoka and provide cargo management and handling services, pilotage, berthing, stevedoring, and other port services at these ports. The company would provide these services by licensing private operators. The port company would dispose of its non-port assets (a headquarters building and an on-shore container yard); reallocate port state control, navigation aids, and hydrographic services to FIMSA; and be required to provide a 15 percent return on equity (ROE) to the Government. A four-fold increase in the current port tariff would be required for MPAF to generate the required ROE. FIMSA would be responsible for sector regulation and PTL would cease to exist. Neither PTL operations nor performance are analyzed in the report. The organizational structure of the port company would remain largely unchanged from the current MPAF structure with the scope of operation reduced to only two ports in place of four. FIMSA, inheriting all noncommercial operations of MPAF and PTL, would need considerable capacity building.

3. Suva Port

32. Suva Port is the main port for international trade. It is also a focal point for outer island domestic services, and a base for fishing and ship repair industries. In 2000, 1.2 million tons of revenue cargo, 940 ship calls, and 32,706 20-foot equivalent unit (TEU)¹⁴ containers were handled by the port. Cargo volumes for Suva declined as a result of the GDP reduction.

33. Suva Port throughput is expected to reach 50,000 TEUs by 2011. Under conservative growth scenarios, bulk cargo volumes will double by 2025. Suva Port handles 69 percent of all ship calls. While the ship calls to Suva have grown only by an average annual rate of 1.3 percent during

¹³ The Marine Act of 1986 was amended to reflect the sector restructuring in 1999.

¹⁴ TEU is the international standard measure for a standard 20-foot-long container.

1992–1997, import and export revenue tons have increased by an annual average of 8 percent in the same period. Imported and exported containers have increased annually by 7 percent. Since 2000, the cargo volumes were affected by the political situation in Fiji, and in particular the consequent reduction in GDP by 8 percent in 2000. Cargo volumes lag behind the general growth trend. As a result of the economic slow down, consumer spending waned, and demand for imports from the export industries slowed. The impact on employment have also affected consumer confidence and spending on imports. As the economy is currently returning to a sustainable level of growth of about 4 percent per annum, and investor confidence grows, demand for cargo is expected to return to the normal level. As a result, containerized cargo volumes were severely affected in 2000, and are expected to recover by the end of 2003 to the 1997 levels. Low and high scenarios for cargo volume growth have been developed based on historical GDP and import and export growth. These yield a low-case annual growth rate of 2.8 percent. Under this scenario, the revenue tons handled by Suva Port would double by 2011, when the capacity of Suva Port with benefits of the Project will be saturated.

34. Suva Port comprises the King's Wharf complex, Muaiwalu fishing wharf complex, Narain jetty, and Rokobili terminal. The King's Wharf complex consists of three linked quay structures of Princes Wharf (152 m), Walu Bay Wharf (183 m), and King's Wharf. The King's Wharf comprises three berths (north, south, and central) with a total length of 492 m and a depth of 12 m. The capacity of the present facilities at Suva Port is restricted as a result of the geotechnical and structural conditions of King's Wharf. While Suva Port has a natural harbor, the wharf has been built on a geotechnically difficult site on the edge of an extensive reclamation. The wharf structure is supported by cylindrical, long, hollow, pre-stressed concrete piles. At the north berth, the piles are solidly founded on the bedrock and act as well-performing rearing piles with an ultimate design capacity of 150 tons. Those in the south end are friction piles and do not reach the bedrock at 60 m. The concrete structure has deteriorated due to corrosion of its reinforcement steel. The current capacity of the structure is only about half of its original design (70 tons). The edge of the reclamation is supported by a retaining wall which can support only limited loads. Because the wharf is connected to the reclamation retaining wall by bridges, failure of the reclamation wall would also cause the wharf to fail. Any seismic safety consideration, thus, must include the entire soil and structure system. Furthermore, the wharf deck is deteriorating, and its concrete has cracked and delaminated.

35. Suva is within a seismic fault. Earthquakes caused damage in the country in 1850, 1902, 1919, 1932 (twice), 1953, and 1979. The reactivation of the faults within the bedrock and slumping of the overlying sediments were partially responsible for the 1953 earthquake and tsunami. This earthquake caused serious damage to the wharf that preceded King's Wharf, and the magnitude has been assessed to have a return period of 50 years. Seismological evidence also suggests that a group of faults in the area running northwest is currently active. Earthquakes capable of damaging King's Wharf, along with other structures in Suva, may occur in the near future.¹⁵ A seismic stability assessment¹⁶ of the reclamation at King's Wharf concluded that safety is unacceptably low during a probable seismic event.¹⁷

36. The layout of Suva Port is shown in Appendix 4. King's Wharf is a multipurpose cargo handling site. While containers dominate cargo operations, unitized, wheeled, break-bulk, dry bulk, and liquid bulk are also handled. Containerization of cargo has increased during the past two decades. The container yard is shallow from the wharf face to the rear fence, which separates the

¹⁵ Minor earthquakes have recently occurred affecting the southern and northern islands of Fiji, the latest measuring 5.6 on the Richter scale.

¹⁶ Shorten, G. 1993. *The Geological and Tectonic Setting for Ground Failure Hazards in Suva Harbour and Environs*. University of Queensland, Queensland, Australia. Tonkin & Taylor International Ltd. 1998. *Geotechnical Review of King's Wharf*.

¹⁷ Australian Geological Survey Organization. 1997. *Probabilistic Earthquake Hazard Assessment for Fiji*.

port area from a market, bus station, Government offices, and the surrounding roads. Prior to May 2000, the container yard of 1.95 hectares (ha) was under pressure from the container volumes. It was designed for 536 containers.¹⁸ Containers are stacked parallel to the wharf. The yard was generally more than half full, and when it became two-thirds full, the containers were stacked three high. Effective policing and high demurrage charges have reduced dwell times for containers in the yard to three days, which compares well with international standards. The international standard for land utilization ranges from an annual 0.5 to 3.5 TEU per square meter (m²). In 1999, the annual land utilization of 2.28 TEU/m² reflected efficient use of the current space. In light of the cargo volume forecast, this efficiency standard can be maintained only through an increase in the area of the container yard. With the current area, the total yard capacity of about 50,000 TEU per annum will be reached by 2011.

37. The current cargo handling operation is inefficient. In the absence of shore-based cranes, Suva Port cannot handle ships that lack lifting gear. The insufficient wharf strength prohibits the use of forklift trucks to lift full containers on the wharf apron; instead the ships' gear is used to lift the containers onto trailers. The trailers are stacked in bays designated by shipping agency. Empty containers are also moved to stacks at shipping agency bays. The cargo handling productivity at Suva Port was 5.23 containers per vessel-hour prior to the sector reorganization in 1998 (paras. 57-61). Thanks to the focus on cargo-handling efficiency under the reorganization, this has since improved to 8.00 containers per hour per vessel using the ships' lifting gear. Pre-1989 New Zealand cargo handling performance of 15 containers per hour using ships' gear gives a regional comparison and a target. International vessels calling at Suva Port can be divided into two categories: (i) those calling on their route from the Americas and Asia to Australia and New Zealand, and (ii) Pacific regional traffic. While the regional traffic must maintain ships' gear to load and unload at the Pacific ports other than Suva, the long-range traffic needs to maintain the ship's gear only for the call at Suva Port. This requirement restricts long range calls to a confined number and type of vessels within the fleets of the shipping lines. Equipping vessels with cranes is expensive, and displaces valuable space and load capacity.

38. Container loading and unloading at Suva Port concurrently with cargo delivery is also inefficient. While the state of cargo handling equipment is poor, two additional forklift trucks were recently purchased that are capable of carrying both 40 and 20 foot containers. The container yard is a common use area allowing the consignees to collect cargo. Ship loading and unloading thus occurs simultaneously with deliveries of cargo to consignees, resulting in vehicles having to maneuver within the small yard. The forecasted increase in cargo will lead to three-container stacks. Subsequently, two container moves will be needed to reach containers at the bottom of the stack. Further, containers are stacked without regard to berthing allocations. Combined, these conditions reduce efficiency of the container handling and, consequently, competitiveness of the port.

39. Cargo handling operations affect vessel productivity, which increases freight costs to the economy. Low productivity and particularly low consistency in productivity can lead to less frequent vessel visits to a port. The shipping industry tends to schedule port calls with increasing precision. The need to use only the few vessels equipped with cranes for calls to Fiji restricts flexibility and affects the frequency of visiting vessels. This also increases freight rates. The reliability of cargo handling at Suva Port has improved lately but is still too low. With general upward pressure on prices, the low cargo handling productivity induces vessel operators to increase rates to Suva. With productivity improvement, some vessels could fit an additional port call into the Pacific route or assign more frequent service to Suva. This would improve the cost-efficiency of the vessels and lead to more competitive freight rates.

¹⁸ The design standards of United Nations Conference Trade Assistance Development are generally conservative. During peak demand 700 containers have been fitted onto the yard.

4. Lautoka Port

40. Lautoka Port is the country's main bulk port handling most of the raw sugar, molasses, wood chip, fertilizer, and timber exports. It is on the northwestern coast of Viti Levu. The port serves as a vital link for regional shipping and Suva, and is a hub for the tourist cruise industry. It hosts about six international cruise vessels per year, the largest of which require the use of both Queen's Wharf and the sugar and wood-chip loading berths. In 2000, 1.2 million cargo revenue tons, 248 ship calls, and 4,467 20-foot TEU containers (footnote 14) were handled by the port. Lautoka Port handles 25 percent of all foreign ship calls to the country's ports and 26 percent of all ship calls. The political events of May 2000 affected cargo volumes of Suva Port more than at Lautoka, which relies on domestic bulk exports for its primary business. However, because of textile factory closures and declining textile exports, the throughput at the Lautoka Port is expected to decline to 1.02 million tons in 2001.

41. Overseas ship calls to Lautoka, excluding oil tankers, fell by an average annual rate of 8 percent during 1992-1997, and have remained stable at an average of 150 calls per year from 1998 to 2000. Import revenue tons remained constant between 1992 and 1999 at an average of 550,000 tons, while exports increased by 7 percent annually between 1992 and 1996 to reach a high point of 105,000 tons. Exports subsequently dropped sharply to 38,000 tons by 1999. Imported containers increased from 3,200 TEU in 1992 to 4,800 TEU in 1995 and then declined to 3,300 TEU in 2000. Export containers similarly grew from 1,100 in 1993 to 1,800 in 1996 and then declined to 940 in 2000. The decline in cargo in recent years reflects a combination of shipping rationalization through Suva, reduced sugar exports in response to a declining price, periods of drought, and some downturn in the garment industry. However, this situation is set to change radically with the introduction of two high volume export industries in north Viti Levu. A major increase in demand for port services in Lautoka is forecast to derive from new exports of mineral water and animal feed. These industries forecast export growth that will double the cargo and ship calls at Lautoka Port once adequate facilities have been completed, and to reach 4.7 million tons of cargo and 446 ship calls in 2003. Container volumes from the new trade are projected to rise to over 100,000 TEUs by December 2002.

42. Lautoka Port is also seen as a relief port for Suva. It is strategically located in vicinity of industry and agricultural production sites. It is envisaged to contribute to improvement of the intermodal interphasing between the two ports and to reduction in demand for road transport by container traffic. The Land Transport Authority of Fiji will gradually enforce the maximum allowed axle-weight of 11 tons per 10-wheel truck with full enforcement from 2003. This will increase land transport costs and place additional demand for international cargo volumes to depart directly from Lautoka. The Queen's Road from Lautoka to Suva has deteriorated due to containerized transit traffic and sugarcane loads. The road is currently the primary road in the country, and has gradually declining safety and environmental conditions.

43. Lautoka is protected from ocean swells by its fringing reefs, and Queen's Wharf draws shelter from Vio Island to the west, Bekana Island to the north, and Covuli Reef to the northwest. The current Queen's Wharf at Lautoka Port was constructed in 1962. The four-sided island wharf is a concrete structure 140 m long and 80 m wide. The north-south oriented structure provides one main cargo berth to the west, for vessels with a draught of up to 10.5 m, and berths to the east for smaller vessels with a draught of 7 m. The wharf has a roll-on-roll-off (RORO) facility and can sustain fully laden forklift trucks with a maximum axle load of 95 tons. Elsewhere, the wharf is capable of supporting a 25 ton load, which allows operation of un-laden 25 ton forklift trucks, and tractor-trailers. Due to the constrained draught, international vessels use only the western berth. Most of the vessels calling at Lautoka exceed 167 m and as a result overhang the berth. While

only few incidences of conflict at the berth have been recorded annually, the berth availability deters vessel traffic from calling at Lautoka. The layout of Lautoka Port is shown in Appendix 5.

44. Presently, the main west berth provides a single berth for cruise liners, RORO and other cargo vessels. The north quay has mixed use by tugboats, large island cruise boats, and interisland cargo coasters and barges. The east quay is used by island cruise boats and the south quay is used for cargo coasters and naval patrol boats.

45. Queen's Wharf was built to handle general cargo and is not capable of taking container loads. The spalled and cracked concrete of the wharf was repaired in 1965. In 1984, severe damage resulting from containerization of the cargo, corrosion of the reinforcement, and further damage to the concrete structures from humidity and maritime conditions were identified. In 1992, the concrete deck structure was treated for corrosion under an EIB loan. Pile caps were rebuilt, fenders were upgraded; and auxiliary services, lighting, and other utilities were replaced and upgraded. Degradation of the wharf brought the original load capacity to 13.5 tons. The seismic strength of the wharf was improved to two-thirds of the standard required by modern structural codes. Since then, cracking and corrosion have occurred in parts of the repaired wharf. The wharf load capacity is not adequate for storing containers. The present container storage is limited to 35 TEUs in the area surrounding Shed 3. In 1999, with an average of 60 full container loads per week shipped to this area, it has become congested, particularly immediately prior to vessel arrival. The proximity of other operations and access to the wharf and shed compounds this problem.

46. The wharf is connected to the shore by a 34 m access bridge, which provides direct access from storage areas to Queen's Wharf. This bridge has similar limited load capacity and condition to those of the wharf. An access road to the south and extensive tidal flats to the north border the port. A large transit shed in the middle of the wharf is used for storage, container packing, and office space. The port includes three storage sheds of 6,030 m² and privately owned terminals facilitating sugar, molasses, wood chip, gas, and petroleum shipment.

47. Separate bulk loading facilities cater especially for the Fiji Sugar Corporation (FSC) and for the wood chip exports of Tropik Woods, and are privately owned and operated. A 1 ha reclamation south of the Queen's Road houses a transit shed of 800 m² and is used for general and container storage providing 35 TEU ground slots. In 1991, a 1.6 ha reclamation area north of Queen's Road was constructed and is occupied by oil storage tanks under a long-term lease. The port has retained control of the seaward end of this area as a barge berth with the remainder serving as a customs storage yard and a car park. In 1993, a general upgrading of the facilities for cargo and passengers was completed. In light of large increases in demand for storage space, MPAF has commenced further reclamation of 6,500 m² south of the access bridge. This will provide for 124 additional container ground slots with three-high stacking capability, giving 372 TEU spaces.

48. Cargo handling operations are inefficient at Lautoka Port. The containers are brought from the container stacks by tractor trailers over the access bridge, which is concurrently used by pedestrians and other traffic. The containers are lifted using ship's cranes. Queen's Wharf deck is not capable of carrying laden forklift trucks so containers must remain on the tractor trailers until loaded onto the ship. Any delays to loading have a direct effect on the throughput of subsequent containers. In the southwest corner, a small section of deck has been strengthened with a 350 millimeter concrete overlay. This allows forklift trucks to handle containers from RORO vessels. Lautoka Port suffers from poor cargo handling. The new facilities envisaged under the Project, the wharf extension and additional container storage area, require significant improvement in cargo handling.

49. The earthquake hazard in Fiji Islands has been scientifically assessed, and seismic design standards set according to the expected level of earthquake ground tremor. A catalogue of 3,200 shallow earthquakes between 1850 and 1990 formed the basis of the assessment. The largest known earthquake in Fiji Islands had a magnitude of 7.1 on the Richter scale. Lautoka Port is in a similar seismic hazard zone to Suva.

C. External Assistance to the Sector

50. The port sector benefited from an ADB loan of US\$7.0 million in 1979 (footnote 1), to rehabilitate and upgrade Suva Port. EIB approved an E6.0 million loan in 1992 for rehabilitating and upgrading Lautoka Port and a loan of E0.4 million in 1995 for preparing the Suva Port Master Development Plan. In addition to these, MPAF and its predecessor have financed their activities with short-term borrowings from domestic commercial sources. In 2000, Singaporean Government granted technical assistance for a technical study on the port developments in Fiji. The conclusions of the study align with this report.

D. Lessons Learned

51. ADB's *Synthesis of Postevaluation Findings in the Ports and Shipping Sector*¹⁹ concluded that the majority of ADB's port projects led to improvements in port operations and to lower cargo handling costs. According to the synthesis, growth projections of some projects did not materialize due to general macroeconomic conditions and the lead time needed to attract new traffic. Port entities were found to be well organized and exceeding their financial projections. Commercialization and expansion of the port entities' autonomy from the governments was implemented as planned. Institutional weaknesses pointed to management information systems and the need to modernize and upgrade staff skills. The synthesis found that ADB's port projects experienced construction delays due to design and scope modifications, site conditions, and shortage of local funds. Financial and economic returns to ADB port projects were lower than expected due to increases in project costs, low increases in tariffs, and delayed benefits as a result of delayed construction. Social impacts of ADB's port projects were found to be positive.

52. The ADB-assisted Suva Port Development Project experienced significant cost increases as a result of high inflation and progressive devaluation of the Fiji dollar.²⁰ This complicated contract negotiations and delayed implementation of works. Works were also disrupted due to a technical dispute between the supervisor and the contractor over the impact of the rock-fill on the steel pile structures. Consequently, the less destabilizing construction methodology of slab-over-pile design was adopted. Delays were also caused by the soil conditions, and selection of the contractor and consultants. The effective delay in project implementation amounted to 12 months. The project completion report considers the performance of PAF, a relatively young executing agency, creditable. PAF complied with all the loan covenants satisfactorily. The project successfully attained its objectives: improvement in the port operations and increased traffic to Suva Port.

53. These problem areas can be addressed under the proposed Project. MPAF will call for expressions of interest for the design and supervision contract for the proposed Project during the fourth quarter of 2001. MPAF will furnish the outline terms of reference to ADB for its approval. Designs exist for the Lautoka component. Adequate provision for physical contingencies has been allowed to accommodate changes that could realistically arise from detailed design. MPAF will be

¹⁹ Operations Evaluation Office. 1996. *Sector Synthesis of Postevaluation Findings in the Ports and Shipping Sector*. Asian Development ADB, Manila.

²⁰ PCR. Loan 411-FIJ: *Suva Port Development*, January 1987.

able, with the support of construction supervising consultants, to successfully implement the proposed Project.

54. Since the early 1980s, MPAF has successfully implemented the EIB-funded Lautoka Port Upgrading and Rehabilitation Project. It has engaged various consultant teams to support its planning, reorganization, technical, and financial reforms. MPAF is operating as a financially solvent and independent entity. While financial management of MPAF is sound, a plan will be prepared with ADB technical assistance (TA)²¹ for improving port asset management, operational, and commercial performance of MPAF (para. 71).

E. ADB's Sector Strategy

55. ADB's Pacific Strategy for the New Millennium supports reform in areas of economic policy, public sector management, poverty, governance, and private sector development. It addresses results-oriented management of government systems and organizations, processes to emphasize performance, and improvement in service delivery. ADB's strategy for Fiji Islands continues to support the transport, urban, and tourism sectors with a focus on poverty reduction. These interventions aim to improve industry-wide resource allocation, efficiency, and sustainability that contribute to economy development. Greater emphasis is placed on institutional issues under sector-based lending that reduce constraints; the proposed Project addresses transport sector's ability to contribute to growth, trade, and competitiveness.

56. The Project targets improvement in the capacity of the country's primary port infrastructure and port management system. It aims to focus port activities toward trade facilitation and releasing the potential growth of export sectors. It further targets increase in the competitiveness of the two main ports in Suva and Lautoka by enhancing productivity and the quality of the port services, leading to reduction in transport and handling costs of imports and exports. The Project, additionally, targets establishment of a lifeline and a relief port system in the country to ensure supply of goods at times of national disasters.

F. Policy Dialogue

57. Policy dialogue undertaken during project processing is reflected in the output-based and time-bound policy matrix in Appendix 6. This focuses on targeted achievement of improvements in the use of the rehabilitated and upgraded facilities under the Project and facilitates monitoring achievement of these objectives with target dates and benefits. ADB has contributed to the Government's sector agenda with a multipronged policy dialogue and has sharpened the focus under sector issues. This policy dialogue has been designed to support sector reforms as well as to strengthen the operational and commercial management of MPAF. The port sector reorganization and preparation of environmental legislation have been supported through past ADB TA.²² Associated with the proposed Project, ADB-funded TA for Port Asset Management Improvement (footnote 21) will support the establishment of realistic options for operational and organizational improvement of the sector (para. 71).

1. Further Sector Reform

58. Trade facilitation relies on effective logistics that enhance exporting and importing. The existence of supportive logistics is a key to attracting investments and trade. In addition to trade

²¹ TA 3199-FIJ: *Port Asset Management Improvement*, for US\$150,000, approved in 31 May 1999.

²² TA 3155-FIJ: *Strengthening the Public Enterprise Reform Program (Phase I)*, for US\$150,000, approved on 5 January 1999, and TA 2180-FIJ: *Environmental Awareness, Legislation, and Database*, for US\$450,000, approved on 13 October 1994.

policy, such logistic include port infrastructure, port and cargo management, and intermodal linkages with land transport systems. The Fiji Islands' existing port facilities and operations are not (i) sufficient to meet the current cargo throughput in the medium term, (ii) adequate to facilitate long-term growth in cargo volumes, or (iii) able to support Fiji Islands' trade policy efficiently supporting trade. Thus, cargo management and port infrastructure must be improved.

2. Management of Cargo Handling

59. The maritime sector reform program needs to focus on the management of cargo handling operations. Current operations constrain the use of the existing infrastructure under the Project. Most pressing, no competition is present in the current cargo handling operation, which is managed by a Government-owned commercial company. Furthermore, cargo handling is constrained by insufficient equipment, staff incentives and training, coordination with the port facilities. Cargo handling at the port could be improved immediately by introducing competition and thus establishing a market for cargo handling service delivery.

60. Suva Port is challenged with poor cargo handling. The self-servicing vessel cranes handle an average of eight containers per vessel hour (ranging from 4 to 13 containers per vessel hour). This can be compared with regional equivalents of 15 containers per hour using ships' gear, which is a reasonable target for the Suva Port operations and for cargo handling operations in the Fiji Islands. The cost of poor performance in cargo handling services is borne by the Fijian consumers. Shipping agents currently charge, on behalf of the vessel operators, an additional US\$73 (F\$150) per TEU container due to the slow cargo handling. This charge recovers the vessel operators' additional costs incurred due to the slow cargo handling. This costs Fiji Islands' consumers US\$2.4 million (F\$5.5 million) per annum. Foregone cargo flows, additional costs of bulk cargo, and foregone opportunities for improved shipping services to Fiji and the related savings have not been included in this estimate.

61. PTL, a Government commercial company, provides cargo handling and storage services under a five-year nonexclusive license agreement with MPAF, which expires in February 2003. The functions of PTL are to undertake (i) stevedoring and cargo handling at Suva and Lautoka ports, (ii) pilotage in designated ports and on coastal routes, (iii) all aspects of warehousing in Suva and Lautoka ports, and (iv) management of local wharves in Suva and Lautoka. PTL's objective is to provide safe and cost effective port terminal services to enhance competitiveness, maximize returns to shareholders, and promote development of its employees. PTL has total assets of US\$2.7 million (F\$6.3 million), in 2001, 32 percent of which is funded from borrowings, 18 percent from retained earnings, and the balance (50 percent) from the owner's capital. Currently, PTL generates about US\$3.7 million (F\$8.6 million) in gross revenues, which yields a gross margin of about US\$0.17 million (F\$0.4 million), or a 6.3 percent return on assets and 12.6 percent on owner's capital. The profit margin is forecast to decline during 2002 to 2007 due to the expected increases particularly in personnel and vehicle expenses. No additional capital investments are planned.

62. In 1998, PTL committed to target a change in culture and business focus, increased efficiency and productivity, provision of a shareholder return, and efficient management of its community service obligations by 2001. In the long term, PTL planned to develop its core business (container handling), improve specialist handling facilities, attract more transshipment cargo, and reduce the cost of cargo handling by 15 percent by 2003. For achieving its performance measures—earnings before interest and tax and a return on invested capital—the board of PTL is accountable to the Ministry of Public Enterprises. Under the PAF Reorganization Charter, market pressure on PTL's services is to be introduced by privatizing PTL and awarding of additional operating licenses for cargo handling. This charter provided that the Government should have sold its PTL shares to PTL employees and its strategic partners within three years of PTL commencing operation, i.e.,

March 2001. Competitors were to be licensed to operate during 1999. Due to the political instability, these reforms and improvements were not implemented.

63. Cargo handling performance is also affected by constraints in storage and container yard space; equipment; labor productivity; coordination and allocation of berthing space; and communications among the cargo handling operation, the port, and the shipping agents. Improvements are required in each of these areas and competition is essential to improving the cargo handling operations. In late 1999, MPAF confirmed the interest of the private sector in participating in the cargo handling operations in Suva and Lautoka ports. This must now be reconfirmed, and subsequently, an additional nonexclusive license for cargo handling operation tendered to the private sector. Cargo handling providers from the private sector are expected to give competitively priced services and to achieve this through training, productivity incentives, and provision of appropriate equipment. Introduction of competition to cargo handling is a condition to disbursement of loan proceeds under the project (para. 139).

64. The move to privatize cargo handling is consistent with PTL's reorientation into a commercial operation. PTL's noncargo handling task would, consequently, be given to MPAF and FIMSA, in accordance with the legal mandates of these organizations.

3. Sector Regulation

65. Key features in the public sector reform have been commercialization, and separation of regulatory from operational functions. The Government has endeavoured to focus on (i) regulating the economic sectors, with the objective of enhancing competition, and (ii) developing the private sector, to create employment and reduce poverty. The Marine Act and the PAF Act have been amended to reflect the port sector reorganization. The PAF Reorganization Charter (1997) and that of the Marine Department (1998) were adopted with an outline for sector reform. The Government has completed the first two components of the sector restructuring: (i) incorporation of a commercial cargo handling company under the Company Act, and (ii) establishment of MPAF as a Government CSA. Separation of the landlord functions of MPAF from its regulatory functions was expected under this Reorganization Charter.

66. The cabinet, in October 2000, declared FIMSA, MPAF, and PTL as Reorganization Enterprises with the objective to establish commercial port operations and a governmental regulatory function vested in FIMSA. This provides the necessary opportunity to focus on efficiency improvements at the port and, in particular, on management of cargo handling operations. With an award of additional cargo-handling licenses, competition and appropriate incentives for effective cargo handling will be introduced as a first step under the reform program. MPAF will award two or more stevedoring licenses no later than by February 2003 at the expiry of the PTL's contract and will conduct the due tender process prior to that date (para. 139).

67. PTL needs to be able to relinquish its noncargo handling activities of warehousing and management of local wharves in Suva and Lautoka. Piloting services at Suva Port are provided by PTL and a private pilot. PTL's piloting license is part of the cargo handling license and should be separated and tendered to private sector operators by MPAF. Warehouse leasing is a responsibility of the landlord port, and the management of the local wharves is a function of the Ministry of Tourism and Transport (MOTT)—the successor of MWCE, which remains responsible for outerisland wharves and jetties. In carrying out this responsibility, MOTT may seek to contract this function to capable parties.

4. Port Infrastructure

68. Introduction of market forces to cargo handling services requires concurrent improvements to the port infrastructure. These include identification of additional space for container storage and handling. Space for container and cargo storage at Suva Port will be increased by the Project, as two sheds currently occupying 5,930 m² will be demolished. This will result in 126 additional container slots, which could accommodate 378 container spaces, or a 71 percent increase. Provision of the additional space will be complemented by civil works to improve maneuverability and will include regrading pavements, rearranging light towers, providing new light towers, and reinstating pavement. Additional space for about 300 containers, or 56 percent on the original capacity of the yard, can be gained from realigning the containers to support efficient cargo management.

69. Strengthening of the wharf deck is planned under the Project. This will allow operation of fully laden 25 ton forklift trucks along the central and northern berths. The strengthening will also allow placing laden containers on the wharf for faster stacking, and operation of mobile cranes on the apron, once their procurement becomes viable. The strengthening and additional space will help improve cargo management efficiency, port productivity, and vessel turn-around time.

5. Port Operations

70. Port operations can be enhanced through (i) improved and consultative yard planning; (ii) effective and purposeful space management, i.e. placing loaded rather than empty containers near the loading vessel and separating outgoing from incoming loads; (iii) improved traffic routing; and (iv) separation of cargo handling from freight handling by haulers. Berth allocation, a responsibility of MPAF, additionally requires computerization and coordination with the cargo handling operations, the licensed companies, and the ship agents. Port traffic should be controlled and circulation improved to support maximum port efficiency. Additionally, activities requiring re-routing of haulers such as management of payments for port services require relocation to improve trafficability of the port area.

71. The TA (footnote 21) for port asset management improvement will (i) examine operational management of port assets and operations, (ii) delineate regulatory functions and noncore operations of PTL and MPAF, (iii) outline a program for improvement in the commercial and operational performance of MPAF, and (iv) recommend a fully integrated management information system for MPAF. MOTT will be the Executing Agency for the TA.

6. Environmental Management

72. Environmental management of Suva Port has significantly improved over the last two years. While the Fiji Maritime Policy Unit is responsible for implementation of national conventions in the sector such as the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78),²³ MPAF has enhanced its capability to comply with the Clean Port Management Policy of this convention. It has also added two people to the staff of the Occupational Health, Safety and Tower Control Section, bringing the total staff to 10. This has enabled MPAF to carry out 24-hour port surveillance. It is also establishing quick response teams with equipment and personnel trained to handle accidents in the port area. To finance the recurrent costs of such operation, MPAF has introduced an environmental charge on vessel calls. The Sydney Ports Corporation has

²³ MARPOL was adopted during the Convention in 1973 and modified by a protocol in 1978.

supported MPAF in upgrading its capacity to implement the International Clean Port Management Policy since 1998.

73. While the port regulations cover control of pollution at the port, the penalties for violating environmental provisions are not adequate. The maximum fine to violators US\$171 (F\$400) is ineffective as a deterrent. Costs of environmental remedies are much higher than these fines. To comply with its obligations under the clean port management policy of MARPOL, MPAF will increase the penalties. Within 2001, MPAF will impose custodial sentences on environmental violators to strengthen the deterrent value of the port regulations.

IV. THE PROPOSED PROJECT

A. Rationale

74. The Project will support the Fiji Islands' return to its normal growth path of about 4 percent per annum. The Project's goals are to achieve a stable macroeconomic environment; support trade, investment, and private sector development; and enhance the competitiveness of the economy. As the Fiji Islands returns to its normal multiparty and democratic political climate, cargo volumes are also expected to increase in line with GDP. Additional demand for port services comes from new exports of mineral water to the United States and animal feed to the Middle East, and imports of coal and bricks. The country's two primary ports in Suva and Lautoka handle nearly all of the cargo, with Suva Port concentrating on containerized traffic and Lautoka Port on bulk cargo. Port and cargo management operations require improvement (paras. 37-38), and structural weaknesses of the wharf apron must be remedied (para. 34). The Project aims to extend the life of the port facilities by 15 years and thus defer the need to relocate Suva Port operations to a new site.

75. Port facilities in Lautoka are unable to attract the vessel traffic required by the export industry, which may have to forego opportunities and face increasing transport costs resulting from complex, slow, and expensive land-to-maritime transport interfaces. Extension of Lautoka Port's life and facilities (with additional berth space, storage, and landing site facilities) will support the country's port system by improving the division of labor between the two ports, thus postponing investment in a new port facility. The proposed Project will enhance the regional competitiveness of the port system and the competitiveness of port operations by improving cargo handling management and by thus decreasing the turnaround time of ships.

76. King's Wharf complex and its reclamation area do not comply with current seismic standards. In the event of an earthquake, the capital area, with 30 percent of the country's population, risks losing its only port facility. This would have serious social implications, and result in significant loss of income. Damage to the remote secondary ports and the connecting roads would complicate rescue operations. While a complete seismic upgrade is not financially feasible, the Project will strengthen two berths at the northern end of the wharf complex, providing a lifeline facility with the minimum required seismic standard.

77. New clients near Lautoka Port need better port services to facilitate trade growth and industrial and agricultural development. The proposed extension of Queen's Wharf and the container storage area will significantly increase capacity for cargo storage and handling and berthing space for cruise and cargo vessels. The additional at Lautoka Port will support and encourage development of the local export industries, both cargo and tourism, encourage international cargo vessel operators to make Lautoka a single point of call in the Fiji Islands, en route to the United States and eastern Pacific destinations. The services at Lautoka Port also are crucial to an optimal allocation of container traffic between Suva and Lautoka to reduce impact on the

road system and the environment. These services are also essential for trade growth. Increased storage and berth facilities will reduce inter-facing needed with Suva Port, reduce the social impact of increased cargo loads on the country's primary road system, reduce freight time between the destination ports, allow Lautoka Port to cope with exports from new local industries, and thus enable the Fiji Islands to successfully compete for new export opportunities and capture the related employment and growth potential.

B. Objectives and Scope

78. The Project will (i) rehabilitate the existing facilities and extend the life of King's Wharf by 15 years, and (ii) extend wharf and storage facilities at Lautoka Port to support new trade and economic growth of the Fiji Islands. Specifically, the Project will (i) arrest the deterioration of the wharf decks at Suva and Lautoka ports; (ii) strengthen critical sections of King's Wharf, enabling it to comply with internationally recognized seismic standards assessed for the Fiji Islands and the site; (iii) improve King's Wharf's deck and container yard capacity to efficiently handle the increasing cargo loads, (iv) increase berth space at Lautoka Port; and (v) increase container storage area at Lautoka Port by 6 ha.

79. The Project will provide the following:

- (i) At Suva Port,
 - (a) civil works for repairs and rehabilitation of the King's Wharf;
 - (b) civil works for strengthening critical sections of King's Wharf to meet seismic standards;
 - (c) civil works for wharf deck strengthening of the King's Wharf life-line berths;
 - (d) civil works for the container yard reorientation; and
 - (e) consulting services for design, supervision, and contract administration.
- (ii) At Lautoka Port,
 - (a) civil works for a wharf extension of 154 m in length and 48 m in width, and installation of fenders and lighting;
 - (b) civil works for a reinforced concrete-piled access bridge of 38 m in length and 12 m in width linking Queen's Wharf to the south-side reclamation area;
 - (c) civil works to reclaim 5.7 ha north of Queen's Wharf; and
 - (d) consulting services for design review, supervision, and contract administration.

C. Technical Justification

1. Maintenance and Repair of King's Wharf

80. The key structural elements of King's Wharf at Suva Port have been adversely affected by corrosion. This needs to be arrested and repairs made to meet the required loads and sustain the anticipated handling and storage operations. The facilities for sewage management are inadequate, which makes it difficult to enforce the environmental Port Regulations. Additional sewerage connections are proposed to enable ships' sewage to be channeled to shore-based treatment facilities. Without the proposed maintenance and repair works, the life of King's Wharf is estimated to end in 2005.

2. Seismic Strengthening of King's Wharf

81. The fundamental technical justification for the seismic strengthening relates to the stability of the entire reclamation at Suva Port. Seismic stability analyses conducted in 1993²⁴ showed that failure, amounting to a lateral displacement of 1 m at the top of the sheet piles, will occur in an earthquake of generating ground accelerations at 0.1g.²⁵ This corresponds to about a third of the assessed earthquake risk. The current seismic deficiencies in the structure can be resolved by tying the structure to the reclamation area. Comprehensive information and analyses of the stability and the prospect of liquefaction were prepared in 1998.²⁶ The risk of soil liquefaction has been investigated and assessed as low.

82. The calculated safety factors under earthquakes of generating ground acceleration of 0.3 g and 0.1 g.²⁷ An acceptable seismic load safety factor is in excess of 1.25. The 1953 Suva earthquake generated a ground acceleration of 0.2 g at the site.²⁸ The current stability of Suva Port falls well short of the standard required for any new facility designed in the Suva area. The current reclamation area can withstand 0.073 g ground acceleration compared with a requirement of 0.38 g, or is only 20 percent of the required standard. Thus, King's Wharf needs seismic strengthening. While a complete seismic upgrading is not financially feasible, the Project will strengthen the two most frequently used berths at the northern end, Walu Bay Wharf, and a northern section of King's Wharf.

3. Strengthening the Deck of King's Wharf

83. The wharf deck slab is inadequate to support the anticipated loads and is barely sufficient for the present loading operation. The longitudinal beams, assuming no deterioration, have only 65 percent of their required strength. Many have significant deterioration due to corrosion. Only two bridge sections connecting the container yard to the wharf are fully rated to carry a loaded 25-ton forklift truck. The proposed civil works include restoration of the longitudinal beams to their original condition. These beams support the bridge units and require strengthening to take the increased loads. The proposed replacement of the bridge units will cater for the heavier loading. The recent load testing of the beam strength revealed that this strengthening will also enable operation of a mobile crane on the apron. Such a crane would permit servicing of vessels that do not have cranes, and this would significantly enhance the productivity of the port.

4. Extension of Queen's Wharf

84. Queen's Wharf provides only one berth for large container vessels. To provide more berthing space and flexibility for berth management, and to reduce conflicts for berth use, 150 m by 48 m will increase the useful life of the berth by 50 years, and accommodate vessels up to 70,000 dead-weight tons (DWT) with a maximum draught of 12.5 m on its western berth and 10,000 DWT with a maximum draught of 7.5 m on the eastern berth. The size and structural design of the extension will allow forklift handling of fully laden 40 foot containers and temporary storage of up to 72 containers. It will thus provide an additional berth for container vessels at Lautoka. The new facility is designed to enhance of container loading and unloading. It will allow berthing of international traffic with a maximum draught of 12.5 m at the west berth and 7.5 m on the east. The design will provide flexibility to concurrently berth two vessels; accommodate forklift trucks of 30 ton capacity;

²⁴ Murray-North/CMPS of April 1993.

²⁵ g = acceleration due to gravity, 9.81 meters/second/second.

²⁶ Geotechnical Review of King's Wharf, February 1998.

²⁷ Ratio of strength to the applied load.

²⁸ April 1998.

accommodate TEU containers stacked three and four high wide in the middle; and be easily extended in the future. The seismic design of the new structural components comply with Fiji Islands' codes of practice and current loading code used in New Zealand.

5. Access Bridge to Lautoka Wharf

85. An area to the south of Queen's Wharf is currently being reclaimed and will provide additional container storage for 372 TEU containers. The proposed access bridge is located to minimize travel distance between Queen's Wharf and the new container yard. The 34 m by 12 m access bridge will take axle loads of 95 tons. This will allow the bridge to support fully laden forklift truck operations.

6. Reclamation

86. Current container storage is limited to 35 ground spaces. This will rise to 124 container spaces with the reclamation. The proposed wharf extension will provide a further 24 container ground slots. Throughput of containers is expected to rise from the present 100 containers per week to 450 per week to accommodate water exports by the end of 2003. Additional throughput from animal feed exports is projected to be 600 containers per week in 2003. The civil works for the proposed reclamation will require the installation and compaction of gravel, basecourse lighting, power points, water and sewerage, 120 m by 10 m access road connecting the marine drive with the reclaimed container yard, and a small public recreational park of 0.25 ha at the reclamation and in accordance with the Town Planning Act, 1978, and town planning guidelines of Lautoka City Council.

7. Remedial Work at Lautoka

87. The proposed extension to the north shows the vital importance of Queen's Wharf. The new facilities will depend on Queen's Wharf for access, which is deteriorating and requires remedial repair and maintenance. The Project will survey the technical condition of the wharf, and implement works necessary to maintain the integrity of the 1,000 piles, supporting beams, and the concrete deck.

D. Cost Estimates

88. The total cost of the proposed Project, including taxes, duties, and financing costs²⁹ during construction, is estimated at US\$32.26 million equivalent, of which the foreign exchange cost is about US\$17.61 million (55 percent) and the local currency cost (including taxes and duties) is about US\$14.65 million equivalent (45 percent).

E. Financing Plan

89. MPAF has requested a loan of US\$16.80 million from ADB's ordinary capital resources to help finance the Project. The loan will have a 25-year term, including a grace period of 4 years, an interest rate interest to be determined in accordance with ADB's LIBOR-based lending facility,³⁰ a commitment fee of 0.75 percent, and a front-end fee of 1.0 (the fee will be capitalized in the loan), and conversion options that may be exercised in accordance with the terms set in forth in the Draft Loan Agreement. The Government has provided ADB with (i) reasons for MPAF's decision to borrow under ADB's LIBOR-based lending facility on the basis of these terms and conditions, and (ii)

²⁹ Includes interest and commitment charges on ADB's loan.

³⁰ London interbank offered rate.

statement that these choices were MPAF's independent decision and not made in reliance on any communication or advice of ADB.

90. MPAF has secured cofinancing from the Australia and New Zealand Banking Group (ANZ Bank) to help finance local costs of the Project. ANZ Bank has confirmed a loan of F\$14 million to MPAF.³¹ MPAF will finance all local currency costs of the Project from its own resources, in case this cofinancing does not materialize for any reason. The estimated costs of the project components are summarized in Table 1 and the details are in Appendix 7.

Table 1. Cost Estimates and Financing Plan

Description	Costs						Financing		
	Foreign Cost		Local Cost		Total Cost		ADB	MPAF	TOTAL
	F\$	US\$	F\$	US\$	F\$	US\$			
million	million	million	million	million	million	US\$ million	US\$ million	US\$ million	
A. Base Costs									
1. Maintenance Repairs	3.22	1.40	2.29	1.00	5.51	2.40	1.40	1.00	2.40
2. Seismic Upgrade	7.90	3.43	2.48	1.08	10.38	4.51	3.43	1.08	4.51
3. Wharf Deck Strengthening	4.00	1.74	3.62	1.57	7.62	3.31	1.74	1.57	3.31
4. Container Yard Reorganization	1.03	0.45	1.66	0.72	2.69	1.17	0.45	0.72	1.17
5. Lautoka Wharf Extension	11.37	4.95	8.78	3.82	20.15	8.77	4.95	3.82	8.77
6. Lautoka Approach Bridge	0.48	0.21	0.31	0.13	0.79	0.34	0.21	0.13	0.34
7. Queen's Wharf Rehabilitation	0.72	0.31	0.48	0.21	1.20	0.52	0.00	0.52	0.52
8. Lautoka North East Reclamation	1.16	0.50	5.65	2.46	6.81	2.96	0.00	2.96	2.96
9. Consulting Services	3.66	1.59	2.43	1.06	6.09	2.65	1.59	1.06	2.65
Subtotal A	33.54	14.60	27.70	12.05	61.24	26.64	13.79	12.86	26.64
B. Contingencies									
1. Physical Contingency ^a	3.49	1.52	2.81	1.22	6.29	2.74	1.52	1.22	2.74
2. Price Contingency ^b	0.80	0.35	1.11	0.48	1.91	0.83	0.35	0.48	0.83
Subtotal B	4.29	1.87	3.92	1.70	8.21	3.57	1.87	1.70	3.57
C. Financing Charges									
1. Interest and Commitment Charge during Construction	2.26	0.98	2.06	0.90	4.32	1.88	0.98	0.90	1.88
2. Front-End Fee	0.39	0.17	0.00	0.00	0.39	0.17	0.17	0.00	0.17
Subtotal C	2.65	1.15	2.06	0.90	4.71	2.05	1.15	0.90	2.05
Total	40.48	17.61	33.68	14.65	74.16	32.26	16.80	15.46	32.26

^a A physical contingency of 10 percent has been applied to all civil works, except the container yard which has received.

^b A price contingency of 2.4 percent has been added to foreign cost components of the Project and 4 percent to local cost components. Source: Staff estimates.

F. Implementation Arrangements

91. MPAF will be the Executing Agency for the proposed Project. The MPAF general manager of technical services will be responsible for project implementation and will handle overall administration of the Project. This includes procurement, disbursement, administration, monitoring, and reporting on the consulting services and works. Contract supervision and quality control will be done by MPAF, assisted by the consultants.

1. Consulting Services

92. International and domestic consulting services will be needed for (i) detailed engineering design for the civil works, pre-construction activities, and construction supervision of the Suva Project component; and (ii) a design review, pre-construction activities, and supervision of the

³¹ ANZ loan will have a maturity of 10 years, 5.45 percent interest rate, grace period from repayment of maturity during the drawdowns, and approval fee of 0.43 percent on the total amount, administration charge of 0.27 percent per annum on the highest level of loan debt on 1 August year to year, and a commitment fee of 0.2 percent charged monthly in advance until drawdown.

Lautoka Project component. These services are estimated to require 80 person-months of international and 110 person-months of domestic consulting services. Detailed design has been prepared for the Lautoka component, and MPAF will appoint the same consultant to ensure quality of the civil works through direct engagement for that component. The consultants for the Suva component will be selected in accordance with ADB's *Guidelines on the Use of Consultants*. Terms of reference will be prepared by MPAF and furnished to ADB for its endorsement. The detailed design work will specify the physical extent and nature of the works. The terms of reference include preparation of the project performance baseline data (para. 101) and preparation of environmental management plans and monitoring of the environmental mitigation during construction (para. 123). They will retain flexibility for identification of new approaches and engineering solutions for the proposed works. Consulting services will commence during the first quarter 2002.

2. Procurement

93. Civil works contracts will be procured and awarded through international and local competitive bidding in accordance with ADB's *Guidelines for Procurement*. Contract packages exceeding US\$1.0 million are subject to international competitive bidding (ICB). ADB approval is required for the evaluation of all bidders prior to the issuance of the invitation for tender and for the bid evaluation prior to the award of contract. The prequalification documents and bidding documents will be submitted to ADB for review and approval. Procurement of equipment is not envisaged under the Project.

94. The construction works are divided into five tentative contract packages (Appendix 8). These are: (i) King's Wharf maintenance repairs, (ii) King's Wharf seismic upgrade and deck strengthening, (iii) demolition of two storage sheds, (iv) container yard civil works, and (v) Lautoka Wharf extension and bridge construction. The works need to be flexible to alter locations to minimize disruption of port operations. Contractors will be eligible to tender for one or more of the contract packages within their bid capacities. ADB approval prior to the award of contracts will be required for all contracts.

3. Implementation Schedule

95. A tentative implementation schedule is given in Appendix 9. This allows for the application of ADB's *Guidelines on the Use of Consultants* in the selection of consultants for design and supervision. The selection process has commenced in the fourth quarter of 2001. Contracts for civil works are expected to be awarded in the second quarter of 2002. The pre-construction activities will commence in the second quarter of 2002 and the construction be completed within four years, by mid-2006. A technical review of the Project will be conducted jointly with MPAF during the first quarter of 2003.

4. Reporting, Accounts, and Audit

96. MPAF will provide ADB and the Government with quarterly progress reports concerning the Project's financial aspects, design, preconstruction activities, and all civil works. Project implementation consultants will assist in this reporting responsibility. MPAF will provide annual reports on wharf and container-yard maintenance budgets, activities, and expenditures covering the past, present, and foreseeable future. MPAF will advise ADB on progress achieved in implementing further commercialization and privatization policy initiatives, regulations, and reorganization of MPAF. To facilitate post-evaluation of the Project, MPAF will provide ADB and the Government, within three months of physical completion of the Project, a completion report that will comprehensively cover details of project implementation, benefits and costs, and any other information that may be requested by ADB concerning the Project.

97. MPAF will establish and maintain separate accounts for all expenditures under the Project, including its individual components. It will furnish ADB with financial statements reflecting the accounts for each project-related contract. These financial statements will be audited using international auditing guidelines by auditors acceptable to ADB. The audited financial statements, together with the auditor's report, will be forwarded to ADB within six months of the end of each related fiscal year. Supervising consultants will keep detailed costing of project components and assist MPAF with reporting, as required.

5. Disbursement Procedures

98. Disbursements will be made for eligible expenditures under ADB's *Disbursement Guidelines* following ADB's *Loan Disbursement Handbook, 1996*. Under the proposed implementation arrangements, all applications for withdrawing loan funds for eligible expenditures will be carried out by direct payment or reimbursement procedures.

6. Technical Review

99. In addition to a schedule of twice yearly, regular review meetings to monitor the progress of the Project, a technical review of the Project will be carried out during the first quarter of 2003. The focus of the review will be to determine a need for any deviations from the project design or implementation; cost overruns; loan reallocations; and other factors, if any, including assumptions and risks that might constrain the satisfactory implementation of the Project and achievement of development objectives.

7. Land Rights

100. The two ports of Suva and Lautoka are on land leased from the Government. All rights to land, dredging, and fishing have been acquired for the seabed under the Lautoka wharf extension and reclamation components. Arrangements for the fill source will be established by MPAF in accordance with the Government's laws on land acquisition and compensation. The Government's land acquisition procedures, compensation rates, and processes for resolving grievances are satisfactory and in compliance with ADB's policy. No resettlement is required under the Project.

8. Project Performance Evaluation

101. MPAF will compile and analyze data to facilitate project performance monitoring and evaluation. It will forward this information to ADB and the Government in accordance with the agreed schedule of performance measurement indicators in Appendix 10. This program aims to assess the macroeconomic impact and sector development goals of the Project. It includes three major activities: (i) benchmarking, to provide MPAF management with objective reference points for impact evaluation that correspond with the needs of the port users and consumers; (ii) benefit monitoring, to ensure that the project benefits actually accrue to the port users; and (iii) post-project performance evaluation, to assess the overall effectiveness of the Project.

G. The Executing Agency

102. PAF operated from 1975 to 1998. In 1998, MPAF assumed the responsibilities of PAF. MPAF is managed by a board that is accountable to the ministers of the Ministry of Public Enterprises and MCWE. MPAF's operations are directed by an executive officer, who is assisted by financial, technical, and corporate general managers.

1. Financial Management and Accounting

103. MPAF's small finance department comprising 13 people is responsible for financial planning, corporate finance, billing and customer accounting, payroll, and financial and management reporting. It uses modern computerized systems. It has a well-organized general ledger that produces budgetary comparisons by business unit and responsibility center. Monthly financial reports are available within 15 days of the end of each month. The auditor generally signs the annual financial statements about six months after the end of the financial year, which conforms with the statutory requirement. Managers for finance and information systems report to the general finance manager. A wide area network is planned to connect the port management systems with the corporate database and financial management systems.

104. MPAF's financial administration is well managed and responsive to organizational needs. The financial development plans are sound. The ADB-supported TA for port asset improvement will outline a program for improving MPAF's commercial and operational performance, including addressing accounting policies and developing traffic forecasting and financial planning models for MPAF (para. 71).

2. Financial Performance of MPAF

a. Financial Reports and Plans

105. MPAF's fourth statement of corporate intent contains a review of the main activities, policies, and plans, including borrowings, major asset procurement and disposal, and accounting policies. Its quantified performance targets include one year's revenue, gross profit, operating profit and net tax paid profit, and nonfinancial targets of grant levy claim and industrial lost time.

106. The corporate plan sets out MPAF's vision, mission, values, and objectives classified as short, medium, and long term. It includes financial projections for FY2001-FY2003.³² Gross and net profits are projected to increase due to revenue growth of 13 percent outstripping cost increases of 7 percent over the period. The accompanying cash-flow statement indicates the need for US\$12.2 million (F\$28.5 million) of new borrowings to finance capital works, repay US\$3.7 million (F\$8.6 million) of loans, and close with about US\$1.1 million (F\$2.6 million) on hand at the end of FY2002.³³

107. The FY2001 budget is prepared by responsibility centers with the principal profit centers being the ports of Suva and Lautoka. Budget figures form the basis of the financial projections. The projections incorporate the new tariff as of 1 July 2001.

b. Tariffs

108. The tariffs were reviewed in 1998,³⁴ with a conclusion that the tariff structure requires simplification. The revised port tariff structure became effective on 1 July 2001. This simplified the tariff, and will enhance its effectiveness in ensuring economic use of the port facilities. The tariff revision will likely result in a maximum increase in revenue of 5 percent. The revised tariff includes maritime charges of port dues; dockage; mooring; and anchorage dues; pilotage and towage fees;

³² Key assumptions: (i) unadjusted tariff, (ii) acceptance of staff and assets transferred from the Marine Department and associated costs, (iii) no offsetting revenue, and (iv) volume projections at a low level.

³³ The capital investment projections include US\$22.5 million for the King's Wharf rehabilitation; 63 percent of this sum, US\$14.2 million, is included as ADB's loan.

³⁴ KPMG Management Consulting Pty, Ltd. 1998. *Tariff Review and Restructure*. MPAF, Suva.

environmental charge, wharfage charged by MPAF; and charges for demurrage, and storage, cargo handling, and auxiliary services charged by PTL. Tugboat charges are no longer included under the revised tariff, and are envisaged to be set from January 2002 freely by the private service provider(s).

109. Port dues are fees for the use of port facilities, space on berth, and marine services. The dues are based on vessel type and registry. With no fundamental changes, the revised port dues continue to favor local vessels. The port dues, however, are generally levied per vessel call. An anchorage fee has been added in the revised tariff and no significant change is implemented in mooring charge. The two are levied regardless of vessel type or registry.

110. A charge for hiring a pilot vessel is levied on all vessels entering the ports, even when the ship's master is qualified to enter or leave a port without a pilot. The charge reflects a considerable proportion of fixed costs and safety involved in providing pilotage services. The pilotage fees increased significantly under the tariff revision, reflecting the cost of the service. Mooring and dockage levies have fundamentally remained unchanged.

111. Wharfage comprises fees for landing cargo on the wharf. In general, the rates have been simplified, and charges for landing empty containers and transshipment containers have been introduced. The revised break-bulk cargo wharfage rates favor exports, while the old tariff encouraged imports, and the bulk rates have been simplified, reduced, and restructured to encourage export of Fijian bulk cargo.

112. Demurrage and container and bulk cargo storage on the port premises is free for the first three days. Relatively high escalation of the storage tariff for additional storage days has kept demurrage levels low and use of space efficient. The storage tariff has been considerably simplified.

113. An environmental charge was introduced in March 2001 to finance operations of a fast-response anti-pollution unit, its equipment, training, and support to implement the environmental improvement program. In 1999, Suva Port's compliance with the MARPOL was considered marginal, and vessels generally did not comply with environmental guidelines at the port. With the support of the Ports of Sydney, MPAF has identified environmental equipment for procurement, will liaise with the petroleum industry in the country on effective response mechanisms to potential accidents, and will train staff for a quick response unit. The University of the South Pacific has been contracted to monitor water quality conditions at Suva Port and will assess the scope of improvement in the required port environment.

c. Past Performance of PAF

114. PAF reported modest operating profits before interest and tax during FY1994-FY1997³⁵ varying from 6 to 14 percent of fixed assets in service. However, it suffered heavy abnormal and extraordinary losses during the same period, mainly for losses on foreign currency denominated loans, redundancy payments, write-offs of subsidiary company debts, payment of indemnities, and value-added tax adjustments. Despite the low gearing (debt-to-equity ratio averaging about 0.15) the earning rate on owner's equity ranged from negative in FY1994 to 12.1 percent in the following year. This fell to 3.5 percent in FY1997.³⁶

³⁵ FY1997 was in fact 14 months ending on 28 February 1998; FY1998 was 13 months ending on 31 March 1999. MPAF's balance date is now fixed at 31 March.

³⁶ As a statutory authority, PAF was exempt from income tax. MPAF as a CSA under the Public Enterprise Act is liable for tax and dividend payments.

115. Since repaying most of its foreign currency denominated loans, MPAF has borrowed heavily on a short-term basis in the local market using a range of instruments, including finance leases, promissory notes, and bonds. Most have now been repaid and replaced with a secured local currency term loan from the ANZ Banking Group at 7.0 percent.

116. The gross profit (revenue less direct operating costs) as a percentage of revenue, declined in each of the three years, from 25.7 percent to 18.9 percent in FY1997, reflecting increasing costs. This further declined to 18 percent in 2000 and 16 percent in 2001, on the account of lower traffic volumes, but is forecasted to improve to 20 and 25 percent in 2002 and 2003.

117. PAF was, and MPAF is, very capital intensive. In all years, the value of fixed assets exceeds the combined investment of lenders and owner. The working capital ratios are poor with only about US\$0.25 (F\$0.60) of current assets covering each dollar of current liabilities and this amount is declining. However, this is not of concern because it is due to the large current portions of short- to medium-term borrowings that have been due for repayment in past years. The ADB-funded TA will address debt management issues of MPAF.

d. Financial Performance of MPAF

118. Stevedoring operations, US\$1.2 million (F\$2.8 million) of operating assets, and US\$128,520 (F\$300,000) working capital were transferred to PTL on 1 March 1988. In Tables 2 and 3, FY1998 is the first year of MPAF's operations. Detailed financial performance forecasts are given in Appendix 11.

Table 2: PAF/MPAF Income Statements FY1994-FY2006
(F\$ million)

Item	1995 Actual 31 Dec ^a	1996 Actual 31 Dec ^a	1997 Actual 14 mos to 28/2/98	1998 Forecast 13 mos to 31/3/99	2000 Rev. Budget 12 mos to 31/3/00	2001 Projected 31 Mar ^a	2002 Projected 31 Mar ^a	2003 Projected 31 Mar ^a	2004 Projected 31 Mar ^a	2005 Projected 31 Mar ^a	2006 Projected 31 Mar ^a
Total Operating Revenue	20.00	19.60	23.61	14.32	17.24	17.79	18.29	18.80	19.33	19.87	20.43
Total Expenses	14.86	15.51	19.16	10.74	14.01	14.80	15.34	15.90	17.38	17.98	18.60
Operating Profit Before Interest & Tax	5.14	4.09	4.45	3.58	3.23	2.99	2.95	2.91	1.95	1.89	1.83
Net Profit After Abnormal Items & Tax	3.48	2.71	1.84	1.92	1.65	1.08	0.93	0.93	0.38	0.40	0.39
Return on Net Fixed Assets in Service	13.7%	11.2%	6.7%	5.9%	5.8%	5.5%	5.5%	3.9%	2.7%	2.7%	2.7%
Return on Owner's Equity	12.1%	8.6%	3.0%	3.2%	2.9%	1.9%	1.6%	1.6%	0.6%	0.7%	0.6%

Note: Income is taxable only from FY1998

Return on net fixed assets in service is operating profit before interest and tax.

^a year end.

Source: MPAF

Table 3: PAF-MPAF Balance Sheets FYs 1994-2006
(F\$ million)

Item	1995 Actual 31 Dec ^a	1996 Actual 31 Dec ^a	1997 Actual 14 mos to 28/2/98	1998 Forecast 13 mos to 31/3/99	2000 Rev. Budget 12 mos to 31/3/00	2001 Projected 31 Mar ^a	2002 Projected 31 Mar ^a	2003 Projected 31 Mar ^a	2004 Projected 31 Mar ^a	2005 Projected 31 Mar ^a	2006 Projected 31 Mar ^a
Working Capital	(1.71)	(3.20)	(1.27)	(0.57)	1.70	0.31	(1.10)	0.07	1.65	3.89	6.18
Fixed Assets	40.41	39.52	58.17	57.50	66.92	74.36	77.26	75.84	73.47	71.06	68.60
Total Capital Employed	38.71	36.31	56.90	56.93	68.62	74.66	76.15	75.91	75.13	74.96	74.78
Financed by:											
Total Loan Capital	9.91	4.81	4.20	2.32	12.36	17.32	17.88	16.71	15.55	14.98	14.41
Total Equity	28.80	31.50	52.69	54.61	56.27	57.35	58.27	59.20	59.58	59.98	60.37
Total Capital Employed	38.71	36.31	56.90	56.93	68.62	74.66	76.15	75.91	75.13	74.96	74.78
Debt Service Cover	0.50	0.68	0.34	1.86	3.41	2.41	1.80	1.54	2.19	2.26	3.08
Self-Financing Ratio	(6.32)	(2.01)	(6.73)	0.29	0.33	0.35	0.36	0.55	2.35	2.41	4.42
Receivables (months' revenue)	0.56	0.48	0.40	1.17	0.88	0.84	0.84	0.84	0.84	0.84	0.84
Debt:Equity	0.34	0.15	0.08	0.04	0.22	0.30	0.31	0.28	0.26	0.25	0.24

Note: Self-financing ratio is based on three years average capital expenditure.

Source: MPAF

119. Much of the decline in revenue and operating profit between 1997 and 1998 is attributable to the reduced scope of operations and from 2000 to 2001 due to the reduction in cargo throughput. While the tariff revision of 1995 restored profitability, the decline resumed in subsequent years when the rates were unchanged and costs, particularly for administration, grew. The operating profit (before interest and tax) turned into a small loss of US\$122,094 (F\$285,000) in FY1998. Regular short-term borrowing using instruments such as promissory notes and bonds required heavy regular repayments that reduced the debt service cover and gave a negative self-financing ratio. Liquidity was good at all times, mainly because MPAF's terms of business require port charges to be prepaid, and receivables are low at around two weeks of revenue. In spite of the frequent short-term borrowing, the total long-term debt capital employed is very low at less than 10 percent of total employed capital.

120. The rate increases, together with traffic growth projected at 2.8 percent per annum, are forecast to arrest the decline in profitability for a period, but are insufficient to offset the assumed 4 percent per annum price inflation on operating costs. Profitability is projected to fall markedly again from FY2004, when depreciation charges on the rehabilitated wharf take effect.

121. MPAF will, nevertheless, remain financially strong. It exhibits the classic characteristics of a capital intensive, low growth utility, generating high free cash flows. As a result of a stable debt structure, its debt service cover is projected to be greater than 1 from FY1998 and remain above 1.5 for all subsequent years but one. With completion of the Project, the self-financing ratio will increase from less than 1 to exceed 2 from FY2004. As a result of the proposed loan, the ratio of debt-to-equity will rise to the 0.30 level, and the proportion of capital employed financed by the owners will fall to about 80 percent. The projections indicate that if no dividends are paid, MPAF will need about US\$3.0 million of new borrowings to finance its capital expenditure program. This roughly offsets the amount of income tax payable over the same period. The agreed assurances require that MPAF maintains (i) an operating profit of not less than 3 percent to be earned on average net revalued fixed assets in service, and (ii) the debt service cover at a minimum of 1.5 commencing from FY2000. Under the assurances, the Government will not draw any dividends or effect any other drawdowns from MPAF, unless MPAF meets these financial conditions.

122. The ADB-funded TA for port asset management improvement (footnote 21) will, in addition to its other objectives, recommend a program to improve the commercial and operational efficiency

of MPAF. This includes addressing issues of (i) MPAF's management autonomy and authority; (ii) accountability for commercial performance of MPAF; (iii) fair market conditions in the sector; (iv) MPAF's financial and operational targets; (v) accounting policies on depreciation and amortization; (vi) commercial development planning; (vii) the financial position of MPAF; (viii) foreign exchange risk mitigation planning; (ix) interconnected planning models for traffic forecasting; (x) financial planning and management over a wide area network; (xi) accounting systems to match costs and revenues by operating centers; and (xii) application of generally accepted accounting policies and commercially based operations, in particular for depreciation, debt, and foreign exchange management. Loan assurances require that a time-bound action plan for implementing the TA's recommendations on these areas be agreed by MPAF and ADB within 2002 (para. 140, item [ii]).

H. Environmental and Social Measures

1. Environment

123. The Project has been classified as environmental category B. Accordingly, an initial environmental examination (IEE) was prepared for the Suva and Lautoka Port Project components in accordance with ADB's *Environmental Guidelines for Selected Infrastructure Projects*. The IEE concluded that impacts of the Project on the environment are within acceptable levels and can be effectively mitigated during construction and operations. Subsequently, no detailed environmental impact assessment is warranted. With the adoption of sound engineering practices and implementation of the proposed mitigation measures described in Appendix 12, environmental impact during construction can be mitigated. These practices and measures will also be included in the contracts for the civil works. Experienced construction supervision consultants will be engaged by MPAF to supervise the implementation of sound engineering practices and environmental mitigation actions. The summary IEE is given in Appendix 13.

2. Social Considerations

a. Waste Control

124. Provision of the proposed ship-to-shore sewerage connection will improve the environment in Suva Port and its vicinity. The Department of Public Works of MCWE has confirmed that the additional sewage from ships can be managed within the capacity of the Suva sewage treatment plant. The risk of a leakage from the pipeline is negligible due to the small incremental quantity of waste from the ships. This pipeline will, on the other hand, enable the port to control the discharge of ship wastes. Together with improved enforcement of the port regulations, discharging of these wastes onto the wharf and into the port waters will decrease significantly. As a result, the water quality at the port will improve.

b. Seismic Risk

125. The recent earthquakes in the Asian and Pacific region have demonstrated the far-reaching social implications when port facilities suffer major earthquake damage. The situation in the Fiji Islands is critical. Immediately following a major earthquake, loss of King's Wharf would require relief supplies to come through Lautoka Port by road to the capital area. This would be complex, expensive, and time consuming. Were the roads to incur damage, this option would become impossible. If King's Wharf could not be used immediately after a major earthquake, considerable social disruption and difficulty in the relief effort can be assumed. This would be compounded by a serious loss of business revenue.

126. The proposed development at Lautoka provides additional capacity to serve as Fiji Islands' main port in the event of earthquake. Use of Lautoka under such a scenario would lead to severe congestion, disrupt established social and commercial activities, and place stress on the road system. Although new facilities at Lautoka will be designed to modern standards, Queen's Wharf meets only two thirds of these requirements. The proposed deferred and regular maintenance and remedial work are necessary to maintain its structural integrity.

c. Cargo Handling

127. An important social impact is expected from improved cargo handling operations. The introduction of competition, and improved employment of technology in cargo handling will enhance productivity and reliability of these services at Suva Port. The proposed civil works make these efficiency improvements possible. The added reliability and productivity improvements help keep down freight rates to the Fiji Islands and enhance the frequency of ship visits. Increased efficiency resulting from the reduced time spent on container handling, will be evidenced in a decline in real freight cost per volume of cargo. A decrease in tariffs will reduce, in the long term, the overall real freight costs of imports and exports. These will constitute savings, adding to the disposable income of Fijians.

d. Impact on Poverty

128. The Project will reduce the real cost of freight for imports and exports through its physical improvements and policy content that will lead to improvements in the efficiency of port services and commercial performance of the sector. About 50 percent of the consumer price index comprises imported goods—all affected by freight rates. The real reduction in the consumer price index will reduce expenditures by the poor. The project loan terms have limited, if any, impact on poverty. The Project will yield considerable savings for society as it will defer a large-scale port relocation project by 15 years.

V. PROJECT JUSTIFICATION

A. Financial and Economic Analyses

1. Traffic Projections

129. Traffic and cargo volumes for Suva Port have been estimated on the basis of a low case scenario developed under a feasibility study for the Suva Port relocation project. This reviewed the historical trends in the Fiji Islands' commodity trade and planned economic developments. A growth rate of 2.3 percent per annum is used to forecast growth of cargo volumes. The throughput forecast is shown in Appendix 14. Details of the financial and economic analyses are in Appendix 15.

2. Financial Analysis

130. A financial internal rate of return is estimated for the Project components at Suva and Lautoka. Least-cost technical options have been selected for each project component as well as the entire Project. The financial analysis is based on with- and without-project comparison and presents all costs at constant values.

131. For Suva, under the without-project case, no relocation of the current port operation is assumed, and the current facility is allowed to run to the end of its economic life, although incurring

increasing maintenance and repair requirements as the structure deteriorates. The revenues include ship revenues calculated with the new tariff from 1 July 2001. With the Project, the traffic volume is assumed to recover to the underlying trend prior to the political disturbances of May 2000 by the end of 2002, and thereafter grow by 2.3 percent per annum. Without the Project, traffic growth will be affected by reducing serviceability of the wharf structure, and a lower rate of 1.0 percent is assumed until 2005, then growth will stabilize and eventually slowly decline as the wharf reaches the end of its operable life. A financial internal rate of return of 22.3 percent was obtained for the Project and a US\$7.6 million (F\$17.7 million) net present value at a 12 percent discount rate.

132. For Lautoka, without the project, growth in the newly developing trades in bottled water would be constrained and the water would continue to be shipped by road to Suva, bearing relatively high inland transport costs. The export of animal feed also depends on additional capacity at Lautoka and it is assumed that this trade would not develop without the Project. Other generated traffic would not occur and there would be no transfer between road transport of inward freight from Suva Port to Lautoka Port as volumes would be insufficient to induce ship calls. With the Project, it is assumed that new trades would develop as projected by their stakeholders. The Project is estimated to achieve a financial internal rate of return of 16.5 percent with a US\$3.47 million (F\$8.1 million) net present value at 12 percent discount rate.

3. Economic Analysis

133. Economic values for costs and benefits are obtained by extracting taxes and duties, and by applying a standard conversion factor of 0.986 and labor conversion factor of 0.86 calculated for Fiji Islands. For Suva Port, the economic benefits of the project comprise returns to shippers of cargo in the form of savings in handling charges—at present a US\$64.3 (F\$150) surcharge per TEU is added to the normal freight rate to recover costs to vessel operators from cargo handling inefficiencies (para. 60). The seismic strengthening confers a benefit from the averted damage cost should an earthquake occur, expressed as the expected value of damage multiplied by the annual probability of occurrence. An economic internal rate of return of 15.8 percent has been obtained, and a net present value of US\$2.16 million (F\$5.0 million) at a discount rate of 12 percent. It does also not calculate the related impact on the country's balance of payments, reserve position, and debt repayment capability. Social consequences from the without-project case would include those from a reduction in imports of essential commodities, including medication. The analysis highlights the lifeline value of King's Wharf to the country and underlines the emergency nature of the rehabilitation works under the Project.

134. For the Lautoka component, economic benefits arise from efficiencies in cargo handling as a result of being able to move full containers by forklift truck on the new wharf rather than the slower process of loading containers onto trailers. The extension removes the constraint of container vessels not being able to berth because a ship at the bulk terminal berth. This saves ship time. There is also a substantial reduction in inland transportation, with benefits in vehicle operating and road maintenance cost savings. Reduction in heavy road transport between Lautoka and Suva will also reduce traffic noise and safety risks to small villages along the route, although these have not been quantified. An economic internal rate of return of 17.6 percent has been estimated and a US\$4.23 million (F\$9.8 million) net present value at 12 percent discount rate.

4. Least Cost Analysis for the Seismic Strengthening

135. The seismic strengthening of King's Wharf under the proposed Project is given an additional economic analysis. The wharf is of significant strategic and economic importance to Fiji Islands. It is expected to have an enhanced role in a recovery period following a natural disaster of any kind. As a responsible port asset manager, MPAF needs to ensure that all its assets are

designed to the required minimum standards, including the seismic standards. Subsequently, there is a pressing need to strengthen the wharf to provide this minimum security. Stability analyses carried out in 1998 indicated a safety factor of 0.4 for a 150-year return period event. This results in a much higher risk than is normally accepted. Modern facilities are designed for a larger, 450-year event, to have a safety factor of more than 1.0. The seismic strengthening under the Project is the least cost option for bringing King's Wharf to the minimum acceptable seismic standards. Due to the friction pile structure in the southern end of the King's Wharf complex, the cost of a full seismic upgrade is high. A full upgrade of the four Walu Bay berths and the three King's Wharf berths was estimated in January 1999 to cost US\$18 million (F\$42 million). For the two lifeline berths, the seismic upgrade was estimated to cost US\$4.5 million (F\$10.4 million). Thus, a partial technical option has been selected covering strengthening the two berths at the northern end of King's wharf. This strengthening is sufficient to protect the two most frequently used berths, adjoining reclamation, and container yard.

136. Damage if an earthquake occurs the year following completion of strengthening has been estimated. Earthquakes of various intensities ranging from 0.1 g to 0.41 g were considered. The obtained benefit-cost ratios, shown in Table 4, demonstrate the need to immediately mitigate seismic risk. If an earthquake with an intensity equal to the 1953 tremor (with a return period of 50 years) occurs after the seismic strengthening, benefits will exceed costs by a factor of 1.4. Benefit cost ratios for a 150-year earthquake are in excess of 3.0 and for a 450 year earthquake, in excess of 5.0. The benefit-cost ratios are also shown for the alternative technical option, the full seismic upgrade. The proposed new developments at Lautoka will be designed to meet modern seismic codes, which will provide acceptable factors of safety.

Table 4: Benefit-Cost Ratios from Mitigation of Seismic Risk

Earthquake Intensity (Gravity 1.0 g)	Return Period	Benefit to Cost Ratio for Partial Seismic Mitigation	Benefit to Cost Ratio for Full Seismic Upgrade
0.10	25	0.1	0.04
0.20	50	1.4	0.50
0.32	150	3.0	1.20
0.38	450	5.3	2.03
0.41	1000	8.5	3.10

B. Risks

137. As designed, the Project does not face unusual risks. Growth in traffic and cargo volumes to Suva Port is likely to exceed the forecast contributing to the urgent need to complete the Project. The costs are based on conservative estimates and high physical contingencies are allowed for unforeseen cost increases and design modifications that may arise from the detailed engineering design.

138. Key parameters in the financial and economic analyses have been subjected to a sensitivity test to assess the possible unfavorable scenarios. The analysis indicates that the Project remains economically viable. Results of the sensitivity tests are in Tables 5-7.

Table 5: Sensitivity Analysis for Suva Port Project Component ^a

Scenario	FIRR	SI	EIRR	SI
1. Base Case	22.32%	-	15.81%	-
2. Increase in Costs (20%)	18.06%	1.466	13.38%	2.972
3. Decrease in Revenue (20%)	21.87%	0.197		
4. Decrease in Cargo Handling Benefits (20%)			15.06%	1.030
5. No Seismic Damage to 2020			13.33%	0.687
6. Depreciation in F\$ (30%)	12.33%	3.160	12.34%	2.985

EIRR = Economic Internal Rate of Return; FIRR= Financial Internal Rate of Return; SI= Sensitivity Indicator.

^a Sensitivity Indicator = $SI = \frac{\text{Percentage Change in Net Present Value}}{\text{Percentage Change in Tested Parameter}}$

Source: Staff analysis.

Table 6: Sensitivity Analysis for Lautoka Project Component ^a

Scenario	FIRR	SI	EIRR	SI
1. Base Case	16.48%	-	17.64%	-
2. Increase in Costs (20%)	12.80%	3.964	14.17%	2.707
3. Decrease in Revenue (20%)	12.05%	4.948		
4. Decrease in Cargo Handling Benefits (20%)			17.03%	0.545
5. Decrease in Road Vehicle Operating Cost Savings (20%)			15.72%	1.709
6. Decrease in Road Maintenance Cost Savings (20%)			15.95%	1.504
7. Depreciation in F\$ (30%)	13.96%	1.731	14.91%	1.365

EIRR = Economic Internal Rate of Return; FIRR= Financial Internal Rate of Return; SI= Sensitivity Indicator.

^a Sensitivity Indicator = $SI = \frac{\text{Percentage Change in Net Present Value}}{\text{Percentage Change in Tested Parameter}}$

Source: Staff analysis.

Table 7: Sensitivity Analysis for the Seismic Strengthening Economic Benefit-Cost Ratios

Earthquake Intensity (Gravity =1.0)	Benefit to Cost Ratio Base Case	Increase in Cost (20%)	SI	Decrease in Benefits (20%)	SI	Depreciation in F\$ (30%)	SI	Combined Scenarios 2, 3, and 4
0.10	0.26	0.22	(0.77)	0.21	(0.96)	0.20	(0.77)	0.17
0.20	3.55	2.95	(0.85)	2.84	(1.00)	2.78	(0.72)	2.31
0.32	7.96	6.63	(0.84)	6.36	(1.00)	6.24	(0.72)	5.19
0.38	13.75	11.46	(0.84)	11.00	(1.00)	10.78	(0.72)	8.97
0.41	21.87	18.23	(0.84)	17.50	(1.00)	17.15	(0.72)	14.26

SI=sensitivity indicator.

Source: Staff analysis.

VI. ASSURANCES

139. MPAF and the Government have given the following assurances, in addition to the standard assurances, which will be incorporated in the legal documents of the Project:

- (i) By 31 December 2002, the MPAF and the Government will prepare and adopt within 2002, a time-bound sector action plan acceptable to ADB to assess the functions of sector institutions, the planned commercialization of these institutions, and improvements in management and operation of port assets, taking into account recommendations of the TA 3199-FIJ: Port Asset Management Improvement (footnote 21).

- (ii) By no later than 1 February 2003, the MPAF will award and make effective two or more nonexclusive licenses to different firms for cargo handling and stevedoring operations. Within six months of that date, the MPAF will have completed deregulation of the cargo handling and stevedoring charges.
- (iii) The Government will continue policy dialogue with ADB, particularly on the implementation of sector reform and commercial and operational performance of MPAF and the port sector, and inform ADB at an early stage of any plans for institutional and organizational restructuring of the port sector and/or planned amendments to the revised PAF Act. ADB will be given a reasonable time to review such plans and submit comments. Any changes to the equity, ownership, capital, or asset structure of MPAF will be agreed upon by the Government and ADB.
- (iv) MPAF will also take all necessary action to achieve and maintain (a) an operating profit of not less than 2 percent to be earned on average net revalued fixed assets in service³⁷ and (b) its debt service cover at a minimum of 1.5 commencing with FY2002.
- (v) The Government will not draw any dividends or effect any other drawdowns from MPAF, unless MPAF meets the criteria under item (iii) for two consecutive years.
- (vi) The Government and MPAF will adopt new or increased penalties for environmental violations of the port regulations by 30 June 2002.
- (vii) The Government and MPAF will adopt no later than by 30 June 2002 for the Lautoka component and 31 December 2002 for the Suva component an Environmental Management Plan acceptable to ADB and will mitigate any adverse environmental and social impacts arising from the project.
- (viii) MPAF will submit for ADB approval a detailed schedule of activities to implement the environmental management plan, including monitoring prior to award of civil works contracts for the Lautoka Port component.
- (ix) The Government and MPAF will ensure that all rights to land required for the Project are obtained or otherwise available prior to the award of the relevant civil works contracts under the Project.

VII. RECOMMENDATION

140. I am satisfied that the proposed loan would comply with the Articles of Agreement of ADB and recommend that the Board approve the loan of US\$16,800,000 to the Maritime and Ports Authority of Fiji for the Fiji Ports Development Project from ADB's ordinary capital resources, with interest to be determined in accordance with ADB's LIBOR-based loan facility, an amortization period of 25 years, including grace of 4 years, and such other terms and conditions as are substantially in accordance with those set forth in the draft Loan and Guarantee Agreements presented to the Board.

TADAO CHINO
PRESIDENT

18 January 2002

³⁷ This is consistent with the financial covenants under Loan 0411-FIJ: *Suva Port*.

APPENDIXES

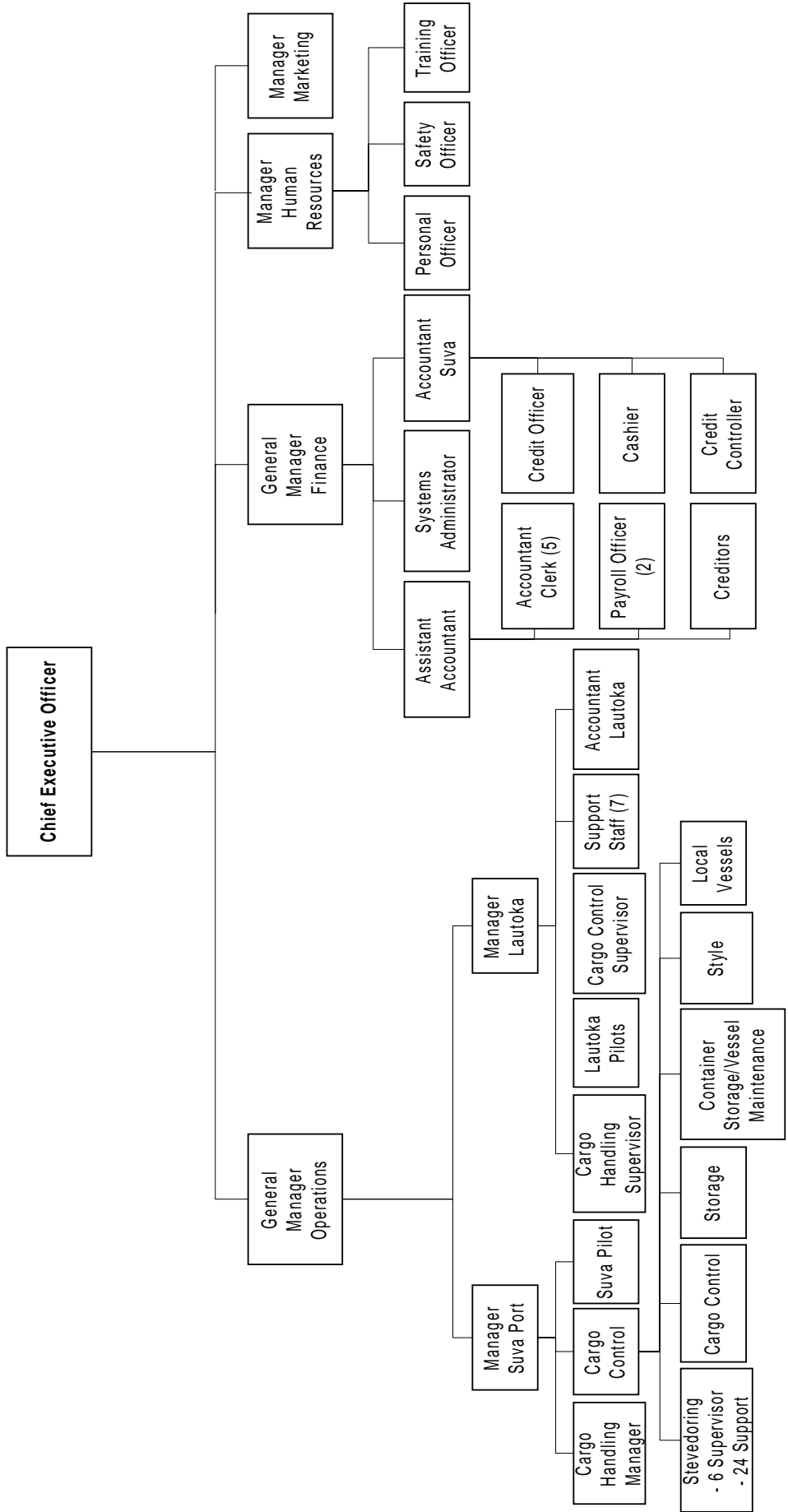
No.	Title	Page	Cited On (page, para.)
1	Project Framework	35	1, 4
2	Ports Terminal Ltd. Organization Chart	37	6, 26
3	Maritime and Ports Authority of Fiji Organization Chart	38	6, 27
4	Layout of Suva Port	39	8, 36
5	Layout of Lautoka Port	40	11, 43
6	Policy Matrix	41	13, 57
7	Preliminary Detailed Project Cost Estimates	43	21, 90
8	Tentative List of Contract Packages	44	22, 94
9	Tentative Implementation Schedule	45	22, 95
10	Project Performance Report	46	23, 101
11	Financial Performance Forecast of Maritime and Ports Authority of Fiji	48	26, 118
12	Environmental Impacts and Mitigation Action during Implementation of the Suva Port Project Component	53	28, 123
13	Summary Initial Environmental Examination	56	28, 123
14	Suva Port Throughput	65	29, 129
15	Financial and Economic Analyses	67	29, 129

PROJECT FRAMEWORK

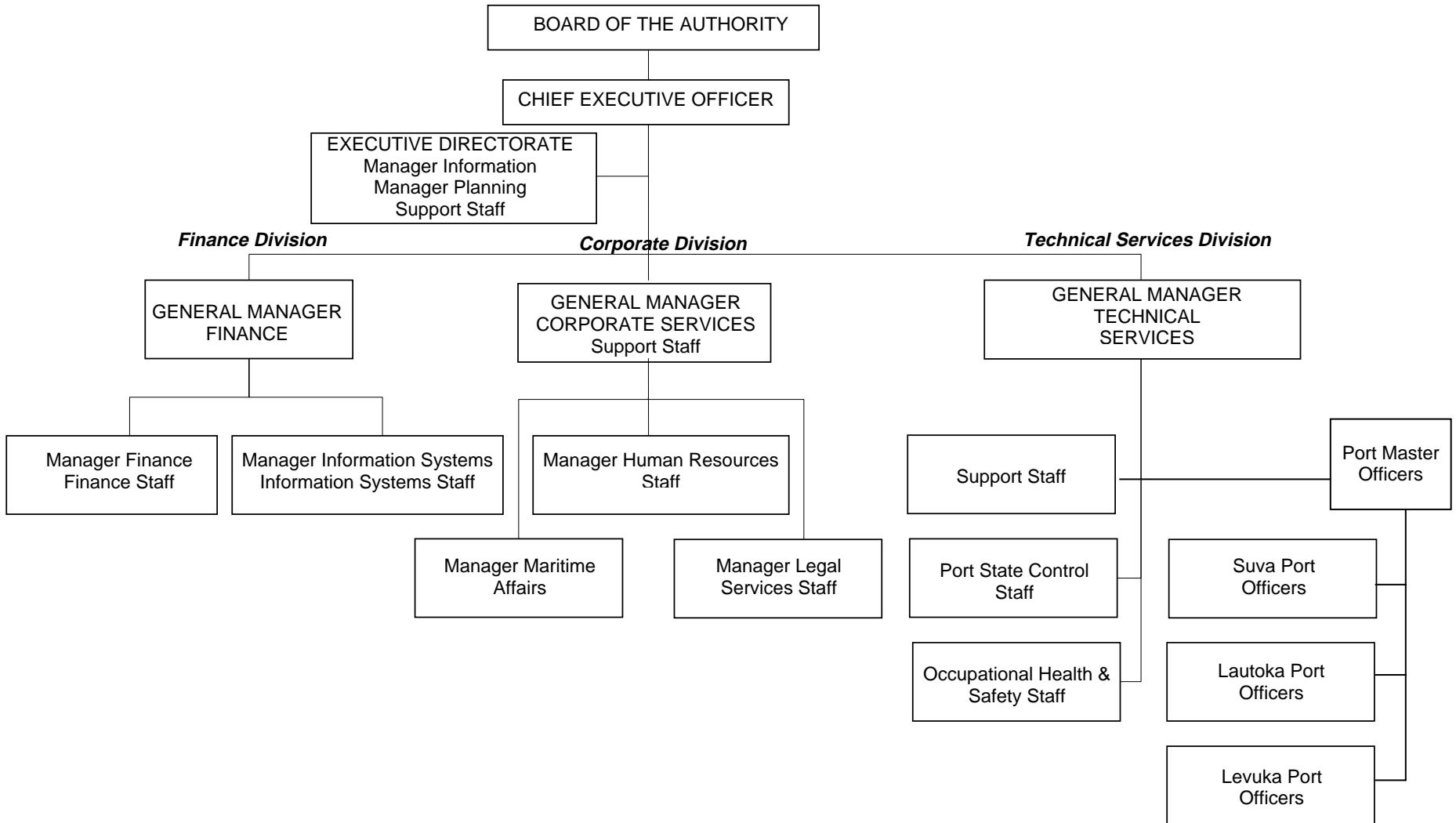
Design Summary	Performance Targets	Monitoring Mechanism	Assumptions/Risks
<p>A. Goals Economic growth through port sector support to trade, investment, and competitiveness</p>	<p>Improved efficiency of port services through:</p> <ul style="list-style-type: none"> • Reduced cost of port services • Improved competitiveness of port services 	<p>Project performance evaluation report (PPER) Benefit monitoring indicators Public reports of commerce Maritime and Ports Authority of Fiji (MPAF) annual reports</p>	<ul style="list-style-type: none"> • Growth in cargo volumes • Introduction of competition to cargo handling services • Improvement in financial and operational management of MPAF
<p>B. Purpose Sustained improvement in port efficiency and in port productivity</p> <p>Postponement of expensive new port project</p> <p>Improved intermodal inter-facing of container traffic</p>	<p>Improved efficiency in port and cargo handling operations:</p> <ul style="list-style-type: none"> • increase in cargo volumes at Lautoka Port • competitive cargo handling (15 containers per hook per hour) • reduced deterioration of Queen's Road • reduced cost of port services (vessel turn-around time) and elimination of penalty of US\$64 (F\$150) per container • land-use ratio at the container yard (containers per square meter) • additional storage capacity (slots available) 	<p>PPER</p> <p>Asian Development Bank (ADB) project review reports</p> <p>Project performance statistics</p> <p>Ship agent's reports on cargo handling</p> <p>Traffic and cargo volumes</p>	<p>Timely project implementation</p> <p>Accurate assessment of seismic risk</p> <p>Introduction of competition in the cargo handling services at Suva Port</p>
<p>C. Outputs Restoration of King's Wharf to extend its life to 2020</p> <p>Upgrade of King's Wharf to minimum seismic standards</p> <p>Strengthening of the King's Wharf deck and reorientation of the container yard to improve the efficiency of cargo handling</p> <p>Ship to shore sewerage to improve water quality control at Suva Port</p> <p>Remedial rehabilitation of Queen's Wharf</p> <p>Extension of Queen's Wharf in Lautoka</p>	<p>Continued port services beyond the current life of King's Wharf to 2020</p> <p>Sustenance of the upgraded sections in the event of an earthquake</p> <p>Improvement in cargo handling efficiency</p> <p>More reliable and frequent port calls to Suva Port (containers handled per hour)</p> <p>Improved competitiveness of the Port (turn-around time)</p> <p>Improved water quality at the Suva Port</p> <p>Extended life of the Queen's Wharf</p> <p>Increased capacity to handle up to 500 additional containers per week</p>	<p>Award of contracts</p> <p>ADB's and MPAF's review reports</p> <p>Reports of the supervising contractors</p> <p>PPER</p> <p>Public reports of the Commerce Committee on pricing of port services</p> <p>Trade, traffic, and cargo volumes</p> <p>Consumer price index</p>	<p>Timely mobilization of consultants and contractors</p> <p>Efficient contract and Project management</p> <p>Improved planning of container yard</p> <p>Improved enforcement of use of sewerage pipe</p> <p>Increased penalties violation of environmental port regulations</p>

Design Summary	Performance Targets	Monitoring Mechanism	Assumptions/Risks
Additional container storage space	Six hectares of additional storage space allowing efficient vessel loading		
<p>D. Inputs Design and supervising consulting services</p> <p>Civil works for restoration of King's Wharf to extend its life by 15 years</p> <p>Civil works for establishing minimum seismic standard</p> <p>Civil works for wharf deck strengthening and reorientation of the container yard</p>	<p>Award of consultant services contract in an estimated value of US\$2.7 million for engineering design of works and to supervise the civil works.</p> <p>Award of contracts for US\$2.4 million to</p> <ul style="list-style-type: none"> (i) rebuild longitudinal beams (ii) restore fender panels and supports (iii) rebuild the south-west corner of the wharf (iv) repair all cracked piles (v) repair bridge beams and pile muffs (vi) install ship-to-shore sewerage <p>Award of contracts for US\$4.5 million to:</p> <ul style="list-style-type: none"> (i) strengthen sheet piles (ii) install rock anchors <p>Award of contracts for US\$3.3 million to:</p> <ul style="list-style-type: none"> (i) strengthen bridge beams (ii) strengthen wharf edge beams (iii) strengthen wharf deck overlay (iv) regrade pavements (v) relocate light towers (vi) remove sheds 2 and 3 (vii) reinstate pavement in locations of sheds 	Time- and quality- bound delivery of consultant services	<p>Timely mobilization of consultant for design</p> <p>Sufficient supervision of works</p> <p>Timely procurement</p> <p>Construction practices to minimize interruption of port services and environmental impact</p> <p>Use of appropriate construction methodologies and materials</p>
<p>Remedial rehabilitation of Queen's Wharf</p> <p>Extension of Queen's Wharf in Lautoka and access bridge</p> <p>Additional container storage space</p>	<p>Award of contracts for US\$0.52 million to carry out remedial repair work and backlog maintenance</p> <p>Award of contracts for US\$9.1 million to</p> <ul style="list-style-type: none"> (i) supply and installation piles (ii) construction reinforced concrete deck (iii) installation of fenders <p>Award of contracts for US\$3.0 million to</p> <ul style="list-style-type: none"> (i) prepare seabed reclamation of six hectares (ii) install associated services (iii) construct a short road and public park 		

**PORTS TERMINAL LTD.
ORGANIZATION CHART**

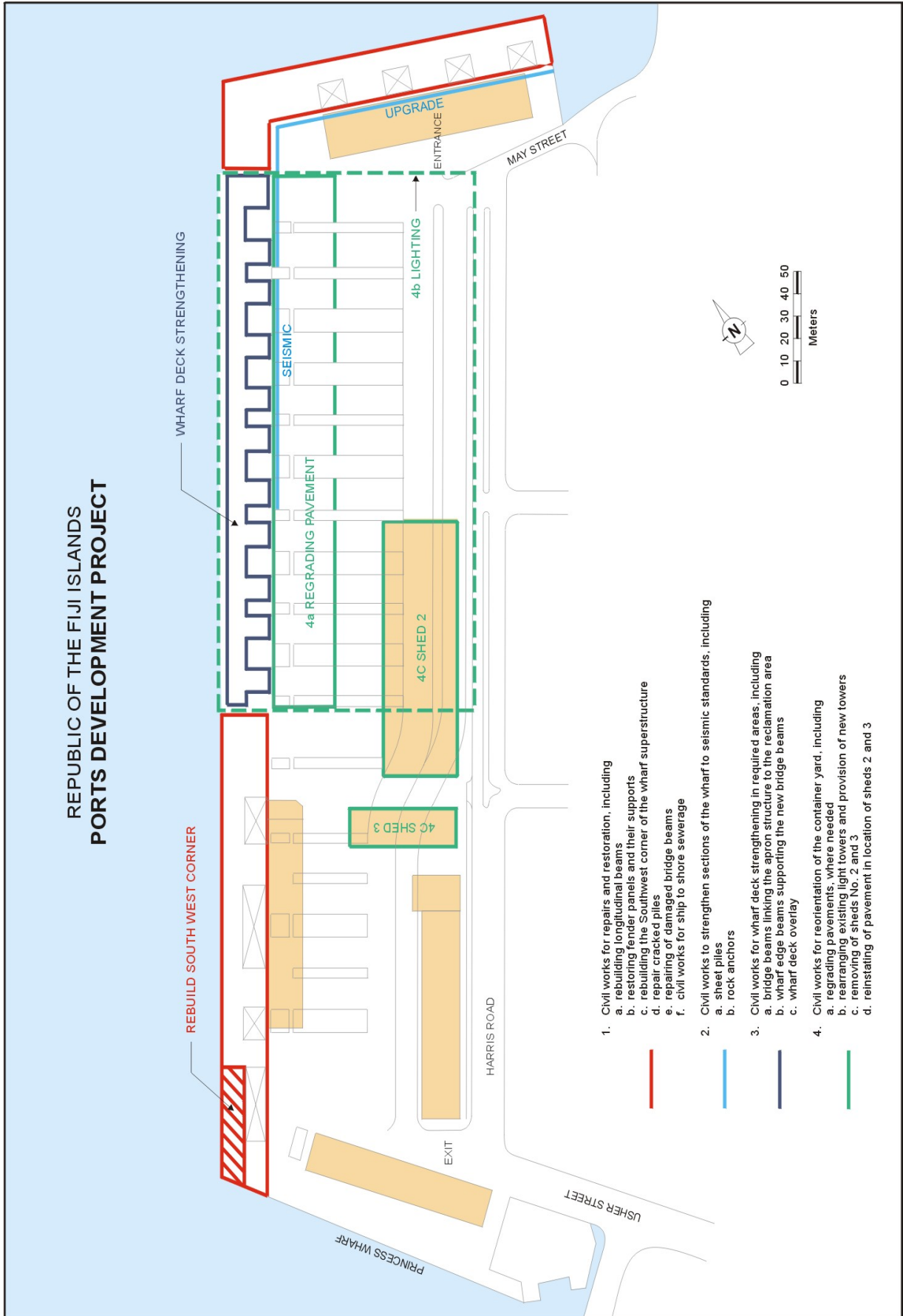


**MARITIME & PORTS AUTHORITY OF FIJI
ORGANIZATION CHART**



LAYOUT OF SUVA PORT

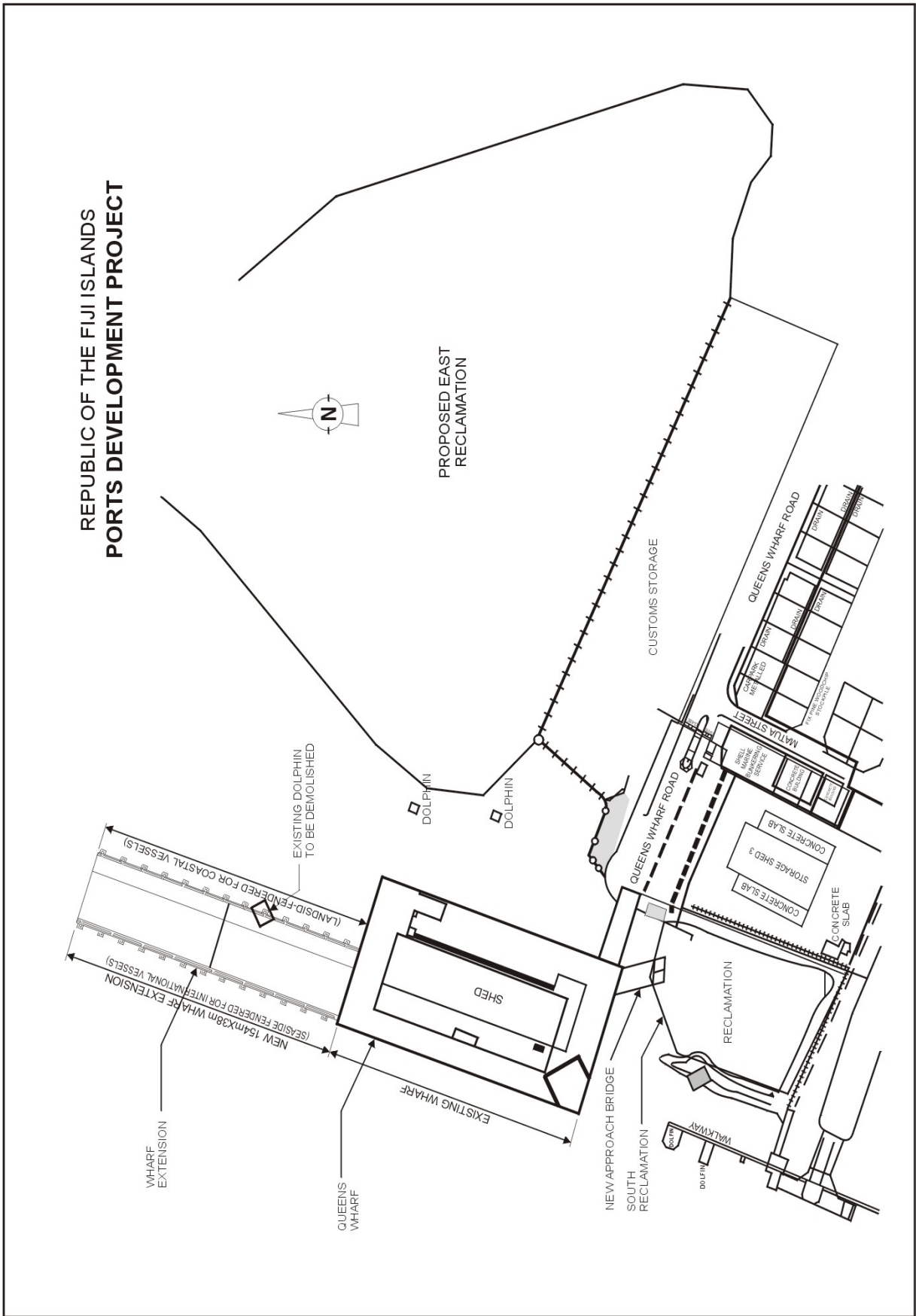
REPUBLIC OF THE FIJI ISLANDS
PORTS DEVELOPMENT PROJECT



1. Civil works for repairs and restoration, including
 - a. rebuilding longitudinal beams
 - b. restoring fender panels and their supports
 - c. rebuilding the Southwest corner of the wharf superstructure
 - d. repair cracked piles
 - e. repairing or damaged bridge beams
 - f. civil works for ship to shore sewerage
2. Civil works to strengthen sections of the wharf to seismic standards, including
 - a. sheet piles
 - b. rock anchors
3. Civil works for wharf deck strengthening in required areas, including
 - a. bridge beams linking the apron structure to the reclamation area
 - b. wharf edge beams supporting the new bridge beams
 - c. wharf deck overlay
4. Civil works for reorientation of the container yard, including
 - a. regrading pavements, where needed
 - b. rearranging existing light towers and provision of new towers
 - c. removing of sheds No. 2 and 3
 - d. reinstating of pavement in location of sheds 2 and 3

LAUTOKA QUEEN'S WHARF EXTENSION

**REPUBLIC OF THE FIJI ISLANDS
PORTS DEVELOPMENT PROJECT**



POLICY MATRIX

Policy Issues	Objectives	Target Date	Objectives under the Project
Commercialization	<ol style="list-style-type: none"> 1. Call for expressions of interest for stevedoring operation 2. Award two or more nonexclusive licenses to the private sector for stevedoring operations 3. Liberalize cargo-handling tariffs for private sector determination 4. Ports Terminal Ltd. (PTL) to relinquish its noncargo handling activities to the Fiji Maritime Transport Safety Authority (FIMSA) and Maritime and Port Authority of Fiji (MPAF) and to operate as comparably with a private business in the industry 5. PTL to adopt <ol style="list-style-type: none"> (i) a customer-focused and business-oriented structure (ii) change to private sector philosophy on organization, conditions, patterns, attitudes, and ethics 	<p>August 2002</p> <p>1 February 2003 loan covenant</p> <p>1 August 2003 loan covenant</p> <p>Upon completion of the above items 1-3 and a review under TA 3199-FIJ: Port Asset Management Improvement of tariffs under market-based cargo handling conditions</p>	<p>Introduction of competition and market conditions to improve cargo-handling performance measured against the target of 15 containers per vessel crane hour</p> <p>Reduced consumers freight rates as a result of the Project and improved management of cargo-handling operations</p> <p>Accomplishment of performance targets listed under PTL's Statement of corporate intent</p> <p>Allow PLT to compete with the private sector cargo handling agent</p> <p>Enhanced competition of the port sector for trade facilitation</p>
Operations and Management	<ol style="list-style-type: none"> 1. Implementation of civil works for storage and cargo handling area 2. Relocation of payment office and other activities to improve traffic routing 3. Arrange, and control traffic routing to improve safety and productivity of cargo handling and port operations 4. Consecutive planning of container 	<p>Project implementation schedule</p> <p>Time-bound action plan prepared for operational improvement under TA 3199-FIJ: Port Asset Management Improvement</p>	<p>Increase in cargo storage area by 71 percent plus an additional 56 percent in container slots through realignment</p> <p>Increase safety of port traffic and reduce traffic-related inefficiencies at the port</p> <p>Increase safety of port traffic and productivity and efficiency of the port</p>

Policy Issues	Objectives	Target Date	Objectives under the Project
	<p>stacking and yard utilization among the port manager, cargo handling, and ship agents to facilitate loading and unloading, and cargo-handling and port operations</p> <p>loading/unloading and productivity</p> <p>5. Coordination of berth allocation to facilitate loading, unloading, and cargo-handling and port operations</p> <p>6. Separation of cargo-handling activity and freight handling by haulers to improve traffic routing</p> <p>7. Computerization of berth allocation</p> <p>8. Coordination of health and trade facilitating services to realize productivity gains</p>		<p>and cargo-handling services</p> <p>Improve container yard layout by separating import and export cargo, and locating laden cargo near arriving vessel, as appropriate</p> <p>Improve coordination and planning of space use on the port premises with gear for productivity improvement in cargo-handling and port operations</p>
Environment and Safety	<p>1. Revision of Port Regulation, 1990 with significant increase in penalties and fines for violators of port regulation for environmental conduct on port premises</p> <p>2. Improvement in control of port area and enforcement of environmental port regulations</p> <p>3. Improvement in sewerage management</p> <p>4. Installation of the ship-to-shore sewerage connection</p> <p>5. Procurement of oil spill response equipment, and provision of relevant training for quick response</p>	30 June 2001 loan covenant	<p>Compliance with the Clean Port Management Policy under the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78, main text, para. 72).</p> <p>Cleaner environment surrounding the ports and at the ports</p>

PRELIMINARY DETAILED PROJECT COST ESTIMATES

Cost	Project Costs						ADB (US\$million)	Financing MPAF (US\$million)	TOTAL (US\$million)
	Foreign Cost Exchange (F\$million)	Foreign Cost Exchange (US\$million)	Local Currency Cost (F\$million)	Local Currency Cost (US\$million)	Total Cost (F\$million)	Total Cost (US\$million)			
A. Base Costs									
1. Maintenance Repairs	3.22	1.40	2.29	1.00	5.51	2.40	1.40	1.00	2.40
a. Rebuilding of longitudinal beams	2.20	0.95	1.43	0.62	3.62	1.58			
b. Restoring fender panels and their supports	0.66	0.29	0.16	0.07	0.82	0.36			
c. Rebuilding the south-west corner of the wharf	0.22	0.09	0.50	0.22	0.71	0.31			
d. Repair of all cracked piles	0.07	0.03	0.05	0.02	0.12	0.05			
e. Repair damaged bridge beams	0.01	0.00	0.00	0.00	0.01	0.00			
f. Ship to shore sewerage pipeline	0.07	0.03	0.16	0.07	0.23	0.10			
2. Seismic Upgrade	7.90	3.43	2.48	1.08	10.38	4.51	3.43	1.08	4.51
a. Sheet piles/rock anchors	7.90	3.43	2.48	1.08	10.38	4.51			
3. Wharf Deck Strengthening	4.00	1.74	3.62	1.57	7.62	3.31	1.74	1.57	3.31
a. 150mm overlay	0.19	0.08	0.26	0.11	0.45	0.20			
b. Beam repairs	0.70	0.30	0.43	0.19	1.13	0.49			
c. Bridge unit upgrade	1.69	0.73	2.36	1.03	4.05	1.76			
d. Bridge piling	1.43	0.62	0.57	0.25	1.99	0.87			
4. Container Yard Reorganization	1.03	0.45	1.66	0.72	2.69	1.17	0.45	0.72	1.17
a. Regrading pavements	0.35	0.15	0.49	0.21	0.85	0.37			
b. Lighting Towers/Substation	0.22	0.10	0.31	0.13	0.53	0.23			
c. Sheds 2 and 3 (Dem and reinst pav.)	0.46	0.20	0.86	0.37	1.32	0.57			
5. Lautoka Wharf Extension	11.37	4.95	8.78	3.82	20.15	8.77	4.95	3.82	8.77
Demolition	0.00	0.00	0.08	0.03	0.08	0.03			
Piling	6.36	2.78	2.76	1.20	9.12	3.98			
Concrete	2.25	0.98	5.22	2.27	7.47	3.25			
Fendering and Bollards	2.48	1.08	0.28	0.12	2.76	1.20			
Cathodic Protection	0.10	0.04	0.04	0.02	0.14	0.06			
Services and Miscellaneous	0.18	0.08	0.41	0.18	0.58	0.25			
6. Lautoka Approach Bridge	0.48	0.21	0.31	0.13	0.79	0.34	0.21	0.13	0.34
Piling	0.39	0.17	0.17	0.07	0.55	0.24			
Concrete	0.05	0.02	0.13	0.05	0.18	0.08			
Cathodic Protection and Misc	0.04	0.02	0.02	0.01	0.06	0.03			
7. Queen's Wharf Rehabilitation	0.72	0.31	0.48	0.21	1.20	0.52	0.00	0.52	0.52
Remedial Repairs to Deck	0.72	0.31	0.48	0.21	1.20	0.52			
8. North East Reclamation	1.16	0.50	5.65	2.46	6.81	2.96	0.00	2.96	2.96
Reclamation Sections 1 to 4	0.41	0.18	3.67	1.60	4.08	1.77			
Road and Public Park - Section 5	0.03	0.01	0.30	0.13	0.33	0.14			
Infrastructure and Rip Rap	0.72	0.31	1.68	0.73	2.40	1.04			
9. Consulting Services	3.66	1.59	2.43	1.06	6.09	2.65	1.59	1.06	2.65
King's Wharf Design and Supervision	2.42	1.05	0.98	0.42	3.40	1.48			
Lautoka Design Review, Design, and Supervision	1.24	0.54	1.45	0.63	2.69	1.17			
Subtotal (A)	33.54	14.60	27.70	12.05	61.24	26.64	13.79	12.86	26.64
B. Contingencies									
1. Physical contingency ¹	3.49	1.52	2.81	1.22	6.29	2.74	1.52	1.22	2.74
2. Price contingency ²	0.80	0.35	1.11	0.48	1.91	0.83	0.35	0.48	0.83
Subtotal (B)	4.29	1.87	3.92	1.70	8.21	3.57	1.87	1.70	3.57
C. Interest During Construction	2.65	1.15	2.06	0.90	4.71	2.05	1.15	0.90	2.05
Interest During Construction	2.26	0.98	2.06	0.90	4.32	1.88	0.98	0.90	1.88
Upfront Fee	0.39	0.17	0.00	0.00	0.39	0.17	0.17	0.00	0.17
Total	40.48	17.61	33.68	14.65	74.16	32.26	16.80	15.46	32.26

¹ A physical contingency of 10 percent has been applied to all civil works, except the container yard which has received a physical contingency of 5 percent. Consulting services have received 15 percent physical contingency.

² A price contingency of 2.4 percent has been added to foreign cost components of the Project and 4 percent to local cost components.

TENTATIVE LIST OF CONTRACT PACKAGES
(US\$ million)

Contract	Description	Amount Base Cost	Mode of Procurement
1. King's Wharf Maintenance Repairs	Repair and reinstatement of wharf elements, including fenders	2.8	ICB
2. King's Wharf Seismic Upgrade and King's Wharf Deck Strengthening	Deep sheet piling and rock anchor installation for two berths only and strengthening of part of wharf deck and bridge units to take fork-lift truck operation	7.81	ICB
3. Container Yard Reorientation-1	Demolition of two sheds	0.57	LCB
4. Container Yard Reorientation-2	Paving reinstatement, lighting and power station relocation, and associated works	0.60	LCB
5. Lautoka Wharf and Bridge Construction	Supply and installation of 180 steel tube piles into soapstone and installation corrosion protection and construction of concrete deck for container wharf and installation of fenders and other fittings. Construction of an access bridge.	9.11	ICB

ICB= international competitive bidding, LCB=local competitive bidding.

PROJECT PERFORMANCE REPORT

A. Objectives

1. A project performance report is prepared to monitor and evaluate the attainment of project benefits. It includes a benefit monitoring program and measurement indicators. The role of the report is to provide benchmark information for the Maritime and Ports Authority of Fiji (MPAF) and the Government as baseline data to enable objective project planning.

B. Benefit Monitoring Evaluation Program and Measurement Indicators

2. MPAF will undertake the (i) benchmarking identifying the current data for the proposed measurement indicators, (ii) benefit monitoring involving collection of indicator data one year after the completion of the Project, and (iii) postproject benefit evaluation involving collecting indicator data five years after project completion. The data will be analyzed and the findings summarized and provided to the Asian Development Bank (ADB). The proposed benefit monitoring evaluation and measurement indicators shown in Table A10 are prepared in accordance with ADB's *Handbook for Benefit Monitoring and Evaluation*.

3. MPAF will select, in consultation with ADB, a set of performance indicators and performance targets to monitor the benefits of the Project by the time of loan inception. Financial performance indicators will indicate the operating revenues under the heads of operating expenditures to facilitate profit center calculations. Financial performance monitoring indicators will be determined under the associated technical assistance. Data on vessel productivity to be collected and analyzed by MPAF, supported by the design and supervising consultants, will comprise turnaround time at the berths. Data on cargo handling will include rates charged for different products, time spent for unloading and loading, data on equipment availability, and container-handling efficiency. MPAF will also monitor unquantifiable benefits of the sector restructuring, including employment creation at the port as a consequence of the restructuring process and environmental benefits of the measures taken to improve the port environment.

Table A10: Proposed Performance Measurement Indicators

Description	Benchmark Project Commencement	1 Year after Completion	5 Years after Completion
A. Cargo Operations Disaggregated by Port			
Cargo volumes by type of cargo			
Containers unloaded/loaded per hour per ship crane			
Vessel turnaround time			
Berth occupancy			
Land use in the container yard (Twenty-foot Equivalent Unit/square meter)			
Real cost of port and cargo-handling services per volume of cargo			
Regionally competitive port services: Share of cost of port and cargo-handling services of that in competing ports			
Share of cost of freight in export prices			
B. Port Operations Disaggregated by Port			
International cargo throughput			
Domestic cargo throughput			
Vessel traffic volumes by type of vessel			
Number of MPAF employees			
TEU's/tons of cargo per MPAF employees			
Cost of port operations			
C. Commercial Performance Indicators			
Revenues			
Expenses			
Rate of return on total assets			
Rate of return on owner's equity			
Nominal cargo volume-based cost of port services			
Cost of port asset maintenance and operation			
Quantity of sewerage facilitated from ships to on-shore facilities			

MPAF= Maritime and Ports Authority of Fiji, TEU= twenty-foot equivalent unit.

FINANCIAL PERFORMANCE FORECAST OF MARITIME AND PORTS AUTHORITY OF FIJI

NOTES AND ASSUMPTIONS

A. Assumptions and Background

1. The financial statements and projections for the Maritime and Ports Authority of Fiji (MPAF) cover 1995 to 2006 and are presented in Table A11.
2. **Balance Sheet.** MPAF revalued its assets in 1997 as part of the reorganization of the Ports Authority of Fiji. New asset values were prepared based on reinstatement and indemnity values for the assets. Adoption of the reinstatement values led to an increase in the fixed assets from F\$19.66 million (US\$10.22 million) to F\$58 million, or US\$30 million. MPAF prepaid its debt with the European Investment Bank and the Asian Development Bank in 1996 and 1997 contributing together with staff redundancy payments to the accumulated losses.
3. **Income Statement.** Reorganization is accounted for in the financial statements of 1998 and 1999. This separated cargo handling operations and the corresponding revenues and costs from MPAF to the Ports Terminal Ltd. Fees from the cargo operating license is collected.
4. **Traffic Volume.** The Port Master Development Plan prepared a range of projections for low, medium, and high traffic growth. The low projection of 2.8 percent per annum has been used by MPAF in its planning and it has been used in the financial projections.
5. **Tariff.** The adopted rate increases on 1 May 1999 yield about 15 percent increase in overall revenue. These have been incorporated from the date of 1 May 1999. Tariff restructuring has been incorporated as of 1 July 2001. This would be expected to yield a general revenue increase of 5 percent, which in light of reduced cargo throughput has not been realized in the revenues.
6. **Recurring Expenses.** Base year employment costs, and operations, maintenance, and administration expenses have been escalated at 4 percent per annum.
7. **Depreciation and Fixed Asset Values.** MPAF has used the 1997 net values for the revalued fixed assets in use. These have also been used for the asset base for depreciation. This base has been retained in the projections and a weighted average depreciation rate of 4.3 percent per annum applied.
8. **Income Tax.** MPAF is liable for income tax on its profits at 35 percent.
9. **Dividends.** The policy on dividends of the Commercial Statutory Authorities remains unclear and flexible. No dividend payment has been assumed during the period of analysis.
10. **Working Capital.** There are no inventories now that stevedoring has been transferred to the Ports Terminal Ltd. Noncash current assets and liabilities are projected as steady proportions of revenue and purchased goods and services.
11. **Local Interest Rates.** The loan from the ANZ Bank carries 7.0 percent interest. New borrowing of \$14 million has been assumed at the same rate and repayable over five years.

12. **Capital Works Plan.** MPAF's corporate plan gives the expected capital expenditure in addition to the Project. Provision has been made for about one third of recent average annual expenditure: \$1.1 million per annum.

B. Definitions

13. The operating ratio is operating expenses (including depreciation) as a percentage of operating revenue. The debt-service ratio is internal cash generation (before debt service) divided by debt-service requirements. The self-financing ratio is the percent of capital expenditures financed by MPAF after meeting operating expenses, debt service, and taxes over an average of three years.

Table A11: Financial Statements

Item	1994 Not Balanced	1995	1996	1997 14 mos to 28/2/98	1998 13 mos to 31/3/99	2000 Rev Budget 12 Mos to 31/12/00	2001 <i>Projected</i>	2002 <i>Projected</i>	2003 <i>Projected</i>	2004 <i>Projected</i>	2005 <i>Projected</i>	2006 <i>Projected</i>
Income Statements												
Revenue												
Ship Charges	7,160	9,745	9,806	8,276	6,903	5,740	5,925	6,091	6,262	6,437	6,617	6,803
Cargo Charges	7,713	9,265	8,290	14,065	4,711	4,315	4,454	4,579	4,707	4,839	4,975	5,114
Other Charges	410	1	549		2,291	1,553	1,603	1,648	1,694	1,742	1,790	1,841
Total from Operations	15,283	19,011	18,645	22,341	13,905	11,608	11,983	12,318	12,663	13,018	13,382	13,757
Sale of Noncurrent Assets	1	19	10									
Interest Income	22	166	104	85	64							
Rent Received	915	800	844	1,186								
Other	90				350							
Total Operating Revenue	16,220	19,996	19,603	23,612	14,319	11,608	11,983	12,318	12,663	13,018	13,382	13,757
Expenses												
Employment		5,629	5,534	6,878	1,970	1,964	2,043	2,124	2,209	2,298	2,390	2,485
Operations & Maintenance		4,967	5,486	7,584	4,879	6,062	6,304	6,557	6,819	7,092	7,375	7,670
Administration		1,165	1,573	1,338	1,449	1,012	1,052	1,095	1,138	1,184	1,231	1,281
Depreciation & Amortization	3,459	2,998	2,919	3,109	2,446	2,380	5,573	5,598	5,623	6,505	6,529	6,554
Depreciation Adjustment				3,980	3,860							
Bad Debts		96		249								
Operating Profit Before Interest & Tax	2,397	5,141	4,091	474	-285	190	-2,990	-3,055	-3,126	-4,060	-4,143	-4,233
Finance charges:												
leases		8	55	79	65							
others	1,345	1,141	856	703	559	129	211	393	655	733	709	685
Operating Profit Before Tax	1,052	3,992	3,180	-308	-909	61	-3,201	-3,448	-3,781	-4,793	-4,852	-4,918
Abnormal Items	-3,351	-515	-473	-1,837								
Provision for Income Tax					0	318	0	0	0	0	0	0
Net Profit (no tax applicable to FY 1997)	-2,299	3,477	2,707	-2,145	-909	-257	-3,201	-3,448	-3,781	-4,793	-4,852	-4,918
Provison for Dividend	0	0	0	0	0	0	0	0	0	0	0	0
Balance to Owner's Equity	-2,299	3,477	2,707	-2,145	-909	-257	-3,201	-3,448	-3,781	-4,793	-4,852	-4,918
	-317											
Balance Sheets												
Working Capital												
Cash (net)	448	2,047	2,711	989	1,739	326	674	-7,594	-10,583	-9,980	-9,409	-8,876
Accounts Receivable	1,001	894	750	862	1,473	1,260	561	577	593	609	627	644
Inventories	7	98	88									

Item	1994 Not Balanced	1995	1996	1997 14 mos to 28/2/98	1998 13 mos to 31/3/99	2000 Rev Budget 12 Mos to	2001 Projected	2002 Projected	2003 Projected	2004 Projected	2005 Projected	2006 Projected
Other Current Assets	538	695	504	479	479	266	288	296	304	313	321	330
Less												
Accounts Payable & Provisions	2,644	1,786	1,677	1,859	1,930	941	1,780	1,851	1,925	2,003	2,083	2,166
Finance Leases	93	40	78	117								
Registered Bonds			5,500			171						
Current Portion of Term Loans	12,940	3,613		1,623	1,296	1,129	1,580	540	540	540	540	540
Working Capital	-13,684	-1,705	-3,202	-1,269	465	-389	-1,837	-9,113	-12,151	-11,600	-11,083	-10,607
Fixed Assets												
Property, Plant & Equipment			65,744	135,363	137,092	139,326	139,947	140,567	162,615	163,235	163,856	164,476
Less Depreciation			29,293	78,414	84,720	87,100	92,673	98,271	103,893	110,398	116,927	123,481
Net Book Value in Service	40,000	37,591	36,451	56,949	52,372	52,226	47,274	42,297	58,721	52,837	46,928	40,995
Work in Progress	2,093	2,822	3,064	1,217	1,270	1,270	5,249	23,615	10,453	10,453	10,453	10,453
	42,093	40,413	39,515	58,166	53,642	53,496	52,523	65,912	69,174	63,290	57,381	51,448
Total Capital Employed	28,409	38,708	36,313	56,897	54,107	53,107	50,686	56,799	57,023	51,690	46,298	40,841
Loan capital												
Finance Leases		135	365	460								
Registered Bonds		9,500	4,000									
Ports Development Project					0	0	2,189	11,750	15,756	15,216	14,676	14,136
Longterm Debt, Other	3,583	278	446	3,744	2,323	1,580	171	171	171	171	171	171
Total Loan Capital	3,583	9,913	4,811	4,204	2,323	1,580	2,360	11,921	15,927	15,387	14,847	14,307
Owner's Equity												
Capital Fund	2,969	2,969	2,969	2,969	2,969	2,969	2,969	2,969	2,969	2,969	2,969	2,969
Reserves	31,894	31,894	31,894	55,530	55,530	55,530	55,530	55,530	55,530	55,530	55,530	55,530
Accumulated Profits	-10,037	-6,068	-3,361	-5,806	-6,715	-6,972	-10,173	-13,621	-17,402	-22,195	-27,047	-31,965
Total Equity	24,826	28,795	31,502	52,693	51,784	51,527	48,326	44,878	41,097	36,304	31,452	26,534
Total Capital Employed	28,409	38,708	36,313	56,897	54,107	53,107	50,686	56,799	57,023	51,690	46,298	40,841
Cash Flows												
Sources												
Net Cash Generated from Operations	1,052	7,183	6,657	6,125	5,481	2,007	4,100	2,590	2,546	2,496	2,440	2,378
Sale of Fixed Assets	1,028					620						
Reduction in Cash Balances	-6,305			1,722	0	1,413	0	8,268	2,988	0	0	0
Borrowings		9,778	5,482	12,500		1,604	2,189	10,101	4,546	0	0	0
Total Cash Available	-4,225	16,961	12,139	20,347	5,481	5,644	6,288	20,960	10,080	2,496	2,440	2,378

Item	1994 Not Balanced	1995	1996	1997 14 mos to 28/2/98	1998 13 mos to 31/3/99	2000 Rev Budget 12 Mos to	2001 <i>Projected</i>	2002 <i>Projected</i>	2003 <i>Projected</i>	2004 <i>Projected</i>	2005 <i>Projected</i>	2006 <i>Projected</i>
Applications												
Debt Servicing:												
Loan & Finance Lease Repayments	4,928	12,919	9,027	17,265	2,325	2,343	1,129	1,580	540	540	540	540
Interest Paid	1,345	1,366	827	752	624	129	211	393	655	733	709	685
Total Debt Servicing	6,274	14,285	9,854	18,017	2,949	2,472	1,340	1,973	1,195	1,273	1,249	1,224
Capital Expenditure (Net)	633	1,115	1,621	2,030	1,782	2,854	4,600	18,987	8,885	621	621	621
Increase in Cash Balances		1,561	664		750	0	348	0	0	603	571	533
Tax & Dividend to Government				300	0	318	0	0	0	0	0	0
Total Cash Applied	6,907	16,961	12,139	20,347	5,481	5,644	6,288	20,960	10,080	2,496	2,440	2,378
Performance Indicators												
Profitability												
Gross Profit, % of Revenue	14.8%	25.7%	20.9%	2.0%	-2.0%	1.6%	-25.0%	-24.8%	-24.7%	-31.2%	-31.0%	-30.8%
Operating Profit Before Interest, Tax, % of Fixed Assets	6.0%	13.7%	11.2%	0.8%	-0.5%	0.4%	-6.3%	-7.2%	-5.3%	-7.7%	-8.8%	-10.3%
Net Profit, % of Equity	-9.3%	12.1%	8.6%	-4.1%	-1.8%	-0.5%	-6.6%	-7.7%	-9.2%	-13.2%	-15.4%	-18.5%
Funds Generation												
Debt Service Cover, Times	0.17	0.50	0.68	0.34	1.86	0.81	3.06	1.31	2.13	1.96	1.95	1.94
Selffinancing, Ratio		(6.32)	(2.01)	(6.73)	1.14	(0.25)	0.31	0.06	0.14	0.36	1.92	1.86
Liquidity												
Receivables, Months	0.79	0.56	0.48	0.40	1.17	1.30	0.56	0.56	0.56	0.56	0.56	0.56
Quick Ratio, Cash:Current Liabilities	0.03	0.38	0.37	0.27	0.54	0.15	0.20	(3.18)	(4.29)	(3.93)	(3.59)	(3.28)
Current Ratio and Assets:Current Liabilities	0.13	0.69	0.56	0.65	1.14	0.83	0.45	(2.81)	(3.93)	(3.56)	(3.23)	(2.92)
Capitalization												
Debt : Equity (\$:\$)	0.14	0.34	0.15	0.08	0.04	0.03	0.05	0.27	0.39	0.42	0.47	0.54
Proprietorship, Equity/TCE	87.4%	74.4%	86.8%	92.6%	95.7%	97.0%	95.3%	79.0%	72.1%	70.2%	67.9%	65.0%

**ENVIRONMENTAL IMPACTS AND MITIGATION
ACTION DURING IMPLEMENTATION OF THE SUVA PORT PROJECT COMPONENT**

Development Phase/Issues	Potential Environmental Impact	Mitigation Measures
Construction	<p>Concrete removal using jack-hammering may create dust, concrete spalls, and noise</p> <p>Concrete repair (sprayed and micro concrete work and shotcreting) may cause leaking or fail immediately following grouting, and may fall into the water and cause pollution.</p>	<p>Dust: Insignificant quantity of dust, most of it will float and/or dissolved into the water. Workers will use protective eyewear and dust protection mouthpieces for safety.</p> <p>Concrete spalls: Insignificant quantity of spalls will be allowed to drop into the water. However, if water quality test show unacceptable limit, construction work will be halted to allow particles to disperse.</p> <p>Noise: Impact on surrounding population is not significant as the work is isolated in wharf area. Workers will use earmuffs.</p> <p>The Maritime and Ports Authority of Fiji (MPAF) will engage an experienced supervising engineer to carry out strict regular inspection on the construction work.</p> <p>Quality control and assurance will be incorporated into the construction contract, experienced operator will be hired, and experienced supervising engineer will inspect all construction activities.</p>
Port Operation	<p>Pollution from sewage disposal</p> <p>Pollution from bilge water</p> <p>Pollution from solid waste disposal</p>	<p>To improve sewage disposal, a ship-to-shore sewage pipe will be connected under the Project.</p> <p>Predetermined procedures for checking sewage levels of the vessels are needed.</p> <p>MPAF will ensure that all vessels will comply with MARPOL (International Convention for the Prevention of Pollution from Ships) requirements, i.e., at least be equipped with (i) approved oily-water separating filter equipment, (ii) holding tank with capacity to retain on-board oily mixtures and residues, or (iii) connect to port's treatment facilities. Phasing-in period for local vessel will be set to enable the local vessel to upgrade the facilities.</p> <p>Present practice is considered adequate, i.e., MPAF provides garbage disposal facilities upon request, and no dumping of garbage is allowed into the harbor. The garbage is then burned at MPAF's incinerator on harbor premises. MPAF will provide garbage bins for the use of smaller vessels.</p>
	Pollution or other major accidents that need environmental emergency	MPAF will secure equipment for the containment and dispersal of oil spills, including flat bottomed aluminum boats with outboard motors,

Development Phase/Issues	Potential Environmental Impact	Mitigation Measures
	procedures	approximately 100 m of containment boom, oil dispersant, spraying equipment, surface skimmers, communication equipment, and training of related personnel. MPAF will prepare an emergency contingency plan.
Environmental enhancement measures	<p>Enhance environmental surveillance and monitoring of the port</p> <p>Public education</p>	<p>Ensure that the occupational health and safety section carry out 24 hour surveillance of port operations, and monitor compliance with environmental provisions of the port regulations. Undertake long-term water quality monitoring at the port area at specific locations at regular intervals covering turbidity, pathogenics, and heavy metals.</p> <p>MPAF will undertake public awareness programs to inform general public, especially children, of the value of the ocean and ports, and the role of the public in preserving the cleanliness and vitality of the marine environment.</p>
Policy adjustments	Water pollution in port area resulting from weak penalty on breaching of the port regulations 1990.	MPAF will adjust the port regulations by introducing a substantial increase in the fines as soon as the Port of Authority of Fiji Act and the Marine Act are enacted (by June 2002).

**ENVIRONMENTAL IMPACTS AND MITIGATION
ACTION DURING IMPLEMENTATION OF THE LAUTOKA PORT PROJECT COMPONENT**

Development Phase/Issues	Potential Environmental Impact	Mitigation Measures
Construction	<p>Environmental management plan (EMP)</p> <p>Loss of mangroves</p> <p>Change in current flow</p> <p>Noise</p>	<p>MPAF will (i) require supervising engineer to prepare and implement an EMP for construction and operation of the port and to mitigate any loss of customary fishing rights, land acquisition, and resettlement effects due to the borrow pits; and (ii) ensure that the contractor provides temporary toilet facilities on site.</p> <p>MPAF will cause contractor to replant mangrove seedlings from the reclamation area to near Tava Island.</p> <p>Wharf design will be appropriate design to minimize current effects.</p> <p>Reclamation design will ensure appropriate revetment to minimize current effects. Supervising engineer will ensure that construction is carried out during normal working hours, contractor fits silencers and acoustic hoods to plant, issues hearing protection to workers, and identifies noise-sensitive neighbors and agrees on mitigation measures.</p>
Port Operation	<p>Waste management</p> <p>Wharf traffic</p> <p>Water supply</p>	<p>Design will apply best engineering practices regarding storage facilities, containment bunds, piping, earthquake, and cyclone loads.</p> <p>MPAF will prepare and implement a wharf and port traffic management plan to optimize traffic flow, minimize impacts, and allow safe wharf traffic.</p> <p>MPAF will require that reclamation and wharf design are appropriate to avoid effects on water intake canal.</p>
Environmental Enhancement Measure	<p>Port environment</p> <p>Hazardous cargo and spills</p>	<p>MPAF's operational EMP for the Lautoka Port will include ship waste spills, port waste spills, and port area industry waste spills, and MPAF will review the EMP every five years.</p> <p>MPAF will prepare and implement a hazardous materials spill contingency plan.</p> <p>MPAF will (i) require oil and chemical companies to prepare and regularly review handling and storage procedures, (ii) provide training to port workers, and (iii) will ensure that sufficient spill response equipment is in the port area.</p>

SUMMARY INITIAL ENVIRONMENTAL EXAMINATION

A. Port of Suva Project Component

1. Introduction

1. The Suva Port is the country's largest port in terms of incoming and outgoing containers handled within its facility. The cargo operations at its King's Wharf are carried out by Port Terminal Services Limited (PTL). The Maritime and Ports Authority of Fiji (MPAF) is the landlord of the port facilities and administer policies and port regulations.

2. Construction of the current wharf was completed in 1963. The wharf has since undergone severe damage from collision. These and the severe tropical marine environment have contributed to the early deterioration of the wharf. The Suva Port is currently degenerating with (i) an aged wharf apron not able to handle the current cargo requirements, (ii) wharf structure and its land-fill below minimum seismic standards, and (iii) insufficient storage space. Life expectancy of the current structure has been estimated to 2005. MPAF rehabilitate the existing structure to increase its usable life, and strengthen the wharf to accommodate anticipated traffic.

3. No major changes are proposed in the port's operations. This initial environmental examination (IEE) screens the possible environmental impacts due to construction works associated with the proposed rehabilitation Project and investigates existing operational impacts.

2. Description of the Project

4. The rehabilitation work for King's Wharf is estimated to take 34 months and will entail (i) civil works for maintenance repairs including rebuilding sides of longitudinal beams facing the seabed, restoring fender panels and their supports, rebuilding the southwest corner of the wharf, and repairing all cracked piles and damaged bridge beams; (ii) civil works for establishing a minimum seismic standard including sheet piles and rock anchors; (iii) civil works for wharf deck strengthening including bridge beams, wharf edge beams, and wharf deck overlay; (iv) civil works for reorientation of the container yard including regrading of pavements, moving of light towers, removal of sheds 2 and 4, reinstatement of pavement in locations of sheds 2 and 4; and (v) civil works for ship-to-shore sewerage. The following main activities will be undertaken to rehabilitate King's Wharf: (i) jack-hammering and chipping off deteriorating concrete, (ii) spraying on additional concrete, (iii) demolishing and reconstructing sections of the wharf, and (iv) replacing and/or thickening the concrete deck slab. The concrete replacement work will involve one or a combination of (i) microconcreting, (ii) spray concreting, (iii) concrete grouting of preformed structural members, and (iv) total reconstruction for small sections.

5. The Project will allow visiting ships to connect to the Suva sewerage line and dispose of their sewage directly into the Suva sewerage reticulation system.

3. Description of the Environment

6. **Physical Resources.** At all seasons, the predominant winds are the trade winds from the east or southeast and are generally moderate. Average temperatures vary only 3°C to 4°C between the coldest part of the year (July-August) and the warmest (January-February). The average rainfall on Viti Levu in the drier period averages 1,000-2,000 millimeter (mm), and in the

wetter months, 1,800-2,600 mm. The marine surface current flows southwesterly through the islands. Tidal ranges are very small, neap tides having a mean range of 0.90 meters (m) and springs of 1.30 m. King's Wharf is within a second-generation seismic fault zone, a structural morphologic overprinting and parallel jointing of surfaces. The reactivation of the faults within the bedrock and slumping of the overlying sediments were partially responsible for the 1953 earthquake and tsunami. Several major earthquakes have been recorded, the most significant were in Kadavu (1850) and Taveuni (1979), with another eight registered since 1850. The 1953 Suva earthquake was the most destructive in Fiji's history.

7. **Ecological Resources.** The current estimate of mangrove areas in the Fiji Islands is approximately 45,000 hectares (ha) with about 6 percent converted to other uses. Reefs are associated with all the island groups. Many of the reef systems are extensive and complex, and include barrier, fringing, and platform reefs. Reefs at Suva bay entrance provide good shelter for the harbor. Some mangrove stands are along the coastal line near to the harbor. These are in good condition. Extensive mangroves are found across the bay. Due to distance, port operations do not adversely affect the mangrove stands. At the harbor, water showed no indication of oil sheen or spills. The manufacturing industry in the Walu Bay area adjacent to the harbor has a larger contributory impact on the marine ecosystem than operations at King's Wharf.

8. **Human Economic Development.** King's Wharf is at the northern end of the capital's central business district. The Customs Department and other shipping/supplies companies are near the port, as are the Suva bus station and the municipal markets. The area near the wharf is quite congested with traffic at peak hours. Residential areas next to the bus station and market are about 1 kilometer (km) from the wharf. At the northern end of the wharf is Walu Bay. Adjacent to Walu Bay is a dedicated industrial area. Further north of King's Wharf is the Lami rubbish dump, which is built up on the foreshore area and serves the Suva and Lami areas. The dump does not have leachate control systems or provision to protect the harbor waters from its pollutants. King's Wharf directly and indirectly provides employment for a large number of people. Any industry that imports and exports products from the Fiji Islands depends on King's Wharf or Lautoka Port.

4. Screening of Potential Environmental Impacts and Mitigation Measures

9. Potential environmental impacts were screened using the *Environmental Guidelines for Selected Infrastructure Projects of the Asian Development (ADB)*. The outcome was used to determine the scope of works associated with the construction and operation of the port. The screening process found no significant environmental impacts arising from the rehabilitation works of King's Wharf.

10. **Construction Work.** The construction phase will have localized impacts around the wharf, concrete removal, and concrete repair.

11. Concrete removal will create (i) concrete dust, (ii) spalls and debris, and (iii) noise. Jack-hammering will cause large- to medium-size pieces of concrete to fall into the sea under the wharf. Due to the minimal quantity of the falling concrete, and because the sea floor under the wharf consists of silts, the impact on the marine ecology will be minimal. Therefore, special mitigation measures will not be necessary. The quantity of dust from jack-hammering is not significant since the works will be done gradually. Most of the dust will float and/or be dissolved into the sea. The airborne dust will disperse relatively quickly. However, construction workers must wear protective eyewear and disposable dust protection mouth pieces during all

construction activities below the wharf deck. These requirements will be stipulated in the construction contract. Noise from jack-hammering of concrete will be too far away from any residential areas, offices, or other social facilities to be considered significant. The construction workers must use protective ear-muffs.

12. Concrete repair work will involve (i) total repair of certain sections, (ii) sprayed concrete work, (iii) micro concrete work, and (iv) grouting of performed concrete members. Environmental impacts could arise from leaking of concrete products into the sea water in large quantities if, for instance, a primary beam fails immediately following grouting. Similarly, in applying shotcreting techniques, inexperienced handlers could unintentionally spray unacceptable quantities of the concrete product into the sea. To reduce the likelihood for such problems, strict quality control and quality assurance measures must be incorporated the construction contract and all activities associated with the construction will be inspected regularly by an experienced supervising engineer. The quality assurance or quality control program should be audited by the engineer to the contract on a regular basis.

13. Reorientation of the container yard will involve removal of two sheds, paving the area of the two sheds, and moving a light tower and the power house. No additional land will be needed for this activity. Dismantling the sheds will not cause significant environmental impacts. Paving will involve concrete removal and repair, and will have no significant environmental impacts. Installing the ship-to-shore sewerage line will not cause significant environmental impacts as it is a relatively small-scale activity.

14. **Operational Phase.** Current cargo handling operations and the loading and unloading procedures of containers and cargo will change. The anticipated traffic growth will also require increased monitoring bilge water, ballast water, solid waste, and sewage disposal. To maintain and enhance the environmental quality of the port, MPAF will implement a clean port management policy during the project construction phase and operations through various measures.

15. Items that need attention include (i) oil spills/leakage within the harbor that spread to the sea; (ii) oil spills from tankers on their way to or from harbor; (iii) inadequate management of wastes from ships; (iv) escape of oils within the harbor; and (v) adverse effects on estuarine lagoons. Mitigation measures are suggested by the International Convention for the Prevention of Marine Pollution from Ships in 1973 (MARPOL 73/78). This was later modified by a Protocol in 1978. MARPOL 73/78 is a legal document that provides guidelines and regulations for the effective control of port operations to minimize pollution and maximize safety/standards. The Fiji Islands is a signatory to MARPOL 73.78. Certain requirements of MARPOL 73/78 are reflected in the Port Authority of Fiji Act and the Marine Act. The following sections discuss some of the provisions in MARPOL 73/78 that cover certain operational aspects and discuss ways in which significant environmental impacts can be mitigated during the operation of King's Wharf.

16. **Penalties.** The maximum fine that can be imposed on offenders of ports regulations under the Ports Regulations 1990 is F\$400, which is not an effective deterrent. The costs of environmental remedies can be considerably higher than the fine. Article 4 of MARPOL 73/78 states that penalties must be adequate in severity to deter violations of regulations. MPAF is revising the policy to increase the fines (maximum F\$50,000 to the owner/company, F\$10,000 to the captain, seizing the vessel, and prosecuting the offender). It is envisaged that revision of the legislation will be brought about by June 2002.

17. **Sewage Disposal.** Facilities for the disposal of sewage are not currently provided to all ships at King's Wharf. Shipping companies make their own arrangements for sewage disposal. MARPOL 73/78 states that the Ports Authority should provide facilities for sewage disposal. MARPOL 73/78 also sets out the requirements for the discharging of sewage at sea and the equipment that is required by ships of various sizes. To maintain the environmental quality of the port area and to comply with MARPOL requirements, the Project will provide a direct sewage pipeline from the ships to the sewage line at the wharf. The sewage line will be connected to the Suva sewerage system and subsequently to a waste water treatment plant. The present capacity of the sewage treatment plant is 60,000 people, and is planned to be upgraded. The total capacity after upgrading will be for 150,000 people. The Public Works Department indicated that additional sewage from the port could be easily accommodated by the treatment plant. Smaller local vessels deliver their sewage through mobile sewage collection vessel provided by the city council.

18. **Bilge Water.** Bilge and oily water at Suva Port is collected by a private company. MARPOL 73/78 specifies that nothing except clean and segregated ballast should be discharged within 50 nautical miles from land areas. The specific requirements for discharging bilge water vary from vessel to vessel, and depend on the ship type and the size. All ships will be required to be surveyed and maintain certification, and an oil record book at all times.

19. Most local ships will be under 400 gross tonnage. Under MARPOL 73/78, these vessels do not require surveys or certificates. However, they will be required to adhere to off-shore discharging criteria. For ships of this size, MARPOL 73/78 recommends that they (i) have approved oily-water separating or oil filter equipment; (ii) have a holding tank to retain oily mixtures and oil residues on board, and gutters around oil appliances; or (iii) where these alternatives are not practicable, have simple oily water separating equipment. A number of local ships and fishing vessels do not have any such systems. MPAF will set a phasing-in period during which boat operators can upgrade their vessels.

20. **Solid Waste Disposal.** Presently, MPAF provides garbage disposal facilities upon request. The garbage is then burned at the MPAF's incinerator. This service is mainly used by large ships. MPAF will provide garbage bins for the use of smaller vessels. This reduces the risk of rubbish being dumped into the harbor.

5. Institutional Requirements and Environmental Monitoring Programs

21. **Emergency Procedures.** The Occupational Health, Safety, and Tower Control Section of MPAF has a checklist of procedures and safety equipment required during bunkering and discharging of petroleum products. Currently, there are no set procedures nor any equipment for an environmental emergency such as a large oil spill. The Fiji-based petroleum companies (Shell Fiji Limited, B.P. South West Pacific Limited, and Mobil Oil Limited) have limited equipment to control small oil spills in the harbor. MPAF has an agreement with these companies to coordinate efforts if accidents happened. MPAF is also affiliated with the Pacific Ports Association. This association is working toward developing an understanding that every port in the Pacific region (including New Zealand and Australia) would come to the aid of another port in the event of an emergency if assistance is requested. Thus, well equipped assistance could be available from Australia and New Zealand. However, to enhance preparedness, MPAF will procure equipment for the containment and dispersal of oil spills. These comprise flat bottomed aluminum boats with outboard motors, approximately 100 m of containment boom, oil dispersant and spraying equipment, surface skimmers, and communication equipment. Environmental personnel will be trained, and the number of

personnel for environmental surveillance under the Occupational Health and Safety and Tower Control Section has been increased from 8 to 10 to enable 24-hour shifts. Initial discussion has been made with the port of Sydney, which will provide full support for such procurement and the need of training.

22. **Environmental Impacts of Other Activities.** Most of the water pollution at Suva Harbor area is a result of land-based point sources at the Walu Bay industrial area (21 industries). These companies were surveyed and some of them (especially the food processing industries) were found to have significant environmental impacts. A comprehensive monitoring program of the industries will be carried out by the Public Works Department. The monetary value of environmental fines will be increased to act as a deterrent as soon as the sustainable development bill is approved. Under the Ports Regulations 1990, MPAF is responsible for monitoring the environmental health of the coastal areas and ports. Similar action will be taken for the point source pollution from industries.

6. Findings and Recommendations

23. **Environmental Impacts.** Based on the screening and evaluation of environmental impacts, no significant environmental impacts were identified for the construction associated with the King's Wharf rehabilitation. The impacts will be limited (paras. 10-13). Environmental impacts during port operation can be mitigated by the proper implementation of revised Port Regulations and MARPOL 73/78. Therefore, a detailed environmental impact assessment study is not warranted.

24. **Monitoring.** Monitoring of the water quality will be undertaken during the construction and operational phase of the Project. Through coordination by the concerned agency, e.g., Department of Environment, this monitoring program can be extended to a larger area of the wharf to monitor outflow of point sources pollution from Walu Bay industrial area. The forthcoming environment and sustainable development bill would provide an effective mechanism to mitigate pollution in the Suva Harbor area.

25. **Emergency Procedures and Monitoring.** An action plan will be incorporated into the Ports Regulations, which outlines the monitoring procedures in the event of an emergency. Liaison with other Pacific ports will be carried out to determine the scope of assistance and procedures that would have to be undertaken to receive emergency services.

26. **Policy Requirements.** MARPOL 73/78 has been adopted in the present Port Regulation, 1990. The level of penalties will be adjusted from the current F\$400 maximum fine to a level that will deter pollution and will pay for all costs associated with environmental remedies in the event of a pollution incidence.

27. **Enforcement.** MPAF can utilize the Sustainable Development Act and a stringent water quality monitoring program to enforce its Ports Regulations, 1990 (or subsequent update legislation) on point of source pollutants along the Suva foreshore including the industrial area of Walu Bay.

7. Conclusion

28. This IEE concludes that significant environmental impacts are unlikely to result from the proposed King's Wharf rehabilitation. Potential environmental impacts during construction will be within acceptable levels. Nonetheless, mitigation measures have been prepared and workers' safety will be enforced. Potential environmental impacts during port operations have been identified and to enhance the effectiveness of the mitigation, mitigation measures in Appendix 12 will be implemented. Therefore, the potential adverse environmental impacts of the Project during construction and the port operations thus can be mitigated to acceptable levels. This IEE concludes that a detailed EIA is not warranted.

B. Lautoka Project Component

1. Introduction

29. Lautoka Port is strategic to the Fiji Islands' economy as an alternative to the main port in Suva. Lautoka Port is on the northwestern side of the Fiji Islands' largest island, Viti Levu, approximately 1 km from the center of Lautoka town. The port is Fiji Islands' second largest port, principally catering to the bulk export of raw and semiprocessed wood chips and sugar. Because a 20-fold increase is projected by 2003 of containerized exports, primarily bottled water and fodder, the port facilities must be expanded.¹

2. Description of the Project

30. MPAF has commissioned a number of engineering and economic investigations assessing options to cater for the projected demand on port facilities. The investigations recommend

- (i) remedial and rehabilitation works on Queen's Wharf to improve its ability to accommodate cargo-handling traffic;
- (ii) construction of an access bridge (34x12 m) between the southern reclamation and Queen's Wharf to facilitate cargo movements to and from storage areas;
- (iii) construction of an extension (150x48 m) to Queen's Wharf to cater for cargo vessels and international and local cruise vessels; and
- (iv) reclamation of 5.7 ha east of Queen's Wharf, primarily for container storage and industrial and commercial development, and including a new road and a recreational reserve.

3. Description of the Environment

31. **Physical Resources.** Lautoka Port is on the northwest side of Viti Levu. Its tropical maritime climate receives light to moderate winds, mainly local sea breezes, temperatures of 18°C-32°C, and a relatively low rainfall of 2,000 mm/year. The rainy season is November to April. In this period, the area is exposed to cyclones. The Port has a moderate tidal range of 0.9-1.5 m. The port is on the open coast, where tidal currents are minor. Under ambient conditions, the port is protected from ocean swells from the southwest by the outer barrier reef and the Yasawa Island chain. The in-shore water quality is degraded by pollution from industries a few meters east of the area for reclamation. The combined effects of the good tidal flushing and strong deepwater currents in the channels have, however, helped maintain relatively clean waters around the port. The Lautoka area sediments are basaltic and sand-size volcanic

¹ *Lautoka Port Development : Review of Master Planning*, 2001, Sinclair Knight Merz.

agglomerates and volcanogenic sediments. In places, muds, sands, and shells have deposited over the Ba Group bedrock including around Queen's Wharf. This is overlain by recently deposited, very soft, marine silty clays and sands. In the deeper water, the upper 1-2 m of recent sediments are coarse to silty sand. The bedrock at the project site is sandstone including soapstone, basaltic sandstone, volcanic sandstone, and altered rock. The tidal flats are edged with a border of rocks moved onshore during cyclone.

32. The major ecosystem at the reclamation site is the foreshore area covered by 1-2 m of water at high tide, but exposed during low tide. The area is ecologically depleted. The impoverished intertidal flats and the foreshore are exposed to pollution from adjacent industries and overexploitation by the local people. Several mangrove trees can be seen from the substrate, but appear to be covered in mud, and may not survive. The dominant fauna is the fiddler crab, *Uca sp.* Benthic fauna is also impoverished as a result of cumulative effects of pollution from the land-based industry. Polychaete worms often associated with anoxic conditions dominated the benthic fauna of the area. The small area of mangroves at the northeastern corner of the area to be reclaimed comprises 20-30 trees. Because the area is small and trees are fairly short, fauna is not abundant or diverse. The biological breakdown of organic wastes from the industries and residential areas close to shore releases high levels of biological oxygen demand material and nutrients into the water. The relatively clean waters offshore indicate the effective dilution and dispersion of these pollutants, as well as the filtering capability of the mangroves around Tava Island. Local residents sometimes use this area for line fishing at high tide. MPAF has compensated for the loss of fishing by the residents as a result of the Project.

33. The Sabeto River and its terrain have been previously used as borrow sources and are the proposed borrow site for the Project. The landscape surrounding the river is dominated by steep hills with forested summits, with some massive cliff faces. Beneath these, the landform is broken and steep, deeply indented by numerous small streams that merge into larger creeks and then form the Sabeto River. The river mouth has dense mangrove stands. The river valley has large areas under sugarcane cultivation. The riverbanks and valley gullies are graced by large overhanging rain trees with secondary regrowth of herbs and shrubs forming the undergrowth.

34. **Human Environment.** Lautoka's urban area has a population of 36,083. The land in Lautoka City is occupied by industry and manufacturing in the west of the port areas and, to a lesser extent, to the north of the city; the civic center with retail and government services is in the north, and residential areas are in the eastern areas. Port activity is long established and, with the sugar industry, has been the main factor influencing land uses. Industrial and agricultural activities and employment rely on the port for export and are generally compatible with the activities occurring at the port.

4. Screening of Potential Environmental Impacts and Mitigation Measures

35. Potential environmental impacts were screened using ADB's *Environmental Guidelines for Selected Infrastructure Projects*. The outcome of the screening process was used to determine the mitigation action to be associated with the construction and operation of the port. The screening process found that no significant environmental impacts will arise from the rehabilitation of Lautoka Port.

36. **Construction Phase.** The construction is unlikely to cause environmental impacts, but slight impacts that may arise must be mitigated. The environmental management plan (EMP)

will include a schedule of detailed activities to implement mitigation measures including monitoring. Most potential environmental effects from construction, including water quality, traffic, and dust, can be mitigated by sound construction practices and management and monitoring. The EMP for construction will be implemented by the contractor as a contract requirement, and be monitored by MPAF supported by the project management consultants.

37. The extension of the Queens Wharf by 150 m northward is not expected to cause significant ecological impact because no coral reefs are in the affected area. The location of the access-bridge rules out any significant environmental impact. Because the affected area is within the existing port area, no new threats to the environment or marine ecosystems will arise. The sites of the wharf extension and the access bridge are not accessible for fishing due to the port activities. The reclamation will have impacts on the ecology, except for the destruction of a small stand of mangroves on the northeastern corner of the area to be reclaimed. If these mangroves are destroyed, MPAF will require the contractor to replant mangrove seedlings in nearby areas to compensate for the loss.

38. **Operational Phase.** The potential environmental and social effects of the Project can be mitigated by appropriate operational procedures. Procedures to satisfactorily mitigate the effects will be identified. MPAF will prepare practical operational plans for the management of the port and port access traffic, and a hazardous materials spill contingency plan. MPAF will also require oil and chemical companies to review their handling, storage, and emergency procedures regularly, to provide training to their workers and any MPAF workers involved in oil and chemical handling, and to ensure that the companies have sufficient spill response equipment at the port. These procedures will be documented and reviewed regularly, and their implementation via training and workplace practice monitored by MPAF. The EMP is a key benefit of the Project.

5. Findings and Recommendations

39. No significant environmental impacts are expected during the construction work at Lautoka Port. All identified impacts are minor and can be satisfactorily mitigated. Therefore, a detailed environmental impact assessment study is not warranted.

40. MPAF will prepare an EMP and establish practical procedures to mitigate impacts of increased port operations. The Project-related mitigation measures could improve current conditions at the port and the EMP will mitigate effects of the proposed expansion.

6. Conclusion

41. Significant environmental impacts are unlikely to occur as a result of the proposed Lautoka Port activities. The impacts that do occur can be mitigated (paras. 36-37). The Lautoka Port mitigating procedures is in Appendix 12.

7. Institutional Requirements and Environmental Monitoring Program

a. Institutional Aspects

42. The Department of Environment of the Ministry of Local Government, Housing and Environment is currently reviewing the Sustainable Development bill of 1999. The draft bill is expected to receive Parliament's consideration during 2002. The draft bill covers environment impact assessment and management of development projects, and provision for controlling,

regulating, and policing the release of wastes from industry. Once the bill is approved by Parliament, enforcement of the environmental requirement is legally binding. The Department of Environment will be the coordinating body in cross-sectoral environmental issues.

43. MPAF's Occupational Health, Safety, and Tower Control Section is responsible for surveillance of the port operations, including monitoring discharges from ships at the wharf and carrying out other environmental checks on operations at the ports. Fire and emergency drills and safety training is carried out by the Occupational Health, Safety, and Tower Control Section. To enhance surveillance of the port operation and to ensure the implementation of Clean Port Management Policy, MPAF, has employed 2 additional personnel giving it a total of 10. Thus, 12-hour shifts with 2 people per shift have been put in place, and the section can undertake 24 hour surveillance. This has enhanced the capacity of the section to police and monitor port operations.

8. Environmental Monitoring

44. Monitoring will ensure that environmental impacts of the Project will be minimized. The two major monitoring phases are during construction and during operation of the port, and are considered within MPAF's capability.

45. **Construction.** No major environmental impacts are expected from construction. Workers will use protective eyewear, disposable dust protection mouth pieces, and ear-muffs and an experienced supervising engineer will carry out strict, regular inspections of all activities associated with the construction works. A monitoring program on water quality will be undertaken under the EMP prior to and during construction. The results of these tests can then be compared with similar tests, undertaken at fixed intervals (as determined by the water quality engineer) during construction. If water quality tests show that acceptable limits have been breached, construction will be halted to allow the particulates to disperse.

46. **Operation.** Continued environmental surveillance during port operation under the control of Pollution of the Port Regulations, 1990 (or forthcoming updated Regulation) will include (i) sewage discharge; (ii) garbage disposal; (iii) ballast water disposal; (iv) disposal of oily, galley, bathroom, and laundry wastes; (v) contaminated tank washings or cargo washings; (vi) disposal of bilge water containing oil; (vii) ship accidents; (viii) accidental release of undesirable substances; (ix) discharge of refuse; and (x) disposal of putrefying or objectionable matter (rubbish, corrosive substances, and dead plants and animals). Water quality will be monitored regularly to determine the long-term impact of port operations on the marine environment (especially on turbidity, pathogenics, and heavy metals).

9. Education

47. MPAF will engage in public awareness and education programs. These programs will inform the general public, especially children, of the value of the ocean and ports, and educate them on the role the public can play in preserving the cleanliness and vitality of the marine environment.

SUVA PORT THROUGHPUT
(tons)

Description	Actual				AAGR 1994- 1997	Base Year					Forecast								
	1994	1995	1996	1997		1998	1999	2000	2001		2002	2003	2004	2005	2006	2007	2008	2011	2012
EXPORTS																			
General Cargo																			
Conventional	13,672	18,219	18,857	18,403	9%	19,990	20,550	21,125	21,717	22,325	22,950	23,593	24,253	24,932	25,630	26,348	28,624	29,425	31,967
Palletized	986	748	547	1,021	-7%	946	972	999	1,027	1,056	1,086	1,116	1,147	1,179	1,212	1,246	1,354	1,392	1,512
Bagged Cargo	448	672	284	766	-13%	663	682	701	720	740	761	782	804	827	850	874	949	976	1,060
Container-LCL	6,715	6,454	3,054	2,725	-42%	1,567	1,611	1,656	1,703	1,750	1,799	1,850	1,902	1,955	2,010	2,066	2,244	2,307	2,506
Transshipment	18,467	29,675	30,318	42,137	23%	51,679	53,127	54,614	56,143	57,715	59,331	60,993	62,700	64,456	66,261	68,116	73,999	76,071	82,642
Motor Vehicle	877	558	992	122	-242%	-173	-178	-183	-188	-194	-199	-205	-210	-216	-222	-229	-248	-255	-277
Sawn Timber	6,799	797	269	224	-323%	-500	-514	-528	-543	-558	-574	-590	-606	-623	-641	-659	-716	-736	-799
Container-FCL	135,070	132,285	147,614	202,783	12%	226,769	233,118	239,646	246,356	253,254	260,345	267,635	275,128	282,832	290,751	298,892	324,709	333,801	362,632
Empty Containers	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Logs	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total General Cargo	183,034	189,408	201,935	268,181	11%	300,941	309,368	318,030	326,935	336,089	345,499	355,173	365,118	375,342	385,851	396,655	430,916	442,981	481,243
Dry Bulk																			
Total Dry Bulk Tons	0	0	759	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Stevedored Tons	183,034	189,408	202,694	268,181	11%	300,941	309,368	318,030	326,935	336,089	345,499	355,173	365,118	375,342	385,851	396,655	430,916	442,981	481,243
Liquid Bulk																			
Total Liquid Bulk	0	8,249	32,964	38,635	63%	63,059	64,825	66,640	68,506	70,424	72,396	74,423	76,507	78,649	80,851	83,115	90,294	92,822	100,840
Total Foreign Tons	183,034	197,657	235,658	306,816	16%	364,001	374,193	384,670	395,441	406,513	417,895	429,596	441,625	453,991	466,702	479,770	521,210	535,804	582,083
Local Tons																			
Copra	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fish	2,093	5,005	3,432	2,147	-16%	1,807	1,858	1,910	1,963	2,018	2,075	2,133	2,192	2,254	2,317	2,382	2,587	2,660	2,890
Mineral Oil	0	28,085	17,522	21,265	19%	25,328	26,037	26,766	27,516	28,286	29,078	29,892	30,729	31,590	32,474	33,383	36,267	37,282	40,502
Sawn Timber	0	34,770	26	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Logs	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fertilizers	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Others	0	56,926	48,189	37,820	18%	44,685	45,936	47,222	48,544	49,903	51,301	52,737	54,214	55,732	57,292	58,897	63,984	65,775	71,456
Total Local Tons	2,093	124,786	69,169	61,232	2%	71,820	73,830	75,898	78,023	80,208	82,453	84,762	87,135	89,575	92,083	94,662	102,838	105,717	114,849
Total Revenue Tons	185,127	322,443	304,827	368,048	18%	435,820	448,023	460,568	473,464	486,721	500,349	514,359	528,761	543,566	558,786	574,432	624,048	641,521	696,932
Number of Containers																			
FCL	6,266	5,733	6,174	7,401	5%	7,757	7,974	8,197	8,427	8,663	8,905	9,155	9,411	9,675	9,945	10,224	11,107	11,418	12,404
LCL	576	469	263	230	-38%	141	145	149	154	158	162	167	172	176	181	186	203	208	226
Empty	7,836	8,667	8,433	10,352	8%	11,227	11,541	11,864	12,196	12,538	12,889	13,250	13,621	14,002	14,394	14,797	16,076	16,526	17,953
Transshipment	0	1,111	1,472	1,302	37%	1,786	1,836	1,887	1,940	1,994	2,050	2,108	2,167	2,227	2,290	2,354	2,557	2,629	2,856
Total Containers	14,678	15,980	16,342	19,285	9%	20,911	21,496	22,098	22,717	23,353	24,007	24,679	25,370	26,081	26,811	27,562	29,942	30,780	33,439
IMPORTS																			
General Cargo																			
Conventional	22,787	44,283	43,787	42,988	15%	49,515	50,902	52,327	53,792	55,298	56,846	58,438	60,074	61,757	63,486	65,263	70,900	72,886	79,181
Palletized	7,677	5,835	3,531	4,378	-26%	3,247	3,338	3,432	3,528	3,627	3,728	3,833	3,940	4,050	4,164	4,280	4,650	4,780	5,193
Bagged Cargo	8,850	3,804	141	208	-899%	-1,663	-1,709	-1,757	-1,806	-1,857	-1,909	-1,962	-2,017	-2,074	-2,132	-2,192	-2,381	-2,448	-2,659
Container-LCL	26,241	25,896	13,113	12,933	-33%	8,613	8,854	9,102	9,357	9,619	9,888	10,165	10,450	10,742	11,043	11,352	12,333	12,678	13,773
Transshipment	45,259	18,758	5,912	5,037	-125%	-1,275	-1,311	-1,347	-1,385	-1,424	-1,464	-1,505	-1,547	-1,590	-1,635	-1,680	-1,826	-1,877	-2,039
Motor Vehicle	36,760	35,309	27,154	42,532	1%	42,818	44,016	45,249	46,516	47,818	49,157	50,534	51,949	53,403	54,898	56,436	61,310	63,027	68,471
Sawn Timber	11,495	9,947	8,790	8,211	-12%	7,232	7,434	7,642	7,856	8,076	8,303	8,535	8,774	9,020	9,272	9,532	10,355	10,645	11,565
Container-FCL	344,838	344,097	417,021	557,779	14%	636,811	654,641	672,971	691,815	711,185	731,099	751,569	772,613	794,246	816,485	839,347	911,845	937,376	1,018,341
Empty Containers	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Logs	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total General Cargo	503,907	487,929	519,449	674,066	9%	745,298	766,166	787,619	809,672	832,343	855,649	879,607	904,236	929,554	955,582	982,338	1,067,187	1,097,068	1,191,826

Description	Actual										Forecast									
	1994	1995	1996	1997	1997	1998	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2011	2012	2015
Dry Bulk																				
Coal	30,570	25,599	20,645	12,053	-38%	7,445	7,653	7,867	8,088	8,314	8,547	8,786	9,032	9,285	9,545	9,813	10,660	10,959	11,905	
Gypsum	0	13,537	6,000	4,500	-20%	3,616	3,717	3,821	3,928	4,038	4,151	4,267	4,387	4,510	4,636	4,766	5,177	5,322	5,782	
Grain	83,923	74,306	77,199	84,848	0%	84,797	87,171	89,612	92,121	94,701	97,352	100,078	102,880	105,761	108,722	111,767	121,420	124,820	136,601	
Clinker	0	0	4,000	7,000	0	7,000	7,196	7,397	7,605	7,818	8,036	8,261	8,493	8,731	8,975	9,226	10,023	10,304	11,194	
Fertilizer	5,881	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Dry Bulk Tons	120,374	113,442	107,844	108,401	-4%	104,503	107,429	110,437	113,529	116,708	119,976	123,335	126,789	130,339	133,988	137,740	149,637	153,827	167,114	
Total Stevedored Ton	624,281	601,371	627,293	782,467	7%	849,801	873,595	898,056	923,202	949,051	975,625	1,002,942	1,031,025	1,059,893	1,089,570	1,120,078	1,216,824	1,250,895	1,358,940	
Liquid Bulk																				
Molasses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mineral Oil	127,844	152,268	192,186	151,916	3%	157,133	161,533	166,056	170,705	175,485	180,399	185,450	190,642	195,980	201,468	207,109	224,998	231,298	251,276	
Soya Bean Oil	2,815	2,904	3,000	3,925	10%	4,315	4,436	4,560	4,688	4,819	4,954	5,093	5,236	5,382	5,533	5,688	6,179	6,352	6,901	
Tallow/Caustic Soda	0	3,041	2,097	1,401	2%	1,426	1,466	1,507	1,549	1,592	1,637	1,683	1,730	1,778	1,828	1,879	2,042	2,099	2,280	
Others	2,175	0	3,622	3,835	0	3,835	3,942	4,053	4,166	4,283	4,403	4,526	4,653	4,783	4,917	5,055	5,491	5,645	6,133	
Total Liquid Bulk	132,834	158,213	200,905	161,077	4%	167,823	172,522	177,353	182,319	187,424	192,672	198,067	203,612	209,314	215,174	221,199	240,305	247,034	268,371	
Cargo not Stevedored	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Foreign Tons	757,115	759,584	828,198	943,544	7%	1,017,624	1,046,118	1,075,409	1,105,521	1,136,475	1,166,296	1,201,009	1,234,637	1,269,207	1,304,745	1,341,277	1,457,129	1,497,928	1,627,310	
Local Tons																				
Copra	0	0	479	37	37	37	38	39	40	41	42	44	45	46	47	49	53	54	59	
Fish	5,832	8,680	5,407	4,321	-18%	3,560	3,659	3,762	3,867	3,975	4,087	4,201	4,319	4,440	4,564	4,692	5,097	5,240	5,692	
Mineral Oil	0	13,370	15,681	8,849	13%	9,956	10,235	10,521	10,816	11,119	11,430	11,750	12,079	12,417	12,765	13,123	14,256	14,655	15,921	
Sawn Timber	0	7,250	3,066	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Logs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Fertilizers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Others	60,170	37,936	15,255	12,386	-77%	2,871	2,952	3,034	3,119	3,207	3,297	3,389	3,484	3,581	3,682	3,785	4,112	4,227	4,592	
Total Local Tons	66,002	67,236	39,888	25,593	-41%	16,424	16,884	17,357	17,843	18,342	18,856	19,384	19,927	20,485	21,058	21,648	23,518	24,176	26,264	
Total Revenue Tons	823,117	826,820	868,086	969,137	5%	1,034,048	1,063,002	1,092,766	1,123,363	1,154,817	1,187,152	1,220,393	1,254,564	1,289,691	1,325,803	1,362,925	1,480,646	1,522,105	1,663,575	
Number of Containers																				
FCL	15,072	14,355	16,101	20,141	9%	21,880	22,493	23,123	23,770	24,436	25,120	25,823	26,546	27,290	28,054	28,839	31,330	32,208	34,989	
LCL	1,746	1,314	723	695	-40%	420	432	444	456	469	482	496	510	524	539	554	602	618	672	
Empty	1,507	1,822	1,382	1,291	-7%	1,198	1,232	1,266	1,302	1,338	1,375	1,414	1,454	1,494	1,536	1,579	1,715	1,764	1,916	
Transhipment	0	764	206	101	-92%	8	9	9	9	9	10	10	10	11	11	11	12	12	14	
Total Containers	18,325	18,255	18,412	22,228	6%	23,507	24,165	24,842	25,537	26,252	26,988	27,743	28,520	29,319	30,139	30,983	33,660	34,602	37,591	
Growth Rate:	0	0	0	0	3%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total Containers	33,003	34,235	34,754	41,513	7%	44,418	45,662	46,940	48,254	49,606	50,995	52,422	53,890	55,399	56,950	58,545	63,602	65,382	71,030	
Total Revenue Tons	1,008,244	1,149,263	1,172,913	1,337,165	9%	1,469,869	1,511,025	1,553,334	1,596,827	1,641,538	1,687,501	1,734,751	1,783,324	1,833,257	1,884,588	1,937,357	2,104,694	2,163,626	2,350,506	

AAGR=average annual growth rate, FCL=full container load, LCL=less than a container load.

Note: 1999 data.

Source: Maritime and Ports Authority of Fiji

FINANCIAL AND ECONOMIC ANALYSES

A. Least Cost Analysis

1. Alternative designs were considered for each project component: (i) the wharf rehabilitation, seismic strengthening, and capacity improvements for King's Wharf, Suva; and (ii) Queen's Wharf, Lautoka extension and reclamation. These were contrasted with capacity, cost, demand forecast, and ship service time considerations. Least cost technical solutions have been identified by comparing costs and benefits of mutually exclusive project options.

B. Rationale

2. **King's Wharf Component.** The rationale for the component arises from the least cost analysis. Under the master plan, relocation of Suva Port was proposed to a site 5 kilometers (km) from its current location by 2005. The construction was to commence in 2000 and permit transfer of port and cargo operations to the new facility by 2005. The current facility will sustain the current cargo throughput until 2005 with the support of additional recurrent maintenance. Beyond this date, the wharf will require increasing maintenance and expenditure. The commissioning of the new facility was to correspond with the end of the structural life of the current facility. The relocation was estimated to cost F\$120 million in 1997. However, a geotechnical study conducted in 1998 concluded that due to the extent of the required reclamation and the quality of the submarine soils, the cost estimates would nearly double. This estimate was prepared for the least cost option for the port relocation, namely the dredge option. The scope includes (i) dredging the reclamation area, (ii) bunding and installing rock armors, (iii) bunding the core material, (iv) bunding the core material to quarried rock, (v) paving, and (vi) reinstating all buildings and access roads.

3. In light of the increased and currently unaffordable costs of relocating the port, the Maritime and Ports Authority of Fiji (MPAF) sought to attain the greatest use of its existing Suva Port facilities. A program of deferred maintenance, repair, rehabilitation, and seismic strengthening was prepared to extend the life of King's Wharf by 15 years, to 2020. The proposed rehabilitation, together with the container handling and yard performance improvements, will enable King's Wharf to handle the anticipated throughput to 2020.

4. The selected seismic strengthening option was furthermore contrasted with a full seismic upgrade of the King's Wharf complex covering the Walu Bay berth and the three berths of King's Wharf. While the seismic strengthening needs to be adequately extensive to protect the reclamation, the container yard, and berths used most frequently, costs of a full seismic upgrade were estimated at F\$42 million. The least cost seismic rehabilitation option of the northern section of Kings Wharf has been adopted for the Project.

5. To improve cargo handling operations, complementary institutional changes are required to the physical improvements including opening of cargo handling at both Suva and Lautoka ports to private sector competition. At present, vessel operators apply a surcharge of F\$150 per container to freight rates into and out of the Fiji Islands to compensate for delays in vessel turnaround time caused by the slow rates of cargo handling. Together with the physical improvements to the wharf under the Project, increase in competition is expected to improve cargo handling performance, which is expected to be passed on to shippers through elimination of this surcharge.

6. **Lautoka Port Component.** The rationale for the Lautoka Port component is a least cost solution to provide adequate length for concurrent berthing of dry bulk cargo vessels and large container vessels. As presently constructed, when a bulk sugar or wood chip carrier occupies the southern Fiji Sugar Corporation berth it also occupies part of the west berth of Queen's Wharf, and

an incoming container vessel might then have to wait, or the bulk vessel will have to be temporarily shifted. The new facility will provide unobstructed berthage for one large (250 m) or two small (120 m) vessels on the west berth of Queen's Wharf, and an additional shallower draft berth on east berth of Queen's Wharf.

7. Significant new trade through Lautoka is the export of bottled water to north America. This industry was established in 1996, and is rapidly expanding through a modern bottling plant at Rakiraki, north Viti Levu. The firm is implementing its plans to double production by early 2002, and could double again in subsequent years. Its business is well capitalized and has already developed a substantial market through diversified distributors in the United States and an effective advertising campaign. The export water is presently transported by road from the plant to Suva, which is both costly and unacceptable on environmental and social grounds due to the limited capacity of Queen's Road and the numerous villages and towns along the route. The production rate of the firm will result in a container truck every 8 minutes along the primary road link between Rakiraki, Lautoka, and Suva. The impact of heavy axle loads are damaging the road system, and the Land Transport Authority is reducing axle load limits to 16.8 tons from the current load of 24 tons. The new regulations will have cost implications for carriers and inland road transport. Construction of the wharf extension will allow this trade to be shipped directly from Lautoka Wharf eliminating at least 220 km of inland transport. Transport to Lautoka would be by road or barge. Port storage and wharf requirements and MPAF's revenues would be unaffected in either case.

8. A number of other export trades based in northern Viti Levu are at a planning or trial shipment stage including container shipment of compacted fodder (animal feed) crops to the Middle East, and other possibilities such as foodstuffs and building products. The market competitiveness of these products will depend on delivered (cargo, insurance, freight) price, which makes the distance to a suitable export port and efficient port handling critical in determining viability of these new economic and trading activities. Once established, the port extensions will encourage the establishment of such export industries and reduce the costs of imported goods.

C. Financial Analysis

9. A separate financial and economic analysis has been carried out for each project component. The financial analysis is summarized in Table A15.1.

10. **Suva Port.** The financial analysis for King's Wharf is based on with- and without-project comparison. The analysis considers the relevant incremental costs of civil works and maintenance. The financial calculations are based on 2001 constant prices including taxes, duties, and physical contingencies. They exclude price contingencies and financing costs. The cost estimates are prepared using conservative standards. In particular, for the seismic analysis, high cost estimates are used to sensitize these to the changes that may arise from the detailed designs. The costs of direct operation and maintenance of King's Wharf are adopted from the financial forecast of MPAF. The with-project case reflects no incremental maintenance during construction. Under the without-project case, the port operator is maintaining the facility to meet the current and anticipated loads until 2005, with the maintenance effort necessarily consuming increasing resources due to the deteriorating condition of the wharf. A physical contingency of 10 percent has been used for each physical project component, except the container yard reorganization, which have received physical contingencies of 5 percent. A 15 percent physical contingency has been calculated for the consulting services.

11. Under the with- and without-project comparison, the revenues include ship revenues calculated with the current tariff at current values. A growth of traffic volume is assumed in accordance with the low growth case of 2.3 percent per annum. Without the project, traffic growth will

be affected by reducing serviceability of the wharf structure, and a lower rate of 1.0 percent is assumed until 2005, then static growth and eventually slow decline as the wharf reaches the end of its operable life. This decline is due to the increasing costs of shipping through King's Wharf arising from increasing limitations on wharf loading and the possible need to restrict the working berth length and have areas periodically shut off for repair work. The increasing inefficiency and costs of sea transport make export goods less competitive and imported goods more expensive, dampening national economic growth and overall transport demand, and increasing a tendency for shipping companies to avoid Suva where possible. With the project physical improvements and accompanying freeing up of competition, the port will be able to improve ship turnaround time, reduce costs, and allow the growth target of 2.3 percent to be met.

12. Without the project there is an annual risk of earthquake damage costs to the wharf of F\$0.22 million (tables A15.2 and A15.3) which would have to be met by MPAF and which would be averted with the Project. This is shown as a cost to MPAF in the without-project case, the annual cost being the probability of occurrence multiplied by the cost of repairs.

13. A financial net present value is a measure of financial benefit accruing to MPAF at the discount rate of 12 percent. The financial internal rate of return equalizes the present values of cost and benefit streams. It is estimated to be 22.3 percent for the Project, with F\$17.7 million net present value for 12 percent discount rate.

14. **Lautoka Port.** The financial analysis for Lautoka Wharf extension (Table A15.4) and the container yard reclamation is also based on a with- and without-project comparison. Without the Project, the newly developing export trade in bottled water is expected to continue to be shipped by road to Suva, bearing high inland transport costs, and the future expansion of this trade would be constrained as a result. The export of animal feed (compacted Rhodes grass and cane leaves) would be compromised by the failure to provide adequate facilities at Lautoka, and this trade is assumed not to proceed in the without-project case. Other generated traffic would not occur, and there would be no transfer between road transport of inward freight from Suva Port to Lautoka Port as volumes would be insufficient to induce ship calls. With the Project, the base case assumes that the new trades would develop as projected by their stakeholders.

15. Under the base projection, container cargo exports through Lautoka would increase by 10,000 twenty-foot equivalent units (TEU) in 2003 on the opening of the new wharf, exceed 65,000 TEU in 2010, when the trade is fully developed as projected by the industry stakeholders. The container projections are based on continuation of an existing trade of 4,300 TEU per year, bottled water trade rising to export 17,500 TEU per year on a fortnightly liner service, fodder crops rising to 40,000 TEU per year on a weekly charter service, other new trades contributing 2,000 TEU per year, and 2,600 TEU per year transferring from Suva. There would also be empty container imports to balance the export traffic, although the growth in the transport of these would be less than exports as the Fiji Islands has a surplus of empty containers due to the existing trade flows.

16. With the Project, it is assumed that new trades will develop as projected by their stakeholders. The Project is estimated to achieve a financial internal rate of return of 16.5 percent with a F\$8.1 million net present value at 12 percent discount rate.

D. Economic Analysis

17. Correspondingly, the economic internal rate of return equalizes the present values of economic costs and benefits that accrue to the national economy. An economic net present value of the Project reflects return in excess of the discount rate of 12 percent. Economic values for costs and benefits are obtained by extracting taxes and duties, and by applying a conversion factor to

labor, local materials, and locally produced benefits to reflect their value in external terms. Local components are adjusted to their border values using a standard conversion factor of 0.986 and a labor conversion factor of 0.86 calculated for the Fiji Islands. The conversion factors are applied to the maintenance costs, as local materials and labor will be used for to carry out works. The economic analyses for each project component are calculated separately based on with- and without-project comparisons.

18. **Suva Port.** For King's Wharf, the economic benefits (Table A15.5) comprise returns to cargo shippers of cargo in the form of savings in handling charges. At present a F\$150 surcharge per TEU is added to the normal freight rate to recover costs to vessel operators from cargo handling inefficiencies. The seismic strengthening confers a benefit from the averted damage cost should an earthquake occur, expressed as the expected value of damage multiplied by the annual probability of occurrence. For King's Wharf, an economic internal rate of return of 15.8 percent has been obtained with a net present value of F\$5.0 million for a discount rate of 12 percent.

19. An additional separate economic analysis has been prepared to estimate the real costs of earthquake damage if an earthquake occurred the year after construction is completed. Project benefit-cost ratios are calculated for each earthquake intensity measured by ground acceleration on the basis of a probability of 1.00. Replacement of the facility is assessed at F\$62 million based on MPAF's asset revaluation.¹ Probabilities of an earthquake at various intensities were determined based on the MPAF's geotechnical study² and data obtained from the South Pacific Applied Geoscience Commission. The damage ratio before mitigation and after mitigation is the cost of damage divided by replacement cost. Damage ratios were assigned to each level of earthquake intensity. For each earthquake level, the benefits of mitigation are calculated and divided by the cost of the seismic strengthening component, estimated in economic terms at F\$7.2 million. The results show that the strengthening is rational and that the chosen strengthening option is the most cost effective.

20. **Lautoka Port.** Economic benefits of the Lautoka Port component (Table A15.6) arise from the (i) reduction in transport costs of the existing cargo traffic through the port instead of through the road system, (ii) cost savings to existing container traffic through improved cargo handling efficiency, and (iii) savings to the new cargo loads made viable by the new logistics systems provided by the additional Lautoka Port facilities.

21. Transport cost savings include efficiencies in port cargo handling, reduced ship delay, and reduced internal transport costs where maritime transport substitutes for land transport connection to maritime transport. Ship delay savings accrue to the shipping operator, and are only partially returned to the Fiji economy. For locally owned shipping companies and single commodity charters, the contract between shipper and shipping company would be expected to take advantage of the transport cost savings.

22. Savings also accrue from the vehicle operating cost savings and reduced road deterioration, which have been estimated through axle loads applied to the road system by the incremental traffic expected to transfer to direct shipping of containers from Lautoka to destination ports without transit to Suva by road.

23. An economic internal rate of return of 17.6 percent has been obtained, and a net profit value of F\$9.8 million based on a discount rate of 12 percent.

¹ MPAF. *Port Asset Revaluation*. Beqa, 1997

² MPAF. *Rokobili Geotechnical Study*. Tonkin and Taylor, 1997

24. The economic analysis shows both components, Suva and Lautoka, to be viable in economic terms. More risk is associated with the Lautoka port due to its reliance on newly developing trades. However, discussions with the project proponents and shipping companies, determination of commercial commitments made, and inspection of production plant give good reason to expect that projections of new trade will be realized. The new exports will have a substantial flow-on impact on the economy of northern Viti Levu and the Fiji Islands as a whole. The port development is an essential element and is expected to catalyze other economic growth. The animal feed project, in particular, is well aligned with the Asian Development Bank's objectives for improving the economic welfare of the poorer members of society, as it will widely benefit owners and leaseholders of land, much of which is lying fallow or showing declining returns with the progressive reduction in prices paid for sugar cane.

Table A15.1: Financial Analysis for Suva Port Component
(F\$ million)

Year	With Project						Without Project					
	Costs			Revenues			Costs			Revenues		
	Capital Cost	O&M	Total Cost	Total Port Revenues	King's Wharf Revenues	Net Income	O & M	Earthquake Damage Costs	Total Cost	King's Wharf Revenues	Net Income	Net Project Income
2002	8.10		8.10	18.29	14.63	6.54	3.96		3.96	14.63	10.67	-4.13
2003	16.19		16.19	18.80	15.04	-1.15	4.16		4.16	14.78	10.62	-11.77
2004	8.10		8.10	19.33	15.46	7.37	4.37		4.37	14.93	10.56	-3.19
2005		2.97	2.97	19.87	15.90	12.92	4.59	0.22	4.81	15.08	10.27	2.66
2006		2.97	2.97	20.43	16.34	13.37	4.82	0.22	5.04	15.08	10.04	3.33
2007		2.97	2.97	21.00	16.80	13.83	5.06	0.22	5.28	15.08	9.80	4.03
2008		2.97	2.97	21.59	17.27	14.30	5.31	0.22	5.53	15.08	9.54	4.75
2009		2.97	2.97	22.19	17.75	14.78	5.58	0.22	5.80	15.08	9.28	5.50
2010		2.97	2.97	22.70	18.16	15.19	5.86	0.22	6.08	15.08	9.00	6.19
2011		2.97	2.97	23.22	18.58	15.61	6.15	0.22	6.37	14.93	8.56	7.05
2012		2.97	2.97	23.76	19.01	16.03	6.46	0.22	6.68	14.78	8.10	7.93
2013		2.97	2.97	24.31	19.44	16.47	6.78	0.22	7.00	14.63	7.63	8.84
2014		2.97	2.97	24.86	19.89	16.92	7.12	0.22	7.34	14.48	7.14	9.78
2015		3.12	3.12	25.44	20.35	17.23	7.48	0.22	7.70	14.34	6.64	10.58
2016		3.28	3.28	26.02	20.82	17.54	7.85	0.22	8.07	14.19	6.13	11.41
2017		3.44	3.44	26.62	21.30	17.85	8.24	0.22	8.46	14.05	5.59	12.26
2018		3.61	3.61	27.23	21.79	18.17	8.65	0.22	8.87	13.91	5.04	13.13
2019		3.79	3.79	27.86	22.29	18.49	9.09	0.22	9.31	13.77	4.47	14.03
2020		3.98	3.98	28.50	22.80	18.81	9.54	0.22	9.76	13.63	3.87	14.94
											IRR:	22.3%
											NPV:	17.7

IRR=internal rate of return, NPV=net present value, O&M=operation and maintenance

Costs: All Capital costs plus physical contingencies F\$32.38 million

Basis of assessment:

50% of MPAF Maintenance costs assigned against King's Wharf

MPAF maintenance costs grow by 5% p.a. from year 1 without project

No maintenance of facilities in years 2002-2004 construction period

Maintenance costs reduce by 25% with project and grow by 5% p.a. after 10 years life

Revenues grow at projected 2.8% rate with project

Revenues grow more slowly to 2005, stagnate to 2010 and then decline by 1% p.a. in without-project

Excess cargo handling costs - based on \$150 per TEU factored by SCF, applied to without-project traffic and at half the rate for incremental traffic

Earthquake disruption costs based on disruption and repair costs factored by annual probabilities of events

Source: Staff analysis.

**Table A15.2: Seismic Strengthening of the King's Wharf Economic Analysis
Economic Analysis
(F\$ million)**

Annual Economic Damage Assessment													
Earthquake Intensity (Gravity =1.0)	Return Period	Return Exceedance Probability	Occurrence Probability	Damage Ratio without Mitigation	Damage Ratio with Mitigation	Savings under Mitigation	Physical loss (F\$million)	Weeks Wharf out of service	Share of Mitigated Assets	Physical Savings under Mitigation (F\$million)	Additional Freight cost when wharf out of service	Social cost of Physical loss	Total savings
0.1	25	0.039	0.019	0.05	0.02	0.03	0.036	0	50%	0.018	0.00	0.00	0.02
0.2	50	0.020	0.013	0.25	0.05	0.20	0.163	13	50%	0.082	0.07	0.10	0.25
0.32	150	0.007	0.004	0.60	0.10	0.50	0.137	26	50%	0.069	0.05	0.07	0.18
0.38	450	0.002	0.001	0.90	0.15	0.75	0.057	52	50%	0.028	0.03	0.04	0.09
0.41	1000	0.001	0.001	1.10	0.25	0.85	0.053	104	50%	0.026	0.04	0.06	0.13
Total							0.400			0.220	0.18	0.27	0.68

**Table A15.3: Seismic Strengthening of the King's Wharf Economic Analysis
Economic Analysis
(F\$ million)
"What If" Analysis**

Earthquake Intensity (Gravity =1.0)	Return Period	Return Exceedance Probability	Occurrence Probability	Damage Ratio without Mitigation	Damage Ratio with Mitigation	Savings under Mitigation	Physical loss (F\$million)	Weeks Wharf out of service	Share of Mitigated Assets	Physical Savings under Mitigation (F\$million)	Additional Freight cost when wharf out of service	Social cost of Physical loss	Total savings	Benefit to Cost Ration	Benefit to Cost Ratio for full Seismic Upgrade
0.1	25	0.039	1.000	0.05	0.02	0.03	1.860	0	50%	0.9	0.0	0.0	0.9	0.13	0.04
0.2	50	0.020	1.000	0.25	0.05	0.20	12.400	13	50%	6.2	5.2	7.8	19.2	2.68	0.60
0.32	150	0.007	1.000	0.60	0.10	0.50	31.000	26	50%	15.5	10.4	15.6	41.5	5.79	1.36
0.38	450	0.002	1.000	0.90	0.15	0.75	46.500	52	50%	23.3	20.8	31.2	75.3	10.50	2.35
0.41	1000	0.001	1.000	1.10	0.25	0.85	52.700	104	50%	26.4	41.6	62.4	130.4	18.19	3.73
Total							144.500								

**Table A15.4: Lautoka Wharf Extension and Reclamation
Financial Analysis
(F\$ million)**

Year	Wharf Extension and Reclamation				
	Costs			Revenues- Additional Port Charges	Net Revenues
	Capital Cost	Incremental O&M Costs	Total Costs		
2002	15.24		15.24	0.57	-14.67
2003	13.70		13.70	3.17	-10.54
2004	6.85		6.85	4.74	-2.11
2005		0.48	0.48	5.77	5.29
2006		0.48	0.48	6.10	5.62
2007		0.48	0.48	6.42	5.94
2008		0.48	0.48	6.75	6.27
2009		0.48	0.48	7.08	6.60
2010		0.48	0.48	7.09	6.61
2011		0.48	0.48	7.11	6.63
2012		0.48	0.48	7.13	6.65
2013		0.48	0.48	7.15	6.67
2014		0.48	0.48	7.17	6.69
2015		0.48	0.48	7.19	6.71
2016		0.48	0.48	7.20	6.72
2017		0.48	0.48	7.22	6.74
2018		0.48	0.48	7.24	6.76
2019		0.48	0.48	7.26	6.78
2020		0.48	0.48	7.28	6.80
2021		0.48	0.48	7.29	6.82
2022		0.48	0.48	7.31	6.83
2023		0.48	0.48	7.33	6.85
2024		0.48	0.48	7.35	6.87
2025		0.48	0.48	7.37	6.89
2026		0.48	0.48	7.39	6.91
				IRR:	16.5%
				NPV:	8.1

O&M=operation and maintenance.

Capital cost - including physical contingencies
excluding Price contingencies and interest during construction

Source: Staff analysis.

**Table 15.5: Economic Analysis of Suva Port Component
(F\$ million)**

Year	With Project								Total Costs	Net Project Benefits
	MPAF Costs									
	Capital Cost	Operations and Maintenance King's Wharf	Total MPAF Costs	Operations and Maintenance King's Wharf	Earthquake Damage Costs	Total MPAF Costs	Excess Cargo Handling Costs	Earthquake Disruption Costs		
2002	7.73		7.73	3.41		3.41			3.41	-4.32
2003	15.47		15.47	3.58		3.58			3.58	-11.89
2004	7.73		7.73	3.76		3.76			3.76	-3.97
2005		2.56	2.56	3.95	0.21	4.16	0.97	0.45	5.58	3.02
2006		2.56	2.56	4.14	0.21	4.35	0.99	0.45	5.79	3.23
2007		2.56	2.56	4.35	0.21	4.56	1.00	0.45	6.01	3.45
2008		2.56	2.56	4.57	0.21	4.78	1.01	0.45	6.24	3.68
2009		2.56	2.56	4.80	0.21	5.01	1.02	0.45	6.48	3.92
2010		2.56	2.56	5.04	0.21	5.25	1.03	0.45	6.73	4.17
2011		2.56	2.56	5.29	0.21	5.50	1.04	0.45	6.99	4.43
2012		2.56	2.56	5.55	0.21	5.76	1.05	0.45	7.26	4.71
2013		2.56	2.56	5.83	0.21	6.04	1.06	0.45	7.55	4.99
2014		2.56	2.56	6.12	0.21	6.33	1.07	0.45	7.85	5.29
2015		2.68	2.68	6.43	0.21	6.64	1.08	0.45	8.17	5.48
2016		2.82	2.82	6.75	0.21	6.96	1.09	0.45	8.50	5.68
2017		2.96	2.96	7.09	0.21	7.30	1.10	0.45	8.84	5.88
2018		3.11	3.11	7.44	0.21	7.65	1.11	0.45	9.21	6.10
2019		3.26	3.26	7.81	0.21	8.02	1.12	0.45	9.59	6.33
2020		3.43	3.43	8.20	0.21	8.42	1.13	0.45	9.99	6.57
									IRR:	15.8%
									NPV:	5.0

IRR=internal rate of return, NPV=net present value

**Table A15.6: Lautoka Wharf Extension and Reclamation
Economic Analysis
(F\$ million)**

Year	Wharf Extension and Reclamation									Net Benefits
	Costs			Savings					Total Savings	
	Capital Cost	Incremental O&M Costs	Total Costs	Road Transport Costs	Road Maintenance Costs	Externalities (Accidents)	Cargo Handling Costs			
2002	8.32		8.32	1.05	0.93	0.05	0.22	2.25	-6.07	
2003	16.63	0.06	16.69	1.32	1.16	0.08	0.43	2.99	-13.70	
2004	8.32	0.06	8.37	1.59	1.40	0.11	0.59	3.68	-4.69	
2005		0.31	0.31	1.86	1.64	0.14	0.71	4.34	4.02	
2006		0.31	0.31	2.13	1.87	0.17	0.74	4.90	4.59	
2007		0.31	0.31	2.39	2.11	0.20	0.76	5.46	5.15	
2008		0.31	0.31	2.66	2.34	0.23	0.79	6.02	5.71	
2009		0.31	0.31	2.67	2.35	0.23	0.82	6.06	5.75	
2010		0.31	0.31	2.67	2.35	0.23	0.85	6.10	5.79	
2011		0.31	0.31	2.68	2.36	0.23	0.85	6.11	5.80	
2012		0.31	0.31	2.69	2.36	0.23	0.85	6.12	5.81	
2013		0.31	0.31	2.69	2.37	0.23	0.85	6.14	5.82	
2014		0.31	0.31	2.70	2.37	0.23	0.85	6.15	5.83	
2015		0.31	0.31	2.70	2.38	0.23	0.85	6.16	5.85	
2016		0.31	0.31	2.71	2.38	0.22	0.86	6.17	5.86	
2017		0.31	0.31	2.72	2.39	0.22	0.86	6.19	5.87	
2018		0.31	0.31	2.72	2.39	0.22	0.86	6.20	5.89	
2019		0.31	0.31	2.73	2.40	0.22	0.86	6.21	5.90	
2020		0.31	0.31	2.73	2.41	0.22	0.86	6.23	5.91	
2021		0.31	0.31	2.74	2.41	0.22	0.86	6.24	5.93	
2022		0.31	0.31	2.75	2.42	0.22	0.86	6.25	5.94	
2023		0.31	0.31	2.75	2.42	0.22	0.87	6.27	5.95	
2024		0.31	0.31	2.76	2.43	0.22	0.87	6.28	5.97	
2025		0.31	0.31	2.77	2.43	0.22	0.87	6.29	5.98	
2026		0.31	0.31	2.77	2.44	0.22	0.87	6.31	5.99	
								IRR:	17.6%	
								NPV:	9.83	

O&M=operation and maintenance
 Capital Cost - including Physical Contingencies
 excluding Price contingencies and interest during construction
 Source: Staff analysis.